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Special Issue

Romance Languages at the Forefront of Language Acquisition Research

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31 December 2017

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Dear colleagues,

The goal of this Special Issue is to showcase state of the art work on the L1, bilingual and non-native acquisition of Romance languages from a theoretical and empirical perspective. The volume will examine how recent learnability issues are approached using acquisition data from different Romance languages. We particularly encourage contributions dealing with different populations, including but not limited to L1 acquisition, L2 acquisition, bi/multilingual and heritage language acquisition, language processing and language disorders.

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Article

Teasing Apart the Effects of Dominance, Transfer, and Processing in Reference Production by German–Italian Bilingual Adolescents

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Abstract: This paper intends to test different accounts of bilingual reference production against the production of referring expressions in Italian by German-Italian bilingual adolescents. In particular, we investigate to what extent bilingual referring expressions involve transfer from one language to the other, result from processing and dominance variables, and are the outcome of a process of language change. We will show that each of these hypotheses makes a precise prediction about which referential strategy bilinguals should adopt. The production of referring expressions is examined in the context of a story-telling task. Based on the analysis of overspecified forms, clitic omissions, and agreement mismatches, as well as on correlations with dominance factors, we argue in favor of the relevance of dominance and processing factors for bilingual reference production. Finally, we verify the possibility of generalizing our conclusions to a different linguistic domain, concerning the expression of word order in main clauses.

Keywords: reference production; transfer; dominance; processing; language change; overspecified referring expressions; clitics; narratives

1. Introduction

When analyzing bilingual language production, it is common to observe the emergence of forms and form-function mappings that may differ from each of the bilinguals' two languages. For these emergent new forms several analyses have been proposed, which all share the effort of understanding how language is represented in the bilingual mind. The aim of our contribution is to test different hypotheses on language internal and external factors affecting bilingual language production, based on the analysis of referring expressions (REs, henceforth) as produced by German-Italian bilinguals in a story-telling task.

There has been a tradition of studies proposing a structural account of bilingual language production, based on the analysis of the linguistic features of the two languages in contact. All these studies start from the observation that bilinguals differentiate their two languages from early on (see, for example, De Houwer 1990; Francis 2011; Lanza 2000; Petitto and Kovelman 2003). Moreover, transfer from one language to the other is a hallmark of bilingualism throughout the lifespan (Döpke 2000; Montrul 2010; Sorace 2004). The main theoretical contributions have investigated the structural (language-internal) conditions that render transfer possible. Following Hulk and Müller (2000) and Müller and Hulk (2001), if Language A has two morpho-syntactic exponents of a linguistic category and Language B allows for only one of these two options, transfer from B to A might (but does not need to) occur (see Schmitz et al. 2012 for a reformulation of

this hypothesis in terms of complexity of syntactic derivations). For example, Nicoladis (2006) shows that French-English preschool bilingual children produce some inappropriate prenominal adjectives in French (Language A)—which has both prenominal and postnominal adjectives, albeit under different semantic conditions. This is interpreted as an effect of transfer from English (Language B), which allows only for the prenominal option (see also Section 1.1 for a discussion related to the domain of bilingual reference production). In other words, linguistic features that are associated with the representation of Language B are "injected" into the representation of Language A (Aboh 2015 for terminology). This analysis of transfer has been challenged in some recent studies. The main points of criticism concern the language conditions underlying the directionality of transfer, the idea itself that transfer is unidirectional and the role of "feature injection" as a mechanism affecting the occurrence of cross-linguistic structures (see, e.g., Lanza 2000; Serratrice 2013 for discussion). Liceras et al. (2012) show that in order for transfer at the syntax/lexicon interface to occur, the influencing language must be more transparent in terms of the morphosyntactic exponents of a given semantic distinction than the influenced language. For example, the fact that Spanish distinguishes between the copulas *ser* and *estar* (both meaning 'to be') may boost the acquisition of copula in English (which does not have this distinction) among English-Spanish bilingual children (see also Liceras and Fuertes 2016). Crucially, this theory predicts that the influencing language is the one with the greater number of morphosyntactic options, contrary to what is predicted by the abovementioned accounts by Müller and Hulk (2001) and Nicoladis (2006). Other studies have claimed that the bilinguals' two languages interact with each other bidirectionally (Cook 2003; Francis 2011)—and not unidirectionally as stated by the accounts reviewed previously—and the notion of "feature-recombination" (and not feature-injection) appears to better account for this bidirectionality as well as for the possible emergence of a new linguistic system among bilinguals (Aboh 2015).

If, on the one hand, all the abovementioned studies claim that bilingual production is the result of language transfer at the underlying, representational level, other studies have argued for intact representations in both languages. The specific patterns of language production exhibited by bilinguals would be the result of their limited processing capacities. In particular, reduced processing resources might affect the integration of information across different linguistic domains and lead to non-native ways of language processing (see, for instance, the Shallow Structure Hypothesis by Clahsen and Felser 2006). For example, some studies have observed that bilinguals are generally slower at retrieving lexical items, due either to low frequency of usage (Gollan et al. 2008) or language competition (Bialystok et al. 2008). These processing difficulties have an impact on the mapping between abstract syntactic representations and the lexicon, and account for the production of incorrect or inappropriate forms with different types of structures, including verbal inflection (Prévost and White 2000), gender morphology (Hopp 2013), and referential expressions (Torregrossa et al. 2018). Another relevant example of such an approach is provided by the most recent elaboration of the Interface Hypothesis (Sorace 2011). In this case, the (optionally) inappropriate reference use by bilinguals is explained in terms of processing complexity, which is involved in the simultaneous integration of grammar and discourse information during reference production. Crucially, most of these studies share the idea that in production, bilinguals rely on default forms as a kind of repair strategy to counteract processing complexity (see the discussion in Section 1.1).

The divide between structural and processing accounts is not as dichotomous as is presented above. It is plausible to hypothesize that under a condition of processing complexity (e.g., integration of information from different domains or cognitive load) the system is more tolerant to transfer. For instance, it might not identify the ungrammaticality/inappropriateness of a certain string in one language, which is grammatical/appropriate in the other language (see Fernández et al. 2017 for discussion on this point). Moreover, the literature has shown that other factors (beyond processing and transfer) must be involved in bilingual language production. Each of these factors may interact with transfer and processing in different ways (Lanza 2000). In this paper, we consider the impact of dominance, intended as a broad construct, encompassing "a linguistic proficiency component,

an external component (input), and a functional component (context of use)" (Montrul 2016, p. 16). Several studies indicate that dominance (in this broad sense) is fundamental in shaping the course and outcome of language acquisition (e.g., Kupisch and Rothman 2016; Rinke and Flores 2014; Torregrossa et al. 2017; Tsimpli 2014; Unsworth 2013). However, with respect to the interaction of dominance with processing and transfer, the results are not always clear-cut. While it seems uncontroversial that dominance affects processing positively (Langacker 1990; Lanza 2000; Pliatsikas and Marinis 2013), the role of dominance in language transfer is still not clear. Some scholars attribute the emergence of cross-linguistic structures to dominance (Bernardini 2003; Nicoladis 2006; Yip and Matthews 2000), while others claim that transfer is an effect of bilingualism, independently of dominance (Fernández et al. 2017; Hsin et al. 2013; Müller and Hulk 2001).[1]

Language contact in bilingualism has often been considered as a trigger for language change (cf. Meisel 2011), since it may lead to the emergence of innovative form-function mappings or accelerate language change processes that are also attested (albeit at a much slower rate) in non-contact situations (Silva-Corvalán 1994). Transfer, processing, and dominance may act as catalysts of these language change processes (on the relation of language change with transfer, see Aboh 2015 and Thomason and Kaufman 1991; with processing, Fernández et al. 2017; with input and dominance, Meisel 2011). Therefore, we will also briefly discuss whether language change accounts for the results of our study (Sections 1.1 and 4).

We use reference production as a testing ground for understanding how transfer, processing, dominance and language change affect bilingual language production. In addition, we consider the production of word order in main clauses, in order to figure out to what extent the findings concerning reference use are generalizable to other linguistic structures. In the remaining of this section, we review previous attempts to analyze bilingual reference production in terms of the categories introduced in this section, and formulate the hypotheses of our study accordingly. Then, in Section 2 we introduce our own study.

1.1. Bilingual Reference Production at the Crossroad of Transfer, Processing and Dominance: A Review of Previous Studies

There is a tradition of studies investigating the acquisition of reference among monolinguals and bilinguals (see Serratrice and Allen 2015 for a general overview). Here, we focus on those dealing with the acquisition of null-subject and clitic languages. In the following review, bilingualism is intended in a very broad sense, including, among others, simultaneous and successive bilingual children, adult second language learners and attrited speakers. Instead of considering bilingualism as a categorical variable, we assume a continuum of bilingual language experience and proficiency (Surrain and Luk 2017 for a very similar view), and we operationalize this continuum by means of an index of degree of bilingualism (the Bilingual Index Score, see Section 2.2).

Several studies have noticed that bilinguals speaking a null-subject/non-null-subject language combination tend to produce overt pronouns (in both subject and object position) in contexts, in which the use of a null or a clitic would have been more appropriate (i.e., when maintaining reference to a discourse referent). In other terms, they produce overspecified (i.e., redundant) forms. In this respect, bilinguals differ from age-matched monolinguals. This tendency has been observed in production and comprehension across different types of bilinguals and language combinations (Serratrice et al. 2004 on

[1] Recent studies—mainly based on code-mixing data—have formulated more clear-cut hypotheses on the relationship between language dominance and transfer, assuming a definition of dominance that is based on linguistic criteria. The dominant language is the one with the most salient (alias most grammaticized) morphosyntactic features (e.g., gender in Spanish vs. English)—see Fernández-Fuertes and Liceras 2018 and Liceras et al. 2016. While this definition seems to account properly for young simultaneous bilinguals' data, its predictive value for other types of bilinguals has not been assessed yet. Therefore, in this paper, we will consider dominance as a proxy for language experience and proficiency, which we believe is more relevant when analyzing language production by older bilingual children that have been exposed to a varying amount of input throughout the lifespan.

English-Italian bilingual children; Belletti et al. 2007 and Sorace and Filiaci 2006 on English near-native speakers of Italian; Tsimpli et al. 2004 on attrited Greek and Italian L2 speakers of English; Lozano 2016 and Tsimpli and Sorace 2006 on L2 Spanish and Greek, respectively). This pattern of production is predicted by the structural account formulated by Müller and Hulk (2001) (Section 1). Italian allows for both null (and clitics) and overt pronouns, while English can only resort to the overt pronoun option.[2] Therefore, bilinguals transfer the form that overlaps between the two referential systems (overt pronoun) from English to Italian. Later studies have proposed a formal account of the observed transfer. On the one hand, Serratrice et al. (2004) argue that Italian overt pronouns have a more complex feature specification than English ones, since the former are marked for discourse features such as [+topic-shift] and [+focus], while the latter are underspecified, being allowed in [±topic-shift] or [±focus] contexts. Following Müller and Hulk (2001) analysis, the simpler option (in English) is transferred to the language instantiating the more complex option (Italian). On the other hand, the account of Belletti et al. (2007) builds on Cardinaletti and Cardinaletti and Starke (1999) observation that Italian overt pronouns are strong forms (i.e., they realize the full noun phrase (DP) structure), while English overt pronouns are weak elements (i.e., compared to strong pronouns, they miss some functional layer). Due to transfer from English, Italian overt pronouns may be reanalyzed as weak elements and are thus allowed to appear in contexts that do not mark any topic-shift or focalization (see also Belletti and Guasti 2015, pp. 258–59).

Among structural approaches, not all theories predict the directionality of transfer to go from German (the non-null-subject language) to Italian (the null-subject language). In line with Liceras and Fuertes (2016), Italian is a more complex system than German, since it allows for two morphosyntactic exponents of subject constituents (i.e., null and overt pronouns), while German has only overt subjects. Therefore, cross-linguistic influence should occur from Italian (the most transparent system) to German (the least transparent one with respect to the phenomenon at stake), and not vice versa (see Section 1 for further details), contrary to what is predicted by the accounts reviewed previously. In support of this hypothesis, Liceras et al. (2012) found no overuse of overt subjects in Spanish by English-Spanish simultaneous bilinguals. Rather, the authors show that among young simultaneous English-Spanish bilinguals, the transparency of the Spanish system favors the acquisition of sentential subjects in English. We will refer to this last approach as the "morphosyntactic complexity account".

The conclusions reached in previous studies are mainly based on the analysis of reference production in Italian or Spanish by Italian-English or Spanish-English bilingual speakers. More in general however, structural approaches to bilingual reference production predict that the pattern of cross-linguistic influence depends on the features of the two languages in contact. In this contribution, we analyze reference production by German-Italian bilingual adolescents. German patterns with English in that it is a non-null-subject language. German-Italian bilinguals should thus overproduce overt pronouns in subject position in Italian, as in the case of English-Italian bilinguals, or alternatively, if the morphosyntactic complexity account holds true, reference production in Italian should not be influenced by German. However, contrary to English, German allows for null objects. Müller and Hulk (2001) show that the latter property of German affects reference production in Italian by German-Italian bilinguals. The authors observe an overuse of ungrammatical object omissions in Italian by German-Italian bilingual children (aged between 1;8 and 6), as compared to mean length of utterance-matched monolinguals. Based on their structural account of cross-linguistic influence, Müller and Hulk claim that the children analyze sentences with a preverbal object clitic as containing an empty element in the canonical direct object position. The observation of null objects in

[2] The distinction between overt pronouns and clitics might appear not as motivated as the distinction between null and overt pronouns, given that clitics are overt too (in the sense of being realized phonologically). In the case of clitics, we consider "overt" as synonymous for "strong", in compliance with the distinction between clitics and strong pronouns reported in Cardinaletti and Starke (1999).

German provides support for this analysis. Thus, the overuse of null objects is interpreted as an effect of transfer from German to Italian.[3]

More recently, Sorace (2011) has recast the analysis of bilinguals' overuse of overt pronouns (in subject and object position) in terms of processing. She interprets overt pronouns as default options that bilinguals use, whenever they fail to integrate syntactic representations with discourse-pragmatic information in real time (Section 1). Within this line of research, Torregrossa et al. (2018) show that the production of default forms manifests itself in association with slow processing (i.e., slow lexical retrieval).[4] Finally, it should be pointed out that the omission of clitics by German-Italian bilingual children considered in the above discussion can also be analyzed as depending on processing variables. Mateu (2015) observes that the amount of clitic omissions in the production of Spanish monolingual children correlates negatively with their working memory capacity. Restrictions in working memory skills cause difficulty in computing complex structures (derived, for instance, by long-distance movement operations). Crucially, Mateu (2015) notices that clitic omissions tend to occur in association with complex verbs (i.e., simple vs. periphrastic forms) and sentences with a greater number of constituents. We refer to this kind of approaches as "computational complexity accounts" to distinguish them from Sorace (2011) theory.

In this contribution, we consider two sources of complexity related to the production of clitics. The former concerns the syntactic context in which the clitic occurs. Italian distinguishes between cases in which the position of the clitic is obligatory (e.g., preceding a finite verb as in (1) or following an infinitive verb as in (2)) and cases in which the position is optional, since the clitic may either precede the modal verb (3) or follow the infinite verb (4), without any consequence on the interpretation (optional clitic climbing structures—OCC, henceforth).[5]

1. *Lo* vuole (* Vuole lo)
   CL.$_{\text{ACC.MASC.SG}}$ want.$_{\text{3SG.PRES}}$
   'He wants it.'

2. (di) voler-lo (* Lo volere)
   to want.$_{\text{INF.}}$-CL.$_{\text{ACC.MASC.SG}}$
   'To want it.'

3. *Lo* vuole prendere
   CL.$_{\text{ACC.MASC.SG}}$ want.$_{\text{3SG.PRES}}$ take.$_{\text{INF}}$
   'He wants to take it.'

4. Vuole prender-*lo*
   want.$_{\text{3SG.PRES}}$ take.$_{\text{INF}}$.-CL.$_{\text{ACC.MASC.SG}}$
   'He wants to take it.'

In (3) the modal *vuole* '(s/he) wants' restructures with the embedded infinitive originating a monoclausal structure consisting of a complex predicate. On the contrary, (4) is a biclausal structure, in which the modal verb selects a sentential (CP) complement (Cinque 2004). This analysis implies that both structures are associated with greater syntactic complexity than sentences like (1) and (2).[6]

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[3] The morphosyntactic complexity account makes no prediction concerning the production of object pronouns in Italian by German-Italian children, as far as we understand the proposal. The two languages are equally complex, since both allow for two morphosyntactic exponents of object pronouns, i.e., clitics and overt pronouns in Italian, and nulls and overt pronouns in German.

[4] The studies of Sorace (2011) and Torregrossa et al. (2018) differ in the assumption of which forms count as default, i.e., overt pronouns for the former, nulls for the latter. The type of form used as default might be an effect of the type of bilingualism taken into account. The investigation of Torregrossa et al. (2018) considers only (relatively) balanced bilingual children.

[5] In Italian, OCC can occur only with certain verbs, i.e., modal (e.g., *volere* 'to want'), aspectual (e.g., *finire* 'to finish') and motion verbs (e.g., *andare* 'to go'). Cf. Cinque 2004.

[6] We refer to Bennati (2007), who shows that in the acquisition of these structures, L2-learners exhibit target like behavior only at near native levels. Moreover, several studies have shown that optional structures—like OCCs—are more difficult to

Another source of complexity that we take into account relates to the form of the clitic itself. Belletti (1999) claims that *ci*-clitics (i.e., locative clitics, meaning 'there') and *ne*-clitics (meaning 'thereof') have the structure of prepositional phrases, thus differing from accusative and dative clitics, which have the structure of determiners. Recent literature has shown that prepositions may represent a vulnerable domain in bilingual language acquisition (Kupisch et al. 2014). Therefore, the use of clitics having the same structure as prepositions might be challenging, too.

Let us return to the predictions related to bilingual reference production, with special focus on the German-Italian language combination. For subject position, both structural (Hulk and Müller 2000) and processing accounts (Sorace 2011) hypothesize that German-Italian bilinguals tend to produce overt pronouns in contexts where the use of a null would be more appropriate. The two theories differ only in how they analyze overt pronouns, i.e., as cross-linguistic structures or default options, respectively. Another possibility is that the production of subjects in Italian is not affected by cross-linguistic influence from German, as predicted by the morphosyntactic complexity account (Liceras et al. 2012). For object position, the picture is more complex. On the one hand, Sorace (2011) expects default overt pronouns to appear in object position as well, instead of clitics. On the other hand, both structural and computational-complexity accounts predict occurrence of clitic omissions, as a case of transfer from German to Italian (Hulk and Müller 2000) or as a performance-related effect (Mateu 2015). However, structural accounts expect omissions to occur independently of syntactic context, while for processing accounts omissions should be more visible in association with complex structures.

It should be noted that the reviewed theories do not make any explicit prediction with respect to the production of full DPs instead of nulls or clitics, which is also an instantiation of overspecification. In a recent contribution, Torregrossa et al. (2017) have analyzed reference production in Greek by 180 bilingual children speaking Greek in combination with Albanian, English, and German, respectively. The authors observe that full DPs are the majority of overspecified forms produced by the children. Moreover, the tendency to produce overspecified forms is more marked among bilinguals for which Greek is the non-dominant language. This use of full DPs cannot be interpreted as a transfer effect, since all the languages considered have full DPs. Nor are they "defaults" stemming from processing limitations, given that the system would rather resort to easier (alias more economic) forms like pronouns (Almor 1999; Burzio 1998; Hendriks 2014). The authors propose that overspecification is an effect of unbalanced dominance: if children do not fully master the syntactic options for reference production (i.e., pronouns), they tend to rely on "safer" pragmatic strategies (full DPs), which are usually not ambiguous.[7]

Finally, a last prediction is worth considering, namely whether the REs occurring in bilingual reference production (with particular reference to clitics) are the result of a process of language change. Several studies have indicated that in contact situation, clitics show a neutralization of morphosyntactic features (gender, number, etc.), so that a unique invariable form ends up being used in all contexts

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acquire than 'categorical' ones (e.g., Zuckerman 2001). In this inventory of syntactic structures, causatives should also be mentioned (see (i)). As in the case of OCCs, causatives involve complex predicate formation (as in *fa portare* '(s/he) makes somebody bring something' in (i)), but no optionality in the position of clitic, which has to precede the verb.

i. La nonna *lo* fa portare dal nipote
the grandma CL.$_{\text{ACC.MASC.SG}}$ make bring.$_{\text{INF}}$ by the grandson
'The grandma makes the grandson bring it'.

[7] The production of full DPs instead of clitic pronouns in Italian has already been observed among English-Italian and German-Italian bilingual children (Belletti and Guasti 2015, pp. 102–5 and reference quoted therein; Serratrice 2007). On the contrary, overt pronouns are rarely produced. The authors interpret the overproduction of full DPs as a strategy to avoid the use of object clitics, due to their complex morphosyntax. This analysis could be extended to the production of full DPs instead of nulls in subject position (as noted in Torregrossa et al. 2017), given that, for example, subject-verb agreement may not be fully mastered by some bilinguals. It should be noted that in the studies of Serratrice (2007) and Belletti and Guasti (2015), dominance is not taken into account as a factor motivating the overproduction of full DPs in object position, but it plays a crucial role in Torregrossa et al. (2017).

(Devlin et al. 2012; Zdrojewski and Sánchez 2014). Navarro et al. (2017) show that such neutralization instantiates a stage in the clitic doubling cycle (i.e., in language change involving clitic doubling structures), which may happen independently of language contact (Vega Vilanova et al. 2018). As has been pointed out in Section 1, language contact (between Italian and German, in our case) may accelerate this process.

The results of our study have implications for different accounts of bilingual reference production. Table 1 summarizes the predictions of each account for reference production in Italian by German-Italian bilinguals.

Table 1. Summary of the predictions related to reference production in Italian by German-Italian bilinguals.

Account	Prediction
a. Structural account (e.g., Müller and Hulk 2001)	overuse of overt pronouns in subject position and production of null objects (alias, clitic omissions)
b. Morphosyntactic complexity account (e.g., Liceras et al. 2012).	no overuse of overt pronouns in subject position (for objects, see footnote 3).
c. Processing account (Sorace 2011)	overuse of overt pronouns in subject and object position
d. Computational complexity account (Mateu 2015)	clitic omission in association with complex structures
e. Dominance-related account (Torregrossa et al. 2017)	overuse of full DPs in subject and object position
f. Language change account (e.g., Devlin et al. 2012)	use of invariable clitic forms

Additionally, we will test the hypotheses reported in Table 1 by analyzing evidence from another linguistic domain, related to use of word order in Italian. Döpke (1998) has shown that in German, English-German bilingual children tend to extend the use of the verb-object (VO)-order—which German uses with finite verbs—to non-finite final verbs—which instantiate the OV-order and do not allow for the VO-pattern. These data can be analyzed in terms of transfer from English—which has only the VO-order—to German—that allows for both orders (albeit in different contexts), along the lines of what has been proposed by the structural accounts reviewed in Section 1—see also Schmeißer and Jansen (2016) for a related account concerning the complexity of syntactic derivations. If this is the case, the verb-second (V2) property of German (which allows for subject-verb (S-V) and constituent-verb-subject (XP-V-S) word orders) should not be transferred to Italian (which is more consistently S-V)—see also Repetto and Müller (2010). Thus, the analysis of the production of word orders in Italian that may (or may not) comply with the V2-property of German allows us to understand which possibilities for transfer (in terms of directionality) may occur. Moreover, correlational analyses with variables such as dominance will indicate under which conditions these (unexpected) cross-linguistic structures occur.

2. Methods and Materials

2.1. Participants

We conducted the study in a German-Italian bilingual school in Cologne (Germany), which used German as the main medium of instruction and offered language classes in Italian (between 4 and 6 h per week). After receiving parental consent, we tested seventeen Italian-German adolescents (11 females). They ranged in age from 11;9 to 14;1 (mean age: 13;0). In order to assess the participants for language proficiency, we measured vocabulary and syntactic skills. Productive verbal abilities were tested in both languages by means of the last 30 items of the Boston Naming Test (a 60-item

instrument), which are used for children above 10 years (Kaplan et al. 1983).[8] As a proxy for syntactic proficiency, we calculated an index of syntactic complexity with reference to the narratives produced by the participants (cf. Section 2.3), by considering the subordinate/main clause ratio. As part of the participants' profiling, we calculated an index of dominance—as defined in Section 1—(Bilingual Index Score, BIS henceforth) for each participant, considering their degree of language exposure in German and Italian respectively, according to the procedure described in the following section.

2.2. Assessing the Bilingual Index Score

The calculation of BIS is based on a "cumulative" view of bilingual language experience, which considers the use of the bilinguals' two languages in different contexts (home, daycare, school) over time (now and in the past)—cf. Unsworth 2013. Each participant in this study was administered a questionnaire by means of a one-to-one interview. The questionnaire consisted of four main modules targeting each of the child's two languages: (i) home language history (amount of exposure before the age of six); (ii) early literacy preparedness (literacy input received prior to schooling); (iii) current literacy (language of schooling and literacy practices outside school, such as writing e-mails or letters, and reading books, comics or newspapers); (iv) current language use (language currently spoken with family members and friends)—cf. Bongartz and Torregrossa 2017; Mattheoudakis et al. 2016. For all modules, we assigned each language a score, which was the sum of the scores from the individual answers. For answers stating that both languages were used in equal proportion, we split the associated scores between the two languages. After normalizing the scores obtained in each language in percentage (i.e., the ratio between the language specific score and the total score of the module), we subtracted one language total (German) from the other (Italian): a positive score indicates dominance in Italian, while a negative score reflects dominance in German. The closer the score to zero, the more balanced the child in the corresponding module.

In previous studies, we have shown that the four modules contribute to bilingual language proficiency to different degrees (Torregrossa et al. 2017). Based on the analysis of 180 children (40 Greek-Albanian, 30 Greek-English, and 110 Greek-German),[9] we extracted the relative weight of each module, employing a linear regression model with difference in vocabulary score between the two languages as dependent variable and difference scores corresponding to the four modules as independent ones. The weights corresponded to the β-values of the linear regression ($R = 0.67$, $R^2 = 0.45$, $p < 0.001$) and indicated the extent to which the difference values in each module predicted the difference in language proficiency.[10] The regression analysis indicated that the most relevant factor was current literacy (weight: 0.29), followed by current language use (weight: 0.23), home language history (weight: 0.12) and early literacy preparedness (weight: 0.02), respectively.

In order to calculate BIS for each participant of the present study, we first added the difference values related to their vocabulary scores and the four modules of the questionnaires to the regression model built from our previous dataset (from which we extracted the weights). After observing that this addition did not lead to any change in the R-square value nor in the abovementioned β-values, we used the same weights as reported above. We derived the individual BIS as the weighted sum of the difference values corresponding to each module of the questionnaire, according to the following formula (where w indicates the weight and n the score for each module of the questionnaire).

$$\text{BIS} = (w_{\text{current\_lit}} \cdot n_{\text{current\_lit}}) + (w_{\text{current\_lang}} \cdot n_{\text{current\_lang}}) + (w_{\text{history}} \cdot n_{\text{history}}) + (w_{\text{early\_lit}} \cdot n_{\text{early\_lit}})$$

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[8] The Boston Naming Test was originally designed for English, and later adapted to German and Italian with the reduced versions designed by Merten (2004) and Riva et al. (2000), respectively.

[9] This dataset has been collected and analyzed within the THALES project (principal investigator: Ianthi Maria Tsimpli) and the CoLiBi project—Cognition, Literacy and Bilingualism in Greek-German-speaking children (principal investigators: Christiane Bongartz and Ianthi MariaTsimpli).

[10] The analysis relied on the assumption that vocabulary skills are a proxy for language proficiency (see Treffers-Daller 2013; Treffers-Daller and Rogers 2014 for a similar view).

Again, a negative number indicated dominance of language experience in German, while a positive one dominance in Italian.

Table 2 reports the means and standard deviations for vocabulary scores in German and Italian, their differences, syntactic proficiency in Italian (alias syntactic complexity in the Italian narratives) and BIS.

Table 2. Descriptive statistics for Italian and German vocabulary, their difference, syntactic proficiency and BIS. The values related to vocabulary scores are reported in raw numbers.

Measure	Mean	SD
Italian vocabulary	11.7	6.3
German vocabulary	14.6	3.7
Difference in vocabulary	−3	8.5
Italian syntactic proficiency	0.29	0.22
Bilingual Index Score (BIS)	−0.08	0.25

The profiling measures adopted in the present study cross-validate each other, since we found strong correlations between BIS and difference in vocabulary ($\beta = 0.88$, $R^2 = 0.78$, $p < 0.001$), BIS and syntactic complexity ($\beta = 0.67$, $R^2 = 0.49$, $p = 0.003$), and difference in vocabulary and syntactic complexity ($\beta = 0.70$, $R^2 = 0.49$, $p = 0.002$).

2.3. Materials

We analyzed the production of REs in Italian in the context of a story-telling task. Stories were elicited by using the Edmonton Narrative Norms Instrument (ENNI)—Schneider et al. 2005. The Edmonton Narrative Norms Instrument includes six picture stories, divided into three groups of increasing complexity. The stories in each group were designed to be structurally equivalent. For our task, we used the most complex ones (A3 and B3) counterbalancing among participants. Each story consists of 13 pictures with no text, representing a series of events involving two major characters (an elephant girl and a giraffe boy in A3, and a dog girl and a rabbit boy in B3) and two minor ones (of different gender, too).

We administered the task as a sequence of Power Point slides on a computer screen. The participants had to choose one of three envelopes appearing on the screen. Although all envelopes contained the same story (either A3 or B3), the participants were told that each envelope contained a different story (Serratrice 2007). Then, the participants looked at the story-pictures two by two. Finally, once the 13-picture synopsis had appeared on the screen, they had to tell the story to the investigator, who did not have access to the pictures. The stories were audio-recorded and then transcribed into CHAT format (MacWhinney 2000) by an Italian native speaker and were later checked by another native speaker. Disagreement were resolved by listening to the audio recordings together with a third person (the first author of this study). The final corpus consists of 17 Italian narratives.

2.4. Procedure

Participants were tested individually at their school by the first author, who is a native speaker of Italian, and a German native speaker research assistant. The testing occurred in two separate sessions (one or two days apart), one for Italian and one for German, counterbalancing the order. For Italian, children first completed the vocabulary test and then told the narrative (either A3 or B3). Subsequently, they told a second narrative (A3 or B3) under increased cognitive load. In the German session, participants were first administered the vocabulary test, then the questionnaires, and finally were asked to tell a narrative in German from the second group of the ENNI stories (i.e., A2 or B2). In the present study, we will consider neither the Italian narratives produced under cognitive load nor the German narratives (but see Torregrossa and Bongartz).

2.5. Analysis of the Narratives

2.5.1. Identifying Overspecified Referring Expressions

The use of REs is dependent on the activation (alias accessibility, salience) of its referent in discourse (Ariel 1990; Arnold 2010). An active referent is, for instance, one that has been mentioned recently. Furthermore, referents that are mentioned in subject position are usually more active for subsequent reference than those occurring in object position (Carminati 2002; Papadopoulou et al. 2015). Finally, additional discourse factors are involved in the activation decay of a referent. For instance, if a character intervenes between two mentions of a referent, the referent loses some of its activation. This effect is even more visible if the intervening character matches in gender with the referent (Arnold et al. 2000; but see Arnold and Griffin 2007 for a discussion of this idea). The use of REs reflects the activation of a referent at a given point in discourse. For example, in Italian, reduced forms (i.e., nulls in subject position and clitics in object position) tend to encode, in a scaled cline of activation, higher degrees of a referent's activation than overt pronouns and full nouns.

The present analysis aims to identify uses of REs departing from the correspondence between high activation of a referent and form reduction (i.e., overspecified uses of REs). First, we will assess the activation of a referent based on the linguistic and discourse factors considered above. Then, we will focus on those discourse contexts in which the speakers produce overt pronouns or full DPs, even if the use of a reduced form (a null or a clitic) would have been more appropriate. Table 3 is an excerpt of our analysis (see also Torregrossa et al. 2018). The first column contains the transcription of the narrative, together with its English translation. Unit of analysis is the clause, defined by the occurrence of a verb. If a unit contains more than one RE (U1), it is repeated as many times as the number of REs it contains. The second column (CHAIN) assigns an index to each character (1 for the giraffe boy, 2 for the elephant girl and 3 for the helicopter[11]). We analyzed how the type of RE used (see column (3)) depends on the grammatical role of the referent's previous mention (alias antecedent, column (5)) and the number of characters intervening between the referent's previous mention and its current mention. For the grammatical role of the antecedent, we distinguished between subject (SUBJ) and non-subject (OBJECT). For instance, the antecedent of *la giraffa* ('the giraffe'), i.e., the full DP in subject position in (U4), is the full DP *la giraffa* ('the giraffe') in (U3) occurring in subject position as well. For the number of intervening characters, we distinguished between characters of the same (S) or different (D) gender. For example, the two mentions of the helicopter in (U3) and (U4) respectively are separated by an intervening character of different gender ('the giraffe'). Likewise, the two mentions of the elephant in (U1) and (U4) are separated by two characters, one of the same ('the helicopter') and one of different gender ('the giraffe'). Occurrence of one character of same gender is sufficient for using the label *S* following the number of intervening characters.[12]

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[11] We included reference to both animate (e.g., the elephant and the giraffe) and inanimate characters (e.g., the helicopter). However, we decided not to include every inanimate character occurring in the stories, but to focus only on the most salient ones (i.e., the ones that are part of a reference chain).

[12] This kind of coding of REs has been evaluated against a set of data taken from different languages (Italian, Greek and German) and types of speakers (adults and bilingual and monolingual children). All the data were elicited by using the ENNI stories and are, thus, comparable with each other (see, e.g., Torregrossa et al. 2015; Torregrossa et al. 2018). In previous work, we coded REs also for the antecedent's syntactic position (i.e., in a main or subordinate clause) and for distance between REs and their antecedent. Our decision to consider, for this study, only a subset of features depends on the observation (based on tentative analyses) that argument role of the antecedent and number of intervening characters (once the gender of the referents is taken into account) are the most relevant factors for referent's activation.

Table 3. Example of coding. The story is told by a 12-year-old German-Italian bilingual speaker (F1). Units containing more than one referring expressions are repeated as many times as the number of referring expressions they contain.

Units	Transcription (1)	Chain (2)	Type (3)	Gramm (4)	Ant-Gramm (5)	Characters (6)
U1	C'era **un elefante** e una giraffa [*There was an elephant and a giraffe*]	1	INDEF	SUBJ	INTRO	INTRO
U1	C'era un elefante e **una giraffa** [*There was an elephant and a giraffe*]	2	INDEF	SUBJ	INTRO	INTRO
U2	**che** stavano vicino [/ /] che stanno vicino a una piscina. [*who were near [//] who are by a swimming pool*]	1 + 2	RELPRO	SUBJ	SUBJ	0
U3	**La giraffa** aveva un bel aerocottero [*The giraffe had a nice helicopter*]	2	DEFDP	SUBJ	SUBJ	1D
U3	La giraffa aveva **un bel aerocottero** [*The giraffe had a nice helicopter*]	3	INDEF	OBJECT	INTRO	INTRO
U4	e ehm **la giraffa** non voleva dare l'aerocottero all'elefante [*and ehm the giraffe did not want to give the helicopter to the elephant*]	2	DEFDP	SUBJ	SUBJ	1D
U4	e ehm la giraffa non voleva dare **l'aerocottero** all'elefante [*and ehm the giraffe did not want to give the helicopter to the elephant*]	3	DEFDP	OBJECT	OBJECT	1D
U4	e ehm la giraffa non voleva dare l'aerocottero **all'elefante** [*and ehm the giraffe did not want to give the helicopter to the elephant*]	1	DEFDP	OBJECT	SUBJ	2S

We analyzed the contexts in which a full DP or an overt pronoun occurred. Based on the coding reported in Table 3, we identified all discourse contexts in which these forms are overspecified. For example, when maintaining reference from subject to subject position with either one intervening character (of same or different gender) or none at all, a null can be used to refer unambiguously to the referent. U4 exemplifies this configuration. The full DP *la giraffa* ('the giraffe') could be replaced by a null without causing ambiguities. Likewise, in the same unit, the use of the clitic *lo* ('it') would have been more appropriate than the full DP to refer to the helicopter. The configuration at stake involves maintaining reference from object to object position, with one intervening character of different gender. Another example of overspecified use of a RE is shown in (5), in which the full DP *il gioco* ('the toy') could be replaced by the clitic *lo* ('it'). Here, we observe a switch from subject to object position and an intervening character of same gender (the big elephant).

5. a. U1 (F5: 12;5)
E *il gioco* è nell'acqua
and the toy be.$_{3SG.PRES}$ in the water
'And the toy is in the water.'

b. U2
E il grosso elefante prende *il gioco*
and the big elephant take.$_{3SG.PRES}$ the toy
'And the big elephant takes the toy.'

After identifying all discourse contexts that are possibly associated with an overspecified use of a full DP, we counted, for each speaker, how many overspecified REs they used, normalizing the result for the square root of the amount of REs produced.

2.5.2. Analysis of Clitics

First, we counted how many clitics were used by each speaker, normalizing the result for the total amount of REs produced in each narrative. Then, we analyzed the syntactic configurations in which the clitic appeared, distinguishing between obligatory (simple finite and infinite verbs, auxiliary + past participle constructions and causatives) and optional clitic climbing contexts (see Section 1.1). Furthermore, we identified all instances of clitic omission, describing the type of structure in which the omission occurred or the type of clitic that was missing. Finally, we considered all cases of mismatch in morphosyntactic features (gender, number and case) between the clitic and its full DP associate.

2.5.3. Syntactic Complexity and Word Orders in Main Clauses

For each narrative, we calculated a subordination ratio, by dividing the number of subordinate clauses for the total number of units contained in the narrative. We used this measure as a proxy for the participant's syntactic proficiency. Furthermore, we classified each main clause based on the word order pattern it instantiated. In particular, we were interested in understanding whether the V2-grammar of main German clauses can be transferred to Italian.

3. Results

Table 4 reports the amount of nulls, clitics, overt pronouns and full DPs occurring in the narratives. Our analysis is based on this dataset.

Table 4. Raw frequencies of nulls, clitics, overt pronouns, and full noun phrases (DPs) occurring in the narratives.

Type of Referring Expression	Frequency
Nulls	98
Clitics	59
overt pronouns	13
full DPs	128

3.1. Production of Clitics

Table 5 shows the distribution of clitics across the different syntactic contexts introduced in Section 1.1. Most clitics occur (in isolation or in a cluster) in contexts where their position is obligatory, i.e., preceding finite verbs in obligatory CC constructions (simple verbs—(1) and (3)—and auxiliary + past participle constructions—(2)) or following infinitive verbs (4). Optional CC structures are also produced, with a tendency in favor of the clitic climbing option ((6) and (7) in Table 5).

Table 5. Raw frequency of clitic pronouns in different syntactic contexts.

Syntactic Configuration	Example	Frequency
a. clitic + verb	(1) **La** dà alla giraffa. CL.$_{ACC.FEM.SG.}$ give.$_{3SG.}$ to the giraffe (2) *E* ***le*** *ha chiesto*. and CL.$_{DAT.FEM.SG.}$ AUX.$_{3SG.}$ asked	26
b. cluster + verb	(3) ***glie-lo*** *ridà alla giraffa*. CL.$_{DAT.FEM.SG.}$-CL.$_{ACC.MASC.SG.}$ give back.$_{3SG.}$ to the giraffe	16
c. verb + clitic	(4) *a prender-****lo***. to take.$_{INF.}$ CL.$_{ACC.MASC.SG.}$	3
d. causative	(5) *e* ***lo*** *ha fatto volare*. and CL. $_{ACC.MASC.SG.}$ AUX.$_{3SG.}$ made fly	2
e. OCC_low	(6) *quindi non puó comprar-****lo***. therefore NEG can buy.$_{INF.}$-CL.$_{ACC.MASC.SG.}$	4
f. OCC_high	(7) *il coniglio* ***lo*** *vuole prendere*. the rabbit CL.$_{ACC.MASC.SG.}$ want take	8

OCC: optional clitic climbing.

The aim of the correlational analyses reported here is to understand which factors affect the production of clitics by bilingual children. The rate of produced clitics correlates positively with BIS ($R^2 = 0.27$, $\beta = 0.52$, $p = 0.031$) and vocabulary score ($R^2 = 0.26$, $\beta = 0.51$, $p = 0.035$). The regression with syntactic proficiency does not reach significance ($R^2 = 0.18$, $\beta = 0.43$, $p = 0.08$).

Given the relevance of BIS for clitic production, we divided the participants into two groups as a function of BIS. Those whose BIS was less than −0.075 (the mean value of the participants' BISs) were classified as low BIS ($n = 9$), while those whose BIS was greater than −0.075 were classified as high BIS ($n = 8$). Figure 1 shows that high-BIS bilinguals tend to produce a greater amount of clitics than low-BIS bilinguals in both obligatory and optional CC contexts.

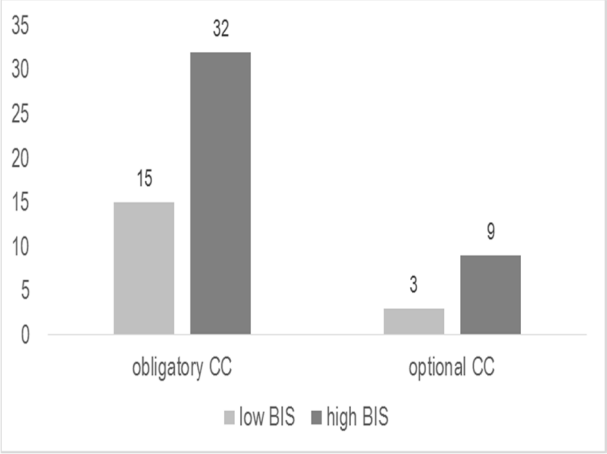

Figure 1. Raw frequencies of clitics occurring in obligatory and optional clitic climbing (CC) contexts across two groups of participants identified based on Bilingual Index Score (BIS): high- and low-BIS bilinguals.

In the next two sections, we will identify which referential strategies the participants (especially the ones with low BIS) use instead of producing clitics. While Section 3.2 refers to the use of overspecified forms, Section 3.3 considers the cases of clitic omission.

3.2. Production of Overspecified Forms

Table 6 reports the results related to the production of overspecified forms. We distinguish between overspecified overt pronouns and full DPs appearing in subject and object position, respectively. A Fischer's Exact test reveals that there is no association between type of overspecified form (overt pronoun vs. full DP) and syntactic position (subject vs. object) in which it appears ($p = 0.634$). In other terms, overt pronouns on the one hand and full DPs on the other appear in subject and object position to the same extent.

Table 6. Raw frequencies of overspecified overt pronouns and full DPs in subject position and object position.

Syntactic Position	Overt Pronouns	Full DPs
Subject position	3	12
Object position	2	17
Total	5	29

First, we consider the use of overspecified forms in object position (where the use of a clitic would have been more appropriate). The children produced a greater number of full DPs than overt pronouns (χ^2 (1, $N = 19$) = 11.84, $p = 0.001$). The normalized amount of produced overspecified forms correlates negatively with BIS ($R^2 = 0.34$, $\beta = -0.58$, $p = 0.04$) and vocabulary score ($R^2 = 0.35$, $\beta = -0.59$, $p = 0.03$), but the correlation with syntactic proficiency does not reach significance ($R^2 = 0.25$, $\beta = -0.50$, $p = 0.08$). We ran these correlations based only on 13 children (out of 17), since four children did not produce REs for reference maintenance in object position.[13]

Considering the total amount of overspecified forms in both subject and object position produces a very similar picture. In this case, the analysis is based on all 17 children. The amount of overspecified full DPs exceeds the amount of overt pronouns (χ^2 (1, $N = 32$) = 15.13, $p < 0.001$). The regression analyses shows that the lower BIS and vocabulary score, the greater the frequency of overspecified forms (for BIS: $R^2 = 0.38$, $\beta = -0.62$, $p = 0.008$—see also Figure 2; for vocabulary score: $R^2 = 0.35$, $\beta = -0.60$, $p = 0.01$). The correlation with syntactic proficiency is not significant ($R^2 = 0.18$, $\beta = -0.42$, $p = 0.09$).

3.3. Omission of Clitics

Table 7 reports all cases of clitic omission (seven in total). While low-BIS children omit clitics in association with syntactically complex structures (one omission with a causative and two omissions with OCCs), high-BIS children omit prepositional clitics (*ci* 'there' and *ne* 'thereof'). Therefore, it seems

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[13] The REs in object position contained in the following narrative excerpt—produced by F2 (age: 13;2, BIS: −0.13)—are used to introduce referents (e.g., *un aeroplanino* 'a small airplane toy' in (ii) and *l'amico*, *l'altro amico elefante* 'the friend, the other elephant friend' in (vi)) and there is no instance of RE used to maintain reference in object position. Therefore, this narrative excerpt cannot verify the hypothesis concerning the use of overspecified forms in object position. Incidentally, it should be noted that in (vii) the participant omits the accusative masculine singular clitic pronoun *lo*, which refers to the airplane.

i.	C'era una giraffa e un elefante	[*there was a giraffe and an elephant*]
ii.	E quella giraffa c'aveva un aeroplanino.	[*and that giraffe had an airplane toy*]
iii.	E poi c'era l'elefante,	[*and then there was the elephant*]
iv.	che voleva giocare.	[*who wanted to play*]
v.	Però poi l'aeroplanino è caduto in acqua.	[*but then the airplane toy fell into the water*]
vi.	E poi l'elefante ha chiamato l'amico // l'altro amico elefante	[*and then the elephant called the friend // the other elephant friend*]
vii.	e ∅ ha preso con una [with help: rete],	[*and took with a [with help: net]*]
viii.	dove si pulisce l'acqua [. . .]	[*where you clean the water*]

that clitic omission is not generalizable to all syntactic contexts, but appears specifically with certain structures, depending on the children's degree of language experience (high vs. low BIS).

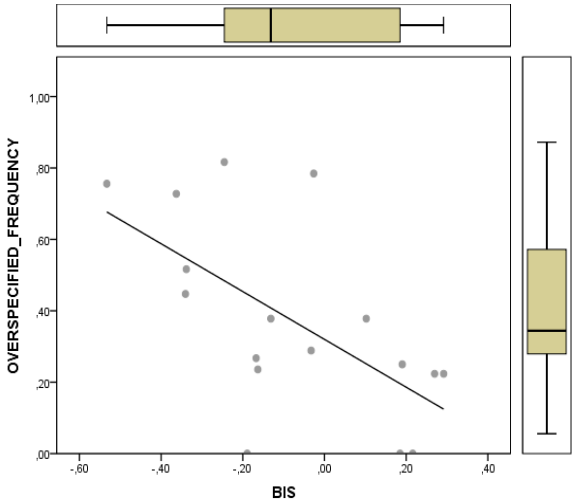

Figure 2. Dispersion graph between BIS and the normalized frequency of overspecified forms (overt pronouns and full noun phrases).

Table 7. Cases of clitic omission occurring in the narratives. The first column indicates the subject that produced the sentence, the second her BIS, and the fourth the type of structure in which the clitic is missing or the type of clitic that is missing.

Child	BIS	Sentence	Type of Structure
F2	−0.13 (low BIS)	(1) E ∅ ha preso con una [. . .] [*and has taken ∅ with one [. . .]*]	AUX + past participle
F3	−0.34 (low BIS)	(2) Un coniglio ∅ voleva mettere al carrello. [*A rabbit wanted to bind ∅ to the cart*]	OCC
F4	−0.36 (low BIS)	(3) e ∅ fa volando [*and makes ∅ flying*]	Causative
M4	−0.53 (low BIS)	(4) e ∅ vole prendere [*and wants to take ∅*]	OCC
M3	−0.03 (high BIS)	(5) e in pratica loro ∅ volevano uno nuovo [*and basically they wanted one new ∅ (of it)*]	NE-clitic
F8	0.018 (high BIS)	(6) peró non ∅ arriva [*but not ∅ arrives (there)*]	CI-clitic
M6	0.19 (high BIS)	(7) che ∅ ha fatto il nodino/il fiocchetto [*that ∅ has tied the knot/the bow (there)*]	(1) CI-clitic
		(8) se ∅ potrebbe avere due [*if he could have two (of them)*]	(2) NE-clitic

3.4. Agreement Mismatches

The analysis of agreement mismatches aims to identify the possible emergence of a generalized clitic form, which may indicate that a process of language change is underway (Section 1.1). Table 8 contains all instances of agreement mismatches between a clitic and its full DP associate that occur in our corpus of narratives. Most of agreement mismatches relate to gender (feminine instead of masculine form). One case mismatch (3) and one number mismatch (1) are present, too. The syntactic context in which the clitic appears may influence the occurrence of agreement mismatches: some occur within subordinate clauses, others in association with OCC, and still others with ditransitive verbs.

Table 8. Cases of agreement mismatches between a clitic and its corresponding referent, which occur in the narratives. The first column indicates the subject that produced the sentence, the second her Bilingual Index Score, and the fourth the type of structure in which the agreement mismatch appears, together with the type of agreement mismatch (gender, number, case). The symbol '>' indicates 'instead of'.

Child	BIS	Sentence	Type of Structure/Type of Mismatch
M1	−0.16 (low BIS)	(1) che ***lo*** vende, i palloni *that it.*$_{ACC.MASC.SG.}$ *sells, the balloons.*$_{MASC.PLUR.}$	subordinate clause with clitic right dislocation (masc. acc. sing. > masc. acc. plur.)
F4	−0.36 (low BIS)	(2) e ***la*** (l'aereo) dà alla giraffa *and it* $_{ACC.FEM.SG.}$ *(the airplane.*$_{MASC.SG.}$*) gives to the giraffe*	ditransitive verb (fem. acc. sing. > masc. acc. sing.)
M5	−0.11 (low BIS)	(3) e ***l'*** ha fatto una treccia (al pallone) *and it.*$_{ACC.MASC.SG.}$ *has tied a bow (to the balloon)*	ditransitive verb (acc. masc. sing. > dat. masc. sing.)
M6	−0.17 (low BIS)	(4) e ***la*** (l'aereo) sta provando per prender-***la*** *and it* $_{ACC.FEM.SG.}$ *(the airplane.*$_{MASC.SG.}$*) is trying to take it* $_{ACC.FEM.SG.}$	OCC (fem. acc. sing. > masc. acc. sing.)
F1	−0.03 (high BIS)	(5) che il // l'elefante ***la*** (l'aeroplanino) toccasse *that the // the elephant it.* $_{ACC.FEM.SG.}$ *the airplane.*$_{MASC.SG.}$ *touches*	(5) subordinate clause with subjunctive (fem. acc. sing. > masc. acc. sing.)
		(6) e ***le*** (la giraffa e l'elefante) voleva aiutare *and them.*$_{ACC.FEM.PL.}$ (*the giraffe* $_{FEM.SG.}$ *and the elephant* $_{MASC.SG.}$*) wanted to help*	(6) OCC (fem. acc. plur. > masc. acc. plur.)
F6	0.10 (high BIS)	(7) perché ***la*** butta là dentro (il pallone) *because it.*$_{ACC.FEM.SG.}$ *throws there inside* (*the balloon.*$_{MASC.SG.}$)	subordinate clause (fem. acc. sing. > masc. acc. sing.)

3.5. Word Orders and Constituent-Verb-Subject-(Object) Structures

The analysis of word order patterns occurring in main clauses is not central to this paper. However, it is useful to understand whether our considerations related to bilingual reference production can be extended to a different linguistic domain. As claimed in Section 1.1, we are mainly interested in the production of sentences whose word order complies with a German V2-syntax. Table 9 reports the frequency (in raw numbers) of all word orders that appear in root contexts. While the word orders in (a.)–(e.) are incompatible with a V2-grammar, the word orders in (f.) and (g.) are consistent with V2. However, the superficial SV(O) order can be licensed by both a V2 and a non-V2 grammar, while (at least) some of the structures described in (g.) can only be generated by a V2-grammar.

Table 9. Word orders occurring in root contexts in the narratives. While the orders (a.)–(e.) are incompatible with a verb-second (V2) grammar, the orders (f.) and (g.) are consistent with V2. In the description of the different structures (first column), the constituents in parentheses may occur or not. When a slash separates the two constituent types, either one can appear (abbreviations used in the Table: *neg*: negation; *cl*: clitic).

Word Order	Example	Frequency
a. presentative	(1) C'erano due conigli, un maschio e una femmina (M2) [*There were two rabbits, a male and a female*]	19
b. (neg) cl-V(O)	(2) La dà alla giraffa (F4) [*CL.$_{ACC.FEM.SG}$. gives to the giraffe*]	27
	(3) Non l' ha fatta (M5) [*NEG. CL.$_{ACC.FEM.SG.}$ has made*]	
c. (neg) V (O/S)	(4) ha chiesto (M6) [*has asked*]	58
	(5) è arrivato un coniglio [*has arrived a rabbit*]	
	(6) ma non aveva i soldi [*but NEG had the money*]	
d. S (neg/cl) VO	(7) Il papà l' ha aiutati [*the father CL.$_{ACC.MASC.PL.}$ has helped*]	22
	(8) però iddo non aveva cinque euro [*but that one NEG had five euros*]	
e. XP SV(O)	(9) Poi la giraffa si arrabbia [*Then the giraffe gets mad*]	12
	(10) Poi l'elefante ha chiamato l'amico // l' altro amico elefante [*Then the elephant has called the friend the other friend elephant*]	
f. SV(O)	(11) Il maschio ha visto ehm un negozio [*the male has seen ehm a shop*]	74
	(12) e il coniglio va [*and the rabbit goes*]	
g. XP VS(O)	(13) E dopo arriva la mamma [*and then comes the mother*]	21
	(14) E poi ha visto il maschio un altro coniglio [*and then has seen the male another rabbit*]	

Figure 3 looks closer at the type of verb-argument configurations instantiated by XP-V-S-(O) structures (g. in Table 9). With unaccusative verbs followed by an indefinite subject, XP-V-S is the unmarked word order. However, if the verb is transitive and followed by two arguments (XP-V-S-O) or if the verb is unaccusative and the subject is definite (XP-V-S_{DEF}), the word order XP-V-S is not allowed in Italian (Vernice and Guasti 2015). In these cases, XP-V-S configurations can be analyzed as proper V2-structures. Neither BIS, nor difference in vocabulary scores (between Italian and German), nor syntactic proficiency correlates with the amount of produced non-target XP-V-S-(O) structures (for BIS: $R^2 = 0.01$, $\beta = -0.12$, $p = 0.64$; for difference in vocabulary scores: $R^2 = 0.001$, $\beta = -0.023$, $p = 0.93$; for syntactic proficiency: $R^2 = 0.001$, $\beta = -0.04$, $p = 0.89$).

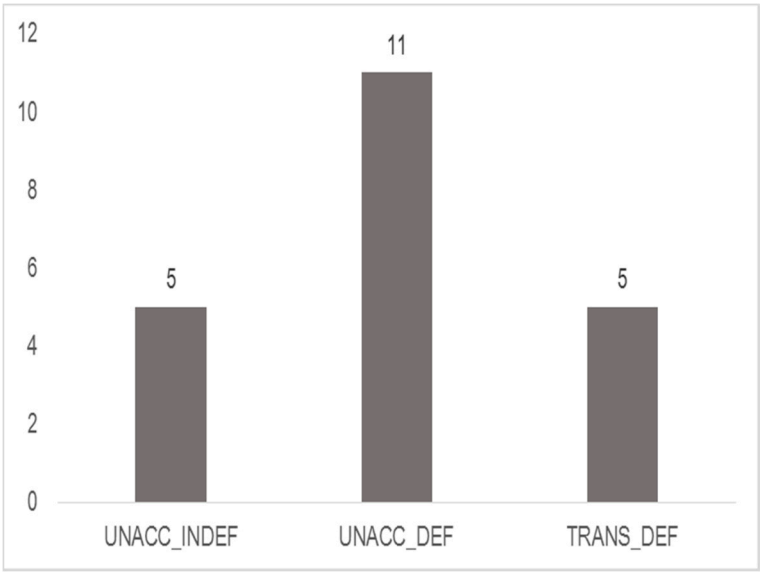

Figure 3. Raw frequencies of different verb-argument configurations instantiated by constituent-verb-subject-(object) structures. UNACC_INDEF: unaccusative verb followed by an indefinite subject; UNACC_DEF: unaccusative verb followed by a definite subject; TRANS_DEF: transitive verb followed by two definite arguments.

4. Discussion

The occurrence in bilingual language production of forms and form-function mappings that cannot be attributed to either of the bilinguals' two languages can be interpreted in different ways. In particular, we identified two main theoretical positions: according to the former, contact between two languages affects language-specific syntactic representations (via transfer or language change processes; cf. Müller and Hulk 2001; Serratrice et al. 2004; Vega Vilanova et al. 2018). For the latter, phenomena occurring in bilingual language production are the result of processing variables, which implies that (at least for some phenomena) language knowledge remains unaffected by bilingual experience (Sorace 2011; Torregrossa et al. 2018). We also left open the possibility that other variables (such as dominance) may account for bilingual language production besides (or in interaction with) language knowledge and processing. In this contribution, we decided to focus on reference production because of its interface nature, which involves both language-specific syntactic mastering of REs and cognitive processes, such as (discourse) updating and attention to one or the other character.

The results of this study show that bilinguals tend to produce full DPs in contexts in which the use of nulls or clitics would have been the most appropriate option.[14] This result is in accordance with widespread evidence concerning the use of overspecified REs among bilinguals (see the overview presented in Sorace and Serratrice 2009 and references in Section 1.1). However, the analysis of the type of overspecified forms that are actually used sheds some new light on the factors affecting this pattern of production. The bilinguals considered in this study produce very few instances

[14] One could argue that our study does not fully support this conclusion, since a monolingual control group is missing. The identification of overspecified DPs reported in this paper is based on a data-coding process that has been tested against several languages and validated for interrater agreement (e.g., Torregrossa et al. 2015; Torregrossa et al. 2017). Therefore, we are confident that our analysis includes only those full DPs that one could substitute with nulls or clitics without generating ambiguity. More in general, the present study shows that it is possible to account for (some aspects of) bilingual language production without resorting to monolingual control groups (Kupisch and Rothman 2016), which is done based on correlational analyses (between use of overspecified DPs and language experience in our case). It is not excluded that overspecification may occur in monolingual language production, too, due for instance to cognitive factors (see Arnold 2010 and references quoted therein). However, such cognitive constraints are supposed to influence monolingual and bilingual language production alike (cf. Torregrossa et al. 2017 for an analysis of how overspecification and underspecification result from the interaction between language experience and cognitive variables among different groups of bilinguals).

of overt pronouns (see Table 6). This pattern of production is not predicted by the structural accounts à la Müller and Hulk (2001), but it rather supports the morphosyntactic complexity account (Liceras et al. 2012), at least as far as the absence of cross-linguistic influence from German to Italian is concerned (see Table 1). Also, the observation that full DPs (instead of overt pronouns) are mostly produced can hardly be interpreted in terms of transfer from German to Italian. Full DPs are in fact available in both languages. Rather, our measure of dominance (expressed in terms of BIS) motivates most of the variation in the use of overspecified forms: the more dominant in German bilinguals were, the more overspecified forms they produced in Italian (Figure 2). We consider dominance as a complex measure encompassing vocabulary proficiency and language experience in both languages (see Sections 1 and 2.2). Torregrossa et al. (2017) found the same (negative) correlation between use of overspecified full DPs and language experience and interpreted this result in terms of a reduced mastery of the syntactic options for reference and a consequent reliance on pragmatic strategies (see also reference to Serratrice 2007; Belletti and Guasti 2015, footnote 5). Here, we propose a refinement of this hypothesis, based on the observation that our measure of syntactic proficiency does not account for variation in the use of overspecified forms (Section 3.2). We argue that the bilinguals' abstract syntactic representations are intact (at least, for the phenomenon at issue here). However, the automatization (alias proceduralization) of this grammatical knowledge is not necessarily fully developed, because of reduced language experience (Ellis 2005; Paradis 2009). In the absence of such automatization, the use of full DPs may be considered as a strategy to ensure accuracy (despite redundancy), when performing a complex task like reference. This hypothesis is more compatible with processing accounts (like the one formulated by Sorace 2011)[15] than with structural accounts of bilingual reference production. It could be claimed, for instance, that more complex structures—such as the ones at the interface between discourse and syntax—are more resistant to automatization processes. In this sense, our account establishes a link between existing processing accounts and language experience (dominance) variables. Moreover, it makes two strong testable predictions. First, greater language exposure should enhance the production of the syntactic options for reference available in the language. This is in line with some recent studies that have emphasized the role of quality and quantity of input in determining (in)complete acquisition of linguistic phenomena (see Kupisch and Rothman 2016; Treffers-Daller et al. 2007; Tsimpli 2014). Second, the use of overspecified full DPs should be observable across bilinguals with other language combinations than the ones considered in this study, including bilinguals speaking two non-null subject languages (e.g., English-German) or two null subject and clitic languages (e.g., Italian-Spanish).[16]

The results of the analysis concerning clitic production are consistent with the conclusions drawn above. The production of clitics reflects dominance in Italian (see Figure 2), but not necessarily greater syntactic proficiency in this language: Syntactic proficiency is indeed not a good predictor of the amount of produced clitics (Section 3.1). The previous analysis of overspecified forms shows that children usually produce full DPs instead of clitics. However, this is not the whole story, since we also found a few occurrences of clitic omission, appearing in the production of both bilinguals with low and high BIS. While the former may omit clitics with OCC structures, the latter encounter difficulties with prepositional clitics. In Section 1.1, we showed that all these structures involve some degree of complexity. Therefore, this set of data complies with the predictions of computational-complexity accounts (see Table 1 in Section 1.1) that clitic omission appears only in certain syntactic contexts.

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[15] However, Sorace (2011) claim that overt pronouns are default forms that counteract complex computations at the syntax-discourse interface cannot be maintained, since it does not comply with the observation that bilinguals tend to produce a greater amount of full DPs. Nor is it plausible that full DPs act as default forms (see the discussion in Section 1.1).

[16] The overuse of full DPs (instead of clitics and null subjects) has already been observed in the production of REs in Greek by Greek-Albanian bilingual children, who are dominant in Albanian (see Torregrossa et al. 2017). Greek and Albanian are both null subject and clitic languages.

Moreover, we found no evidence of transfer of null objects from German to Italian, contrary to the predictions formulated based on Müller and Hulk (2001).[17]

Another phenomenon that can be observed in our data is the presence of (a few) agreement mismatches between clitics and their full nominal phrase associates (Table 8). Based on these occurrences, it is difficult to identify a pattern consistent with the hypothesis that clitics are the outcome of a process of language change accelerated by language contact between Italian and German (see Section 1.1). If this were the case, all cases of agreement mismatches should have involved a unique clitic form, as shown in Section 1.1. However, Table 8 shows that, although the use of a feminine singular form instead of a masculine singular seems to be the most frequent mismatch, other kinds of forms (e.g., masculine singular or feminine plural) can appear, too. Moreover, as in the case of clitic omissions, there seems to be a correspondence between presence of mismatch and complexity of the syntactic structure in which it occurs (Section 3.4), which suggests that agreement errors are motivated by limited processing resources.

The analysis of clitics strengthens our previous claim that the bilinguals in our study are equipped with abstract grammatical representations of the Italian referential system (null subjects, clitics, etc.). Grammatical knowledge does not seem to be affected by either transfer, language change or "incomplete" acquisition (as suggested, in the last case, by the absence of correlation between amount of produced clitics and syntactic proficiency). Rather, the pattern of clitic production exhibited by bilinguals seems to be primarily determined by performance (i.e., processing) and dominance variables.[18]

In order to test whether this conclusion (related to the impact of performance variables on bilingual reference production) can be extended to other linguistic phenomena, we reported the results of a tentative analysis for different word orders produced in Italian. Interestingly, the bilinguals produce XP-V-S_{def}, as in (6), and XP-V-S-O structures (see also Table 9), as in (7), which are available in Italian only as marked word order strategies[19]. Such structures are compatible with a V2-grammar.

6. Poi so' andati quelli
   Then AUX.3PP.PRES gone those
   'Then those have gone.'

7. Poi chiede la femmina alla giraffa
   Then ask.3.SG.PRES the girl to the giraffe
   'Then the girl asks the giraffe.'

Sentences like (6) and (7) can hardly be analyzed as the result of processing variables, contrary to what has been observed above for clitics. Crucially, the participants were also asked to produce a narrative under cognitive load (Section 2.4). Such condition should have enhanced the production of V2-structures, if this were motivated by limited processing capacity. However, our analysis shows that this is not the case (Torregrossa and Bongartz). Thus, the most viable hypothesis is to interpret V2-structures as the outcome of transfer from German to Italian. In Section 1.1, we observed that

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[17] It should be pointed out that the analysis of Müller and Hulk (2001) was formulated based on the production of very young bilinguals. Thus, transfer effects might still be visible in the early phases of bilingual language development, but cannot account for bilingual language production in later stages of acquisition.

[18] As suggested by one of the reviewers, another piece of evidence that grammatical knowledge is unaffected among the bilinguals considered in this study is the fact that in our corpus of narratives, we did not find any occurrence of "redundant" full DPs involving a violation of Principle C of Binding Theory. In other terms, the production of overspecified full DPs always occurs *across* clauses, not *within* clauses (or better said, not within the c-command domain of the antecedent). This observation is particularly relevant in view of the proposal by Balaban et al. (2016) to disentangle syntactic and discourse factors constraining the repetition of full DPs.

[19] Postverbal subjects may be licensed by a narrow-focus interpretation on the subject (followed by "emarginazione" (margination) of the object in the case of XP-V-S-O structures; see, a.o., Belletti 2004). In these contexts, the subject constituent is associated with intonational prominence. It should be pointed out that the narrow focus interpretation is not supported by the discourse context at stake. We will not discuss the possibility that in fact the bilinguals intended to express narrow focus, but did not master the prosodic means to mark it.

when an SVO-language (like English, French, or Italian) and a V2-language that allows both VO- and OV-structures (like German) are in contact, transfer from the former to the latter should be observed. However, our data reveal exactly the opposite pattern. Although the dataset is too small to drive any generalization (see Figure 3), the type of transfer at stake here does not seem to be motivated by "feature-injection", according to the mechanism identified by Müller and Hulk (2001), but rather "feature recombination", in line with Aboh (2015)—see the discussion in Section 1.[20] We leave to future research the understanding of the conditions and mechanisms triggering this recombination. Based on our data, we can only conclude that dominance does not seem to motivate it (see the correlation analysis presented in Section 3.5).

Independently of how to account for the emergence of new word-order patterns, the comparison between the analysis of REs and word orders underscores the methodological importance of considering different sources of evidence before drawing any conclusion on bilingual language production. Based on our analysis, a processing account may explain bilingual production of REs (and potentially linguistic phenomena at the syntax-discourse interface), but does not necessarily hold for other aspects of language, such as language properties related to narrow syntax (e.g., word order). Moreover, our contribution underscores the need to investigate bilingual language production by undertaking a fine-grained linguistic analysis—which takes into account the linguistic nature of the investigated phenomenon as well as cross-linguistic differences between the two languages in contact—coupled with a careful profiling of bilingual speakers—in terms of language experience and proficiency.

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References

Aboh, Enoch. 2015. *The Emergence of Hybrid Grammars*. Cambridge: Cambridge University Press.

Almor, Amit. 1999. Noun-phrase anaphora and focus: The informational load hypothesis. *Psychological Review* 106: 748–65. [CrossRef] [PubMed]

Ariel, Mira. 1990. *Accessing Noun-Phrase Antecedents*. London: Routledge.

Arnold, Jennifer. 2010. How speakers refer: The role of accessibility. *Language and Linguistic Compass* 4: 187–203. [CrossRef]

Arnold, Jennifer E., and Zenzi M. Griffin. 2007. The effect of additional characters on choice of referring expression: Everyone counts. *Journal of Memory and Language* 56: 521–36. [CrossRef] [PubMed]

[20] It may be observed that a V2-grammar is not a necessary condition for XP-V-S orders. For example, Italian allows such structures in correspondence with the phenomena observed under footnote 16, *wh*-questions, frontings and unaccusative verbs followed by indefinite subjects (cf. Meisel et al. 2013 for discussion). However, as far as we know, the structural account by Müller and Hulk (2001) does not make any prediction concerning a situation in which two ambiguous languages (like German, which has VO and OV, and Italian, with VO and XP-V) enter in contact.

Arnold, Jennifer E., Janet G. Eisenband, Sarah Brown-Schmidt, and John C. Trueswell. 2000. The rapid use of gender information: Evidence of the time course of pronoun resolution from eye tracking. *Cognition* 76: B13–B26. [CrossRef]

Balaban, Noga, Adriana Belletti, Naama Friedmann, and Luigi Rizzi. 2016. Disentangling Principle C: A contribution from individuals with brain damage. *Lingua* 169: 1–20. [CrossRef]

Belletti, Adriana. 1999. Italian/Romance clitics: Structure and derivation. In *Clitics in the Languages of Europe, Empirical Approaches to Language Typology*. Edited by Henk van Riemsdijk. Berlin and New York: Mouton de Gruyter, pp. 543–79.

Belletti, Adriana. 2004. Aspects of the low IP-area. In *The structure of CP and IP*. Edited by Luigi Rizzi. New York: Oxford University Press, pp. 16–51.

Belletti, Adriana, and Maria Teresa Guasti. 2015. *The Acquisition of Italian: Morphosyntax and Its Interfaces in Different Modes of Acquisition*. Amsterdam: John Benjamins.

Belletti, Adriana, Elisa Bennati, and Antonella Sorace. 2007. Theoretical and developmental issues in the syntax of subjects: Evidence from near-native Italian. *Natural Language and Linguistic Theory* 25: 657–89. [CrossRef]

Bennati, Elisa. 2007. Pronouns in Adult L2 Acquisition: Evidence from L2 Near-Native Italian. Ph.D. dissertation, University of Siena, Siena, Italy.

Bernardini, Petra. 2003. Child and adult acquisition of word order in the Italian DP. In *(In)vulnerable Domains in Multilingualism*. Edited by Natascha Müller. Amsterdam: John Benjamins, pp. 41–81.

Bialystok, Ellen, Fergus Craik, and Gigi Luk. 2008. Cognitive control and lexical access in younger and older bilinguals. *Journal of Experimental Psychology: Learning, Memory and Cognition* 34: 859–73. [CrossRef] [PubMed]

Bongartz, Christiane, and Jacopo Torregrossa. 2017. The effects of balanced biliteracy on Greek-German bilingual children's secondary discourse ability. *Journal of Bilingual Education and Bilingualism*, 1–16. [CrossRef]

Burzio, Luigi. 1998. Anaphora and soft constraints. In *Is the Best Good Enough? Optimality and Competition in Syntax*. Edited by Pilar Barbosa, Daniel Fox, Paul Hagstrom, Martha McGinnis and David Pesetsky. Cambridge: MIT Press, pp. 93–114.

Cardinaletti, Anna, and Michal Starke. 1999. The Typology of Structural Deficiency. A Case Study of the Three Classes of Pronouns. In *Clitics in the Languages of Europe*. Edited by Henk van Riemsdijk. Berlin: Mouton-De Gruyter, pp. 145–233.

Carminati, Maria Nella. 2002. The Processing of Italian Subject Pronouns. Ph.D. dissertation, University of Massachusetts, Amherst, MA, USA.

Cinque, Guglielmo. 2004. Restructuring and Functional Structure. In *The Cartography of Syntactic Structure*. Edited by Adriana Belletti. New York: Oxford University Press, vol. 3, pp. 132–91.

Clahsen, Harald, and Claudia Felser. 2006. Grammatical processing in language learners. *Applied Psycholinguistics* 27: 3–42. [CrossRef]

Cook, Vivian, ed. 2003. *Effects of the Second Language on the First*. Second Language Acquisition Series; Clevedon: Multilingual Matters.

De Houwer, Annick. 1990. *The Acquisition of Two Languages from Birth: A Case Study*. Cambridge: Cambridge University Press.

Devlin, Megan, Raffaella Folli, Alison Henry, and Christina Sevdali. 2012. Clitic left dislocation in absence of clitics: A study in trilingual acquisition. *University of Pennsylvania Working Papers in Linguistics* 18: 41–50.

Döpke, Susanne. 1998. Competing language structures: The acquisition of verb placement by bilingual German-English children. *Journal of Child Language* 25: 555–84. [CrossRef] [PubMed]

Döpke, Susanne, ed. 2000. *Cross-Linguistic Structures in Simultaneous Bilingualism*. Amsterdam: John Benjamins.

Ellis, Nick C. 2005. At the interface: Dynamic interactions of explicit and implicit language knowledge. *Studies in Second Language Acquisition* 27: 305–52. [CrossRef]

Fernández, Eva M., Ricardo Augusto De Souza, and Agustina Carando. 2017. Bilingual innovation: Experimental evidence offers clues regarding the psycholinguistics of language change. *Bilingualism: Language and Cognition* 20: 251–68. [CrossRef]

Fernández-Fuertes, Raquel, and Juana M. Liceras. 2018. Bilingualism as a first language: Language dominance and cross-linguistic influence. In *Language Acquisition and Contact in the Iberian Peninsula*. Edited by Alejandro Cuza and Pedro Guijarro-Fuentes. Berlin: De Gruyter Mouton.

Francis, Norbert. 2011. *Bilingual Competence and Bilingual Proficiency in Child Development*. Cambridge: The MIT Press.

Gollan, Tamar H., Rosa I. Montoya, Cynthia Cera, and Tiffany C. Sandoval. 2008. More use almost always means a smaller frequency effect: Aging, bilingualism and the weaker links hypothesis. *Journal of Memory and Language* 58: 787–814. [CrossRef] [PubMed]

Hendriks, Petra. 2014. *Asymmetries between Language Production and Comprehension*. Studies in Theoretical Psycholinguistics. Dordrecht: Springer, vol. 42.

Hopp, Holger. 2013. The development of L2 morphology. *Second Language Research* 29: 3–6. [CrossRef]

Hsin, Lisa, Géraldine Legendre, and Akira Omaki. 2013. Priming cross-linguistic interference in Spanish-English bilingual children. In *BUCLD 37: Proceedings of the 37th Annual Boston University Conference on Language Development*. Edited by Sarah Baiz, Nora Goldman and Rachel Hawkes. Somerville: Cascadilla Press, pp. 165–77.

Hulk, Aafke, and Natascha Müller. 2000. Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition* 3: 227–44. [CrossRef]

Kaplan, Edith, Harold Goodglass, and Sandra Weintraub. 1983. *The Boston Naming Test*. Philadelphia: Lea & Febiger.

Kupisch, Tanja, and Jason Rothman. 2016. Terminology matters! Why difference is not incompleteness and how early child bilinguals are heritage speakers. *International Journal of Bilingualism*. [CrossRef]

Kupisch, Tanja, Tatjana Lein, Dagmar Barton, Dawn Judith Schröder, Ilse Stangen, and Antje Stoehr. 2014. Acquisition outcomes across domains in simultaneous bilinguals with French as weaker and stronger language. *Journal of French Language Studies* 24: 347–76. [CrossRef]

Langacker, Ronald W. 1990. *Concept, Image, and Symbol: The Cognitive Basis of Grammar*. Berlin: Mouton de Gruyter.

Lanza, Elizabeth. 2000. Concluding remarks: Language contact—A dilemma for the bilingual child or for the linguist? In *Cross-Linguistic Structures in Simultaneous Bilingualism*. Edited by Susanne Döpke. Amsterdam: John Benjamins, pp. 227–46.

Liceras, Juana M., and Raquel Fernández Fuertes. 2016. Subject omission/production in child bilingual English and child bilingual Spanish: The view from linguistic theory. *Probus* 29: 1–34. [CrossRef]

Liceras, Juana M., Raquel Fernández Fuertes, and Anahí Alba de la Fuente. 2012. Overt subjects and copula omission in the Spanish and the English grammar of English-Spanish bilinguals: On the locus and directionality of interlinguistic influence. *First Language* 32: 88–115. [CrossRef]

Liceras, Juana M., Raquel Fernández Fuertes, and Rachel Klassen. 2016. Language dominance and language nativeness: The view from English-Spanish code-switching. In *Spanish-English Codeswitching in the Caribbean and the US*. Edited by Rosa E. Guzzardo Tamargo, Catherine M. Mazak and María del Carmen Parafita Couto. Amsterdam: John Benjamins, pp. 107–38.

Lozano, Cristóbal. 2016. Pragmatic principles in anaphora resolution at the syntax-discourse interface: Advanced English learners of Spanish in the CEDEL2 corpus. In *Spanish Learner Corpus Research: Current Trends and Future Perspectives*. Edited by Margarita Alonso-Ramos. Amsterdam: John Benjamins, pp. 236–65.

MacWhinney, Brian. 2000. *The CHILDES Project: Tools for Analyzing Talk*, 3rd ed. Mahwah: Lawrence Erlbaum Associates.

Mateu, Victoria Eugenia. 2015. Object clitic omission in child Spanish: Evaluating representational and processing accounts. *Language Acquisition* 22: 240–84. [CrossRef]

Mattheoudakis, Marina, Aspasia Chatzidaki, Christina Maligkoudi, and Eleni Agathopoulou. 2016. Family and school language input: Their role in bilingual children's vocabulary development. *Journal of Applied Linguistics*.

Meisel, Jürgen M. 2011. Bilingual language acquisition and theories of diachronic change: Bilingualism as cause and effect of grammatical change. *Bilingualism: Language and Cognition* 14: 121–45. [CrossRef]

Meisel, Jürgen M., Martin Elsig, and Esther Rinke. 2013. *Language Acquisition and Change: A Morphosyntactic Perspective*. Edinburgh: Edinburgh University Press.

Merten, Thomas. 2004. Entwicklung einer deutschen Kurzform des Boston Naming Test. *Neurologische Riabilitation* 6: 305–11.

Montrul, Silvina. 2010. How similar are L2 learners and heritage speakers? Spanish clitics and word order. *Applied Psycholinguistics* 31: 167–207. [CrossRef]

Montrul, Silvina. 2016. Dominance and proficiency in second language acquisition and bilingualism. In *Measuring Dominance in Bilingualism*. Edited by Carmen Silva-Corvalán and Jeanine Treffers-Daller. Cambridge: Cambridge University Press, pp. 15–35.

Müller, Natascha, and Aafke Hulk. 2001. Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and Cognition* 4: 1–53. [CrossRef]

Navarro, Müller, Fischer Susann, and Jorge Vega Vilanova. 2017. Reconstruyendo un ciclo: Doblado de clíticos y gramaticalización en las lenguas romances. In *Investigaciones en Lingüística*. vol. III: Sintaxis. Edited by Silvia Gumiel-Molina, Manuel Leonetti and Isabel Pérez-Jiménez. Alcalá de Henares: Publicaciones de la Universidad de Alcalá.

Nicoladis, Elena. 2006. Cross-linguistic transfer in adjective-noun strings by preschool bilingual children. *Bilingualism: Language and Cognition* 9: 15–32. [CrossRef]

Papadopoulou, Despina, Eleni Peristeri, Evagelia Plemenou, Theodoros Marinis, and Ianthi Maria Tsimpli. 2015. Pronoun ambiguity resolution in Greek: Evidence from monolingual adults and children. *Lingua* 155: 98–120. [CrossRef]

Paradis, Michel. 2009. *Declarative and Procedural Determinants of Second Language*. Amsterdam: John Benjamins.

Petitto, Laura-Ann, and Ioulia Kovelman. 2003. The bilingual paradox: How signing-speaking bilingual children help us to resolve bilingual issues and teach us about the brain's mechanisms underlying language acquisition. *Learning Languages* 8: 5–18.

Pliatsikas, Christos, and Theodoros Marinis. 2013. Processing of regular and irregular past tense morphology in highly proficient second language learners of English: A self-paced reading study. *Applied Psycholinguistics* 34: 943–70. [CrossRef]

Prévost, Philippe, and Lydia White. 2000. Missing Surface Inflection or Impairment in second language acquisition? Evidence from tense and agreement. *Second Language Research* 16: 103–33. [CrossRef]

Repetto, Valentina, and Natascha Müller. 2010. The acquisition of German V2 in bilingual Italian-German children residing in Germany and Italy: A case of acceleration? In *Movement and Clitics: Adult and Child Grammar*. Edited by Vicenç Torrens, Linda Escobar, Anna Gavarró and Juncal Gutiérrez. Newcastle upon Tyne: Cambridge Scholars Publishing, pp. 155–84.

Rinke, Esther, and Cristina Flores. 2014. Morphosyntactic knowledge of clitics by Portuguese heritage bilinguals. *Bilingualism: Language and Cognition* 17: 681–99. [CrossRef]

Riva, Daria, Francesca Nichelli, and Monica Devoti. 2000. Developmental aspects of verbal fluency and confrontation naming in children. *Brain and Language* 71: 267–84. [CrossRef] [PubMed]

Schmeißer, Anika, and Veronika Jansen. 2016. Finite verb placement in French language change and in bilingual German-French language acquisition. In *The Acquisition of French in Its Different Constellations*. Edited by Katrin Schmitz, Patuto Guijarro-Fuentes and Natascha Müller. Bristol: Multilingualism Matters.

Schmitz, Katrin, Marisa Patuto, and Natascha Müller. 2012. The null-subject parameter at the interface between syntax and pragmatics: Evidence from bilingual German-Italian, German-French and Italian-French children. *First Language* 32: 205–38. [CrossRef]

Schneider, Phyllis, Rita V. Dubé, and Denyse Hayward. 2005. The Edmonton Narrative Norms Instrument. Available online: http://www.rehabresearch.ualberta.ca/enni (accessed on 25 May 2016).

Serratrice, Ludovica. 2007. Referential cohesion in the narratives of bilingual English-Italian children and monolingual peers. *Journal of Pragmatics* 39: 1058–87. [CrossRef]

Serratrice, Ludovica. 2013. Crosslinguistic influence in bilingual development: Determinants and mechanisms. *Linguistic Approaches to Bilingualism* 3: 3–25. [CrossRef]

Serratrice, Ludovica, and Shanley E.M. Allen, eds. 2015. *The Acquisition of Reference*. Amsterdam: John Benjamins.

Serratrice, Ludovica, Antonella Sorace, and Sandra Paoli. 2004. Crosslinguistic influence at the syntax-pragmatics interface: Subjects and objects in English-Italian bilingual and monolingual acquisition. *Bilingualism: Language and Cognition* 7: 183–205. [CrossRef]

Silva-Corvalán, Carmen. 1994. *Language Contact and Change*. Oxford: Oxford University Press.

Sorace, Antonella. 2004. Native language attrition and developmental instability at the syntax-discourse interface: Data, interpretations and methods. *Bilingualism: Language and Cognition* 7: 1–3. [CrossRef]

Sorace, Antonella. 2011. Pinning down the concept of 'interface' in bilingualism. *Linguistic Approaches to Bilingualism* 1: 1–33. [CrossRef]

Sorace, Antonella, and Francesca Filiaci. 2006. Anaphora resolution in near-native speakers of Italian. *Second Language Research* 22: 339–68. [CrossRef]

Sorace, Antonella, and Ludovica Serratrice. 2009. Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism* 13: 195–210. [CrossRef]

Surrain, Sarah, and Gigi Luk. 2017. Describing bilinguals: A systematic review of labels and descriptions used in the literature between 2005–2015. *Bilingualism: Language and Cognition*, 1–15. [CrossRef]

Thomason, Sarah Grey, and Terrence Kaufman. 1991. *Language Contact, Creolization, and Genetic Linguistics*. Berkeley: University of California Press.

Torregrossa, Jacopo, and Christine Bongartz. In preparation. Bilingual narratives under cognitive load.

Torregrossa, Jacopo, Christiane Bongartz, and Ianthi Maria Tsimpli. 2015. Testing accessibility: A cross-linguistic comparison of the syntax of referring expressions. Paper presented at the 89th Annual Meeting of the Linguistic Society of America, Portland, OR, USA, January 8–11.

Torregrossa, Jacopo, Maria Andreou, Christian Bongartz, and Ianthi Maria Tsimpli. 2017. Pinning down the role of type of bilingualism in the development of referential strategies. Paper presented at the Generative Linguistics in the Old World (GLOW 40), Leiden, The Netherlands, March 15–17.

Torregrossa, Jacopo, Christiane Bongartz, and Ianthi Maria Tsimpli. 2018. Bilingual reference production: A cognitive-computational account. *Linguistic Approaches to Bilingualism*, 1–16. [CrossRef]

Treffers-Daller, Jeanine. 2013. Measuring lexical diversity among L2 learners of French: An exploration of the validity of D, MTLD and HD-D as measures of language ability. In *Vocabulary Knowledge: Human Ratings and Automated Measures*. Edited by Scott Jarvis and Michael Daller. Amsterdam: Benjamins, pp. 79–104.

Treffers-Daller, Jeanine, and Vivienne Rogers. 2014. Grammatical Patterns and the L2 lexicon. In *Dimensions of Vocabulary Knowledge*. Edited by James Milton and Tess Fitzpatrick. London: Palgrave, pp. 106–22.

Treffers-Daller, Jeanine, A. Sumru Özsoy, and Roeland Van Hout. 2007. (In)complete acquisition of Turkish among Turkish-German bilinguals in Germany and Turkey: An analysis of complex embeddings in narratives. *International Journal of Bilingual Education and Bilingualism* 10: 248–76. [CrossRef]

Tsimpli, Ianthi Maria. 2014. Early, late or very late? Timing acquisition and bilingualism. *Linguistic Approaches to Bilingualism* 3: 283–313. [CrossRef]

Tsimpli, Ianthi Maria, and Antonella Sorace. 2006. Differentiating Interfaces: L2 performance in syntax-semantics and syntax-discourse phenomena. In *BUCLD 30: Proceedings of the 30th annual Boston University Conference on Language Development*. Edited by David Bamman, Tatiana Magnitskaia and Colleen Zaller. Somerville: Cascadilla Press, vol. 2, pp. 653–64.

Tsimpli, Ianthi Maria, Antonella Sorace, Caroline Heycock, and Francesca Filiaci. 2004. First language attrition and syntactic subjects: A study of Greek and Italian near-native speakers of English. *International Journal of Bilingualism* 8: 257–77. [CrossRef]

Unsworth, Sharon. 2013. Assessing the role of current and cumulative exposure in simultaneous bilingual acquisition: The case of Dutch gender. *Bilingualism: Language and Cognition* 16: 86–110. [CrossRef]

Vega Vilanova, Jorge, Mario Navarro, and Susann Fischer. 2018. The clitic doubling cycle. A diachronic reconstruction. In *Comparative and Diachronic Perspectives on Romance Syntax*. Edited by Gabriela Pană Dindelegan, Adina Dragomirescu, Irina Nicula and Alexandru Nicolae. Cambridge: Cambridge Scholars Publishing.

Vernice, Mirta, and Maria Teresa Guasti. 2015. The acquisition of SV order in unaccusatives: Manipulating the definiteness of the NP. *Journal of Child Language* 42: 210–37. [CrossRef] [PubMed]

Yip, Virginia, and Stephen Matthews. 2000. Syntactic transfer in a Cantonese-English bilingual child. *Bilingualism: Language and Cognition* 3: 193–208. [CrossRef]

Zdrojewski, Pablo, and Liliana Sánchez. 2014. Variation in accusative clitic doubling across three Spanish Dialects. *Lingua* 15: 162–76. [CrossRef]

Zuckerman, Shalom. 2001. The Acquisition of 'Optional' Movement. Ph.D. dissertation, University of Groningen, Groningen, The Netherlands.

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Bilingual Processing of Comparative Structures in Spanish

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Abstract: Previous studies have focused on the access of content words to investigate the cognitive strategies used in bilingual processing (e.g., Fernández 2003), but less is known about functional words. In this study, I assess (i) whether three groups of bilingual speakers of Spanish (native, heritage, and second language (L2) speakers) access the lexically-encoded information of the quantifier *más* 'more' to activate a comparative structure interpretation, and (ii) what processing strategies are used to resolve a temporary semantic ambiguity that surfaces upon accessing that interpretation. Using a self-paced reading task, three groups of Spanish speakers living in the United States read comparative sentences, which allowed for two possible continuations at the subordinate clause: a subject continuation (e.g., *El cantante obtiene más premios que el pianista en el festival* 'The singer gets more awards than the pianist at the festival') or an object continuation (e.g., *El cantante obtiene más premios que críticas en el festival* 'The singer gets more awards than criticism at the festival'). Results revealed longer reading times for the subject comparison compared to the object comparison structures, and no significant differences between the three groups, suggesting that participants in all groups followed similar processing strategies and preferences in the reading of comparative structures.

Keywords: comparative structures; bilinguals; Spanish; English; comprehension

1. Introduction

Koenig et al. (2002, p. 226) define the term lexically-encoded information as "that information which is accessed upon recognition of a word [...] and is relatively specific to the relevant verb." Lexically-encoded information comprises phonological, semantic, or syntactic information, as well as implicit information about the frequency of that word being followed by another word. Previous studies on cognitive processing have been conducted to better understand how the parser accesses and uses that lexical information during online comprehension (e.g., Altmann et al. 1998; Anisimov et al. 2014; Coco and Keller 2015; Demestre and García-Albea 2004; Dussias 2003; Dussias and Scaltz 2008; Dussias and Sagarra 2007; Engelhardt et al. 2017; Fernández 2003; Garnsey et al. 1997; Havik et al. 2009). These studies have suggested that, with enough experience with a language, the linguistic system can extract lexically-encoded information, including the probability of a specific word to be followed by a preferred continuation over several competing possibilities, to anticipate upcoming linguistic information in a sentence (e.g., Altmann 1998). For example, an English speaker who reads the string of words *The boy eats macaroni and ...* will most likely select the word *cheese* automatically as the most possible continuation, whereas other less frequent continuations, such as *vegetables*, will be considered a secondary option. Thus, the expectations to use *cheese* over *vegetables* is because the structure *macaroni and cheese* is most likely to appear together than *macaroni and vegetables*.

The use of lexically-encoded information during processing has been found to be an intrinsic mechanism of the linguistic system in monolinguals (e.g., Altmann 1998). However, with bilinguals' processing in their second language (L2), results were originally mixed, suggesting in many instances

that L2 speakers do not always access all the information encoded in the lexicon, resulting in differences when native and L2 learners were compared. This has led to suggest that L2 speakers are limited in the amount of linguistic information accessible to the comprehension system (e.g., Martin et al. 2013), which in turn, results in the inability to access information in the L2 like a native speaker. Later, research took issue with these differences and found that the ability of L2 speakers to use the same processes as native speakers during comprehension is determined by the speaker's individual differences, such as their level of proficiency or the structure at hand, making it possible for L2 speakers to process information like native speakers when certain conditions were met (see Kaan 2014).

Although much of the work on lexically-encoded information has focused on exploring the verb (e.g., Bernolet and Hartsuiker 2010; Demestre and García-Albea 2004; Dietrich and Balukas 2012; Ferreira and Schotter 2013; Garnsey et al. 1997; Villegas 2014) or nouns (e.g., Dussias 2003; Fernández 2003), fewer studies have investigated whether native and non-native speakers can access and use information encoded on function words during processing (e.g., Dussias et al. 2013; Hopp 2013). This distinction between content and functional words is of special interest for psycholinguistic research because previous evidence from the monolingual literature has suggested that function words have a different representation in the brain than content words (e.g., Brown et al. 1999) and that they differ in the roles that they play in online sentence processing (e.g., Segalowitz and Lane 2000), raising the question of whether these results found in monolingual speakers can also be found in other bilingual groups, such as second language learners and heritage speakers.

In this article, I investigate the comprehension of native and non-native speakers of Spanish to examine whether they access the encoded information of the words *más* ... *que* ('more ... than') to activate a comparative structure in Spanish, and whether they use that information during comprehension to resolve a temporary semantic ambiguity between two possible comparisons. To that end, I use comparative structures in Spanish (e.g., *El cantante obtiene más premios que* ... 'The singer gets more awards than ... '), a novel structure in the processing literature. This structure is of interest for two reasons. First, the encoded information of the functional words *más* ... *que* ('more ... than') is necessary to interpret the sentence as a comparative clause. Second, that interpretation presents a temporary ambiguity between two possible continuations at the subordinate clause where either a comparison with the subject (i.e., e*l cantante* 'the singer') or the object (i.e., *premios* 'the awards') are possible, making it a structure ideal to measure the preferred type of continuation of two competing linguistic outcomes.

1.1. Lexically-Encoded Information

The parser is the cognitive system involved in the comprehension of language. This system is fast and able to extract phonological, semantic, morphological, and syntactic information encoded in the lexicon to establish the relationships between lexical items in a sentence. Studies conducted with monolingual speakers have found that the parser is able to extract lexical information and use it to facilitate comprehension. For instance, Altmann and Kamide (1999) investigated how lexically-encoded information could facilitate the assignment of thematic roles during sentence processing. In their study, they presented participants with a static picture containing a child, a toy car, a toy train, a ball, and a cake. Participants were then presented orally with the sentence "The boy will eat the cake", while monitoring their eye movements. Interestingly, the researchers found that participants directed their eyes to the picture of the cake moments before they heard the word *cake*, suggesting that the participants used the semantic information of the verb *eat* to discriminate all the temporarily ambiguous items in the picture that were not edible and direct their attention to the only plausible element (i.e., the cake). Thus, the results suggest that the participants were able to access the semantic information of the word *eat* to conclude that the direct object had to be *cake*, because it was the only eatable item in the visual stimulus.

Verbs have received a special attention in the literature, mostly because they determine the main syntactic relationships between the constituents of a sentence. They contain the semantic information of the action expressed, the syntactic relationships between the verb and its arguments through thematic role assignments, and, in languages like Spanish, morphological information that specifies the tense, aspect, mood of the action as well as the person and number of the agent. More interestingly, studies have found that the information contained in the verb is used to explore the relation between the verb and the preference of certain syntactic continuations over others (e.g., Demestre and García-Albea 2004; Trueswell et al. 1993). For example, Trueswell et al. (1993) investigated subcategorization biases of transitive verbs in English that could be followed either with a Determiner Phrase[1] (DP; e.g., *the boy admitted the mistake and went home*) or a sentence complement clause (SC; e.g., *the boy admitted the mistake was problematic*). They used verbs that were biased towards the use of DP structures (e.g., *The doctor visited the child . . .*) and measured the reading times in sentences with temporarily ambiguous nouns that were possible continuations of verbs that were biased towards the DP (Direct Object-bias verbs). Their results showed that sentences that contained verbs that were strongly biased for the DP continuation were read faster than when the same verbs were followed by the SC continuation. They interpreted the results as the participants being able to use the lexical information of the verb to create preferences for a specific syntactic structure following the verb. Later research has investigated the frequency with which a verb was used, how it affected the preferences for a specific syntactic structure of the direct object following it, and whether those preferences followed the predictions established by previous models of sentence processing (e.g., Garnsey et al. 1997).

In the bilingual literature, the study of syntactic encoded information has also focused heavily on the verb. Studies on verb bias in Spanish have been studies both in production (e.g., Dietrich and Balukas 2012; Dussias et al. 2010) and comprehension (e.g., Dussias and Scaltz 2008). One interesting result extracted from the bilingual literature is the discovery of crosslinguistic differences regarding the information encoded in verbs. That is, verbs that are biased towards the subcategorization of an DP in English, do not necessarily have the same biases in Spanish, revealing the possibility of different processing outcomes depending on the language used (e.g., Dussias et al. 2010).

Other studies have explored whether bilinguals were able to use the encoded information of the verb to decide on the verb morphology used at the first subordinate clause. Villegas (2014), using similar materials to the study conducted with monolinguals by Demestre and García-Albea (2004), investigated whether immersion in the L2 English environment affected the sensitivity to process morphological information efficiently by native and heritage speakers of Spanish. Experimental items were constructed using verbs in Spanish that obligatorily subcategorized for a verb marked with subjunctive mood morphology at a subordinate clause. For example, in a sentence like *Pedro aconseja a los chicos que beban agua y que coman mucho* ('Peter advises the boys to drink water and eat a lot'), the verb *aconseja* 'advises' requires that the verb in the subordinate clauses (e.g., *beban* 'drink' and *coman* 'eat') be marked with subjunctive mood morphology. Thus, he hypothesized that if participants were able to access the subcategorization information encoded in the main verb, participants would expect the use of subjunctive morphology at the subordinate clause. He compared the sentences to similar ones where the verb of the first subordinate clause was in indicative mood, marking a relative clause (e.g., *Pedro aconseja a los chicos que beben agua que coman mucho* 'Peter advises the boys who drink water to eat a lot'). The results showed that all groups were able to access the information of the main verb to select the correct morphology of the upcoming verb during comprehension and, more interestingly, that there were no differences between native and heritage speakers of Spanish.

The studies reviewed in this section so far have focused on content words. However, fewer studies have investigated the ability of bilingual speakers to access the encoded information of functional

[1] I use Determiner Phrase (DP) instead of Noun Phrase (NP) following Abney (1987) proposal of the DP hypothesis, which states that the Noun Phrase is headed by the functional element D, identified with the determiner.

words during reading comprehension. Such words have been often problematic for the study of comprehension because they are usually skipped during online reading tasks when the stimuli are presented within the sentence all at once. Yet, some studies have suggested that monolingual and bilingual speakers are able to extract information from functional words and that the information can affect comprehension (e.g., Brown et al. 1999; Dussias et al. 2013; Hopp 2013). For instance, studies have investigated whether bilingual speakers used grammatical gender encoded in Spanish articles to anticipate the grammatical gender of the upcoming noun. One example is Dussias et al. (2013) where, following a previous study with monolingual speakers of Spanish (Lew-Williams and Fernald 2007), they investigated whether grammatical gender encoded in articles facilitated the anticipation of nouns in Spanish. They tested monolingual speakers of Spanish, L1 Italian–L2 Spanish, and L1 English–L2 Spanish speakers to investigate whether language systems that have grammatical gender in the L1 (i.e., Italian) make it easier for L2 learners to access and use that information in their L2 Spanish when compared to languages that do not have grammatical gender (i.e., English). Their results showed that L1 Italian speakers only revealed an anticipatory effect when the determiner and the noun in Spanish were feminine, but failed to find the same results with masculine gender markings. For L1 English speakers, their ability to use grammatical gender during processing was modulated by proficiency. That is, L1 English participants with higher proficiency in Spanish used the information of the article to anticipate the noun whereas those with lower proficiency did not.

This article contributes to this line of research and further explores the accessibility to lexically-encoded information in functional words using comparative structures in Spanish. In these structures, the access to the semantic information of the words *más* . . . *que* 'more . . . than' is necessary for the interpretation of a comparative subordinate clause. Moreover, this interpretation creates a temporary ambiguity during comprehension that can be resolved through case and theta-role assignments within the subordinate clause. To that end, I explore the structure under study next.

1.2. Comparative Structures

Comparative structures establish a relation of superiority, inferiority, and equality between two notions through grammar (Gutierrez Ordóñez 1997; Real Academia Española 2009). In this paper, I focus on comparative structures of superiority in Spanish, such as example (1):

1. *El cantante obtiene más premios que el pianista en el festival*
   'The singer gets more awards than the pianist at the festival.'

Sentences like (1) are formed by identifiable constituents. First, the comparative notion establishes the semantic relation between the constituents that are being compared (e.g., *el cantante* 'the singer' and *el pianista* 'the pianist'). This semantic relation is determined syntactically by a first constituent of the comparison (i.e., *el cantante*) and the second constituent of the comparison (i.e., *el pianista*). Preceding the second constituent of the comparison, the comparative quantifier *más* ('more') determines the degree of comparison (i.e., superiority). Finally, the complementizer[2] (i.e., *que* 'than'), together with the second constituent of the comparison, form the comparative complement (i.e., *que el pianista* "than the pianist").

To interpret comparative sentences efficiently, the parser has to consider several things. First, the lexical information of the functional word *más* ('more') has to be accessed obligatorily to activate the comparative structure. If that information were not accessed, the subordinate clause would have to be interpreted as a relative clause. Second, the element following the word *que* must be a DP, which establishes the comparison with the subject or the object of the sentence. Finally, the parser must

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[2] I follow here Gutierrez Ordóñez (1997) who argues that the comparative structure following *que* in the structure presented in (1) (i.e., *que el pianista en el festival*) is a subordinate clause because this part of the comparative structure is dominated by an elided verb (i.e., *El cantante obtiene más premios que el pianista [obtiene] en el festival*) that provides case to the second element of the comparison.

establish a preference between competing elements that can be possibly compared at the subordinate clause. What is interesting about these structures, as pointed out by Gutierrez Ordóñez(1997), is that both the subject and the object are potential candidates for the semantic comparison:

2. ***El cantante*** *obtiene más premios que* ***el pianista*** *en el festival*
   '**The singer** gets more awards than **the pianist** at the festival'
3. *El cantante obtiene más* ***premios*** *que* ***críticas*** *en el festival*
   The singer gets more **awards** than **criticism** at the festival

Thus, the comparison may occur with the subject of the main clause as in (2) (i.e., el *cantante/el pianista*) or with the direct object as in (3) (i.e., *premios/críticas*), creating a temporary semantic ambiguity on the type of continuation that can be resolved through theta-role assignment. If we assume that the subordinate clause contains an elided verb that assigns theta roles to its arguments and that the verb is elided at the subordinate clause to avoid repetition (see footnote 1), one may argue that the DP surfacing at the comparison (i.e., *el pianista/críticas*) must mirror how the parser initially interprets the main clause. Thus, if the parser interprets these sentences as a comparison between the subjects, a DP with nominative case and agent theta-role should be expected at the subordinate clause (i.e., *el pianista*). However, if the parser interprets the sentence as a comparison between the objects, the first DP at the subordinate clause would be expected to receive accusative case and theme theta-role (i.e., *críticas*). Consequently, the initial interpretation of the main clause should facilitate the anticipation of case and theta-role assignments at the DP of the subordinate clause.

The structure is relevant when investigating comprehension by bilingual speakers because it can provide further insight into what information is used by the parser that allows for specific subcategorization of the type of continuation in comparative clauses.

2. Processing of Comparative Clauses

2.1. Methods

2.1.1. Preliminary Norming Study

Following previous studies investigating the preferred subcategorization of verbs in English (verb bias; e.g., Jaeger and Snider 2007; Trueswell et al. 1993), I normed the preferred type of continuation in comparative structures. To that end, I extracted 1233 tokens from the Corpus del Español database (Davies 2002), which included written and spoken sources from different Spanish speaking countries. Searches included structures formed by any verb followed by the word *más* ('more'), any noun, and the word *que* ('than'). Additional searches kept the initial structure adding one to five words before and after the first constituent of the comparison to include as many tokens as possible. The goal of this norming study was to investigate the frequency of the possible subcategorizations in comparative structures.

First, all tokens were coded to identify which ones contained comparative structures. Results showed that 810 of the tokens were comparative structures. After they were identified, tokens were coded again by the type of second constituent of the comparison following the word *que* ('than'). Tokens were coded based on whether the second constituent set a comparison with the:

4. a. Subject
*En este sentido, **el PP** está más a la izquierda que **el PSOE**.* (76 19-OR)

b. Direct Object
*Lógicamente, pues, la novedad del ambiente seminarista le causó más **placeres** que **nostalgias**.* (5 19-F)

c. Indirect Object
*Sin embargo, **al importante dios tebano Amón** se le otorgó más importancia que **a otras divinidades.*** (17 19-AC)

d. Adverb
*Es decir, y además que **en Cochabamba** tuvo más votos que **en ninguna parte**.* (1 19-OR)

e. Complement
*Las tintas de imprenta se parecen más **a la pintura** que **a la tinta para escritura**, pues se componen de pigmentos [. . .]* (104 19-AC)

Results (Table 1) showed that the most frequent type of comparison is the comparison with a subject (n = 290, percentage = 36.80%), followed by the comparison with a direct object (n = 262, percentage = 32.34%), and an adverb (n = 177, percentage = 21.58%). Less frequent are the comparison with an indirect object (n = 24, percentage = 2.96%) and a complement (n = 57, percentage = 7.03%). To observe these differences statistically, a chi-square test of goodness-of-fit was performed to determine whether the five types of continuation were equally preferred. Results showed that preference for the five types of continuation were not equally distributed in the corpus, X^2 (4) = 350.8, $p < 0.001$. To further observe the differences among the five types of continuation, standardized residuals were calculated. In this calculation, positive numbers mean that the frequency of the type of continuation was higher than expected and negative numbers mean that it was lower than expected in a normal distribution. Results showed that there was a higher frequency to form comparison with the subject (+10.06), the object (+7.86), and the adverb (+1.18) than expected. However, comparison with the indirect object (−10.84) and the complement (−8.25) were below expectations. Overall, results suggest that the comparisons with the subject and the direct object were the two most frequent types of continuation when compared to any other constituents of the sentence.

Table 1. Results of the preferred type of continuation in corpus data.

Type of Continuation	*n*	Percentage	Expected *n*	Standardized Residuals
Subject	290	35.8%	162	+10.06
Direct Object	262	32.3%	162	+7.86
Indirect Object	24	3%	162	−10.84
Adverb	177	21.9%	162	+1.18
Complement	57	7%	162	−8.25
TOTAL	810	100%		

The results of this norming study revealed two important findings. First, they showed that there were two prevalent continuations in these structures. Comparisons to the subject and the direct object were more frequent than any other type of continuation. Second, the frequency of both the subject and the direct object continuation was similar (i.e., subject percentage = 35.8%; direct object percentage = 32.3%), showing that expectations should not be driven at first by the frequency of the type of subcategorization. These two findings are relevant because they allow creating accurate

experimental items to investigate the processing of these structures. Since subject and direct object comparisons were the most frequent comparative structures, they can be selected to create a temporary semantic ambiguity between a subject comparison reading and a direct object comparison reading. In addition, these two possible continuations are similarly distributed in the corpus, which suggests there should be no preference of one continuation over the other. However, if there are underlying cognitive processes driving a preference, these differences should be captured during online processing, similar to previous studies that have found differences between the production and the comprehension of the same structures, within the same bilingual participants and arguments that the cognitive processes in comprehension and prediction may differ (e.g., Villegas 2014).

2.1.2. Participants

Three groups of bilingual speakers living in Florida (United States) at the time of the experiment were recruited (Approval of Human Research, University of Central Florida Institutional Review Board No: SBE-14-10568). The first group (native group) consisted of 20 L1 Spanish-L2 English speakers who learned their L1 in a Spanish speaking country since birth and their L2 in the United States during adulthood. The second group (heritage group) consisted of 20 LA Spanish-LB English[3] speakers who were born in the United States or migrated before the age of five, whose parents were originally from a Spanish speaking country, learned Spanish at home as their L1, and considered themselves more dominant in L2 English as adults by their social interactions with the language spoken in their communities. Finally, the third group (learner group) consisted of 22 L1 English–L2 Spanish speakers taking Spanish courses at the university level.

To tap into the information of the participants, participants completed two separate tasks. The first task was a Language History Questionnaire (LHQ), which was a version of the LEAP-Q task designed by Marian et al. (2007). The LHQ reported the demographic information, the linguistic experiences, self-rated linguistic dominance, and self-rated proficiency evaluation of the participants. In addition to the LHQ, participants were administered a short version of the Diploma del Español como Lengua Extranjera (DELE), which certifies the degree of competence and mastery of the Spanish language and is granted by the Ministry of Education, Culture, and Sport of Spain. This was a fifty-item grammar-based questionnaire previously used in research to evaluate the participants' proficiency in Spanish (e.g., Montrul 2004).

A set of one-way analyses of variance (ANOVA, Table 2), with Score as dependent variable and Group (native, heritage, learner) as a between-subject factor, were conducted to investigate group differences with regard to the participants' age, proficiency in Spanish (speaking, reading, listening), their exposure to Spanish (overall, reading, speaking), and the DELE scores. Results (Table 2) revealed significant differences among the groups in all measures. Scheffé post hoc comparisons were conducted for each of the measures to investigate which group prompted the differences.

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[3] It is common in the heritage literature to avoid the use of L1 and L2 to define heritage speakers and to use LA (i.e., language A) and LB (i.e., language B) instead when the acquisition of both languages happens simultaneously (Montrul 2013).

Table 2. Participant information.

	GROUP MEANS			ANOVA	
	Native	**Heritage**	**Learners**	***F***	***p***
n	20	20	22		
Age	26.40 [range: 18–26]	21.45 [range: 18–40]	23.32 [range: 19–39]	5.23	0.009
Proficiency Spanish (x/10)					
Speaking	9.26	8	7.05	13.91	0.000
Reading	9.11	7.75	7.77	8.4	0.001
Listening	9.47	9.40	7.77	33.82	0.000
Exposure Spanish (%)					
Overall	47.37	31.45	24.48	9.11	0.000
Reading	50.79	70.70	61.90	6.24	0.004
Speaking	41.16	24.30	41.62	3.79	0.028
DELE (x/50)	37.90	29.00	26.45	22.38	0.000

DELE: Diploma del Español como Lengua Extranjera ('degree of competence and mastery of the Spanish language').

Regarding age, results revealed that members of the heritage group (Mean (M) = 21.45, Standard Deviation (SD) = 2.41) were significantly younger than the native group (M = 26.40, SD = 6.60, $p = 0.009$). No other group differences were found.

In regard to the participants' proficiency in Spanish, results showed that native speakers rated themselves significantly higher in their speaking (M = 9.26, SD = 0.933) and reading skills (M = 9.11, SD = 0.809) when compared to the participants in the heritage (speaking: M = 8.00, SD = 1.71. $p = 0.018$; reading: M = 7.75, SD = 1.58. $p = 0.003$) and the learner groups (speaking: M = 7.05, SD = 1.25, $p < 0.001$; reading: M = 7.77, SD = 1.02, $p = 0.003$). Moreover, results revealed that the learner group (M = 7.77; SD = 0.813) rated their listening proficiency significantly lower than the native (M = 9.47, SD = 0.697, $p < 0.001$) and the heritage groups (M = 9.40; SD = 0.754; $p < 0.001$).

Next, examining the participants' exposure to Spanish, overall results showed that the native group (M = 47.37, SD = 19.10) rated themselves being overall significantly more exposed to Spanish than the heritage (M = 31.45, SD = 16.17, $p = 0.021$) and the learner groups (M = 24.48, SD = 16.50. $p < 0.001$). However, specific ratings for reading and speaking exposure to Spanish revealed differences between the groups. For reading, heritage speakers (M = 70.70, SD = 14.96) rated themselves as reading significantly more in Spanish than the native group (M = 50.79, SD = 18.12, $p = 0.004$). No other group differences were reported. For speaking, results revealed that the heritage group (M = 24.30, SD = 17.49) rated themselves as being exposed to spoken Spanish almost significantly more often than the native (M = 41.16, SD = 28.83, $p = 0.76$) and the learner (M = 41.62. SD = 20.64, $p = 0.53$) groups.

Finally, results showed significant group differences for the DELE scores. Results revealed that the native speakers (M = 37.90, SD = 5.78) scored significantly higher than the heritage (M = 29.00, SD = 6.43, $p < 0.001$) and the learner (M = 26.45, SD = 5.05, $p < 0.001$) groups. No other group differences were reported.

Overall, participants' data suggest that the native group was generally different from the heritage and the learner groups. In addition, the data also suggest that the heritage and the learner groups were generally not different to each other.

2.1.3. Materials and Procedures

Upon consenting to participate in the experiment, participants were first administered the LHQ and were given as much time as they needed to complete it. After the LHQ, participants then completed a Self-Paced Reading Task (SPRT) designed to investigate the online processing of sentences that were ambiguous between a subject comparative reading and an object comparative reading. The SPRT was selected to ensure that participants read all the words of the sentence and they accessed the word *más* "more" during the task. Twenty-four pairs of sentences were created, representing the following two conditions:

5. a. Subject Comparative Condition

El	*cantante*	*obtiene*	*más*	*premios*	*que*	*el pianista*	*en*	*el*	*festival*
The	singer	gets	more	awards	than	the pianist	at	the	festival

b. Object Comparative Condition

El	*cantante*	*obtiene*	*más*	*premios*	*que*	*críticas*	*en*	*el*	*festival*
The	singer	gets	more	awards	than	criticism	at	the	festival

The difference between the two conditions resides on the first DP following the complementizer *que* ('than'). Thus, assuming that participants access the information encoded in the word *más* 'more', which allows them to identify the structure as a comparative, upon reading the sentence up to the word *que* 'than', participants must encounter a temporary semantic ambiguity based on the case and the theta-role that the DPs receive from the verb. If participants interpret the sentences as a comparison between the subjects (e.g., *el cantante* 'the singer' and *el pianista* 'the pianist' in (5a)), results should show longer reading times in the Object Comparative Condition when compared with the Subject Comparative Condition, because readers should expect a DP with the same case and theta-role at the subordinate clause as the DP selected for comparison at the main clause. However, if participants interpret the sentences as a comparison between the direct objects (e.g., *premios* 'awards' and *críticas* 'criticism' in (5b)), reading times in the Subject Comparative Condition should be longer when compared to the Object Comparative Condition. No differences between the two conditions will be interpreted as the inability to decide on the type of continuation either because (i) participants followed the frequencies found in the corpus study or (ii) they failed to access the information of the functional word *más* 'more' to interpret the structure as a comparative clause.

To control for the effects of frequency at the critical area, a Welch's *t*-test was conducted, comparing the frequency of the DPs between the two conditions[4] and results revealed no significant differences between the two ($t(27.83) = 1.93$; $p = 0.063$). A similar post-hoc analysis was also conducted to measure the effects of length in characters at the critical area. Results from this test revealed a significant difference between the length of the DPs in the two conditions ($t(4.05) = 4.48$, $p < 0.001$)[5].

Participants read 80 sentences during the experiment consisting of 8 practice sentences, 24 experimental sentences, and 48 filler sentences. Practice sentences were designed for the participants to get used to the task, and they were the same for all participants. Experimental sentences were 24 pairs of sentences that were semantically ambiguous between a subject comparison and an object comparison reading. The experimental sentences were divided into two files following a Latin Square design so that participants were not exposed to the same pair of sentences during the experimental session. Finally, all participants read the same 48 filler sentences, which aimed at distracting the participants from identifying the experimental sentences. Out of all the filler sentences, half were random sentences with no set structure that grouped them (e.g., *El ronquido del estudiante fastidiaba a*

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[4] Data frequencies were obtained at the Corpus del Español (Davies 2002) database, the same source of information for the Preliminary Corpus Study, to maintain consistency of the data source.

[5] It is important to point out that the differences in length at the critical area can have a direct effect on the results and their interpretation. I address this in the Analysis and Discussion section below.

sus compañeros de clase 'The snoring of the student bothered his classmates'). The other half were filler sentences similar to those used in studies investigating high and low attachment of relative clauses (e.g., *Hugo escribió a la traductora del dramaturgo que era rusa y anciana* 'Hugo wrote to the translator of the playwright who was Russian and old'). All experimental and filler sentences were randomly mixed so that participants could not recognize the structure under study. In addition, they were all followed by a "yes/no" comprehension question about the information they had just read in the sentence designed to keep participants involved in the task.

Following the SPRT, participants completed the DELE test, which assessed the participants' knowledge of Spanish grammar, and it was used as a reference for their overall proficiency in Spanish. Correct answers were scored with a 1 value and incorrect answers were scored with a 0 value. Overall, the whole session lasted about an hour.

2.2. Hypotheses

The hypotheses for the comprehension study are based on the results from the Preliminary Norming Study, which revealed no difference in the frequency of Subject and Object comparative structures in a corpus of Spanish. Therefore, it was hypothesized that, if participants relied mainly on the frequency of these structures during comprehension, participants were expected to show no differences in processing times at the critical area (i.e., the DP following *que* 'than'). However, if participants prefer one type of continuation over the other, significant differences between the two conditions are expected. If participants initially interpret the structure as a comparison between the subject at the main clause and at the subordinate clause, results should reveal longer reading times in the Object Comparative Condition than in the Subject Comparative Condition because participants will expect a DP containing nominative case and agent theta-role. However, if participants initially interpret the structure as a comparison between the objects, results should show longer reading times in the Subject Comparative Condition than in the Object Comparative Condition because participants will expect a DP with accusative case and patient theta-role.

2.3. Analyses and Results

Prior to the analysis, one sentence was eliminated after data collection took place because it revealed a spelling error that could potentially affect the results at the critical area. The analyses that follow were based on 23 experimental sentences. Mean reading times were calculated for each word in the two experimental conditions. Since the number of words in the critical area were different between the two conditions, the two words following the word *que* ('than') in the Subject Comparative Condition were concatenated, and their times added to create a unique area. This analysis would allow for more accurate results at the critical area.

A repeated measures analysis of variance (ANOVA) was conducted with Type of Continuation (Subject, Object) as a within-subject factor and Group (native, heritage, learners) as a between-subjects factor for each of the areas in the experimental sentences (Table 3). Analysis were conducted treating both participants (*F1*) and items (*F2*) as a random factor. Results revealed no significant effect of Type of Condition and no interaction between the Type of Condition and Group in any of the areas preceding the critical area for both participants and items. At the critical area, results revealed a significant effect of the Type of Continuation for participants ($F1$ (1, 59) = 297.16, $p < 0.001$) and for items ($F2$ (1, 66) = 265.88; $p < 0.001$). For the area following the critical area, results showed a significant effect of the Type of Continuation for participants ($F1$ (1, 59) = 7.19, $p = 0.009$) but not for items ($F2$ (1, 66) = 2.27; $p = 0.137$). There were no significant interactions between the Type of Continuation and Group at the critical and the following areas.

Table 3. Reading times of Type of Continuation with raw data in milliseconds.

		SUBJECTS			ITEMS		
		Mean Reading Times (ms)			Mean Reading Times (ms)		
AREA	**WORD**	**Subject**	**Object**	***p*** *	**Subject**	**Object**	***p*** *
1	*El*	459.22	468.57	0.344	462.96	465.56	0.781
2	*cantante*	619.21	630.92	0.408	624.08	631.26	0.620
3	*obtiene*	604.96	606.39	0.932	605.32	617.10	0.506
4	*más*	469.57	484.59	0.101	473.33	485.89	0.269
5	*premios*	539.52	558.71	0.139	540.18	562.95	0.058
6	*que*	441.20	443.65	0.776	446.03	442.97	0.765
7	*el pianista / críticas*	993.65	639.71	0.000	999.68	628.71	0.000
8	*en*	443.75	472.62	0.009	448.89	468.54	0.137
9	*el*	418.63	433.89	0.241	426.23	433.43	0.538
10	*festival.*	668.07	645.24	0.207	657.41	638.77	0.350

* $\alpha = 0.05$.

However, it is possible that the results obtained in this first analysis could have been influenced by the differences in length of characters between the lexical items at the critical area in both conditions. Whereas the Object Comparative Condition included a DP with only one word (e.g., *críticas*), the Subject Comparative Condition included a DP with a determiner followed by a noun (e.g., *el pianista*). Thus, it was logical to expect that the critical area at the Subject Comparative Condition would take longer to read than the critical area at the Direct Object Comparative Condition just because the region was longer in number of characters in the first condition compared to the second condition.[6] To resolve this, residual reading times were then calculated following Keating and Jegerski (2015) to eliminate the effect that length at the critical area may have had in the results. A regression equation with word length (including the space in the Subject Comparative Condition) as the predictor variable was calculated using the participants' raw reading times for each participant, all areas, and all items (filler sentences included). Reading times predicted by the participants' regression equation was then subtracted from the raw reading times obtained in the experiment, which produces positive and negative results. Negative numbers indicate that reading times were faster than expected, whereas positive ones indicate that they were slower than expected. The data were then submitted for statistical analysis.

A new repeated measures analysis of variance (ANOVA) using residual reading times as data was conducted with Type of Continuation (Subject, Object) as a within-subject factor and Group (native, heritage, learner) as a between-subjects factor for each of the areas of the experimental sentences. The results showed no significant difference between Type of Continuation nor an interaction between Group and Type of Continuation at any of the areas of the experimental sentences except for the critical area (see Table 4 for results). At the critical area (e.g., *el pianista/críticas*), results revealed a significant effect of Type of Continuation for participants ($F1$ (1, 59) = 5.43, $p = 0.023$) and for items ($F2$ (1, 66) = 8.29; $p = 005$) and no interaction between Type of Continuation and Group. Thus, results suggest that the results in the study were not directly affected by the length of the DP at the critical area.

[6] A reviewer has suggested that, although controlling for the number of characters at the critical area was important, it does not take away the fact that the two areas of interest differ in the number of words and that can be another factor driving the results beyond length. I conducted the residual reading time analysis that follows to quantify the possible effect of differences in length at the DP, but I was not able to analyze the effects of number of words taking into consideration the nature of the materials. We are currently investigating this difference and whether the results can be replicated with the same number of words in both conditions.

Table 4. Residual reading times of Type of Continuation in milliseconds *.

		SUBJECTS			ITEMS		
		Mean Reading Times (ms)			Mean Reading Times (ms)		
AREA	**WORD**	**Subject**	**Object**	***p*** **	**Subject**	**Object**	***p*** **
1	*El*	−22.18	−13.07	0.379	−17.89	−16.91	0.913
2	*cantante*	−41.57	−36.37	0.710	−40.95	−30.55	0.440
3	*obtiene*	−6.14	−5.46	0.958	−5.71	5.74	0.451
4	*más*	−2.97	12.64	0.096	-.40	12.92	0.212
5	*premios*	−54.33	−36.83	0.135	−54.56	−32.46	0.053
6	*que*	−16.89	−15.13	0.789	−14.17	−16.18	0.834
7	*el pianista/críticas*	7.99	−26.63	0.023	21.67	−31.61	0.005
8	*en*	13.61	.30	0.254	6.71	−8.68	0.245
9	*el*	−13.59	−7.24	0.452	−9.74	−8.12	0.889
10	*festival.*	34.82	54.42	0.338	28.26	26.56	0.927

* Positive numbers indicate reading times that were slower than expected. Negative results indicate reading times that were faster than expected. ** $\alpha = 0.05$.

3. Discussion and Conclusions

In this paper, I investigated whether three groups of speakers of Spanish access lexically-encoded information from functional words that activate the interpretation of a comparative structure (i.e., *más* ... *que* 'more ... than') and whether, upon accessing that interpretation, participants showed a preference between two competing interpretations (i.e., a subject or an object comparison) based on the case and the theta-role of the first DP at the subordinate clause. To prepare the materials, a norming study was first conducted to investigate the preferred type of comparison, which revealed a preference for subject (4a) and direct object (4b) over indirect object (4c), adverb (4d) and complement (4e) continuations. The results from the comprehension study showed that native speakers, heritage speakers, and L2 learners living in the United States were able to access the linguistic information encoded in the words *más* ... *que* 'more ... than', during comprehension, to identify the structure as a comparative. Further analyses showed a preference for the comparison with the direct object over the subject and no differences between the participant groups. These results suggest that, during comprehension, speakers of Spanish living in the United States show a preference to build the comparison with the object than the subject of the main clause. Overall, these results show important implications in terms of the participants and the processing strategies used in comparative structures.

First, results showed that native and non-native speakers of Spanish were able to extract the information of functional words to interpret the structure as a comparative. Without accessing the information of the word *más* 'more', participants were expected to interpret those sentences as a relative clause. If so, it was hypothesized that the results would show no differences between the conditions. The fact that the results show faster reading times at the Object Comparative Condition over the Subject Comparative Condition suggests that all participants interpreted the sentences as comparative clauses and that both native and non-native speakers of Spanish can use information encoded in functional words that is required to successfully establish a comparison between different components in the structure. This is a relevant finding in this paper because participants revealed similarities in comprehension even when the individual differences show a statistical difference between the proficiency of the three groups. As it was mentioned in the introduction, Dussias et al. (2013) have suggested that processing linguistic information in the L2 may be determined by the grammatical similarities between the languages, and that different outcomes could be expected from different bilingual populations depending on the proficiency of the participants. Here, the results from the comprehension study show that all groups processed the experimental sentences similarly, regardless

of the proficiency differences in Spanish. Recall that results on individual differences between the groups (Table 1) showed differences in proficiency, both self-rated and in the DELE, eliminating proficiency as a possible factor affecting these results. However, it is important to notice that, in Dussias et al. (2013), participants had to process information in the L2 (i.e., grammatical gender) that was not part of their L1 English, whereas this study uses a structure that is similar in both languages.

Second, the results reported in this study bring into question whether the processes identified to take part in the comprehension of syntactic ambiguities can also be extrapolated to other ambiguities in the linguistic domain. This is an important question because it provides more information on whether processing strategies are universal or whether they really depend on the structures and the information being processed. In studies investigating syntactic ambiguities, researchers have used relative clause structures (such as El policía arrestó a la hermana del criado que estaba enferma desde hacía tiempo 'The police arrested the sister$_{female}$ of the servant$_{male}$ who had been ill$_{female}$ for a while'; Dussias and Sagarra 2007). The syntactic ambiguity in this structure resides in making the decision about who the relative pronoun (i.e., *que* 'who') referred to (i.e., *la hermana* 'the sister' or *el criado* 'the servant'). They manipulated the adjective of the relative clause (i.e., *enferma* 'ill'), which matched with the grammatical gender of the main clause, to measure the participants' preference through reading times. The researchers hypothesized that, if participants accessed the information of the two competing DPs at the main clause (i.e., *la hermana* 'the sister' or *el criado* 'the servant') and were sensitive to grammatical gender, processing the grammatical gender at the adjective in the relative clause would reveal their preferences to attach the relative clause to the higher DP (*la hermana* 'the sister') or the lower DP (i.e., *el criado* 'the servant'). Relevant to the results of this paper is that Dussias and Sagarra (2007) found that native speakers of Spanish living in the United States showed a preference to attach the relative clause to the lowest DP, whereas native speakers of Spanish living in Spain showed a preference to attach to the high DP. Similarly, the structure used in this study, which introduces a temporary semantic ambiguity, follows similar processes to those in the studies on syntactic ambiguities, although it uses semantic information encoded in the critical area instead of morphosyntactic information. Here, participants had to access the information of the DP at the subject (i.e., *el cantante* 'the singer') and the DP at the object (i.e., *premios* 'awards') of the main clause before accessing the DP at the subordinate clause. As in relative clause attachment structures, the case and theta-role of the first DP of the subordinate clause was expected to reveal the participants' preference to build a semantic comparison with the subject or the object of the main clause. The results of this study showed that native speakers of Spanish living in the United States showed similar results as in the study of relative clause attachment. That is, in structures with two DPs competing, either syntactically or semantically, speakers of Spanish living in the United States showed similar preferences to use the latest processed DP at the main clause to process these structures. If this holds true, it may be possible that the processing strategies used in the resolution of syntactic ambiguities are also active during the resolution of semantic ambiguities.

Nonetheless, conclusions from this study should be drawn carefully for two reasons. First, as indicated in footnote 4, there is a methodological issue that was pointed by the reviewers in relation to the length in characters and words at the critical area. In the analyses of the results, I applied an analysis using residual reading times that is often used in psycholinguistic research to control for length at the critical area. This analysis showed faster than expected reading times at the Object Comparative Condition, supporting the results of the original analysis. However, as indicated by the reviewer, this does not take away the fact that the critical area in the two conditions differed in the number of words. This difference in the number of words may have had an effect on the results that may have not been completely resolve through the analyses of residual times. To investigate this, we are currently conducting two separate variations in our lab using comparative structures to further investigate this issue. The first experiment has changed the contents of the DP into a proper noun consisting on a single word, so that the critical area has the same number of words across conditions. The second experiment explores the processing of bilinguals using the same structure in Russian,

because this language does not require a determiner in the Subject DP and the case is marked overtly through morphology. Results from these studies will help to shed light on the results from this study.

In addition, the results reported here lack a group of bilingual speakers that were not immersed in a linguistic environment dominant in English. In this study, native speakers where living in the United States at the time of the experiment. This group would be important to understand how native speakers of Spanish process this structure under minimal influence of English. These groups were not originally included in this study because of limitations on funding at the time of the investigation. Instead, to cover this gap, I reported the results from a norming study that investigates the overall production of these structures in Spanish. This analysis was conducted based on previous arguments arguing that corpus data can also inform us about the production of native speakers (Biber 2000). Yet, I recognize that the analysis of the data provided, although informative, is not conclusive, and that the direct production of these structures by the participants would have provided more information on the structure. This is currently being investigated in a study on the production and comprehension of speakers of Spanish, similar to the study reported here, that includes a group of native speakers of Spanish with no immersion in the L2 English environment using eye-tracking methodology.

In conclusion, the results of this study suggest that all three groups of speakers, regardless of their proficiency level, display similar results and were able to extract information from functional words in Spanish to process comparative clauses. Moreover, the processing strategies used to parse these structures may be guided by strategies captured in other processing studies investigating syntactic ambiguities, something that future studies should corroborate further.

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References

Abney, Steven P. 1987. The English Noun Phrase in its Sentential Aspect. Ph.D. dissertation, Massachusetts Institute of Technology, Cambridge, MA, USA, May 8.

Altmann, Gerry. 1998. Ambiguity in sentence processing. *Trends in Cognitive Sciences* 2: 146–52. [CrossRef]

Altmann, Gerry, and Yuki Kamide. 1999. Incremental interpretation at verbs: Restricting the domain of subsequent reference. *Cognition* 73: 247–64. [CrossRef]

Altmann, Gerry, Kathy van Nice, Alan Garnham, and Judith-Ann Henstra. 1998. Late Closure in Context. *Journal of Memory and Language* 38: 459–84. [CrossRef]

Anisimov, Victor, Olga V. Fedorova, and Alexander V. Latanov. 2014. Eye movement parameters in reading sentences with syntactic ambiguities in Russian. *Human Physiology* 40: 57–68. [CrossRef]

Bernolet, Sarah, and Robert J. Hartsuiker. 2010. Does verb bias modulate syntactic priming? *Cognition* 114: 455–61. [CrossRef] [PubMed]

Biber, Douglas. 2000. Investigating Language Use through Corpus-based Analyses of Association Patterns. In *Usage-Based Models of Language*. Edited by Michael Barlow and Suzanne Kemmer. Standford: CSLI Publications, pp. 287–314. ISBN 1-57586-219-0.

Brown, Colin, Peter Hagoort, and Mariken ter Keurs. 1999. Electrophysiological signatures of visual lexical processing: Open-and closed-class words. *Journal of Cognitive Neuroscience* 11: 261–81. [CrossRef]

Coco, Moreno, and Frank Keller. 2015. The interactions of visual and linguistic saliency during syntactic ambiguity resolution. *Quaterly Journal of Experimental Psychology* 68: 46–74. [CrossRef] [PubMed]

Davies, Mark. 2002. Corpus del Español: 100 million words, 1200s–1900s. Available online: http://www.corpusdelespanol.org (accessed on 6 February 2013).

Demestre, Josep, and Jose Eugenio García-Albea. 2004. The on-line resolution of the sentence complement/relative clause ambiguity: Evidence from Spanish. *Experimental Psychology* 51: 59–71. [CrossRef] [PubMed]

Dietrich, Amelia Jane, and Colleen Balukas. 2012. A Corpus Study of Verb Bias in Spanish. In *Selected Proceedings of the 14th Hispanic Linguistics Symposium*. Edited by Kimberly Geeslin and Manuel Díaz-Campos. Somerville: Cascadilla Proceedings Project, pp. 258–71.

Dussias, Paola E. 2003. Syntactic ambiguity resolution in second language learners: Some effects of bilinguality on L1 and L2 processing strategies. *Studies in Second Language Acquisition* 25: 529–57. [CrossRef]

Dussias, Paola E., and Tracey R. Cramer Scaltz. 2008. Spanish–English L2 speakers' use of subcategorization bias information in the resolution of temporary ambiguity during second language reading. *Acta Psychologica* 128: 501–13. [CrossRef] [PubMed]

Dussias, Paola E., and Nuria Sagarra. 2007. The effect of exposure on syntactic parsing in Spanish–English bilinguals. *Bilingualism: Language and Cognition* 10: 101–16. [CrossRef]

Dussias, Paola E., Alejandra Marful, Chip Gerfen, and María Teresa Bajo Molina. 2010. Usage frequencies of complement-taking verbs in Spanish and English: Data from Spanish monolinguals and Spanish—English bilinguals. *Behavior Research Methods* 42: 1004–11. [CrossRef] [PubMed]

Dussias, Paola E., Jorge R. Valdés Kroff, Rosa E. Guzzardo Tamargo, and Chip Gerfen. 2013. When gender and looking go hand in hand: Grammatical gender processing in L2 Spanish. *Studies in Second Language Acquisition* 35: 353–87. [CrossRef]

Engelhardt, Paul, Joel T. Nigg, and Fernanda Ferreira. 2017. Executive function and intelligence in the resolution of temporary syntactic ambiguity: An individual differences investigation. *The Quarterly Journal of Experimental Psychology* 70: 1263–81. [CrossRef]

Fernández, Eva. M. 2003. *Bilingual Sentence Processing: Relative Clause Attachment in English and Spanish*. Amsterdam: John Benjamin, vol. 29, ISBN 9781588113450.

Ferreira, Victor S., and Elizabeth R. Schotter. 2013. Do verb bias effects on sentence production reflect sensitivity to comprehension or production factors? *Quarterly Journal of Experimental Psychology* 66: 1548–71. [CrossRef] [PubMed]

Garnsey, Susan, Neal Pearlmutter, Elizabeth Myers, and Melanie A. Lotocky. 1997. The contributions of verb bias and plausibility to the comprehension of temporarily ambiguous sentences. *Journal of Memory and Language* 37: 58–93. [CrossRef]

Gutierrez Ordóñez, Salvador. 1997. *Estructuras Comparativas*. Madrid: Arcos.

Havik, Else, Leah Roberts, Roeland van Hout, Robert Schreuder, and Marco Haverkort. 2009. Processing subject-object ambiguities in the L2: A self-paced reading study with German L2 learners of Dutch. *Language Learning* 59: 73–112. [CrossRef]

Hopp, Holger. 2013. Grammatical gender in adult L2 acquisition: Relations between lexical and syntactic variability. *Second Language Research* 29: 33–56. [CrossRef]

Jaeger, T. Florian, and Neal Snider. 2007. Implicit Learning and Syntactic Persistence: Surprisal and Cumulativity. *University of Rochester Working Papers in the Language Sciences* 3: 26–44.

Kaan, Edith. 2014. Predictive sentence processing in L2 and L1: What is different? *Linguistic Approaches to Bilingualism* 4: 257–82. [CrossRef]

Keating, Gregory. D., and Jill Jegerski. 2015. Experimental designs in sentence processing research. *Studies in Second Language Acquisition* 37: 1–23. [CrossRef]

Koenig, Jean-Pierre, Gail Mauner, and Breton Bienvenue. 2002. Class specificity and the lexical encoding of participant information. *Brain and Language* 81: 224–35. [CrossRef] [PubMed]

Lew-Williams, Casey, and Anne Fernald. 2007. Young children learning Spanish make rapid use of grammatical gender in spoken word recognition. *Psychological Science* 18: 193–98. [CrossRef] [PubMed]

Marian, Viorica, Henrike K. Blumenfeld, and Margarita Kaushanskaya. 2007. The language experience and proficiency questionnaire (LEAP-Q): Assessing language profiles in bilinguals and multilinguals. *Journal of Speech, Language, and Hearing Research* 50: 940–67. [CrossRef]

Martin, Clara D., Guillaume Thierry, Jan-Rouke Kuipers, Bastien Boutonnet, Alice Foucart, and Albert Costa. 2013. Bilinguals reading in their second language do not predict upcoming words as native readers do. *Journal of Memory and Language* 69: 574–88. [CrossRef]

Montrul, Silvina. 2004. Subject and object expression in Spanish heritage speakers: A case of morphosyntactic corvengence. *Bilingualism: Language and Cognition* 7: 125–42. [CrossRef]

Montrul, Silvina. 2013. *El Bilingüismo en el Mundo Hispanohablante*. Hoboken: Wiley-Blackwell, John Wiley & Sons Ltd. ISBN 978-0-470-56720-1.

Real Academia Española. 2009. *Nueva Gramática de la Lengua Española*. Madrid: Real Academia Española.

Segalowitz, Sidney J., and Korri C. Lane. 2000. Lexical access of function versus content words. *Brain and Language* 75: 376–89. [CrossRef] [PubMed]

Trueswell, John C., Michael K. Tanenhaus, and Christopher Kello. 1993. Verb-specific constraints in sentence processing: Separating effects of lexical preference from garden-paths. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 19: 528–53. [CrossRef] [PubMed]

Villegas, Alvaro. 2014. The Role of L2 English Immersion in the Processing of L1 Spanish Sentence Complement/Relative Clause Ambiguities. Ph.D. dissertation, The Pennsylvania State University, State College, PA, USA, March 4.

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Revisiting (Non-)Native Influence in VOT Production: Insights from Advanced L3 Spanish

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Abstract: A growing body of research investigating cross-linguistic influence on the acquisition of a third phonological system suggests that first (L1) and second (L2) languages concur in influencing oral production in the target third language (L3). Yet, there are also claims of either a more noticeable effect of the L2 on the L3, or a prevailing influence from the L1. This study further explores whether the L1 and the L2 compete or converge on exerting influence on L3 pronunciation. To do so, we examine the production of voice onset time for voiceless stops by adult advanced learners of L3 Spanish divided into two groups (15 L1 English-L2 French, and 15 L1 French-L2 English speakers). Three monolingual control groups were also tested. Participants were recorded reading word lists that contained voiceless stops in stressed onset position. A Kruskal-Wallis test uncovered significant differences traceable to the L1-English speakers, which puts them at a slight disadvantage vis-à-vis their Francophone counterparts. These results favor claims of a more decisive role for the L1 in L3 pronunciation. We compare our results to findings from previous studies targeting intermediate learners, and find proficiency in the L3 may account for the observed differences.

Keywords: L1 influence; L2 influence; voice onset time; third language phonology

1. Introduction

Research on the acquisition of phonological systems beyond the second language (L2) is "a newly emerging dynamic area" (Cabrelli Amaro and Wrembel 2016, p. 395). However, within the recently established field of Third Language Acquisition (TLA), the acquisition of third language (L3) phonology has often been labeled as an understudied domain (Cabrelli Amarom 2012). While this has been the case in the last two to three decades, this trend in attention is finally reversing. Thanks to the upsurge experienced in recent years, studies devoted to L3 phonetics/phonology seem no longer to lag behind those dealing with L3 lexicon and L3 syntax.

In their state-of-the art overview of the subfield, Cabrelli Amaro and Wrembel (2016) list four general questions L3 phonology research has addressed so far, which revolve around the following issues: (i) the so-called bilingual advantage; (ii) the source and/or (iii) directionality of transfer, and (iv) the developmental path of acquisition of an L3 sound system. This study will add to the body of work devoted to the second issue, the source of transfer, which will also be referred to as cross-linguistic

influence (CLI) throughout the paper. We will focus on forward transfer and lateral transfer as defined by Jarvis and Pavlenko (2008), that is, influence from the L1 to the L2/L3, and from the L2 to the L3.

When delving into CLI sources, it is not uncommon for studies dealing with L3 lexicon and syntax to test how L2 status and typological similarity compete and/or interact in determining which previously acquired language will become the main contributor of influence (for a discussion on the alleged competition between these two factors, see Sánchez (2011)). While typological similarity has been expected to boost positive L2-to-L3 transfer (Gut 2010; Mehlhorn 2007), it has not been reported as being a decisive factor in determining CLI in L3 pronunciation so far. The initial disregard towards the L2 as a source of phonological influence, or towards typology's role in promoting it, could be due to the fact that, generally, the native language seems to be regarded as the true hurdle to overcome in the acquisition of all sound systems beyond the L1. Drawing on observations from a seminal case study (Williams and Hammarberg 1998), Hammarberg (2009) reported that although his participant relied more on the L2 in the initial stages of L3 learning, L1 influence was more evident as L3 proficiency increased.

A predominant effect of the L1 on the L3 has been reported in earlier TLA investigations (e.g., Llisterri and Poch 1987; García Lecumberri and del Puerto 2003). Several recent studies, however, show that non-native languages can also considerably impact a developing L3 sound system (Kamiyama 2007; Llama et al. 2010; Tremblay 2007; Wrembel 2010—see also Bardel and Falk 2007, for similar claims in L3 syntax). An alternate finding increasingly reported in the TLA literature is the presence of combined transfer, understood as the interaction of two or more languages, which concur in influencing the target one, including language universals. More specifically, combined CLI has been defined as "a type of transfer that occurs when two or more languages interact with one another and concur in influencing the target language, or whenever one language influences another, and the already-influenced language in turn influences another language in the process of being acquired" (De Angelis 2007, p. 49). Examples of combined CLI in L3 pronunciation are provided by Benrabah (1991), who found that his Algerian Arabic-French bilinguals transferred L2 French vowels and L1 Arabic consonants to their L3 English. Similarly, Pyun (2005) found evidence of phonological knowledge in L3 Swedish traceable to phonological rules from L1 Korean (such as unreleased obstruents in syllable-final position), L2 English (such as r-coloring vowels when followed by /r/), the L3 itself (such as the deletion of /r/ when followed by an alveolar consonant), and inter-rules, that is, rules developed by learners to act as bridges between the acquired languages and the language being acquired (such as /i/-epenthesis)[1]. Finally, Blank and Zimmer (2009) reported, for example, that the English vowel /ɔ/ displayed overlap in the first and second formants (F1/F2) with its L2 equivalent, as well as overlap in F1 with its L1 equivalent. This, together with several similar instances, was interpreted as hybrid vowel production in the L3 English of an L1 Brazilian Portuguese/L2 French speaker.

In view of the mixed findings discussed so far, we designed a study with the main objective of further exploring the issue of native (L1) vs. non-native (L2) CLI on the acquisition of a third phonological system. To do so, we focused on the production of voice onset time (VOT, one of the most frequently studied properties in L3 phonology) by L3 learners at an advanced level of proficiency (an understudied group in TLA). It is generally believed that CLI patterns are more robust in early stages of acquisition. This does not mean, however, that CLI does not occur at more advanced stages (see De Angelis 2007, for a similar claim). Admittedly, it may be harder to identify CLI once a certain level of proficiency has been reached in the target language. Nonetheless, it seems reasonable to examine learners at all levels to broaden our understanding of proficiency effects on CLI. Moreover, recall Hammarberg (2009)

[1] Pyun (2005) labels "inter-rules" those rules that shape the interlanguage of the learners but that do not exist as internal rules neither in the grammar of the source languages (namely Korean and English) nor in the grammar of the target language (Swedish). For an account of how these examples illustrate inter-rule creation/use and transfer of L1, L2 and L3 phonological rules, as well as additional examples of each category, please see (Pyun 2005, pp. 56–60)).

claim of a shift of transfer source (from the L2 to the L1) in the pronunciation of his participant as a result of increased L3 proficiency. Choosing this property and this proficiency level allows, then, for an interesting comparison with results from a previous study by Llama et al. (2010), who targeted intermediate learners, and claimed a predominant influence from the L2. By conducting a partial replica of that study, we intend to see if a switch in source language will be observed. As in Llama et al. (2010), the L3 is Spanish and the background languages selected in this study are English (L1 or L2) and French (L2 or L1).

2. Voice Onset Time in Second and Third Language Acquisition

Third Language Acquisition researchers have given more attention to segmental properties (including phonetic knowledge such as VOT) than to suprasegmental ones, as tends to happen in Second Language Acquisition (SLA) research in general (Gut 2009). In fact, L3 phonology studies often turn to L2 work as a point of reference upon which to develop. Unsurprisingly, then, L3 research mirrors SLA tendencies in several ways, such as the imbalance between the number of studies focusing on production (more frequent) and those focusing on perception, or the bias in favor of segmental features, as just mentioned. Among the limited number of L3 phonetic/phonological issues that have been investigated so far, we find vowels (Blank and Zimmer 2009; Kamiyama 2007; Kopečková 2015; Lechner and Kohlberger 2014; Missaglia 2010; Sypiańska 2016), and a phonetic measure of phonemic voicing in stops: VOT (Liu 2016; Llama et al. 2010; Tremblay 2007; Wrembel 2014; Wunder 2011). Both vowels and VOT also happen to be the most frequently investigated aspects of L2 speech (see, for example, Cabrelli Amaro and Wrembel 2016; Hansen Edwards and Zampini 2008 for similar claims).

When (Lisker and Abramson 1964, p. 422) coined the term VOT, they defined it as "the time interval that marks the release [of the stop] and the onset of periodicity that reflects laryngeal vibration [for vowel production]". Voice onset time is the most commonly used phonetic measure of phonemic voicing in pre-vocalic stops. Of interest to this study, VOT production for voiceless stops is similar in Spanish and French, on the one hand, and different in English, on the other. When placed along a VOT continuum, Spanish and French voiceless stops are expected to fall within the 0 to 30 ms range associated with short lag (as per Cho and Ladefoged 1999 definition of voiceless unaspirated stops). In contrast, typical VOT values for their English counterparts are greater than 30 ms and often fall within a 60–100 ms range (Lisker and Abramson 1964), occupying the extreme end of the continuum labeled as long lag, as depicted in Figure 1.

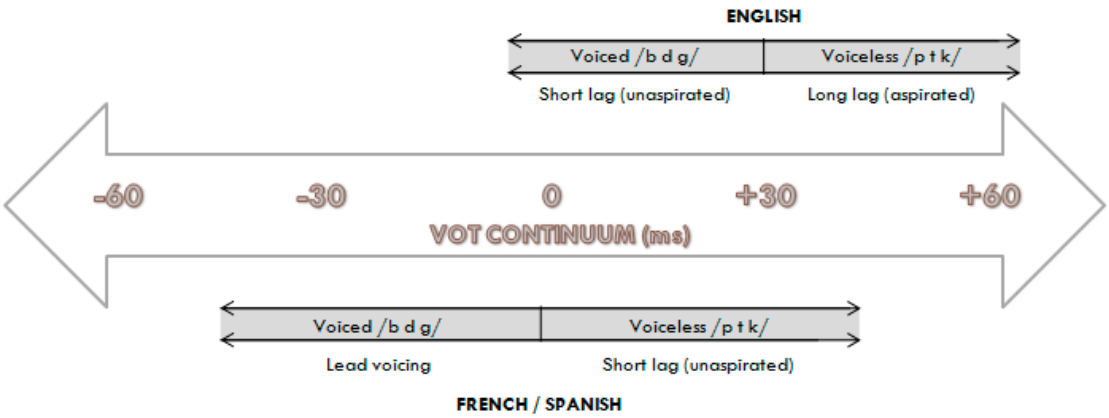

Figure 1. Schematic depiction of the relationship between English versus Spanish and French stops (adapted from Llama et al. 2010).

This divergence in lag patterns can result in another distinction in terms of presence (in long-lagged stops) vs. absence (in short-lagged stops) of aspiration, a feature typically described as

an audible burst of air noticeable on the release of /p t k/ in stressed onset position in English (Avery and Ehrlich 1995). English speakers tend to produce Spanish (Lord 2005) and French (Fowler et al. 2008) voiceless stops with overly long VOTs (and thus with aspiration), which results in a noticeable accent (Lord 2005). Conversely, French and Spanish speakers tend to produce English voiceless stops with overly short VOTs, which may cause English speakers to perceive /p/, /t/ /k/ as their corresponding voiced counterparts (due to the duration overlap between Spanish and French voiceless and English voiced stops, as shown in Figure 1). These issues have made VOT an interesting candidate for investigation in studies involving speakers of English and a Romance language either from an acquisition (see Section 2.1) or, less frequently, from a pedagogical standpoint (Kissling 2013; Lord 2005; Suarez 2008; among others).

2.1. L2 Acquisition of Voice Onset Time

Studies on the acquisition of L2 VOT patterns are not in short supply, and a comprehensive review would require considerable space. What follows is a brief account of a selection of investigations that can offer the reader insight into what our Francophone and Anglophone participants' VOT production may have resembled in their background languages before they started learning Spanish as an L3.

Countless are the investigations into the phonological acquisition of bilinguals who speak language pairs that differ in VOT patterns. Such studies' focus has often been placed on comparing the participants' production and/or perception of VOT to determine whether the different types of speakers (simultaneous vs. sequential bilinguals, for example) develop two separate systems or employ a shared range of values for both languages. Transfer of L1 VOT patterns to the L2 seems to be a common scenario with learners at lower levels of proficiency (Flege 1987). However, many studies have revealed that more proficient L2 speakers tend to depart from L1 values and approach (or reach) native-like production in their L2, with varying degrees of success. Some speakers produce L2 voiceless stops with VOT values that are intermediate between those of monolinguals and their L2 (Caramazza et al. 1973; Flege and Eefting 1987; Flege 1991; Gurski 2006; Laeufer 1996). Yet others exhibit rather monolingual-like VOT patterns for some stops but not necessarily for all. For example, when investigating the production of voiced and voiceless stops by adult bilingual and monolingual speakers of Canadian English (CEn) and Canadian French (CFr), Sundara et al. (2006) and MacLeod and Stoel-Gammon (2009) observed their participants maintained monolingual-like contrasts for all French stops and some of the English voiceless stops tested, but not for English /b d/. These findings bring to light two ideas pertinent to our work. On the one hand, and despite reports that attaining native-like VOT is hardly ever possible (Caramazza et al. 1973; Díaz-Campos 2004; Fellbaum 1996), they provide proof of such an achievement for voiceless stops in L2 CEn and CFr. On the other, they instigate the hypothesis that mastering VOT can be easier in French voiced stops than in English ones.

Given that our participants are Francophones and Anglophones who have attained a high level of proficiency in their L2 (English or French), it could be assumed that they have either approximated or achieved native-like VOT durations in their L2, which could have in turn led to a modification of their L1 values, as has been shown to happen in previous L3/L2 studies (Sypiańska 2013; Waniek-Klimczak 2011).

2.2. L3 Acquisition of Voice Onset Time

The production of VOT has also received a good deal of attention in the L3 literature (see, for example, Aoki and Nishihara 2013; Bandeira and Zimmer 2012; Beckmann 2012; Dittmers et al. 2018; Gabriel et al. 2016; Liu 2016; Llama et al. 2010; Llama and López-Morelos 2016; Tremblay 2007; Wrembel 2011, 2014, 2015; Wunder 2011). Among the reasons that may have contributed to spur interest on VOT among SLA and TLA researchers are repeated suggestions that it is correlated with degree of foreign accent (Major 2001; Riney and Takagi 1999).

L3 VOT studies feature a variety of data collection methods, bilingual profiles, and language combinations, and not all are equally pertinent to the current study. As indicated earlier, the most relevant is Llama et al. (2010), who investigated which of two factors, L2 status or typological similarity, was most likely to predict the source language for CLI during L3 VOT production. To answer this question, they tested two groups of intermediate learners of L3 Spanish, whose previously learnt languages were L1 English/L2 French or L1 French/L2 English. Participants from both groups seemed to produce similar VOT means in their L2s and L3, which was interpreted as an L2-to-L3 transfer pattern. It was observed, however, that they appeared to have retained some L1 phonetic traces in their L2, which prevented the authors from providing an unambiguous answer to their research question. Considering that the values achieved in the L2 were already influenced by the L1, and that this already-influenced L2 had an impact on L3 performance, the authors suggested combined CLI as a second explanation for their findings. In this partial replica of that work, we address one of the main limitations of Llama et al.: the lack of L1 data from experimental groups.

At this point, it is pertinent to discuss the overall similarities and differences between Llama et al. (2010) study and the current one. They both employ a mirror design for the two experimental groups, that is, the second group speaks the same background languages as the first group but in reverse order. However, two subtle, yet potentially decisive, differences regarding participants are: (i) their level of L3 proficiency, which is higher (advanced) in our study; and (ii) their place of residence (a French-dominant city in their case vs. an English-dominant city in ours). In terms of the instruments used, both studies use read-aloud tasks featuring word lists. However, our instruments have been slightly modified, as will be described in the Methodology section.

Similar to Llama et al. (2010), the study by Tremblay (2007) targeted the same background languages (English and French), while the study by Wunder (2011) focused on Spanish as the L3. Tremblay investigated VOT production by L1 English-L2 French bilinguals who were beginner learners of L3 Japanese. They produced strikingly similar patterns in their L2 French and L3 Japanese, and Tremblay put forward two possible explanations for this result. The first one was a predominant L2 effect in the production of L3 Japanese voiceless stops, which agrees with previous reports that L2 status prevails at the early stages of L3 phonological acquisition. The second explanation was a purported acquisition of Japanese values due to the participants' enhanced abilities as experienced language learners. In her conclusion, Tremblay opts for the first possibility, with a caveat: the L2 seemed to be already influenced by the L1, which could help one argue in favor of combined CLI being at play.

Wunder (2011) set up a study to shed light on the issue of whether it was L2 status rather than combined CLI that explained the L3 values obtained by previous studies such as Llama et al. (2010) and Tremblay (2007). She recruited eight L1-German /L2-British English speakers, who were either high beginner or advanced learners of L3 Spanish. Instead of reading lists, the author selected a short text for a read-on-your-own task, which yielded rather mixed results. With L3 VOT means that fell in between those of L1 German and L2 English, Wunder explained that "some CLI from the L2 existed, but a prominent L1 effect was also detected" (p. 122). The limited number of participants prevented her from creating two separate groups according to L3 proficiency. Everything considered, Wunder interpreted her results as contradicting rather than corroborating findings of a prevailing L2 status effect, and as pointing instead to combined CLI as an explanation for the findings observed.

The available literature on L3 VOT shows that the acquisition of VOT patterns in an L3 is not fully understood. Overall, we could classify reported results in three main categories: (i) studies that claim a predominant L2 effect (Llama et al. 2010; Tremblay 2007); (ii) studies that report combined CLI (Wrembel 2011, 2015; Wunder 2011); (iii) studies that report a predominant L1 effect (Bandeira and Zimmer 2012). Of notice, several authors report mixed results, which may be explained in more than

one way: L2 status or combined CLI (Llama et al. 2010), combined CLI or L1 effect (Wunder 2011)[2]. Against this backdrop, the research question addressed in this study is which (or whether) one of the previously acquired language exerts the strongest influence on L3 pronunciation at a high level of proficiency.

In light of the overview we have presented, we predict that the outcome will be triggered by combined CLI with an underlying L1 effect (Hammarberg 2009; Wunder 2011). More precisely, we believe that having learnt an L2 will have a somewhat negative effect (i.e., increase in VOT values relative to the L1) for Group TF (Trilingual Francophones), and a somewhat positive effect (i.e., reduction in VOT values relative to the L1) for Group TA (Trilingual Anglophones) on L3 production. However, we expect the L1 to ultimately affect achievement in the L2. This underlying L1 effect will still leave Anglophones at a slight disadvantage relative to Francophones, who will better approximate Spanish values. Nonetheless, combined CLI can also manifest itself in the form of hybrid values, as reported in several VOT bilingual studies (Flege 1987; Flege and Eefting 1987; Gurski 2006). This would imply the production of intermediate values (between those attributable to English and French) in the L1, L2 and L3, which would indicate that our participants have some sort of a merged VOT system. Out of these two combined CLI scenarios, the latter seems less likely, given that highly proficient, early CEn-CFr bilinguals have been shown to produce distinct VOT for voiceless stops in English and French (MacLeod and Stoel-Gammon 2009).

We acknowledge other outcomes are plausible. Among them, a scenario that should not be ruled out when learners have reached a high level of proficiency is the acquisition of the target Spanish VOT patterns. Admittedly, this outcome cannot be clearly teased apart from L1-influenced production in the case of Francophone speakers (provided L1 French values have been maintained), and L2-influenced production in the case of Anglophone speakers (provided target values have been achieved in the L2 French).

3. Methodology

3.1. Participants

Two experimental and three control groups were recruited. The first experimental group, henceforth Group TA (trilingual Anglophones), consisted of 15 L1 CEn speakers with an advanced knowledge of CFr, their L2. The second, henceforth Group TF (trilingual Francophones), was made up of 15 L1 CFr speakers with an advanced knowledge of CEn, their L2. All of them were high intermediate to advanced learners of Spanish, their L3, and were recruited either at a university, or through the organizers of two Spanish conversation clubs in Ottawa, a predominantly English-speaking Canadian city. Consequently, they did not form as homogeneous a group as desired, especially in terms of age. Please note that the mean ages were 30.13 (SD = 17.14) for Group TA, and 37.87 (SD = 15.81) for Group TF. All recruited candidates met three main criteria: (i) they were not simultaneous bilinguals (i.e., they did not consider English and French as two L1s); (ii) they were more proficient in their L2 than in their L3;[3] and (iii) they had no or very limited knowledge of any languages besides English,

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[2] It is worth noting that the studies cited in this paragraph have concentrated on learners at the beginner and/or intermediate levels of L3 proficiency, with varying levels of L2 proficiency. Within this context, it is complicated to estimate the role proficiency in the non-native languages may play in accounting for the different outcomes. In fact, most L3 researchers control for proficiency but hardly ever make this variable the focus of investigation. Future studies should target L2 and L3 proficiency, so we can gain insight into this factor's impact on CLI in TLA.

[3] As pinpointed by several authors (Hammarberg 2010; García-Mayo 2012; among others), the terms first, and specially, second and third language are used ambiguously and variably in the literature. In fact, a multilinguals' languages can be labeled either in a chronological sense or according to other characteristics. For a comprehensive discussion on this terminological issue, the reader is referred to Hammarberg (2010). Regarding the purposes of this study, L2 is to be understood strictly as the second language for our participants not only because of the order of acquisition but also in terms of proficiency, i.e., it is the language learnt after the L1 and the level of proficiency in that language is lower than in the L1, but higher than in the L3.

French and Spanish. The selection of location for data collection was mainly based on our ability to recruit participants who met these three criteria.

In our increasingly multilingual world, true monolingual participants who have never studied and never use an L2 are rare to come by. As a result, our three control groups consist mostly of functional monolinguals, that is, of speakers who live in an L1-dominant environment, interact in their L1 as part of their daily routine, and are seldom exposed to other languages. They have had some formal instruction in their L2, one of the two official languages of Canada, but hardly ever use it. Crucially, they have never lived in a setting where their L2 is the community language. The 15 participants in the Spanish control group, henceforth Group MS (Spanish monolinguals), were recruited in a small town in a monolingual region of Northern Spain and are therefore native speakers of Castilian Spanish (CSp). Their ages ranged between 19 and 43 years (mean = 27.87, SD = 7.44).

Participants in the monolingual Anglophone group, henceforth Group MA (n = 8), were recruited in Ottawa, where they currently live, although some of them were raised in other English-speaking Canadian cities. Their mean age was 48.3 (SD = 12.15). Lastly, the 15 participants in the monolingual Francophone group, henceforth Group MF, were recruited in three small towns in the province of Quebec. Their mean age was 36.93 (SD = 17.85). For an overview of these groups' linguistic profiles, see Table 1. All participants in the control and experimental groups signed a consent form in their L1 and received a monetary compensation.

Table 1. Control and experimental groups' linguistic profiles.

	Group	*n*	L1	L2	L3
Experimental	TA	15	CEn	CFr (Ad)	Sp (Ad/Hi)
	TF	15	CFr	CEn (Ad)	Sp (Ad/Hi)
Control	MA	8	CEn	CFr (Be)	–
	MF	15	CFr	CEn (Be)	–
	MS	15	CSp	En (Be)	–

Ad = advanced; Be = beginner (please note that proficiency in the control groups is self-reported); Hi = high intermediate (according to their proficiency test scores, three participants from Group Trilingual Francophones (TF) and four participants from Group Trilingual Anglophones (TA) were high intermediate rather than advanced learners); MA: Monolingual Canadian English Speaker; MF: Monolingual Canadian French Speaker; MS: Monolingual Castilian Spanish Speaker; CEn: Canadian English; CFr: Canadian French; CSp: Castilian Spanish; Sp: Spanish (any variety of Spanish).

3.2. Instruments

The instruments used for this study were a Language Background Questionnaire (LBQ), three proficiency tests, and three reading aloud tasks consisting of word lists. The LBQ was taken, with minor modifications, from the Language Acquisition Research Laboratory (LAR Lab) at the University of Ottawa, and has been used by a series of its members in several studies. This questionnaire was key in ensuring the informants' suitability for participation, since they were asked to state the number of languages they spoke, how often they used them, and the order in which they were acquired. The participants' L2 and L3 proficiency was assessed via a set of standardized grammar tests readily available on-line: the placement tests used by the University of Oxford Language Centre.

Word lists are commonly used for gathering VOT measures in a controlled way, both in L2 (Flege 1991; Yavaş and Wildermuth 2006) and in L3 studies (Tremblay 2007; Wrembel 2014). The lists, which can be found in Appendix A, are a shorter version of those employed by Llama et al. (2010), with 30 items (of which we analyze 18) per language. Shortening the lists allowed for the exclusion of certain items such as cognates like *taxi* or *taco*, which could trigger the pronunciation of the word in a non-intended language. In addition, some items were not retained but rather replaced by new ones based on syllable complexity: syllabically complex words such as *cor-to* (CVC) were substituted by simpler ones such as *co-do* (CV). The lists consisted of real words with the following restrictions:

they (i) were either disyllabic or monosyllabic,[4] (ii) contained a "voiceless stop + vowel" sequence (a typical CV syllable structure), and (iii) the voiceless stop occurred in stressed, word-initial onset position (e.g., */pa.to/* 'duck'). The stimuli (six /p/-, six /t/-, and six /k/- initial words) were presented on a computer screen, one at a time. A pause was created in between stimuli to ensure they were produced in isolation.

3.3. Procedure

The data collection took place at a quiet environment either at the LAR Lab, or at a place convenient for the participant. Participants in the experimental groups were tested over the course of two one-hour sessions. The first session was always held in L3 Spanish, except for the consent form and the LBQ, which participants filled out in their L1. The first half of the second session was devoted to the tasks in the L2, and the second half to the L1 tasks. The readings of the word lists were audio recorded using a Zoom H4n Handy Digital Recorder (Zoom North America, Hauppauge, NY, USA) and saved as 16-bit mono files at 44.1 kHz sampling.

3.4. Data Analysis

The program PRAAT 5.3.78 (Boersma and Weenink 2014) was used to perform the acoustic analysis of a total of 2298 tokens. As is standard in the literature, VOT measurements are reported in milliseconds (ms); these values correspond to the interval between the stop release and the beginning of regular vocal fold vibration for the production of the following vowel. For details about the computation of VOT values in PRAAT, see the discussion around Figure 1 and Llama et al. (2010).

We analyzed combinations of /p t k/ + low and mid vowels. Since /t/ tends to affricate in Canadian French when followed by a high vowel, consequently lengthening the VOT, "voiceless stop + high vowel" sequences were included in the reading lists but excluded from analysis for all groups of participants and all languages.

4. Results

We report mean VOT values as produced by control (monolingual) and experimental (trilingual) participants. We performed Kruskal-Wallis tests to reveal any significant differences regarding VOT production across the control and experimental groups[5] as well as within the experimental groups. When significant differences were found, post hoc comparisons ensued, namely Mann-Whitney-Wilcoxon (for paired comparisons) and Dunn's (for two-to-one comparisons) tests, as required. The alpha value was set at 0.05.

4.1. Control Groups

The Spanish word list yielded a total of 270 tokens for analysis from Group MS. Their means per stop are /p/ = 14.82 ms, /t/ = 18.18 ms, /k/ = 30.58 ms. The 270 tokens obtained from Group MF yielded the following means per target stop: 18.33 ms for /p/, 23.07 ms for /t/, and 45.82 ms for /k/. Lastly, after discarding two tokens (due to mispronunciation), the 142 tokens analyzed from Group MA resulted in the following means: 76.9 ms for /p/, 86.65 ms for /t/, and 90.19 ms for /k/.

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[4] In French, word-level stress falls on the rightmost syllable. To ensure the production of voiceless stops in stressed, onset position, words in the French list are monosyllabic.

[5] An anonymous reviewer questioned the usefulness of comparing our findings to native speaker means when determining the L1/L2 influence on the L3. We believe that reporting these comparisons allows for the presentation of our findings in a more nuanced way, with a more comprehensive analysis of our participants' behavior in all their known languages. Moreover, it is common practice in similar L3 studies to compare VOT means either to L1 control groups (e.g., Aoki and Nishihara 2013; Beckmann 2012; Gabriel et al. 2016) or to L1 reference values from the literature (e.g., Bandeira and Zimmer 2012; Dittmers et al. 2018; Wrembel 2011).

All means from the three control groups, portrayed in Figure 2, will be used as a baseline to determine the extent to which the L2 and the L3 values have been acquired, and the L1 values maintained.

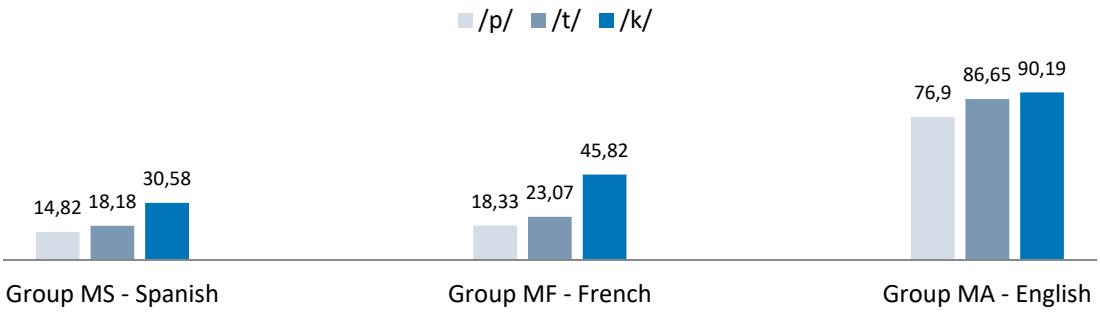

Figure 2. Mean Voice Onset Time (VOT) (ms) in the voiceless stops of monolingual speakers of Castilian Spanish (MS), Canadian French (MF), and Canadian English (MA).

4.2. Experimental Groups

For our trilingual data, we report the results organized in terms of language. We focus first on the two background languages, and then turn to the L3.

4.2.1. French as an L1 and an L2

We analyzed a total of 270 French tokens from Group TF, and 267 from Group TA. L1 French means are 27.8 ms for /p/, 39.11 ms for /t/, and 54.6 ms for /k/, as shown in Figure 3. These are higher than the means reported from the monolinguals, although lower than the means from Group TA's L2 French: /p/ = 46.48 ms, /t/ = 53.43 ms, /k/ = 61.7 ms, portrayed in Figure 4. The Kruskal-Wallis test used to compare the experimental and control groups was significant for /p/, χ^2 (2, 45) = 20.949, p = 0.00002; /t/, χ^2 (2, 45) = 25.366, p = 0.000003; and /k/, χ^2 (2, 45) = 8.6779, p = 0.013.

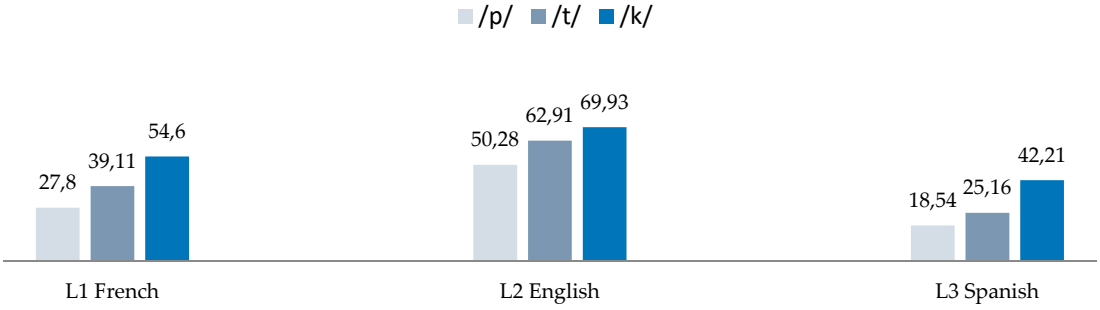

Figure 3. Mean VOT (ms) in the voiceless stops of Group TF in L1 French, L2 English and L3 Spanish.

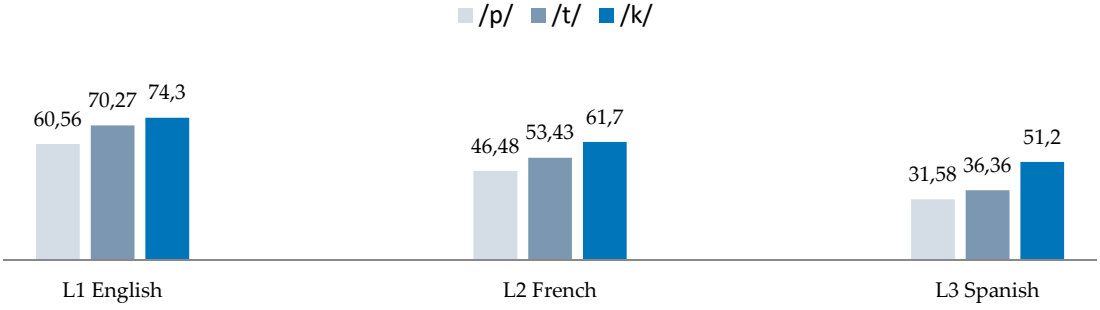

Figure 4. Mean VOT (ms) in the voiceless stops of Group TA in L1 English, L2 French and L3 Spanish.

To trace the significant differences to one or both experimental groups, Mann-Whitney-Wilcoxon tests followed. These tests showed that all groups behaved significantly differently from each other in the case of /p/ and /t/, but the experimental groups behaved alike regarding /k/ and, together, they differed from the control group. This indicates that our trilingual Anglophones have not fully acquired L2 French values, whereas trilingual Francophones have departed from the monolingual French norm, that is, produce voiceless stops with a longer lag than expected for this language.

4.2.2. English as an L1 and L2

The English list yielded 268 (plus two mispronounced) tokens from Group TF and 270 from Group TA. Group TA's L1 English means, represented in Figure 4, are: /p/ = 60.56 ms, /t/ = 70.27 ms, and /k/ = 74.3 ms. With a drop of no less than 15 ms per stop if compared to the Anglophone control group, these trilingual Anglophones also seem to have departed from English monolingual norms. Group TF's L2 English means, displayed in Figure 3, are: /p/ = 50.28 ms, /t/ = 62.91 ms, /k/ = 69.93 ms. Once again, the Kruskal-Wallis test yielded significant differences for all three stops, as follows: /p/, χ^2 (2, 38) = 12.468, p = 0.001; /t/, χ^2 (2, 38) = 11.79, p = 0.002; and /k/, χ^2 (2, 38) = 11.292, p = 0.003. To determine which group(s) this significant difference could be attributed to, we employed Mann-Whitney tests, which indicated no significant differences between the experimental groups.

This suggests that, unlike in the case of French, both experimental groups behave alike in English, and together are significantly different from the relevant control group of monolingual speakers. While trilingual Anglophones better approximate English norms, overall there is a smaller (and non-significant) difference between experimental groups in this language than there was for French. Crucially, and despite the significant difference from monolinguals, both experimental groups produced means that could be placed on the long-lag side of the VOT continuum depicted in Figure 1, and consistent with English-like production.

4.2.3. Spanish as an L3

In L3 Spanish, we gathered 270 tokens from each group. Spanish L3 means are 18.54 ms for /p/, 25.16 ms for /t/, and 42.21 ms for /k/ for Group TF, and 31.58 ms for /p/, 36.36 ms for /t/, and 51.2 ms for /k/ for Group TA. Trilingual Francophones approximate Spanish monolingual values, especially in the case of bilabials. In fact, although the Kruskal-Wallis determined there was a significant difference regarding /p/ (χ^2 (2, 45) = 15.266, p = 0.004), the difference was ultimately traceable to Group TA (when compared in pairs using Mann-Whitney-Wilcoxon tests). Therefore, regarding this stop, Francophones pattern with Spanish monolinguals, as indicated by the grey cells[6] in Table 2.

A significant difference among all groups was obtained once again, this time regarding Spanish /t/ (χ^2 (2, 45) = 17.896, p = 0.0001). Although they have achieved a further reduction of means if compared to their L2, trilingual Anglophones deviate from monolingual Spanish norms more than trilingual Francophones. Nonetheless, the post hoc tests revealed that all three groups behaved significantly differently from each other (see summary in Table 2). Trilingual Francophones are closer to, yet still different from, Spanish monolinguals.

A third, interesting scenario emerges regarding /k/. Whereas a Kruskal-Wallis test indicated a significant difference across groups once more (χ^2 (2, 45) = 19.802, p = 0.000005), the Mann-Whitney-Wilcoxon and Dunn's tests that ensued revealed that the experimental groups were not significantly different among themselves, and together they were significantly different to the control group (see summary of results in Table 2).

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[6] Please note that grey-shaded cells represent language pairs that show some overlap, as per the lack of significant differences yielded by the post hoc tests. White cells, on the other hand, display values that have been found to differ significantly from the means in other cells within the same column.

Table 2. Intergroup comparisons for all three voiceless stops in Spanish.

	/p/	/t/	/k/
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
Group MS	14.82 (3.85)	18.18 (4.85) *	30.58 (4.58) *
Group TF	18.54 (5.42)	25.16 (7.42) *	42.21 (9.77)
Group TA	31.58 (15.63) *	36.36 (15.52) *	51.2 (14.8)

*: Asterisks indicate statistical significance. Grey shading: Grey-shaded cells contain language pairs for which no significant difference was found (see footnote 6).

In sum, regarding L3 Spanish, a complex picture of acquisition emerges from these findings, which reveal different production patterns for each stop. To better answer our research question, however, it is necessary to examine the overall patterns observed, rather than concentrate only in Spanish. For ease of comparison across the three languages between the two experimental groups, we provide a summary of the results obtained in Table 3.

We had hypothesized that a combined influence, with an underlying L1 effect would be the answer to the question of which (or whether) one of the background languages exerts the strongest influence on L3 pronunciation at a high level of proficiency. With L3 Spanish VOT means lower than those in any of the previously learnt languages, our results point to the acquisition of Spanish values to some extent, which was one of the outcomes that we anticipated. In our opinion, however, the obtained means also reveal the retention of L1 traits in the two non-native languages, as will be argued in the Discussion section.

Table 3. Summary of VOT means in all languages from both experimental groups.

	Group TA				**Group TF**		
	/p/	**/t/**	**/k/**		**/p/**	**/t/**	**/k/**
	Mean (SD)				**Mean (SD)**		
EN (L1)	60.56 (16.96)	70.27 (14.69)	74.3 (12.49)	**EN (L2)**	50.28 (12.79)	62.91 (13.19)	69.93 (11.07)
FR (L2)	46.48 (21.58)	53.43 (19.42)	61.7 (17.92)	**FR (L1)**	27.8 (8.35)	39.11 (9.22)	54.6 (11.93)
SP (L3)	31.58 (15.62)	36.36 (15.52)	51.2 (14.81)	**SP (L3)**	18.54 (5.42)	25.16 (7.42)	42.21 (9.77)

4.2.4. Comparison of VOT Means Across the L1, the L2, and the L3

We also compared each group's three languages. These intragroup comparisons could add or subtract support to claims that bi/multilinguals sometimes develop merged VOT systems, and help to further explore the interactions between the three languages spoken by our participants. The details of such comparisons are presented in Table 4. Note that the U scores presented are the output of a Mann-Whitney U test used to assess whether two independent groups are significantly different from each other; consequently, these scores help us assess, indirectly, the difference, or lack thereof, between the means/medians of the two groups being compared.

Table 4. Cross-language comparison of VOT means within each experimental group.

	Group TA				Group TF		
	Language Pairing	**U**	***p***		**Language Pairing**	**U**	***p***
/p/	L1 vs. L2	69	0.071	**/p/**	L1 vs. L2	19.50	≤0.001 *
	L2 vs. L3	66	0.054		L2 vs. L3	6.00	≤0.001 *
	L1 vs. L3	22.00	≤0.001 *		L1 vs. L3	34.00	≤0.001 *
/t/	L1 vs. L2	52.50	0.013 *	**/t/**	L1 vs. L2	16.00	≤0.001 *
	L2 vs. L3	57.50	0.023 *		L2 vs. L3	0.00	≤0.001 *
	L1 vs. L3	15	≤0.001 *		L1 vs. L3	27.00	≤0.001 *
/k/	L1 vs. L2	73	0.101	**/k/**	L1 vs. L2	34.50	≤0.001 *
	L2 vs. L3	66	0.054		L2 vs. L3	2.00	≤0.001 *
	L1 vs. L3	30.00	0.001 *		L1 vs. L3	38	0.002 *

*: Asterisks indicate statistical significance. Grey shading: Grey-shaded cells contain language pairs for which no significant difference was found (see footnote 6).

The Mann-Whitney tests performed for Group TA revealed that Anglophones' /p/ and /k/ were not significantly different in the L1 and L2, and in the L2 and L3. An overlap in these two language pairs could cautiously be interpreted as potential forward (L1–L2) and lateral (L2–L3) interaction, while in the L1 and the L3 they remain as distinct categories. In contrast, the production of voiceless stops across Group TF's three languages was found to be significantly different in all cases for all language pairings, which could possibly be interpreted as proof of separate rather than merged (hybrid) VOT systems in the speech of the trilingual Francophones. Curiously, none of the French and Spanish voiceless stops by this group patterned together, although from a typological point of view they should. Interestingly, their VOT productions in L1 French are higher and less-target-like than their productions in L3 Spanish. This suggests that having learnt English seems to have had a stronger effect on the L1 than on the L3.

5. Discussion

This study set out to examine which previously acquired language exerts the strongest influence on L3 pronunciation at a high level of proficiency. Our findings have revealed a complex picture of L3 acquisition and interplay across the three languages. As indicated earlier, the current study was a partial replication of Llama et al. (2010), in which we employed similar instruments and tested participants with relatively comparable profiles, except for level of proficiency and the place of residence, so that we could examine the effects of higher proficiency levels on phonological CLI. The discussion of our findings, presented below, includes: (i) a comparison of the experimental group's L1 and L2 production to the respective control groups; (ii) an account of combined, L1- and/or L2-predominant influence in L3 production at the advanced level; and (iii) a comparison to background-language influence in L3 production at the intermediate level. To conclude, we provide some recommendations for future studies based on some of the limitations observed.

Regarding the native language, both experimental groups departed from monolingual values in their L1, which indicates that learning an L2 (at least at advanced levels) has had an impact on their pronunciation of L1 voiceless stops. This impact is more pronounced for Group TF, since the VOT means in their L1 and standard deviations show that part of their productions are likely to fall outside the 0–30 ms range suggested for French voiceless stops. In contrast, Group TA's means are significantly lower than those of English monolinguals, but their productions are more likely to stay within the 60–100 ms range suggested for English voiceless stops.

Moreover, none of the participants behaved like monolinguals in their L2 which, at first glance, corroborates the claim that it is hard to fully master VOT duration in a non-native language, as has been reported in the literature (e.g., Caramazza et al. 1973; Díaz-Campos 2004; however,

see Birdsong 2007, for a counterexample). Nonetheless, the trilingual Francophones pattern with the trilingual Anglophones in English (they behave alike and significantly different from monolingual Anglophones). This finding (not too surprising, considering that participants from both groups live in an English-dominant context) means that both experimental groups have similar chances of producing English-accented (French and Spanish) voiceless stops. Recall that VOT has been linked to foreign accent in the Spanish of English speakers (Lord 2005). However, in their L3 Spanish, the Francophone Group approximates monolingual-like values more than the Anglophone Group especially for /p/ and /t/, which could indicate minimal influence from the L2 on the L3, if any.

The main finding regarding L3 pronunciation was the underlying presence of L1 traits in both the L2 and the L3 of our participants. In the case of the Anglophone Group, this meant not being able to consistently produce short-lagged voiceless stops in the two non-native languages. Of note, however, Anglophones were able to further reduce the VOT values in their L3 in relation to their L2 French, which we have interpreted as a sign of partial acquisition of the L3 patterns. In the case of the Francophone Group, this meant being able to outperform Anglophones in Spanish. As shown by the intragroup analysis, their Spanish values were significantly reduced if compared to their L1 French. In our opinion, this points to the acquisition of L3 VOT values, rather than to positive transfer from the L1 alone.

As already discussed, Llama et al. (2010) claimed a predominant L2-to-L3 transfer pattern, since mean VOTs were relatively similar between the non-native languages across groups. In our current results, however, the L2 plays a less determinant role, especially in the case of Group TF. We had anticipated a potential reason for why our results could fail to replicate those from 2010: the increase in L3 proficiency. Our findings, together with Llama et al. (2010), appear to provide support to the claim that there is an L2 effect that weakens when the L3 is acquired and/or fades in favor of the L1 as proficiency increases (Hammarberg and Hammarberg 1993; Williams and Hammarberg 1998). Although we cannot report a clear switch to the L1 as a source language at a more advanced level, we have seen how Francophones in the current study were able to better overcome L2 influence[7] to possibly benefit more from positive L1 transfer to the L3. Admittedly, acquisition of the L3 and L1-prevalent influence are hard to disentangle for Group TF. In this regard, it would have not been reasonable for Anglophones to switch to the L1, since relying on their L2 French is more advantageous, but it appears as if an underlying L1 effect were preventing them from fully attaining (French and) Spanish-like values.

In accounting for the differences between the two studies, it is worth adding that, for the most part, participants from the previous study were recruited at Montreal CEGEPs (*Collèges d'enseignement général et professionnel*, 'General and Vocational Colleges' in English) and universities, had never travelled to Spanish-speaking countries, and did not seem to associate with Hispanophones as part of their social lives. In the current study, in contrast, participants were older, most of them had been to Spanish-speaking countries, participated in Spanish conversation clubs in which native speakers also took part, and/or had regular contact with native or fluent Spanish speakers. We believe that real, meaningful exposure to Spanish has contributed to a higher achievement in the production of Spanish voiceless stops. Language exposure can also provide a plausible explanation as to why both the Anglophone and Francophone participants approximate Spanish VOT values more than French ones. English and French are in constant contact in the Ottawa-Gatineau region (in the Ontario-Quebec border in Canada), and it is reasonable to assume that our informants are exposed to somewhat accented English and, crucially, French on a regular basis.

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[7] Trilingual Francophones in the 2010 study produced L3 VOT means of 34 ms for /p/, 33 ms for /t/, and 59 ms for /k/, which are considerably higher than the means we are reporting here.

6. Concluding Remarks

Overall, it could be argued this study's main contribution to the subfield of L3 phonetics and phonology has been to examine the production of L3 VOT at advanced proficiency levels (cf. Llama et al. 2010, which focused on pre-advanced proficiency levels). Whereas the two related studies employed a cross-sectional approach, which allowed to portray static performance by two groups of Anglophones and two groups of Francophones at two different proficiency levels, a future study could benefit from a longitudinal design to better capture the dynamic nature of multilingual language learning, the different stages that characterize the phenomenon, and the potential switch in main source language for L3 production due to gains in proficiency.

It must be noted that the results at our disposal are limited to voiceless stops, which provide only a partial insight into the development of VOT patterns in L3 acquisition. Although it is common in this kind of research to target one set of stops, or one voiced-voiceless stop dyad, the inclusion of voiced stops, less frequently studied, would have been pertinent, as pointed out by an anonymous reviewer. On this note, we could remark that the three languages under investigation are similar in that they distinguish between two categories of stops (i.e., voiceless and voiced), but different with regard to how they differentiate the voiceless category: While voiceless stops can be aspirated or unaspirated in English (depending on segmental and prosodic factors; e.g., Nespor and Vogel 1986), the same stops can only be unaspirated in French and Spanish. Interestingly, if aspirated stops are incorrectly "unaspirated" in English, they are often perceived as voiced stops; this behavior assigns a phonemic status to this phonetic feature in English, similar to the voiced versus voiceless contrast in French and Spanish. For details on what these voiced/voiceless and aspirated/unaspirated differences entail, see Figure 1 and the related discussion on divergent lag patterns in Section 2. Accordingly, future studies should investigate both voiced and voiceless plosives to widen the scope of inquiry and thus offer a more comprehensive account of this issue. In this sense, another clear limitation of the present study is its small sample size. Not having larger groups as well as more comprehensive (and consequently longer) instruments has prevented us from carrying out a more thorough statistical analysis, which could have included relevant variables such as word length and following vowel.

While it was not our intention to focus on regressive transfer, we have found evidence of the impact of learning an L2 on the L1. This holds not only for learners immersed in an L2 setting (the case of our Group TF), as could be expected, but also for speakers who live in their L1 environment (such as our Group TA), although to a lesser extent. Undoubtedly, Ottawa can offer a favorable context for regressive transfer to take place. However, since this finding has also been reported in studies on bilinguals (Waniek-Klimczak 2011) learning an L2 (English) in an L1 setting (Poland), and on (Polish) trilinguals living in their L2 environment (Denmark; Sypiańska 2016), it may merit further investigation. Moreover, only a few L3 studies have considered regressive transfer from the L3, and at least three of them indicate a greater impact of the L3 on a native-like L2 sound system than on L1 speech production (Cabrelli Amaro and Rothman 2010; Cabrelli Amaro 2017; Liu 2016). This observation led to the proposal of the Phonological Permeability Hypothesis (Cabrelli Amaro and Rothman 2010; Cabrelli Amaro 2017), according to which "a late-acquired L2 is more vulnerable to L3 influence than an L1" (Cabrelli Amaro and Wrembel 2016, p. 403). Our study does not allow us to make claims in this regard, but we recognize that the topic deserves further attention in this (still) emergent field of L3 phonology.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Word Lists in Alphabetical Order

Spanish list: cama, casa, codo, copa, cubo, cura, pala, pato, pelo, pena, piña, piso, poco, pollo, puño, puro, queja, queso, quinto, quita, talla, tarro, tela, tema, tina, tiro, toro, torre, tubo, tuyo.

French list: cadre, canne, coq, corde, cou, coût, pas, patte, pêche, père, pile, pipe, poche, pomme, poudre, pour, quelle, quête, quitte, tache, tasse, terre, tête, thon, tique, tir, tort, touche, tout.

English list: cabbage, cocky, cookie, cooler, copper, cuddle, kennel, kettle, killer, kitten, parrot, penny, pepper, pillow, pity, pocket, polish, poodle, pool, puppy, tacky, teller, tenant, tickle, tipping, toddler, toonie, tooth, topping, tummy.

References

Aoki, Rika, and Fumiaki Nishihara. 2013. Sound feature interference between two second languages: An expansion of the feature hypothesis to the multilingual situation in SLA. In *Proceedings of the 37th Annual Meeting of the Berkeley Linguistics Society*. Edited by Chundra Cathcart, I.-Hsuan Chen, Greg Finley, Shinae Kang, Clare S. Sandy and Elise Stickles. Berkeley: eScholarship: University of California, pp. 18–32.

Avery, Peter, and Susan Ehrlich. 1995. *Teaching American English Pronunciation*. Oxford: Oxford University Press.

Bandeira, Marta Helena Tessmann, and Márcia Cristina Zimmer. 2012. The dynamics of interlanguage transfer of VOT patterns in multilingual children. *Linguagem and Ensino* 15: 341–64.

Bardel, Camilla, and Ylva Falk. 2007. The role of the second language in third language acquisition: The case of Germanic syntax. *Second Language Research* 23: 459–84. [CrossRef]

Beckmann, Eltje. 2012. A gup of dea, please: Crosslinguistic influence in English and German word-initial stops produced by German L3 learners of Dutch. *Dutch Journal of Applied Linguistics* 1: 252–62. [CrossRef]

Benrabah, Mohamed. 1991. Learning English segments with two languages. In *Actes du XIIème Congrès International des Sciences Phonétiques*. Aix-en-Provence: Université de Provence, Service des Publications, pp. 334–37.

Birdsong, David. 2007. Nativelike pronunciation among late learners. In *Language Experience in Second Language Learning: In Honor of James Emil Flege*. Edited by Ocke-Schwen Bohn and Murray J. Munro. Amsterdam: Benjamins, pp. 99–116.

Blank, Cintia Avila, and Márcia Cristina Zimmer. 2009. A transferência fonético-fonológica L2 (francês)–L3 (inglês): Um estudo de caso. *Revista de Estudos da Linguagem* 17: 207–33. [CrossRef]

Boersma, Paul, and David Weenink. 2014. Praat, A System for Doing Phonetics by Computer, Version 5.3.78. Available online: http://www.praat.org (accessed on 14 December 2014).

Cabrelli Amarom, Jennifer. 2012. L3 phonology: An understudied domain. In *Third Language Acquisition in Adulthood*. Edited by Jennifer Cabrelli Amaro, Suzanne Flynn and Jason Rothman. Amsterdam and Philadelphia: John Benjamins, pp. 33–60.

Cabrelli Amaro, Jennifer. 2017. Testing the Phonological Permeability Hypothesis: L3 phonological effects on L1 versus L2 systems. *International Journal of Bilingualism* 21: 698–717. [CrossRef]

Cabrelli Amaro, Jennifer, and Jason Rothman. 2010. On L3 acquisition and phonological permeability: A new test case for debates on the mental representation of non-native phonological systems. *International Review of Applied Linguistics in Language Teaching* 48: 275–96.

Cabrelli Amaro, Jennifer, and Magdalena Wrembel. 2016. Investigating the acquisition of phonology in a third language—A state of the science and an outlook for the future. *The International Journal of Multilingualism* 13: 395–409. [CrossRef]

Caramazza, Alfonso, Grace H. Yeni-Komshiam, Edgar B. Zurif, and Emilio Carbone. 1973. The acquisition of a new phonological contrast: The case of stop consonants in French-English bilinguals. *The Journal of the Acoustical Society of America* 54: 421–28. [CrossRef] [PubMed]

Cho, Taehong, and Peter Ladefoged. 1999. Variation and universals in VOT: Evidence from 18 languages. *Journal of Phonetics* 27: 207–27. [CrossRef]

De Angelis, Gessica. 2007. *Third or Additional Language Acquisition*. Clevendon: Multilingual Matters.

Díaz-Campos, Manuel. 2004. Context of learning in the acquisition of Spanish second language phonology. *Studies in Second Language Acquisition* 26: 249–73. [CrossRef]

Dittmers, Tetyana, Christoph Gabriel, Marion Krause, and Sveda Topal. 2018. The production of voiceless stops in multilingual learners of English, French, and Russian: Positive transfer from the heritage languages? In *Proceedings of the 13th Conference on Phonetics and Phonology in the German-Speaking Countries*. Edited by Malte Belz, Christine Mooshammer, Susanne Fuchs, Stefanie Jannedy, Oksana Rasskazova and Marzena Zygis. Berlin: ZAS, pp. 41–44.

Fellbaum, Marie L. 1996. The acquisition of voiceless stops in the interlanguage of second language learners of English and Spanish. In *Proceedings of the 4th International Conference on Speech and Language Processing*. Edited by H. Tim Bunnel and William Idsardi. Wilmington: Applied Science and Engineering Laboratories, pp. 1648–51.

Flege, James E. 1987. The production of new and similar phones in a foreign language: Evidence for the effect of equivalence classification. *Journal of Phonetics* 15: 47–65.

Flege, James E. 1991. Age of learning affects the authenticity of voice-onset time (VOT) in stop consonants produced in a second language. *Journal of the Acoustical Society of America* 89: 395–411. [CrossRef] [PubMed]

Flege, James E., and Wieke Eefting. 1987. Production and perception of English stops by native Spanish speakers. *Journal of Phonetics* 15: 67–83.

Fowler, Carol A., Valery Sramko, David J. Ostry, Sarah A. Rowland, and Pierre Hallé. 2008. Cross language phonetic influences on the speech of French-English bilinguals. *Journal of Phonetics* 36: 649–63. [CrossRef] [PubMed]

Gabriel, Christoph, Tanja Kupisch, and Jeanette Seoudy. 2016. VOT in French as a foreign language: A production and perception study with mono- and multilingual learners (German/Mandarin-Chinese). In *Actes du 5^{e} Congrès Mondial de Linguistique Française*. Edited by Franck Neveu, Gabriel Bergounioux, Marie-Hélène Côté, Jean-Michel Fournier, Sylvester Osu, Philippe Planchon, Linda Hriba and Sophie Prévost. Paris: ILP/EDP Sciences, pp. 1–14.

García Lecumberri, María Luisa, and Francisco Gallardo del Puerto. 2003. English EFL sounds in learners of different ages. In *Age and the Acquisition of English as a Foreign Language*. Edited by María del Pilar García-Mayo and María Luisa García Lecumberri. Clevendon: Multilingual Matters, pp. 115–35.

García-Mayo, María del Pilar. 2012. Cognitive approaches to L3 acquisition. *International Journal of English Studies* 12: 1–20. [CrossRef]

Gurski, Claire. 2006. The hybrid system of voice onset time in French/English bilinguals. *The Journal of the Acoustical Society of America* 119: 3392. [CrossRef]

Gut, Ulrike. 2009. Non-Native Speech: A Corpus-Based Analysis of Phonological and Phonetic Properties of L2 English and German. Frankfurt am Main: Peter Lang.

Gut, Ulrike. 2010. Cross-linguistic influence in L3 phonological acquisition. *The International Journal of Multilingualism* 7: 19–38. [CrossRef]

Hammarberg, Björn. 2009. *Processes in Third Language Acquisition*. Edinburgh: Edinburgh University Press.

Hammarberg, Björn. 2010. The languages of the multilingual: Some conceptual and terminological issues. *International Review of Applied Linguistics* 48: 91–104. [CrossRef]

Hammarberg, Björn, and Britta Hammarberg. 1993. Articulatory re-setting in the acquisition of new languages: Reports from the Department of Phonetics, University of Umea. *Phonum* 2: 61–67.

Hansen Edwards, Jette G., and Mary L. Zampini, eds. 2008. *Phonology and Second Language Acquisition*. Amsterdam: John Benjamins.

Jarvis, Scott, and Aneta Pavlenko. 2008. *Crosslinguistic Influence in Language and Cognition*. New York: Routledge.

Kamiyama, Takeki. 2007. Acquisition of French vowels by Japanese-speaking learners: Close and close-mid rounded vowels. Paper presented at the Satellite Workshop of ICPhS XVI, Freiburg, Germany, August 3–4.

Kissling, Elizabeth M. 2013. Teaching pronunciation: Is explicit phonetics instruction beneficial for FL learners? *The Modern Language Journal* 97: 720–44. [CrossRef]

Kopečková, Romana. 2015. Differences in the perception of English vowel sounds by child L2 and L3 learners. In *Universal or Diverse Paths to English Phonology?* Edited by Ulrike Gut, Robert Fuchs and Eva-Maria Wunder. Berlin: Mouton de Gruyter, pp. 71–90.

Laeufer, Christiane. 1996. The acquisition of a complex phonological contrast: Voice timing patterns of English initial stops by native French speakers. *Phonetica* 53: 86–110. [CrossRef]

Lechner, Simone, and Martin Kohlberger. 2014. Phonetic transfer onto L3 English in subtractive bilinguals. Paper presented at the SLE 2014 Workshop on Advances in the Investigation of L3 Phonological Acquisition, Poznan, Poland, September 12.

Lisker, Leigh, and Arthur S. Abramson. 1964. A cross-language study of voicing in initial stops: Acoustical measurements. *Word* 20: 384–422. [CrossRef]

Liu, Zhao. 2016. Exploring Cross-Linguistic Influence: Perception and Production of L1, L2 and L3 of Bilabial Stops by Mandarin Chinese Speakers. Master's thesis, Universitat Autònoma de Barcelona, Barcelona, Spain.

Llama, Raquel, and Luz Patricia López-Morelos. 2016. VOT production by Spanish heritage speakers in a trilingual context. *International Journal of Multilingualism* 13: 444–58. [CrossRef]

Llama, Raquel, Walcir Cardoso, and Laura Collins. 2010. The influence of language distance and language status on the acquisition of L3 phonology. *International Journal of Multilingualism* 7: 39–57. [CrossRef]

Llisterri, Joaquim, and Dolors Poch. 1987. Les réalisations sonores dans l'apprentisage d'une troisième langue par bilingues. *Revue de Phonétique Appliquée* 82-83-84: 209–19.

Lord, Gillian. 2005. (How) can be teach foreign language pronunciation? On the effects of a Spanish Phonetics Course. *Hispania* 88: 557–67. [CrossRef]

MacLeod, Andrea A. N., and Carol Stoel-Gammon. 2009. The use of voice onset time by early bilinguals to distinguish homorganic stops in Canadian English and Canadian French. *Applied Psycholinguistics* 30: 53–77. [CrossRef]

Major, Roy Coleman. 2001. *Foreign Accent: The Ontogeny and Phylogeny of Second Language Phonology*. Mahwah: Lawrence Erlbaum Associates.

Mehlhorn, Grit. 2007. From Russian to Polish: Positive transfer in third language acquisition. Paper presented at 16th International Congress of Phonetic Sciences, Saarbücken, Germany, August 6–10; Edited by William J. Barry and Jürgen Trouvain. Saarbrücken: Universität des Saarlandes, pp. 1745–48.

Missaglia, Federica. 2010. The acquisition of L3 English vowels by infant German-Italian bilinguals. *International Journal of Multilingualism* 7: 58–74. [CrossRef]

Nespor, Marina, and Irene Vogel. 1986. *Prosodic Phonology*. Dordrecht: Foris.

Pyun, Kwang-soo. 2005. A model of interlanguage analysis—The case of Swedish by Korean speakers. In *Introductory Readings in L3*. Edited by B. Hufeisen and R. Fouser. Tübingen: Staufenberg Verlag, pp. 55–70.

Riney, Timothy J., and Naoyuki Takagi. 1999. Global foreign accent and voice onset time among Japanese EFL speakers. *Language Learning* 49: 275–302. [CrossRef]

Sánchez, Laura. 2011. "Luisa and Pedrito's dog will the breakfast eat": Interlanguage transfer and the role of the second language factor. In *New Trends in Crosslinguistic Influence and Multilingualism Research*. Edited by Gessica de Angelis and Jean-Marc Dewaele. Clevendon: Multilingual Matters, pp. 86–104.

Suarez, Philip. 2008. The pronunciation of the aspirated consonants p, t, and k in English by native speakers of Spanish and French. In *Proceedings of the Seventh Annual College of Education Research Conference: Urban and International Education Section*. Edited by Maria S. Plakhotnik and Sarah M. Nielsen. Miami: Florida International University, pp. 144–50.

Sundara, Megha, Linda Polka, and Shari Baum. 2006. Production of coronal stops by simultaneous bilingual adults. *Bilingualism: Language and Cognition* 9: 97–114. [CrossRef]

Sypiańska, Jolanta. 2013. Quantity and Quality of Language of Language Use and L1 Attrition of Polish due to L2 Danish and L3 English: The Role of L2 Proficiency. Ph.D. dissertation, Adam Mickiewicz University, Poznan, Poland.

Sypiańska, Jolanta. 2016. Multilingual acquisition of vowels in L1 Polish, L2 Danish, and L3 English. *International Journal of Multilingualism* 13: 476–95. [CrossRef]

Tremblay, Marie-Claude. 2007. L2 influence on L3 pronunciation: Native-like VOT in the L3 Japanese of English-French bilinguals. Paper presented at the Satellite Workshop of ICPhS XVI, Freiburg, Germany, August 3–4.

Waniek-Klimczak, Ewa. 2011. Aspiration and style: A sociophonetic study of the VOT in Polish learners of English. In *Achievements and Perspectives in SLA of Speech*. Edited by Magdalena Wrembel, Małgorzata Kul and Katarzyna Dziubalska-Kolaczyk. Frankfurt: Peter Lang, pp. 303–16.

Williams, Sarah, and Bjorn Hammarberg. 1998. Language switches in L3 production: Implications for a polyglot speaking model. *Applied Linguistics* 19: 295–333. [CrossRef]

Wrembel, Magdalena. 2010. L2-accented speech in L3 production. *International Journal of Multilingualism* 7: 75–90. [CrossRef]

Wrembel, Magdalena. 2011. Crosslinguistic influence in third language acquisition of voice onset time. Paper presented at 17th International Congress of Phonetic Sciences, Hong Kong, China, August 17–21; Edited by Lee Wai-Sum and Eric Zee. Hong Kong: City University of Hong Kong, pp. 2157–60.

Wrembel, Magdalena. 2014. VOT patterns in the acquisition of Third Language Phonology. *Concordia Papers in Applied Linguistics* 5: 751–71.

Wrembel, Magdalena. 2015. *In Search of a New Perspective: Cross-Linguistic Influence in the Acquisition of Third Language Phonology*. Poznan: Wydawnictwo Naukowe UAM.

Wunder, Eva-Maria. 2011. Cross-linguistic Influence in Multilingual Language Acquisition: Phonology in Third or Additional Language Acquisition. In *New Trends in Crosslinguistic Influence and Multilingualism Research*. Edited by Gessica de Angelis and Jean-Marc Dewaele. Clevendon: Multilingual Matters, pp. 105–28.

Yavaş, Mehmet, and Renée Wildermuth. 2006. The effects of place of articulation and vowel height in the acquisition of English aspirated stops by Spanish speakers. *International Review of Applied Linguistics* 44: 251–63. [CrossRef]

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Acquiring L1-English L2-Spanish Code-Switching: The Role of Exposure to Language Mixing

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Abstract: This paper explores the code-switching behavior of second language (L2) bilinguals as a lens into the development of their L2 linguistic systems. Specifically, it investigates the acceptability judgments of L1-English L2-Spanish bilinguals on intra-sentential code-switching, comparing those judgments to a group of Spanish–English bilinguals who acquired both languages as an L1. The particular issues of proficiency and bilingual language behavior are analyzed, testing whether either factor has an effect on L2 code-switching intuitions. The results suggest that both proficiency and bilingual language behavior are relevant. L2 bilinguals with an intermediate/advanced proficiency level of Spanish were more likely to align with 2L1 bilinguals with regard to code-switching judgments, as were L2 bilinguals who reported prior experience with language mixing. L2 bilinguals with lower proficiency in Spanish, as well as those who reported never engaging in code-switching, however, were more likely to diverge from the 2L1 bilinguals in their judgments.

Keywords: code-switching; bilingualism; Second Language Acquisition; syntax; Spanish; English

1. Introduction

Code-switching (CS) is a bilingual phenomenon commonly defined as the fluid alternation between languages during conversation (Poplack 1980). This paper focuses on intra-sentential CS—language mixing that occurs within the same sentence. Consistent findings from CS research show that it is not an artifact of bilingual deficiency or language detrition. Rather, it is a rule-governed phenomenon prevalent in the speech of highly proficient bilinguals. Consider, for instance, the examples of Spanish–English CS in (1).

1. a. *Ese* *hombre* ordered a glass of water.
   That guy
   'That guy ordered a glass of water.'

   b. **Él* ordered a glass of water.
   He
   'He ordered a glass of water.'

Here we see two similar switches from Spanish into English. The only distinction between the two sentences is that in one instance a full lexical Determiner Phrase (DP), *ese hombre* 'that guy', occupies the subject position (1a), whereas in the other we have a personal pronoun, *él* 'he' (1b). This minor difference has a crucial consequence: the switch from a Spanish lexical DP to a finite English verb is considered grammatical, whereas the switch between a Spanish pronoun and a finite English verb is not. This distinction between switching lexical DPs and pronouns (regardless of the language direction) has been known for quite some time (Gumperz 1977; Lipski 1978; Timm 1975; among others), and it is

just one example of a number of commonly attested, rule-governed instances of (un)grammaticality in CS.

Although there is a large body of work that attempts to account for the structural constraints on CS, the CS of second language (L2) bilinguals in particular has received less attention. In many cases, L2 bilinguals are excluded entirely, focusing solely on bilinguals who learned both languages from birth (i.e., both as an L1). Moreover, researchers who do include L2 bilinguals often have them form part of a broad umbrella "bilingual" group. In these cases, since the L2 data are not separated from those of 2L1 bilinguals, no information can be gleaned that is specific to L2 speakers.

Nonetheless, there are some notable exceptions. For example, L2 CS has been analyzed with regard to language dominance (Fernández Fuertes et al. 2016; Liceras et al. 2016) and L2 proficiency (Giancaspro 2015; Liceras et al. 2008; Toribio 2001). This line of work highlights the fact that there are crucial differences in the structure of CS across diverse bilingual groups, and there is a need to further explore these contrasts with L2 speakers. Within the field of Second Language Acquisition (SLA) specifically, though, L2 CS has more frequently been discussed with regard to pedagogy. That is to say, CS has been looked at when ascertaining to what level language learners do and/or should use their L1 in the L2 classroom (Hancock 1997, Macaro 2005; among others).

Although few investigations have explicitly analyzed CS with regard to the development of the L2 linguistic system, Toribio (2001), Giancaspro (2015), and Fernández Fuertes et al. (2016) all found evidence that it is possible for L2 bilinguals to acquire rule-governed restraints on CS. In these studies, proficiency or dominance was shown to play a critical role. Other possible factors have yet to be investigated, including the role of actual exposure to (and/or production of) language mixing. The current study tackles this specific issue as it relates to L2 CS, with the results suggesting that exposure to language mixing, in conjunction with increased proficiency, aids in L2 bilinguals in acquiring well-formedness judgments for CS.

2. L2 Code-Switching

2.1. Code-Switching as a Lens into the Developing L2 System

As with 2L1 bilinguals, L2 CS should not be considered a linguistic deficiency where language mixing occurs because the individual cannot maintain monolingual communication. It is true that CS can serve as a linguistic crutch to fill in gaps for L2 learners at the beginning levels of proficiency. However, the same way L2 speakers can learn to style shift given different sociolinguistic contexts (Tarone 1982, as cited in Ellis 1994), we can imagine them also learning to shift between languages, even in the same sentence, if given an appropriate bilingual context.

Recall that CS is a rule-governed phenomenon practiced by highly proficient bilinguals. That is to say, language mixing is understood as part of the grammatical competence of bilinguals. Although SLA researchers have explored countless other domains of grammar with regard to L2 acquisition, as it stands, there is little research that investigates L2 CS as a lens into the development of a non-native linguistic system. This study contributes to the limited line of research that aims to explain whether L2 bilinguals are able to acquire restrictions on CS, and, if so, how they are able to do so.

2.2. L2 Code-Switching and the Functional Head Constraint

The first work to explicitly examine L2 bilinguals with regard to their development of CS intuitions was Toribio (2001), specifically asking whether they were able to acquire well-formedness restrictions on CS. The study explored whether the predictions of the Functional Head Constraint (FHC), as proposed by Belazi et al. (1994), align with the acceptability judgments of L1-English L2-Spanish bilinguals.

The FHC is a generative model of CS that marks lexical items as being from either one language or the other. The proposal hinges upon a refinement of the Abney (1987) notion of f-selection—the idea that functional heads select the features of their complements. By making the language index

on each lexical item a feature, the FHC by Belazi et al. (1994, p. 228) states that "the language feature of the complement f-selected by a functional head, like all other relevant features, must match the corresponding feature of the functional head". According to the model, the FHC is applied in all forms of speech—both monolingual utterances and CS. The difference, of course, is that it does not ever constrain anything in monolingual sentences as the language features always match, as the lexical items come from the same lexicon. With CS, there is a distinction in grammaticality between functional and lexical heads: a functional head and its complement must come from the same language; however, switching between a lexical head and its complement is possible. Given this, Belazi et al. (1994) cite the following as examples where switching is not allowed: between the Complementizer and the Tense Phrase, between Tense and the Verb Phrase, and between Negation and the Verb Phrase.

Using a written Acceptability Judgment Task (AJT), the target stimuli in the Toribio (2001) study of L2 CS were functional switches like those including auxiliary verbs (2a), complementizers (2b), negation (2c), and so on.

2. a. **Los estudiantes han* elected a new representative.
   The students have
   'The students have elected a new representative.'

   b. *The clinic does not treat students that no tienen seguro médico.*
   not have insurance medical
   'The clinic does not treat students that don't have medical insurance.'

   c. **La biblioteca normalmente no* opens on Sunday mornings.
   The library normally not
   'The library normally does not open on Sunday mornings.'

The results show that proficiency of the L2 bilinguals was key for CS acceptability to align with the predictions of the FHC framework. Advanced learners were less likely to accept functional switches, whereas beginners relied on "a strategy of translation" (Toribio 2001, p. 224), and intermediate learners occupied a position somewhat in between the two. That is to say, the less proficient L2 bilinguals accepted switches where a word-for-word equivalency could be made between Spanish and the English translation, such as in (2a). It is important to note that proficiency here was determined by course level: beginners had one semester of university Spanish language study, whereas intermediate speakers had three, and advanced speakers had at least six. Overall, Toribio provides evidence that with continued linguistic development in the target language, L2 speakers can acquire the expected (un)grammaticality of intra-sentential CS.

2.3. L2 Code-Switching and the Constraint-Free Approach

More recently, Giancaspro (2015) conducted a similar investigation of L1-English L2-Spanish CS. Crucially different about this work is its focus on the Constraint-Free (CF) approach (MacSwan 1999, 2014) instead of the FHC. Eschewing the need of a language feature, the CF approach argues that CS grammaticality is dependent solely on features already inherent to the two grammars involved. In CS, the syntactic elements undergo feature-checking as they would in a monolingual derivation according to contemporary Minimalist syntax, following the specifications of the grammar of each element. Constraints on CS in this model are a result of movement (as a result of feature-checking) that creates a complex phonological head when mapping to the phonetic form (PF). This universal constraint is known as the PF Disjunction Theorem (MacSwan 1999). Using this analysis, the CF approach argues for a number of different reported restrictions on CS, including the ungrammaticality of auxiliary and pronoun switches, as both undergo head movement.

The switches included as stimuli in the Giancaspro (2015) study were reduced in comparison to Toribio (2001), as auxiliary switches (3a) and pronoun switches (3b) were specifically targeted.

3. a. *They boys had *pintado* *el* *cuadro*.
painted the picture
'The boys had painted the picture.'

b. *They *habían* *pintado* *el* *cuadro*.
had painted the picture
'They had painted the picture.'

There were also three other central differences between the studies. First, Giancaspro included a 2L1 bilingual group as a direct comparison, and he had participants complete an aural AJT, instead of written. Additionally, unlike Toribio's participants, all of the L2 speakers in Giancaspro's study were enrolled in upper-level, undergraduate Spanish classes. Proficiency was instead determined using a modified version of the Diplomas de Español como Lengua Extranjera (DELE, Certificate of Spanish as a Foreign Language)[1] (Montrul and Slabakova 2003).

The results of Giancaspro (2015) show that the CS acceptability of both the L2 and 2L1 bilinguals aligned with the CF approach. Interestingly, proficiency was not found to be a relevant factor. L2 participants who scored as advanced, intermediate, and beginner all behaved similarly, rating subject–predicate switches that included a pronoun or auxiliary at the switch point consistently lower than those that did not. Recall, though, that based on the way Toribio (2001) categorized proficiency, all participants in Giancaspro's study would be considered as intermediate/advanced. In effect, the end results of both Toribio and Giancaspro's studies point in the same direction: L2 bilinguals with higher proficiency can exhibit theoretically aligned intuitions with regard to intra-sentential CS, suggesting that the developing L2 system also includes acquired linguistic knowledge related to language mixing.

2.4. L2 Speakers' Exposure to Language Mixing

The implications of the Toribio (2001) and Giancaspro (2015) results are particularly interesting as L2 speakers seemingly exhibit what seems to be the outcome of a "poverty of the stimulus" learning environment (Chomsky 1980, p. 34). As Toribio (2001, p.219) states, "in the context of the second language classroom [. . .] learners receive no evidence, positive or negative, which could guide them in determining the appropriate code-switching patterns". This deviates from the typical 2L1 bilingual situation, where such a speaker is commonly exposed to language mixing from an early age. As members of a bilingual community where CS is a part of the linguistic input (in addition to monolingual utterances), it is not controversial to assume that 2L1 bilinguals "learn" to code-switch the same way they learn all other monolingual grammatical structures.[2] This is not the case for L2 speakers. Unlike other grammatical structures, language mixing is not something that is ever taught (explicitly or implicitly) in an L2 classroom. In fact, its presence is almost universally frowned upon in contemporary foreign language teaching practices. A communicative approach, for example, emphasizes the benefit of maximizing the L2 and avoiding the L1, using the target language "not only [for] the planned activities, but also the classroom management that revolves around it" (Littlewood 1981, p. 45). Using the L1 results in a reduction of comprehensible L2 input, which can be considered "not an optimal condition for language acquisition to take place" (Lee and VanPatten 2003, p. 33). As a consequence, many classrooms push for almost exclusive use of the L2 by both the instructor and the

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[1] The DELE is an official accreditation of Spanish language proficiency given by the Instituto Cervantes on behalf of the Spanish Ministry of Education and Professional Training. For more information, see https://examenes.cervantes.es/es/dele/que-es.

[2] It is worth noting that exposure to language mixing cannot be the sole factor for 2L1 bilinguals' restrictions on CS, as they can occur regardless of whether the 2L1 bilingual is a habitual code-switcher or not, and regardless of whether they live in a CS community or not.

learners, leaving no room for CS. In such a scenario, L2 CS is understood as an intrusion of the L1 and should be avoided as much as possible.[3]

At the same time, we should not assume that all L2 speakers are devoid of exposure to CS. First, foreign language teachers can confirm that although classroom policies may disfavor language mixing, it is still often present. Even if the instructor conducts the class entirely in the L2, it is still common for students to move in and out of the target language, especially when communicating with each other. Also, the question of whether L2 speakers are exposed to CS should not be limited to just the classroom environment. Although a formal learning environment may be the primary source of L2 use for these speakers, it is not clear what their bilingual language behavior looks like elsewhere. The L2 could be used outside the classroom while completing coursework with fellow students, or even at social events or workplaces where other bilinguals are present.

The question remains: to what extent are L2 speakers exposed to and/or do they participate in CS? Toribio (2001) assumes not at all; however, without actually asking the participants, it is unclear if that is indeed the case. This is especially true since Giancaspro (2015) states that the majority of his L2 participants reported daily exposure to CS. Given the limited exposure to CS reported across all L2 proficiency levels, Giancaspro (2015, p. 402) concludes that "it seems farfetched to suggest that L2 learners could be acquiring their subtle knowledge of the particular CS points of interest on the basis of this very limited CS input". Nonetheless, L2 participants who reported having zero instances per day were not compared to those who indicated at least some exposure to it. Consequently, more detailed information regarding the role of exposure to language mixing is left unexplored.

2.5. Research Questions and Hypotheses

Given the aforementioned background, the following research questions are proposed in order to address the acquisition of structural restrictions on L2 CS:

1. Do L1-English L2-Spanish bilinguals accept or reject a code-switch after an auxiliary verb?
2. Do L1-English L2-Spanish bilinguals accept or reject a code-switch after a pronoun?
3. Do L1-English L2-Spanish bilinguals perform differently than 2L1 bilinguals with regard to CS judgments?
4. Does language proficiency play a role with regard to L2 CS judgments?
5. Does exposure to language mixing play a role with regard to L2 CS judgments?

Previous research (Fernández Fuertes et al. 2016; Giancaspro 2015; Toribio 2001) predicts that both auxiliary and pronoun switches should be unacceptable, and that at least a subset of L2 bilinguals will reject such switches. Similarly, bilinguals with a higher L2 proficiency will be expected to pattern with 2L1 bilinguals, as these individuals will be more likely to reject auxiliary and pronoun switches. However, it is unknown whether exposure to language mixing (or lack thereof) will have any effect on the results.

3. Materials and Methods

3.1. Participants

The primary group of participants for the current study were U.S. L1-English L2-Spanish bilinguals (N = 192) who learned English since birth in a natural context and then Spanish later in a school setting (M = 11.2 years). Recruited from third- and fourth-year university Spanish courses, their ages ranged between 18 and 33 (M = 20.0 years). All participants were compensated for their time either via extra credit in their course or a small monetary amount.

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[3] For examples of work that challenges such a stance, see Liceras (2013, 2014); Kaushanskaya et al. (2014); Antón et al. (2015); and Avery (2015).

The participants were first divided into groups based on reported bilingual language behavior. Specifically, they were categorized by whether or not they self-reported to be exposed to and/or participate in intra-sentential Spanish–English CS. It is not possible to simply ask a participant, "Are you a code-switcher?" as most bilinguals either do not know what that term means or have a possibly mistaken understanding of it. Instead, a series of indirect questions within the language background questionnaire was used:

1. Is there someone (or multiple people) you speak both English and Spanish with?
2. When speaking with this person (or people), do you ever use both languages in the same conversation?
3. When speaking with this person (or people), do you ever use both languages in the same sentence?
4. What is an example of something you or the other person could possibly say where both Spanish and English are used in the same sentence?

The participants fell into one of five different groups based on their respective answers. The first three questions broadly separated individuals into three categories: intra-sentential code-switchers, inter-sentential code-switchers, or neither. A participant was categorized as No CS (n = 48) if they answered "No" to either the first or second question, as it indicated that the person maintains complete separation between Spanish and English. Those who responded affirmatively to the first two questions but negatively to the third were categorized as Inter-sentential CS only (n = 26), as these individuals reported mixing their languages in conversation, but only at the sentence level. The remaining participants included the individuals who responded "Yes" to the first three questions (n = 108), indicating an exposure to and/or use of language mixing within the sentence (i.e., intra-sentential CS).

The participants who reported engaging in intra-sentential CS were not considered homogenous. They were further divided into three different groups based on the example mixed sentence they provided for the fourth question. Any individual who provided a response that exemplified a code-switch where the intention was purely translational and/or was due to a linguistic gap was put in a group labeled Gap intra-sentential CS (n = 30). Given that these participants are all L1-English L2-Spanish bilinguals, these examples included sentences where an English word or phrase was inserted into an otherwise completely Spanish sentence, explicitly due to a lack of knowing how to say it monolingually. Such examples included sentences with an actual code-switch (4a), as well as generic descriptions of such switches (4b,c).

4. a. *Cómo* *se* *dice* Bachelor of Science *en* *español?*
   How PASS say in Spanish
   'How do you say Bachelor of Science in Spanish?'

   b. If I forget a word in Spanish.

   c. When speaking Spanish and get most of the way through a sentence, then forget a word and finish in English.

Of course, it is possible that these individuals also engage in intra-sentential CS that is not merely a linguistic crutch to compensate for performance issues related to their L2 proficiency. Nonetheless, given the information provided, it is just as feasible that these individuals only switch in such circumstances, and in that case their experience with CS would be quite distinct from the type of CS that is the central focus of this investigation.

On the other hand, there were participants who were categorized as engaging in True intra-sentential CS (n = 63). These individuals provided an example code-switched sentence that did not involve translation and/or linguistic gaps in the L2, but rather provided mixed utterances that directly mirror those produced by 2L1 bilinguals throughout the literature (5).

5. a. I'm on my way to *la clase de biología*.
the class of biology
'I'm on my way to biology class.'

b. *A lo mejor* we should go to dinner tonight.
To the better
'Maybe we should go to dinner tonight.'

Unlike the previous group, these individuals show evidence of Spanish–English mixing that is not a result of a lack of L2 proficiency. Of course, this does not rule out that these speakers do not engage in CS that is centered around a gap in their L2 linguistic competence. Nevertheless, we can assume that at least a percentage of their use of language mixing is not motivated by issues of proficiency.

The final set of participants included those considered Unclear intra-sentential CS (n = 15), as their example sentence could not be easily identified as either true intra-sentential CS or merely a linguistic gap in their L2. The example sentences for these individuals were always a generic explanation of when they would mix their languages but did not provide a clear enough description (6).

6. a. Talking about homework.

b. Referencing a television show.

In such situations, it is equally possible that the individual engages in either type of language mixing previously defined for the two other intra-sentential CS groups. A summary of the categorization of participants by bilingual language behavior is provided in Table 1.

Table 1. Summary of bilingual language behavior.

Group	*n*	Q1	Q2	Q3	Q4
No CS	48	No	-	-	-
		Yes	No	-	-
Inter-sentential CS only	26	Yes	Yes	No	-
Gap intra- sentential CS	30	Yes	Yes	Yes	*¿Cómo se dice wallet?* 'How do you say wallet?'
True intra- sentential CS	63	Yes	Yes	Yes	*The printer dice que no tiene papel.* 'The printer says it's out of paper.'
Unclear intra- sentential CS	15	Yes	Yes	Yes	*We talk about cute boys in Spanish.*

CS: Code-switching.

In addition to bilingual language behavior, the participants were divided into groups based on their Spanish proficiency score via the modified DELE (Montrul and Slabakova 2003). The intermediate and advanced L2 bilinguals were collapsed into the same proficiency group as there were few individuals who scored at the advanced level (n = 18). Therefore, participants who scored between 30 and 50 (out of 50) were considered L2 Intermediate/Advanced (Int–Adv) (n = 86), whereas a score between 0 and 29 was considered L2 Low (n = 96). The proficiency categorization combined with the aforementioned CS groupings resulted in 10 different participant groups, which are provided in Table 2.

Table 2. Participants by bilingual language behavior and L2 proficiency.

Group	L2 Int–Adv	L2 Low
	n	***n***
No CS	22	26
Inter-sentential CS only	16	10
Gap intra-sentential CS	14	16
True intra-sentential CS	31	32
Unclear intra-sentential CS	3	12

L2 Int–Adv: L2 Intermediate/Advanced.

Given the focus of this present study, only 4 of the 10 different groups are included in the actual data analysis. To best investigate the role of exposure to language mixing on the acquisition of L2 CS, emphasis is placed on the two extreme ends of the spectrum: (i) those who indicate never mixing their two languages (i.e., the No CS groups); and (ii) those who indicate true intra-sentential CS (i.e., the True intra-sentential CS groups). For ease of description, these individuals will be henceforth referred to as members of the No-CS and +CS groups, respectively. Of course, as with all self-reporting on language, it must be acknowledged that participant responses are not always indicative of true behavior. Nonetheless, the process just detailed can serve as a productive approximation of the real-life distinctions in language mixing behavior among L2 bilinguals.

In addition to the L2 bilinguals, there was also a group of U.S. Spanish–English 2L1 bilinguals (n = 15) included as a comparison. As with the L2 participants, the 2L1 bilinguals were recruited from third- and fourth-year university Spanish courses. Commonly referred to as heritage speakers of Spanish, these individuals were exposed to Spanish since birth and English soon thereafter, by at least age 6 when entering the school system. Their ages ranged between 19 and 47 years old (M = 22.1 years old). Unlike the L2 bilinguals, the 2L1 bilinguals all fell into the same group regarding both bilingual language behavior and Spanish proficiency. First, they engage in true intra-sentential CS (i.e., +CS), as they reported mixing Spanish and English in the same sentence and provided examples such as those in (7).

7. a. *El* *otro* *día* *fui* *a* *Publix* *a* *comprar* apples.
The other day went.1SG to Publix to buy
'The other day I went to Publix to buy apples.'

b. *Tenía* *que* *llamar* *a* *usted* because my mom wasn't answering.
Had.1SG to call DOM you
'I had to call you because my mom wasn't answering.'

Second, they all scored above the threshold for the intermediate proficiency level of the modified DELE. An overview of the participants comparing various linguistic factors of the 2L1 and L2 bilingual groups is provided in Table 3, including the aforementioned variables, as well as parallel details regarding their English proficiency[4] and their daily exposure to both languages.

Although there was no explicit measure of language dominance, all participants in this study should be considered English-dominant. This is expected for the L1-English L2-Spanish bilinguals. However, this consideration is important to note for the 2L1 bilingual group, as they were all born and raised in the U.S., with the only exception being one individual who arrived by age 1. This presumed

[4] Given the participants, a relative homogeneity with regard to English across the groups was expected. However, a proficiency measure for English was included (i) to ensure participants were actually completing the task and not just clicking through; and (ii) to reduce the stigma of only testing the proficiency level of Spanish, especially with regard to the 2L1 bilinguals, a group that often exhibits high levels of linguistic insecurity regarding their heritage language.

English language dominance is supported by the self-rated proficiency and self-reported exposure data presented in Table 3.

Table 3. Overview of participants.

Factor	2L1		L2 +CS Int–Adv		L2 +CS Low		L2 No-CS Int–Adv		L2 No-CS Low	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age of acquisition:										
English	3.0	2.5	0.1	0.4	0.0	0.0	0.3	0.9	0.2	0.9
Spanish	0.3	1.3	11.5	3.9	10.8	3.4	10.3	3.9	12.1	3.1
Proficiency score:										
English (out of 40) [i]	37.7	1.0	39.0	0.9	36.0	6.6	38.9	0.9	38.1	1.8
Spanish (out of 50)	35.5	9.0	35.6	4.6	21.6	4.8	37.4	3.3	21.6	4.5
Self-rated proficiency:										
English (out of 5) [ii]	4.9	0.3	5.0	0.0	4.9	0.6	5.0	0.0	5.0	0.0
Spanish (out of 5)	3.8	0.8	3.5	0.5	3.3	0.6	3.2	0.5	3.1	0.7
Self-reported exposure:										
% English	66.5	15.3	84.5	7.8	79.9	11.5	84.5	11.1	87.5	10.1
% Spanish	31.9	15.1	15.3	7.9	20.1	11.5	13.3	8.2	11.5	7.4
% Other	1.6	5.0	0.2	0.9	0.0	0.0	2.2	7.7	1.0	3.5

[i] The English proficiency measure was a multiple-choice cloze test (O'Neill et al. 1981). [ii] The scale for self-rated proficiency was as follows: 1—Poor; 2—Needs work; 3—Good; 4—Very good; 5—Native speaker command. M: mean; SD: standard deviation.

3.2. Task

The task was a written AJT conducted online via Qualtrics (Qualtrics, LLC, Provo, UT, USA), in line with the general guidelines of experimental CS research proposed by González-Vilbazo et al. (2013). A written AJT was chosen over an aural AJT to align more with the methodology of other studies involving L2 CS, including Toribio (2001), Liceras et al. (2008), Fernández Fuertes et al. (2016), and Klassen (2016), albeit distancing it from that of Giancaspro (2015). Nonetheless, following Koronkiewicz and Ebert (forthcoming), both written and aural modalities of CS can provide comparable results in an AJT. The AJT was preceded by a language background questionnaire and task training, the latter of which was minimal and only included general instructions on how to complete an AJT, as well as a dozen practice sentences. Presented in code-switched Spanish–English in order to prime them for bilingual mode, the instructions highlighted avoiding prescriptive rules (i.e., *lo que hayas aprendido en la escuela* 'what you learned in school') and encouraged participants to focus on whether the sentence structures simply sounded "strange" or "completely fine". During the training is also when the 7-point Likert scale was introduced that explicitly asked, 'How acceptable is this sentence'/*¿Qué le parece esta oración?*, with the low end of the scale (i.e., 1) labeled 'Completely unacceptable'/*Completamente inaceptable*, and the high end (i.e., 7) labeled 'Completely acceptable'/*Completamente aceptable*.

Included in the AJT were Spanish–English code-switched sentences (n = 54), as well as monolingual blocks of Spanish (n = 27) and English (n = 27). A complete list of all experimental stimuli is included in Appendix A. The experimental blocks were separated by the proficiency measures, so that the overall order of the experiment was as follows: background questionnaire; training; CS AJT block; Spanish proficiency measure; monolingual Spanish AJT block; English proficiency measure; monolingual English AJT block. Within the blocks, all stimuli were individually randomized for each participant.

3.3. Stimuli

The target stimuli focused on two different types of switches, which I refer to generally as (i) "verb switches" (n = 12), and (ii) "subject switches" (n = 12). For the former, the critical difference is whether the language switch occurs after a finite auxiliary verb (n = 6) or before a finite lexical verb (n = 6);

whereas for the latter, the switch occurs after either a pronominal subject (n = 6) or a lexical DP subject (n = 6). The code-switched stimuli were half Spanish-to-English switches, and half English-to-Spanish switches. Examples of the verb switches are in (8), and examples of the subject switches are in (9).

8. a. **Su hermano ha* trained at the gym every day.
   His brother has
   'His brother has trained at the gym every day.'

   b. **Su hermano* trains at the gym regularly.
   his brother
   'His brother trains at the gym regularly.'

9. a. *He *pidió una cerveza*.
   ordered a Beer
   'He ordered a beer.'

   b. *That guy *pidió un vaso de agua*.
   ordered a glass of water
   'That guy ordered a glass of water.'

In (8) we see an example of the verb stimuli for Spanish-to-English switches. First, there is the expectedly unacceptable switch (8a) as shown with the Spanish auxiliary verb *haber* 'to have' and an English finite participle, in this case *trained*. The companion control stimulus (8b) includes no auxiliary, but rather switches between the Spanish lexical DP in subject position, in this case *su hermano* 'his brother', and the finite lexical verb in English, in this case *trains*. In (9), we see the same for the pronoun stimuli. Here, the expectedly unacceptable switch (9a) includes an English weak pronoun, in this case *he*, and a finite lexical verb in Spanish, in this case *pidió* 'ordered'. The respective control stimulus (9b) includes an English full lexical DP, here *that guy*, switched with the same Spanish finite verb.

Note that for both the verb and subject switches, the comparison control switch is the exact same type of sentence: a lexical DP switched with a finite verb (with no auxiliary), as shown in (8b) and (9b). These stimuli are included as a baseline comparison of CS acceptability. Since a lexical DP switched with a finite verb is one of the most commonly cited switches in the literature, the ratings of these stimuli should provide an understanding of where on the Likert scale the participants consider a switch as completely acceptable. Consequently, if the auxiliary switches and/or pronoun switches are rated significantly lower, we know that the participants consider such a switch (at least to some extent) unacceptable. Without this comparison, the first two research questions would not be answerable without drawing an arbitrary line on the Likert scale where "acceptable" ends and "unacceptable" begins. Given that these control stimuli have the same sentence structure, an alternate option would have been to include just one set of lexical DP switches. However, two different sets of comparison stimuli were tested as the auxiliary switches and pronoun switches were designed using distinct lexical verbs. By having two sets of lexical DP switches, the auxiliary switches and pronoun switches can be directly compared to acceptable switches with similar lexical material.

All target stimuli followed the same basic structures shown in (8) and (9). The subject was always third person, half the time singular and half plural, balanced across conditions. Similarly, gender of the subject was explicitly feminine half of the time, with the other half being masculine. All lexical DPs in subject position included solely a distal demonstrative (e.g., *that*, *those*) or a possessive adjective (e.g., *his*, *their*) in the same language as the noun phrase. Following the verb was always either an adverbial adjunct or direct object complement in the same language as the finite verb, except in the case of the verb switches where these sentence-final elements were in the same language as the participle. The verb switches always included the present perfect, which meant a form of either *have* in English or *haber* 'to have' in Spanish.

Also included were monolingual comparisons for both the verb stimuli (n = 12) and subject stimuli (n = 12). These sentences were equivalent to their code-switched counterparts except for the crucial difference of being entirely monolingual. Monolingual English examples of the verb stimuli are in (10), and similar examples of the subject stimuli are in (11).

10. a. Her brother has trained at the gym every day.

    b. Her brother trains at the gym regularly.

11. a. He ordered a beer.

    b. That guy ordered a glass of water.

The remaining stimuli were different filler sentences. For the code-switched block, the filler stimuli (n = 30) included complex sentence switches, coordinated pronoun switches, direct object switches, present progressive switches, and other general subject–predicate switches. The monolingual English fillers (n = 15) and monolingual Spanish fillers (n = 15) included the same structures just mentioned, as well as unacceptable that-trace violations and adjective violations for English, and unacceptable negation violations and adverb violations for Spanish.

4. Results

4.1. Verb Switches

Before analyzing the CS results, it is important to first assess the ratings received for the monolingual stimuli. Following Ebert and Koronkiewicz (2018), monolingual judgments can provide a benchmark comparison of acceptability, as well as point out any potential ungrammaticality that stems from elements unrelated to CS. That is, if participants rate a monolingual sentence as unacceptable, rating that same sentence as unacceptable when code-switched tells us nothing interesting about the grammaticality of the switch. However, if the opposite is true, where participants rate a monolingual sentence as completely acceptable, but the code-switched version as unacceptable, we can be assured that the difference is due to the switch and the switch alone.

The results for the monolingual verb stimuli are presented in Figures 1 and 2.[5] Overall, we can see that all the participants favored both types of verb stimuli, providing mean ratings at the high end of the acceptability scale. This is not surprising, given that these are all grammatical sentences in both Spanish and English. This was confirmed by a two-way ANOVA of all the monolingual verb stimuli that examined the effect of group and stimulus type (i.e., Aux+V or V-only) on rating. A main effect was found for both group, $F(4, 1562) = 14.442$, $p < 0.001$, and type, $F(1, 1562) = 33.836$, $p < 0.001$, but there was no significant interaction, $F(4, 1562) = 0.613$, $p = 0.653$. A Tukey post hoc analysis revealed that the 2L1 bilingual group rated everything significantly lower than all other groups, $p < 0.0001$, but no other significant group differences were found. This tells us that, in spite of the trend of high acceptability extended throughout all participant groups, the 2L1 bilinguals rated everything just slightly lower than the other groups. Also, in the monolingual English condition, the stimuli that included just a regular finite verb (V-only), received slightly higher scores than the stimuli that included an auxiliary verb and a participle (Aux+V) instead. Why these differences were found with the monolingual stimuli will be addressed in more detail in Section 5.4.

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[5] The error bars in all of the figures represent the standard error for each respective mean rating.

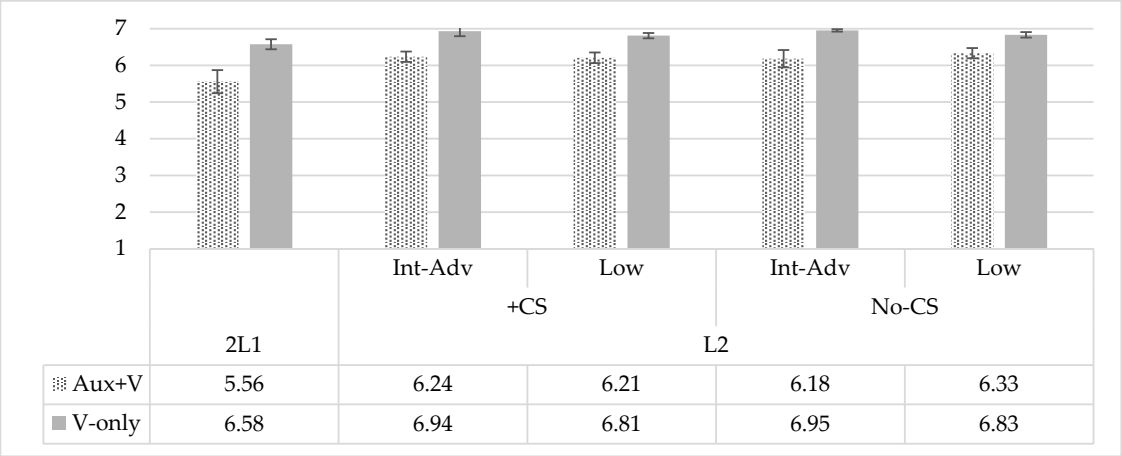


Figure 1. Monolingual English verb stimuli ratings by group and type. Aux+V: auxiliary verb and participle; V-only: regular finite verb; Int–Adv: Intermediate/Advanced; +CS: true intra-sentential code-switching groups; No-CS: non-code-switching groups.

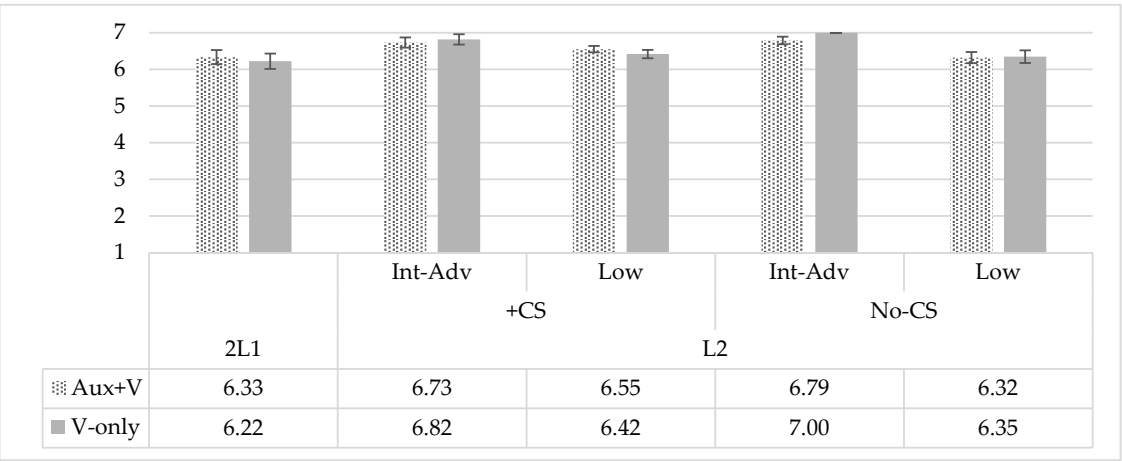
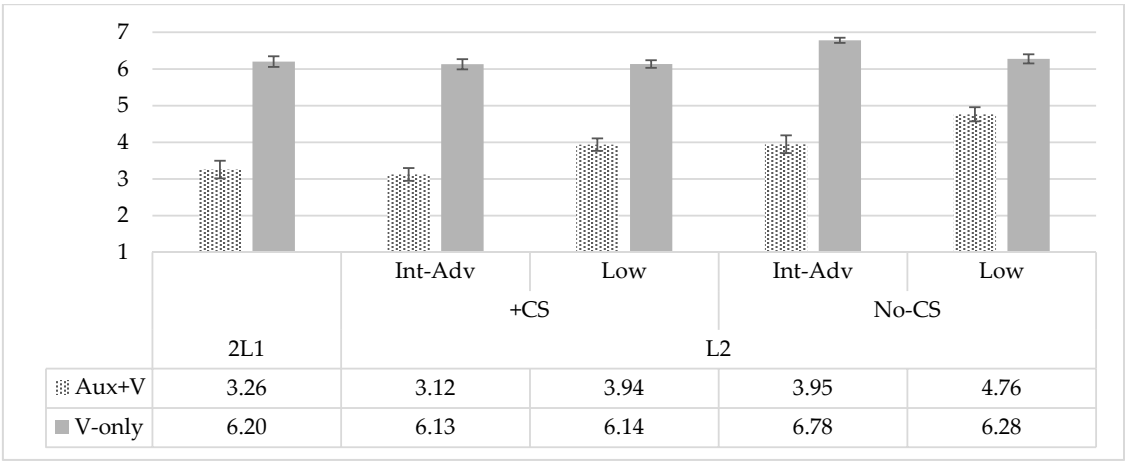


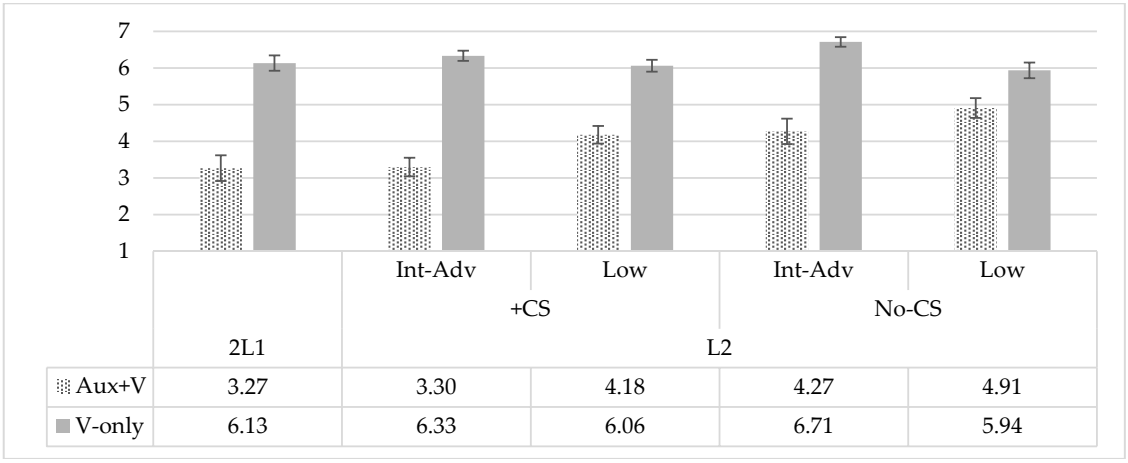
Figure 2. Monolingual Spanish verb stimuli ratings by group and type.

We can now turn to the code-switched verb stimuli. The combined CS results are presented in Figure 3, with them separated by switch direction (i.e., English-to-Spanish or Spanish-to-English) in Figures 4 and 5. Here we see a different picture than with the monolingual stimuli. The control V-only stimuli, which included just a lexical DP switched with a finite verb, received favorable acceptability scores, with judgments toward the high end of the scale, just like their monolingual counterparts. The Aux+V stimuli, however, received much lower scores, more toward the middle of the scale. This pattern follows expectations, as such a switch is said to be ungrammatical following the theoretical framework and previous research, whereas the control switch is not. In short, there is an overall tendency across the groups so that the less a bilingual uses CS and the less proficient they are, the higher the rating of the unacceptable auxiliary switch. There is some minor variability when comparing the switch direction, as the L2 +CS Low group and both L2 No-CS groups found a larger distinction in acceptability when the switch was from Spanish-to-English; however, the overall trend is consistent.



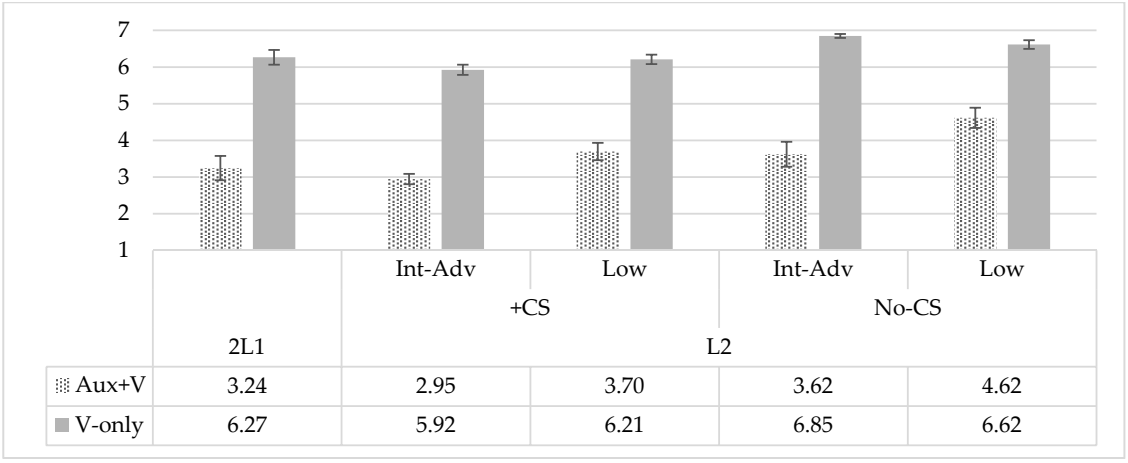
	2L1	+CS Int-Adv	+CS Low	No-CS Int-Adv	No-CS Low
Aux+V	3.26	3.12	3.94	3.95	4.76
V-only	6.20	6.13	6.14	6.78	6.28

Figure 3. Code-switched verb stimuli ratings by group and type.



	2L1	+CS Int-Adv	+CS Low	No-CS Int-Adv	No-CS Low
Aux+V	3.27	3.30	4.18	4.27	4.91
V-only	6.13	6.33	6.06	6.71	5.94

Figure 4. Code-switched English-to-Spanish verb stimuli ratings by group and type.



	2L1	+CS Int-Adv	+CS Low	No-CS Int-Adv	No-CS Low
Aux+V	3.24	2.95	3.70	3.62	4.62
V-only	6.27	5.92	6.21	6.85	6.62

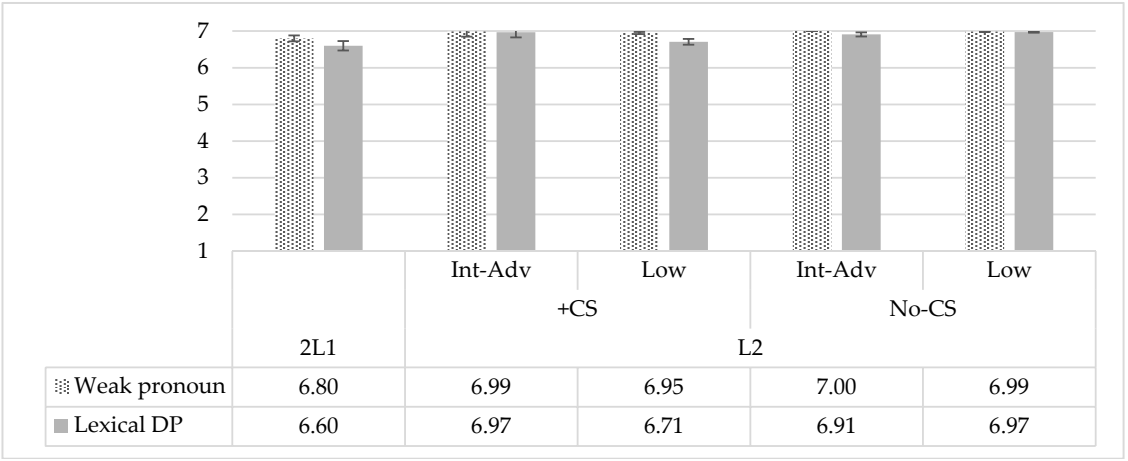
Figure 5. Code-switched Spanish-to-English verb stimuli ratings by group and type.

A two-way ANOVA measuring the effect of group and stimulus type on rating revealed a main effect for both group, $F(4, 1562) = 54.001$, $p < 0.001$, and type, $F(1, 1562) = 537.089$, $p < 0.001$, as well as a significant interaction between the two, $F(4, 1562) = 6.898$, $p < 0.001$. Post hoc analysis using a Bonferroni correction for multiple comparisons indicated that all groups rated the Aux+V switches

significantly lower than the V-only switches, $p < 0.001$. As for the amount of distinction made between the two switch types, the differences in mean ratings for the 2L1 the L2 +CS Int–Adv groups were found to be significantly larger than all other groups, $p < 0.05$, but not each other. Additionally, the L2 +CS Low group made a distinction that was significantly larger than the L2 No-CS Low group, $p < 0.05$. No other significant differences between groups were found.

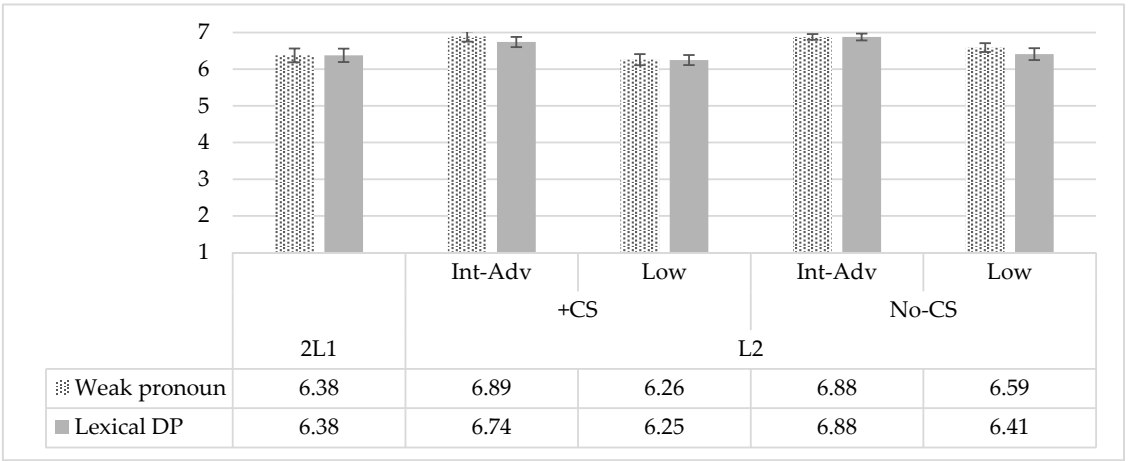
4.2. Subject Switches

We must again assess the ratings received for the monolingual stimuli first to ensure the (un)acceptability found in CS results is specific to the language switch. The results for the monolingual subject stimuli are presented in Figures 6 and 7. A two-way ANOVA of all the monolingual subject stimuli measuring the effect of group and stimulus type (i.e., weak pronoun or lexical DP) on rating found a main effect for group, $F(4, 1562) = 18.690$, $p < 0.001$, but not type, $F(1, 1562) = 3.581$, $p = 0.059$. A Tukey post hoc analysis revealed that the 2L1 bilingual group and the L2 +CS Low group were found to rate all stimuli lower than the other three groups, $p < 0.05$, but not each other. No other significant differences were found.



	2L1	L2 +CS Int-Adv	L2 +CS Low	L2 No-CS Int-Adv	L2 No-CS Low
Weak pronoun	6.80	6.99	6.95	7.00	6.99
Lexical DP	6.60	6.97	6.71	6.91	6.97

Figure 6. Monolingual English subject stimuli ratings by group and type. DP: determiner phrase.



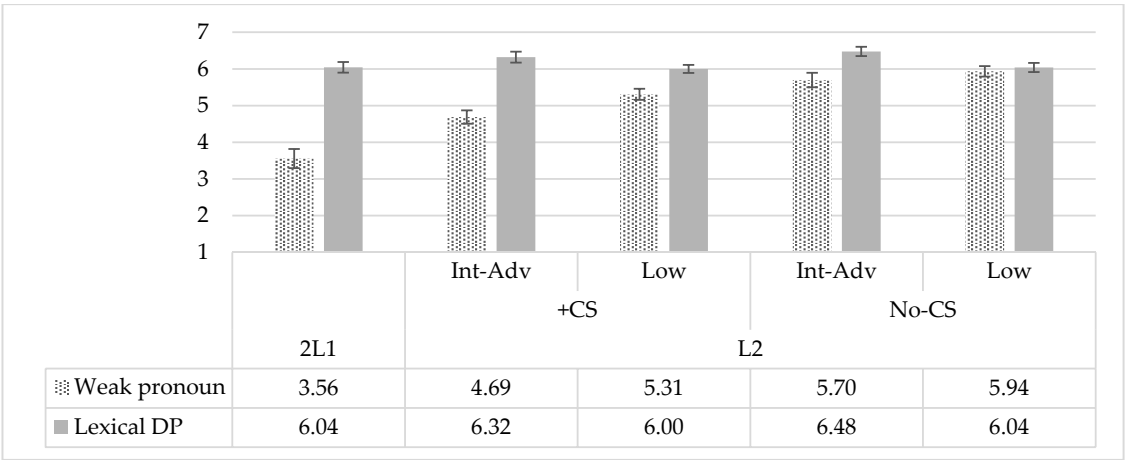
	2L1	L2 +CS Int-Adv	L2 +CS Low	L2 No-CS Int-Adv	L2 No-CS Low
Weak pronoun	6.38	6.89	6.26	6.88	6.59
Lexical DP	6.38	6.74	6.25	6.88	6.41

Figure 7. Monolingual Spanish subject stimuli ratings by group and type.

The combined code-switched subject stimuli are presented in Figure 8, with the results separated by switch direction (i.e., English-to-Spanish or Spanish-to-English) in Figures 9 and 10. As was the case with the verb stimuli, we see a clear distinction between the code-switched subject stimuli and their

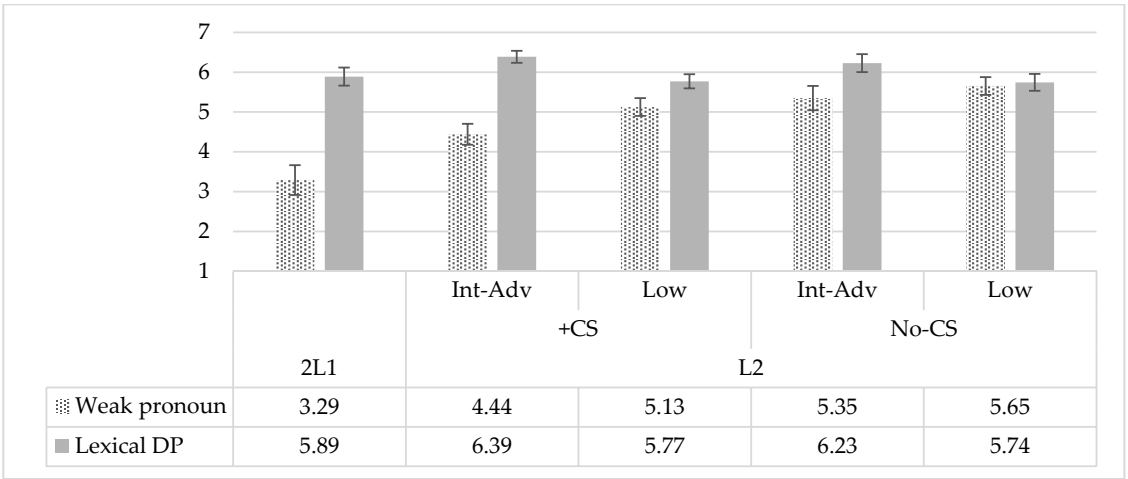
monolingual comparisons. Although the control lexical DP stimuli received favorable scores at the high end of the acceptability scale, the weak pronoun stimuli ratings are reduced and more variable, including some scores averaging toward the middle of the scale. Even more interesting, though, is that the weak pronoun stimuli ratings seem to vary more substantially from group to group, with the 2L1 bilingual group rating them the lowest, and the L2 No-CS Low group rating them at almost the same level as the lexical DP stimuli. Again, there is some minor variability when comparing the switch direction, as the Spanish-to-English switches seem to be rated as slightly more acceptable across the board. Nonetheless, the overall trend remains the same: the less a bilingual uses CS and the less proficient they are, the higher the rating of the unacceptable switch, which in this case included a pronoun.

A two-way ANOVA measuring the effect of group and stimulus type on rating revealed a main effect for both group, $F(4, 1562) = 21.162$, $p < 0.001$, and type, $F(1, 1562) = 112.515$, $p < 0.001$, as well as a significant interaction between the two, $F(4, 1562) = 11.585$, $p < 0.001$. Post hoc analysis using a Bonferroni correction for multiple comparisons indicated that all groups except the L2 No-CS Low group rated the weak pronoun switches lower than the lexical DP switches, $p < 0.05$. As for the amount of distinction made between the two switch types, the difference in mean ratings for the 2L1 bilingual group was found to be statistically larger than all other groups, $p < 0.001$. Additionally, the L2 +CS Int–Adv group made a distinction that was found to be significantly larger than both No-CS groups, $p < 0.05$, as was the case for the L2 +CS Low group and the L2 No-CS Int–Adv group, $p < 0.05$. No other significant differences between groups were found.



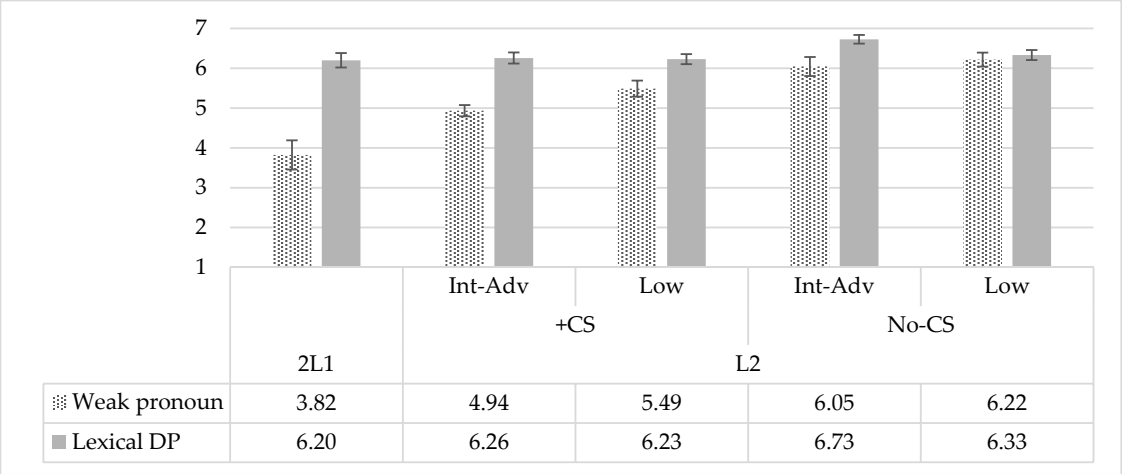
	2L1	L2 +CS Int-Adv	L2 +CS Low	L2 No-CS Int-Adv	L2 No-CS Low
Weak pronoun	3.56	4.69	5.31	5.70	5.94
Lexical DP	6.04	6.32	6.00	6.48	6.04

Figure 8. Code-switched subject stimuli ratings by group and type.



	2L1	L2 +CS Int-Adv	L2 +CS Low	L2 No-CS Int-Adv	L2 No-CS Low
Weak pronoun	3.29	4.44	5.13	5.35	5.65
Lexical DP	5.89	6.39	5.77	6.23	5.74

Figure 9. Code-switched English-to-Spanish subject stimuli ratings by group and type.



	2L1	L2 +CS		L2 No-CS	
		Int-Adv	Low	Int-Adv	Low
Weak pronoun	3.82	4.94	5.49	6.05	6.22
Lexical DP	6.20	6.26	6.23	6.73	6.33

Figure 10. Code-switched Spanish-to-English subject stimuli ratings by group and type.

5. Discussion

5.1. Differences between Switch Types

There was an almost-universal trend in which participants showed the expected pattern of CS (un)acceptability. This was evidenced by all groups judging a switch between an auxiliary verb and a participle less acceptable than a standard subject–predicate switch. In other words, the reduced acceptability of an auxiliary switch exhibited itself regardless of bilingual type, Spanish proficiency, or bilingual language behavior. These findings are intriguing in that they suggest that without exposure to and/or production of CS, L2 bilinguals even at a lower proficiency level show evidence of linguistic competence regarding constraints on intra-sentential CS. At a broad level, this finding is in line with the Giancaspro (2015) study, as it supports the proposal by MacSwan (1999, 2014) that there are no constraints on CS except for the features of the two grammars in question. Although we have no way of knowing what cognitive strategies were employed during the task, given the surface-level similarity between Spanish and English auxiliary structures, it at least suggests that participants were not simply relying on word-for-word translation (e.g., being able to simply substitute a Spanish auxiliary for an English one, or vice versa), as we would not have seen a result where the Aux+V stimuli were consistently rated lower than the V-only comparison stimuli.

Nevertheless, although the expected patterns of CS (un)acceptability were pervasive in the results, they were not absolute. By turning to the subject stimuli results, we have a more nuanced picture, showing that the particular structure under analysis is relevant, highlighting the importance of not collapsing switch types into too-broad categories. Unlike with the verb stimuli, with the subject stimuli, the participant groups did not all differentiate between the expectedly unacceptable stimuli and the control stimuli. The L2 No-CS Low group diverged by finding pronoun switches just as acceptable as lexical DP switches. This finding in combination with the auxiliary switch results tells us that the acquisition of the constraints on CS is not all or nothing. That is to say, it suggests that the same way L2 speakers acquire different features of the L2 in stages, so too do they acquire different CS restrictions. Based on the current results, it seems the restriction on auxiliary switches is acquired earlier than that on pronoun switches. The fact that auxiliary switches are much more salient than pronoun switches could be a possible explanation for this distinction. Using Ravid's (1995, as cited in Gass et al. 2017, p.117) definition of salience as "the property of a structure that is perceptually distinct from its environment", the fact that the auxiliary construction includes both the finite verb and the participle makes it stand out as opposed to the more straightforward subject switches.

5.2. Differences Between Groups

Despite this overall trend of L2 bilinguals exhibiting expected distinctions in CS acceptability, it is important to note that the degree of the distinction varied among the different groups. Although most L2 participants demonstrated that they differentiate between the expectedly unacceptable switches and the control switches, the groups' average ratings were not identical for the different switch types. Using the 2L1 bilingual group's ratings as a comparison, we can analyze the extent of the distinction between the expectedly unacceptable and control switches to tap into how their L2 linguistic systems are developing with regard to CS. When rating code-switched verb sentences, for example, the L2 +CS Int–Adv group and the 2L1 bilinguals formed one cohesive unit. In other words, for these switches, the L2 +CS Int–Adv group performed entirely 2L1-like, exhibiting strong intuitions about the ungrammaticality of an auxiliary switch. Meanwhile, the remaining groups formed a hierarchy with regard to this same distinction. The +CS Low made more of a distinction than the No-CS Low group, and the No-CS Int–Adv occupied an intermediary position between the other two groups. We can interpret this to mean that both proficiency and bilingual language behavior play a role in the acquisition of L2 CS constraints regarding verb switches.

The story is slightly different for the subject stimuli. Unlike with the verb stimuli, no L2 participants exhibited judgments that mirrored the 2L1 bilingual group, which made a much larger distinction between pronoun and lexical DP switches than all other groups. Nonetheless, both bilingual language behavior and proficiency again seem to be playing a role. The results suggest that the constraint on pronoun switching can be acquired by either (i) increased proficiency in the L2 or (ii) exposure to language mixing, as evidenced by both the L2 +CS Low and L2 No-CS Int–Adv group ratings. Importantly, though, the group with the most 2L1-like judgments (i.e., the highest distinction between the switch types) was the L2 +CS Int–Adv group. This suggests that although these L2 bilinguals are not patterning exactly like the 2L1 bilinguals as they were with the verb stimuli, more nuanced competence in L2 CS restrictions occurs with a combination of both higher proficiency and exposure to language mixing.

5.3. Limitations

There are certain limiting factors, both in the methods and analysis, that are worth discussion. First, recall the comparison structure for the auxiliary switches, as originally shown in (8b). These control stimuli do not include an auxiliary verb, although the lexical material is otherwise equivalent. A more direct comparison is possible if the control stimuli explicitly included an auxiliary, but without involving it in the actual switch. This could include having the switch occur after the participle (12a) or before the auxiliary (12b).

12. a. *Su* *hermano* *ha* *entrenado* at the gym every day.
His brother has trained
'His brother has trained at the gym every day.'

b. *Su* *hermano* has trained at the gym every day.
His brother
'His brother has trained at the gym every day.'

The type of switch shown in (12a) was the comparison Toribio (2001) included, whereas the one in (12b) was used by Giancaspro (2015). As the current study only has data for a nonauxiliary comparison, it is unknown if the results would be altered by using a comparison like (12a) or (12b). It is possible that the degree of the distinction found between the two types of verb switches would be reduced, as the control stimuli in (12) might not produce the same high level of acceptability as the one in (8b). Nevertheless, as the switches in (8b) and (12) are all considered acceptable throughout the literature, one could expect that the overall trend in the results would remain unchanged.

It is also worth noting again that language dominance was not explicitly measured. As Liceras et al. (2008) and Liceras et al. (2016) have demonstrated, language dominance is a strong predictor of CS preferences. Importantly, all participants in the current study are assumedly English-dominant, so any dominance effect should be comparable for both the 2L1 and L2 bilingual groups. Nonetheless, it was not actively controlled for, and as such it may be having an unseen influence, particularly within the 2L1 bilingual group.

Finally, the analysis of the results did not focus heavily on the switch direction (i.e., English-to-Spanish or Spanish-to-English). Although the descriptive results are provided, the statistical analyses collapse the code-switched stimuli into one category. This was done to align directly with the analyses of Toribio (2001) and Giancaspro (2015). Albeit beyond the scope of the current paper, it is possible to employ a more fine-tuned analysis regarding how these types of switches may vary depending on whether the auxiliary or pronoun is in English or Spanish. As noted descriptively, there was some minor variation in the results. First, although the 2L1 bilinguals and the L2 +CS Int–Adv bilinguals did not seem to differentiate between switch direction for the verb stimuli, the other three groups did seem to slightly disfavor a Spanish auxiliary switched with an English participle compared to the other way around. As for the subject stimuli, there seemed to be no group variation. However, Spanish-to-English switches did seem to be slightly more favored, regardless of whether the subject was a pronoun or a lexical DP. Crucially, though, these issues do not have an obvious impact on the overall trend in which both increased exposure to language mixing and higher proficiency in Spanish result in larger distinctions in (un)grammaticality for both switch types.

5.4. Future Directions and Final Thoughts

Overall, the results are in line with both Toribio (2001) and Giancaspro (2015): L1-English L2-Spanish bilinguals are able to acquire the expected restrictions on CS. Additionally, the findings regarding proficiency are compatible with previous research. First, although Toribio did find differences based on proficiency level, recall that the low-level L2 speakers in her study were those with only one semester of university-level Spanish study. Like Giancaspro, the participants of the current study had multiple semesters of study, so it is not surprising that the majority of L2 speakers made distinctions within their CS judgments. Moving beyond proficiency, the new results show how looking at proficiency is not sufficient, as exposure to language mixing can play just as crucial a role in L2 bilinguals acquiring constraints on CS.

Although insightful, the current results should be considered just a first step in understanding the role of bilingual language behavior with regard to L2 CS. Future work is needed to investigate more fine-tuned aspects of exposure to language mixing. For example, the current analysis does not address the level of exposure to language mixing. Participants were divided into categorical groups of exposure to CS or not; however, it is possible that even within the +CS group, more detailed differences could be found. It is not unreasonable to assume that increased frequency in exposure to language mixing would produce more differentiation between the switch types. Furthermore, there are a multitude of more specific questions about exposure to language mixing. Are these L2 bilinguals mostly receiving CS in their input, or are they also producing it? Who are the interlocutors involved in these interactions—other L2 bilinguals or 2L1 bilinguals? When and where are these mixed languages interactions occurring? These questions, among others, could help paint a much clearer picture of how L2 bilinguals end up acquiring constraints on CS.

Having addressed the importance of the CS findings, recall we did find some differences in the monolingual stimuli as well. First, why were the monolingual Aux+V stimuli rated significantly lower than the monolingual V-only comparison? This is possibly an artifact of the particular English lexical choices, particularly with regard to the varied adjunct Adverbial Phrases (i.e., *every day*, *at the elementary school*, *recently*). Given the complexity of the tense-aspect requirements of the present perfect, a more controlled stimuli design could alleviate this issue. Importantly, though, the ratings for the monolingual Aux+V sentences were still substantially higher than for the code-switched Aux+V

sentences, indicating that the switch itself does indeed have an effect on acceptability. Second, why is it that the 2L1 group patterned differently? Note that the 2L1 bilingual participants provided depressed ratings throughout the entire study, for both monolingual and CS judgments. When looking at the CS stimuli ratings, we see that the control switches are not receiving scores at ceiling, just like the monolingual ratings. For whatever reason, this particular group was more critical of all structures, and was therefore reticent to give any structure a "perfect" score of acceptability. Interestingly, though, the L2 bilingual groups were perfectly fine with using the full scale for the monolingual stimuli. But, when judging the CS stimuli, we see a reduction in acceptability across the board. This could be indicative of some inherent bias against CS as a stigmatized form of communication (Bullock and Toribio 2009; Montes-Alcalá 2001; Poplack 1980; among others). This is in line with Badiola et al. (2018), who report that a negative perception of CS results in lower ratings in an AJT. As for the difference between the 2L1 and L2 groups, it is known that different groups of speakers can have variable biases, such as Liceras et al. (2008) finding that L1 French speakers rated code-switched structures consistently lower than L1 English or L1 Spanish speakers. What is interesting, though, is that many of the current study's L2 participants were still able to distinguish between the switch types, even though they did not consider the acceptable forms as acceptable as monolingual sentences.

Finally, we can return to the poverty of the stimulus argument for L2 CS. The results of the current study help illuminate two important factors in this regard. First, contrary to what Toribio (2001) suggests, the current study further dispels the notion that L2 speakers are not exposed to CS, as at least a subsection of them report experiencing some level of language mixing. We cannot assume that all L2 bilinguals exhibit an almost idealized poverty of the stimulus for learning CS constraints. As evidenced here, there are at least some L2 speakers who report engaging in true intra-sentential CS. However, secondly, this finding should not be taken as evidence against the poverty of the stimulus argument. The participants that best represent a poverty of the stimulus are those in the No-CS groups, as they are specifically defined by a lack of exposure to language mixing. Recall that these groups were able to show expected patterns of (un)acceptability in code-switched sentences, unanimously in the case of the verb switches, and those with higher proficiency for the subject switches. That is to say, with individuals who report lacking CS input, we have evidence that the constraints on CS can still be acquired. This again follows MacSwan's (1999, 2014) proposal where there are no restrictions specific to CS; each bilingual is able to switch (or not) depending on the features they already have available from their two grammars. As such, these findings for the No-CS groups support the poverty of the stimulus argument. Nonetheless, the current study suggests that, although acquisition without exposure to CS is possible, both increased proficiency and exposure to language mixing maximize this acquisition.

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Appendix A

Code-Switched Auxiliary Stimuli

Su hermano ha trained at the gym every day.
Su hermano trains at the gym regularly.
The students have prestado atención a la profesora hoy.
The students prestan atención a la profesora en clase.

Nuestra tía ha taught fourth grade at the elementary school.
Nuestra tía teaches psychology at the community college.
Her colleagues have visto muchas películas this year.
Her colleagues ven muchas películas en el cine.
Sus amigas han gone shopping with their mothers recently.
Sus amigas go shopping with their mothers frequently.
Your neighbors have comido en ese restaurante varias veces.
Your neighbors comen en ese restaurante todas las semanas.

Monolingual English Auxiliary Stimuli

His brother has trained at the gym every day.
His brother trains at the gym regularly.
Our aunt has taught fourth grade at the elementary school.
Our aunt teaches psychology at the community college.
Her friends have gone shopping with their mothers recently.
Her friends go shopping with their mothers frequently.

Monolingual Spanish Auxiliary Stimuli

Los estudiantes han prestado atención a la profesora hoy.
Los estudiantes prestan atención a la profesora en clase.
Sus colegas han visto muchas películas este año.
Sus colegas ven muchas películas en el cine.
Tus vecinos han comido en ese restaurante varias veces.
Tus vecinos comen en ese restaurante todas las semanas.

Code-Switched Pronoun Stimuli

Él met our grandmother.
Ese chico met our cousin.
He pidió una cerveza.
That guy pidió un vaso de agua.
Ellos bought some peaches.
Esos hombres bought some apples.
They compraron unas manzanas.
Those guys compraron unos duraznos.
Ellas started to sing.
Esas chicas started to dance.
She conoció a nuestro primo.
That girl conoció a nuestra abuela.

Monolingual English Pronoun Stimuli

He ordered a beer.
That guy ordered a glass of water.
They bought some apples.
Those guys bought some peaches.
She met our cousin.
That girl met our grandma.

Monolingual Spanish Pronoun Stimuli

Él conoció a nuestra abuela.
Ese chico conoció a nuestro primo.
Ellos compraron unos duraznos.
Esos hombres compraron unas manzanas.
Ellas empezaron a cantar.
Esas chicas empezaron a bailar.

Filler Code-Switched Stimuli

Todos van a mojarse if it rains today.
Ella se esconde when he calls her.
Voy a salir if I feel sick.
Sometimes he'll go to the store y olvida lo que estaba buscando.
We'll hear a sound si alguien toca el timbre.
We'll tell him si lo vemos.
Casi nadie visits the museum.
Ninguna persona aquí has a knife.
El mapa costs six dollars.
Her entire family habla español.
My brother está pescando.
The bear ya no ha muerto.
Sólo tengo five dollars.
No les han dado an opportunity to leave.
Van a hacer a lot of different activities.
He has una mala reputación.
The earthquake destroyed la ciudad y los suburbios.
The man ate un sándwich de atún.
Su hermano está training at the gym right now.
The students are prestando atención a la profesora mucho.
Nuestra tía está teaching biology at the high school.
Her colleagues are viendo muchas películas this month.
Sus amigas están going shopping with their mothers this weekend.
Your neighbors are comiendo en ese restaurante ahora mismo.
Susana y él met our uncle.
Lisa and him pidieron dos copas de vino.
Tú y ellos bought some oranges.
You and them compraron unas naranjas.
Esos chicos y ellas started to laugh.
Michael and her conocieron a nuestra tía.

Filler Monolingual English Stimuli

Sometimes he'll go to the store and forget what he was looking for.
We'll hear a sound if someone rings the doorbell.
We'll tell him if we see him.
Who did she say that speaks Spanish?
Who did you think that is fishing?

What did you believe that has not died yet?
He has a red big balloon.
The earthquake destroyed the ancient beautiful city.
The man ate a meat-free delicious sandwich.
His brother is training at the gym right now.
Our aunt is teaching biology at the high school.
Her friends are going shopping with their mothers this weekend.
Lisa and him ordered two glasses of wine.
You and them bought some oranges.
Michael and her met our aunt.

Filler Monolingual Spanish Stimuli

Todos van a mojarse si llueve hoy.
Ella se esconde cuando él la llama.
Voy a salir si me siento mal.
La gente visita el museo nunca.
José Miguel tiene ningún cuchillo.
El mapa cuesta nada.
David y Diego han ya pedido cinco dólares.
Ellos les han brevemente dado una oportunidad de salir.
Ellos han siempre tenido muchas actividades diferentes.
Los estudiantes están prestando atención a la profesora mucho.
Sus colegas están viendo muchas películas este mes.
Tus vecinos están comiendo en ese restaurante ahora mismo.
Susana y él conoció a nuestro tío.
Tú y ellos compraron unas naranjas.
Esos chicos y ellas empezaron a reírse.

References

Abney, Steven Paul. 1987. The English Noun Phrase in Its Sentential Aspect. Ph.D. dissertation, Massachusetts Institute of Technology, Cambridge, MA, USA, May 8.

Antón, Eneko, Guillaume Thierry, and Jon Andoni Duñabeitia. 2015. Mixing languages during learning? Testing the one subject-one language rule. *PLoS ONE* 10: e0130069. [CrossRef] [PubMed]

Avery, Thomas. 2015. The Pedagogical Potential of Codeswitching. Master's Thesis, Daejin University, Pocheon City, Korea, June.

Badiola, Lucia, Rodrigo Delgado, Ariane Sande, and Sara Stefanich. 2018. Code-switching attitudes and their effects on acceptability judgment tasks. *Linguistic Approaches to Bilingualism* 8: 5–24. [CrossRef]

Belazi, Hedi M., Edward J. Rubin, and Almeida Jacqueline Toribio. 1994. Code switching and X-bar theory: The Functional Head Constraint. *Linguistic Inquiry* 25: 221–37.

Bullock, Barbara E., and Almeida Jacqueline Toribio. 2009. Themes in the study of code-switching. In *The Cambridge Handbook of Linguistic Code-Switching*. Edited by Barbara E. Bullock and Almeida Jacqueline Toribio. Cambridge: Cambridge University Press, pp. 1–17.

Chomsky, Noam. 1980. *Rules and Representations*. Cambridge: MIT Press.

Ebert, Shane, and Bryan Koronkiewicz. 2018. Monolingual stimuli as a foundation for analyzing code-switching data. *Linguistic Approaches to Bilingualism* 8: 25–66. [CrossRef]

Ellis, Rod. 1994. *The Study of Second Language Acquisition*. Oxford: Oxford University Press.

Fernández Fuertes, Raquel, Juana M. Liceras, and Anahí Alba de la Fuente. 2016. Beyond the subject DP versus the subject pronoun divide in agreement switches. In *Romance Linguistics 2013: Selected Papers from the 43rd Linguistic Symposium on Romance Languages (LSRL), New York, 17–19 April 2013*. Edited by Christina Tortora, Marcel den Dikken, Ignacio L. Montoya and Teresa O'Neill. Amsterdam: Jon Benjamins, pp. 79–98.

Gass, Susan M., Patti Spinner, and Jennifer Behney. 2017. *Salience in Second Language Acquisition*. Chicago: Routledge.

Giancaspro, David. 2015. Code-switching at the auxiliary-VP boundary: A comparison of heritage speakers and L2 learners. *Linguistic Approaches to Bilingualism* 5: 379–407. [CrossRef]

González-Vilbazo, Kay, Laura Bartlett, Sarah Downey, Shane Ebert, Jeanne Heil, Bradley Hoot, Bryan Koronkiewicz, and Sergio E. Ramos. 2013. Methodological considerations in code-switching research. *Studies in Hispanic and Lusophone Linguistics* 6: 119–38. [CrossRef]

Gumperz, John J. 1977. The sociolinguistic significance of conversational code-switching. *RELC Journal* 9: 1–34. [CrossRef]

Hancock, Mark. 1997. Behind classroom code-switching: Layering and language choice in L2 learner interaction. *TESOL Quarterly* 31: 217–35. [CrossRef]

Kaushanskaya, Margarita, Megan Gross, and Milijana Buac. 2014. Effects of classroom bilingualism on task shifting, verbal memory, and word learning in children. *Developmental Science* 17: 564–83. [CrossRef] [PubMed]

Klassen, Rachel. 2016. Asymmetric Grammatical Gender Systems in the Bilingual Mental Lexicon. Ph.D. dissertation, University of Ottawa, Ottawa, ON, Canada.

Koronkiewicz, Bryan, and Shane Ebert. forthcoming. Modality in experimental code-switching research: Aural versus written stimuli. In *Code-Switching: Theoretical Questions, Experimental Answers*. Edited by Luis López. Philadelphia: John Benjamins.

Lee, James F., and Bill VanPatten. 2003. *Making Communicative Language Teaching Happen*, 2nd ed. New York: McGraw-Hill.

Liceras, Juana M. 2013. Un lugar para cada cosa y cada cosa . . . ¿en qué lugar?: La lengua materna, el input y las técnicas de obtención de datos. In *Plurilingüismo y Enseñanza de ELE en Contextos Multiculturales: Actas del XXIII Congreso Internacional ASELE*. Edited by Beatriz Blecua, Sara Borrell, Berta Crous and Fermín Sierra. Girona: Universitat de Girona, pp. 17–41.

Liceras, Juana M. 2014. Incorporating Second Language Acquisition research into teacher education. In *English as a Foreign Language Teacher Education: Current Perspectives and Challenges*. Edited by Juan de Dios Martínez Agudo. Amsterdam: Rodopi, pp. 11–33.

Liceras, Juana M., Raquel Fernández Fuertes, Susana Perales, Rocío Pérez-Tattam, and Kenton Todd Spradlin. 2008. Gender and gender agreement in bilingual native and non-native grammars: A view from child and adult functional-lexical mixings. *Lingua* 118: 827–51. [CrossRef]

Liceras, Juana M., Raquel Fernández Fuertes, and Rachel Klassen. 2016. Language dominance and language nativeness: The view from Spanish-English code-switching. In *Spanish-English Code-Switching in the Caribbean and the US*. Edited by Rosa E. Guzzardo Tamargo, Catherine M. Mazak and M. Carmen Parafita Couto. Amsterdam: Jon Benjamins, pp. 107–38.

Lipski, John. 1978. Code-switching and the problem of bilingual competence. In *Aspects of Bilingualism*. Edited by Michel Paradis. Columbia: Hornbeam Press, pp. 250–64.

Littlewood, William. 1981. *Communicative Language Teaching: An Introduction*. Cambridge: Cambridge University Press.

Macaro, Ernesto. 2005. Codeswitching in the L2 classroom: A communication and learning strategy. In *Non-Native Language Teachers*. Edited by Enric Llurda. New York: Springer, pp. 63–84.

MacSwan, Jeff. 1999. *A Minimalist Approach to Intrasentential Code Switching*. New York: Garland.

MacSwan, Jeff, ed. 2014. Programs and proposals in codeswitching research: Unconstraining theories of bilingual language mixing. In *Grammatical Theory and Bilingual Codeswitching*. Cambridge: MIT Press, pp. 1–33.

Montes-Alcalá, Cecilia. 2001. Written codeswitching: Powerful bilingual images. In *Code-Switching Worldwide*. Edited by Rodolfo Jacobson. Berlin and Boston: De Gruyter Mouton, pp. 59–74.

Montrul, Silvina, and Roumyana Slabakova. 2003. Competence similarities between native and near-native speakers: An investigation of the preterite/imperfect contrast in Spanish. *Studies in Second Language Acquisition* 25: 351–98. [CrossRef]

O'Neill, Robert, Edwin T. Cornelius, and Gay N. Washburn. 1981. *American Kernal Lessons: Advanced Student's Book*. London: Longman.

Poplack, Shana. 1980. Sometimes I'll start a sentence in Spanish y termino en español: Toward a typology of code-switching. *Linguistics* 18: 581–618. [CrossRef]

Ravid, Dorit Diskin. 1995. *Language Change in Child and Adult Hebrew*. New York: Oxford University Press.

Tarone, Elaine E. 1982. Systematicity and attention in interlanguage. *Language Learning* 32: 69–84. [CrossRef]

Timm, Lenora A. 1975. Spanish-English code-switching: El porque and how-not-to. *Romance Philology* 28: 473–82.

Toribio, Almeida Jacqueline. 2001. On the emergence of bilingual code-switching competence. *Bilingualism: Language and Cognition* 4: 203–31. [CrossRef]

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Article

Implicit and Explicit Knowledge of a Multiple Interface Phenomenon: Differential Task Effects in Heritage Speakers and L2 Speakers of Spanish in The Netherlands

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Abstract: This paper compares heritage speakers and second language (L2) speakers of Spanish with Dutch as their dominant language, in order to explore the role of age of onset and manner of acquisition in the nature of the knowledge (implicit vs. explicit) of the subjunctive. Differently from previous studies, all items were presented orally and in written form, so that language mode of presentation could be excluded as a confounding factor. Moreover, the groups were matched on their general proficiency in Spanish using both an explicit and an implicit proficiency task. The results showed that the L2 speakers outperformed the heritage speakers in the explicit knowledge task and vice versa in the implicit knowledge task, suggesting that differential task effects, which thus far have only been attested for morpho-syntactic phenomena, can be extended to interface phenomena as well. These findings imply that age of onset and manner of acquisition have an influence in the way knowledge is represented in these two populations, and moreover emphasize the importance of using different task types in bilingual research.

Keywords: heritage speakers; second language acquisition; Spanish; bilingualism; explicit knowledge; implicit knowledge; subjunctive; interface phenomena; task-based differences; age of acquisition

1. Introduction

This study compares adult L2 speakers and heritage speakers of Spanish with comparable proficiency levels regarding their knowledge of the subjunctive, with the aim to explore the roles of age of onset and manner of acquisition. Heritage speakers are bilinguals who speak both the dominant language of the society they live in, and a minority language, which is passed on to them by their parent(s). Generally, these speakers receive a considerable amount of input in the home language in their first years of life, but experience a so-called dominance shift when they start school and the input in the dominant language increases drastically. By the time they reach adulthood, these speakers are typically dominant in the societal language; their heritage language has become their weaker language. Linguistically speaking, heritage speakers resemble L2 speakers[1] in many ways (Montrul 2012), but there are differences as well, which can be traced back to their respective acquisitional pathways. For instance, phonology and core syntax seem to be more robust in heritage

[1] In this paper, we use the term "L2 speakers" to refer to people who have learned a second (foreign) language postpuberty and in an instructional setting.

speakers than in L2 speakers (e.g., Au et al. 2002; Montrul 2006), probably due to the fact that these modules are acquired early in childhood. Although morpho-syntax seems to be prone to deviation in both populations, recent research in this area has attested to differences between the two groups depending on the type of task: advantages for heritage speakers are attested in oral tasks which target implicit knowledge, while L2 speakers do better when it comes to written and more explicit tasks e.g., (Montrul et al. 2008a; Bowles 2011). These task effects can be attributed to at least three differences between heritage and L2 speakers: (1) differences in "age of onset" of acquisition; (2) differences in "manner" of acquisition (naturalistic exposure vs. classroom instruction); and (3) differences in "mode" of exposure (oral vs. written). Clearly, heritage speakers acquire their language in childhood, whereas L2 speakers start learning an L2 in adulthood. On some critical period accounts, a fundamental difference between early and late language acquisition is that while early acquirers can rely on implicit acquisition and only need to be exposed to naturalistic input, late learners have lost this ability, and are forced to fall back on explicit learning mechanisms (Bley-Vroman 1990; DeKeyser 2000).[2] But besides age of onset, heritage and L2 learners also differ with respect to the *manner* in which the language is acquired: while heritage speakers acquire their heritage language through exposure to naturalistic input, most L2 speakers learn a great deal of the second language through explicit instruction. Finally, the two populations differ regarding the language "mode" they are more familiar with: heritage speakers are generally more exposed to spoken language than written language, while the opposite is true for L2. The last factor, language "mode", has often been a confounding factor in studies: generally, the tasks used to target explicit knowledge are written tasks, whereas the implicit tasks are oral production tasks. In the present study, all stimuli are presented both aurally and in written form, with the aim to rule out a confounding effect of language mode.

While task-based effects have only been reported for morpho-syntactic structures, there is no reason to assume that similar effects should not apply in other linguistic domains. In the present paper, we focus on a multiple interface phenomenon: the subjunctive in syntactically, semantically and pragmatically constrained contexts. The results for the heritage speakers have been reported elsewhere (Van Osch and Sleeman 2016; Van Osch et al. 2017). In this paper, these findings are compared to results by L2 speakers on the same tasks. We will demonstrate that differential task effects apply to this interface phenomenon as well. We moreover explore whether these task effects are more likely to be the result of differences in age of onset of acquisition or in manner of acquisition.

The following section introduces the linguistic background on the subjunctive in the three linguistic contexts that are relevant to the present paper: volitional predicates, relative clauses and negated sentences. Section 3 discusses the distinction between explicit and implicit knowledge and the operationalization of these constructs. A summary of previous research in heritage and L2 Spanish is presented in Section 4, followed by the formulation of the hypotheses in Section 5. Section 6 describes the methods of the present study. Section 7 reports the results, which will be discussed in relation to previous findings and theories about age effects in (second) language acquisition in Section 8. Section 9 contains a brief conclusion of the paper.

2. The Subjunctive

Mood in Spanish is a multiple interface phenomenon, because it is governed by syntactic, semantic and pragmatic constraints. Two moods can be distinguished: indicative and subjunctive, of which the latter is the focus of the present paper. Dutch, the dominant language of the bilinguals in this study, does not exhibit productive use of the subjunctive (Thieroff 2004). Our study includes three different contexts in which subjunctive is required: first, there are those contexts where mood is syntactically

[2] Other accounts mention different explanations for the critical period effect, such as affective-motivational factors (Krashen 1982), L1 influence (e.g., Flege 1999), socio-educational factors (e.g., Bialystok and Hakuta 1999), and time on the task (e.g., Flynn and Manuel 1991).

selected by the verb. Verbs that are volitional in nature, like *querer* ('to want') or *esperar* ('to hope') obligatorily select subjunctive, as illustrated in in example (1).

1. Quiero que me *ayudas/ayudes
   Want-1SG that me help-IND.2SG/help-SUBJ.2SG
   'I want you to help me.'

In this type of context, which is generally considered to be morpho-syntactic in nature, the wrong mood leads to ungrammaticality. However, there are other contexts in which mood alternation occurs and the choice of mood depends on semantic and pragmatics factors. An example is sentences containing relative clauses, such as (2):

2. Busco Una blusa que tiene/tenga botones grandes
   look-1SG a shirt that have-IND.3SG/have-SUB.3SG big buttons
   'I'm looking for a shirt that has big buttons.'

Whenever the sentence starts with a verb like *buscar* ('to look for'), a volitional construction such as *querer comprar* ('to want to buy'), or a future reference like *compraré* ('I will buy'), the choice of mood depends on the specificity of the antecedent. In example (2), if the speaker refers to a specific shirt, indicative is more appropriate, but if he is looking for any shirt (as long as it has big buttons), subjunctive is more felicitous. Given that the specificity (a semantic feature) of the antecedent is involved, this use of the subjunctive pertains to the interface between syntax and semantics following (Borgonovo et al. 2015).

Another type of sentence in which choice of mood depends on the context is sentences with negated epistemic, communication or perception verbs, such as (3):

3. Juan no cree que María está/esté embarazada
   John NEG believe-3SG that Mary is-IND/is.SUB pregnant
   'John does not believe that Mary is pregnant.'

In this type of sentence, the subordinate verb can be in either the indicative or the subjunctive mood, depending on whether the speaker wishes to approach the event expressed in the embedded clause from his own perspective or from the perspective of the matrix subject (Quer 2001). If the speaker disagrees with the statement in the embedded clause (that is, if the speaker thinks that Mary is in fact pregnant), he can use the indicative to emphasize that he views the event from his own epistemic model. Subjunctive on the other hand would indicate a shift from the epistemic model of the speaker to that of the matrix subject. Thus, in the case that the speaker believes the proposition in the embedded clause to be true, both moods are possible, depending on the model of evaluation. However, Van Osch et al. (2017) demonstrated that in this situation the specific matrix verb plays a role as well: with perception and communication verbs monolingual speakers of Spanish prefer indicative, whereas with epistemic verbs subjunctive is the preferred option.

If, on the other hand, the speaker agrees with the matrix subject (i.e., neither speaker nor matrix subject believe that Mary is pregnant), subjunctive is unambiguously the most felicitous option. This use of the subjunctive is generally considered to pertain to the interface between syntax and pragmatics.

As for instruction of the subjunctive in L2 acquisition, Mikulski (2006) reports that the subjunctive is generally introduced early in Spanish L2 curricula. Most textbooks start with an explanation of the formal characteristics of the present subjunctive. The use of the subjunctive is typically formulated in terms of doubt, uncertainty, non-assertion, non-specificity and presupposedness. Generally, the obligatory contexts for the subjunctive are explained first, for instance the subjunctive in volitional constructions (one of the contexts discussed in this study), with affective predicates (*me alegro de que* 'I'm happy that' + SUB) or following certain propositions (*para que* 'so that' + SUB). Variable uses of the subjunctive are introduced later, but the exact order varies by textbook: some textbooks introduce relative clause contexts before negation contexts, while others treat them in the opposite

order. However, all three contexts for the subjunctive tested in this study are typically introduced within the first year of the curriculum. Interestingly, the negation construction is generally only explained with epistemic verbs in the first person (e.g., *No creo que* 'I don't think that'), not with communication and perception verbs and not in the third person, which was the context tested in the present study. This means that any knowledge L2 speakers acquire of the subjunctive in contexts broader than *No creo que* has to come from either exposure in the input or from their ability to recognize the pattern (namely, that in these contexts subjunctive refers to non-assertion from the perspective of the speaker) and extend this pattern to constructions with other verbs.

Despite the extensive instruction L2 speakers receive on the subjunctive, it remains a vulnerable area for this population, especially in those contexts where mood is variable and determined by semantic and pragmatic features (Iverson et al. 2008; Borgonovo et al. 2015). Similar problems are reported for heritage speakers of Spanish e.g., (Silva-Corvalán 1994; Montrul 2009). In this paper, we ask the question whether one of these groups has an advantage over the other, and whether this advantage might differ depending on the type of knowledge we are looking at: implicit or explicit. The following section discusses these notions in more detail.

3. Explicit vs. Implicit Knowledge

What is meant exactly by the terms explicit and implicit? This is not an easy question, since different studies adopt different definitions. However, the key component seems to be awareness/consciousness. Explicit knowledge is knowledge someone is aware/conscious of, whereas implicit knowledge lies outside awareness (e.g., DeKeyser 2003; Ellis 2009a, 2009b). Ellis (2009a) adds that access to implicit knowledge is automatic, and therefore fast and effortless, whereas explicit knowledge requires attentional control and is thus more time-consuming. He furthermore mentions that implicit knowledge can only become evident in linguistic behavior, whereas explicit knowledge can be expressed in words. Not all scholars agree that a distinction between explicit and implicit knowledge is psychologically and neurally real (e.g., Shanks 2003). However, as Ellis (2009b) argues, the mere fact that speakers are capable of correctly applying linguistic rules without being able to verbally explain those rules, as well as the opposite situation, namely that speakers know the rule but are unable to apply it correctly, implies that two different types of knowledge are involved. Moreover, there exists neurological evidence that both types of knowledge are stored in different parts of the brain (Paradis 1994).

An important question is how to operationalize the concepts explicit and implicit knowledge. In early research, many different instruments were used to measure the same construct. Ellis (2005, 2009b) attempted to provide a valid and reliable test battery that could be consistently used by all researchers. The test battery contained: (1) an elicited oral imitation test; (2) an oral narrative test; (3) a timed grammaticality judgment test; (4) an untimed grammaticality judgment test; and (5) a metalinguistic awareness test. These tests were designed so that they would differ maximally on the following 4 criteria:

1. Degree of awareness. Explicit knowledge is considered to be conscious; implicit knowledge is not.
2. Time availability. Implicit knowledge is assumed to be accessed automatically and fast, whereas explicit knowledge requires controlled processing and thus is more time-consuming.
3. Focus of attention. Tasks that focus on fluency (focus on meaning) are considered to test implicit knowledge, whereas tests that prioritize accuracy (focus on form), tap into explicit knowledge.
4. Metalanguage, used to verbalize linguistic rules, is related to explicit, but not implicit knowledge.

Results from both native and L2 speakers of English showed that the 5 tasks could be grouped into two clusters: the elicited oral imitation test, the oral narrative test and the timed grammaticality judgment task on the one hand and the untimed grammaticality judgment task and the metalinguistic knowledge test on the other hand, providing evidence that they load on different factors. Ellis (2005, 2009b) concluded that the first three tasks are more likely to test implicit knowledge and

the last two tap into explicit knowledge. The results furthermore showed no evidence for a distinction between production vs. judgment, given that the timed grammaticality judgment task clustered together with the two oral production tasks. The same pattern of clustering of these tasks was replicated for Spanish by Bowles (2011).

The design of the present study is based on three of the four criteria described above, namely: degree of awareness, time availability and focus of attention, as will be discussed in the method section. In the next section, we look at previous studies comparing heritage speakers and L2 speakers, highlighting those that have used different task types, and focusing on the subjunctive in particular.

4. Previous Research

4.1. Heritage Speakers and L2 Speakers Compared

Montrul (2012) offers an overview of scientific research exploring the similarities and differences between heritage speakers and L2 speakers. She concludes that, although both populations often diverge from the native speaker norm and make similar types of errors, heritage speakers seem to have an advantage over proficiency-matched L2 learners, but only in certain linguistic modules. For instance, when it comes to the perception and production of phonological features, quite a lot of evidence shows that heritage speakers are closer to monolinguals than L2 speakers. This has been found for Spanish as a heritage language (Au et al. 2002; Knightly et al. 2003) but also for other languages like Korean (Oh et al. 2003), Mandarin (Chang et al. 2008) and Russian (Lukyanchenko and Gor 2011).

Another domain where early acquisition seems to present an advantage is core syntax. An interesting pilot study by (Håkansson 1995) showed that heritage speakers of Swedish were more target-like than L2 speakers with V2 (syntax), while they were less accurate with gender agreement (morpho-syntax). Montrul has carried out several studies showing that heritage speakers of Spanish outperform L2 speakers when it comes to purely syntactic phenomena, such as the syntax of subjects and objects (Montrul 2006), wh-movement in questions with (embedded) subject and object extraction in Spanish (Montrul et al. 2008a) and the syntax of clitics (Montrul 2010; Montrul et al. 2006).[3]

To our knowledge, morpho-syntax is the only domain in which differential task effects have been reported for heritage and L2 speakers. (Bowles 2011) for instance, used the same test battery as (Ellis 2005, 2009b) for a whole range of (morpho-)syntactic structures in Spanish, among which is the subjunctive (but results are not reported for the separate structures), and found that heritage speakers performed better on the implicit tasks and L2 speakers on explicit tasks. Montrul et al. (2008b, 2014) report a similar pattern for gender assignment and agreement in Spanish.

Interface phenomena are generally found to be notoriously vulnerable in both heritage and L2 speakers (e.g., Montrul 2008, Iverson et al. 2008). In her overview, Montrul (2012) does not mention advantages for one group over the other. Nevertheless, some of her studies find that Spanish heritage speakers are more similar to monolinguals than L2 speakers with certain interface phenomena, such as felicitous use of overt subjects syntax-discourse interface (Montrul 2006) and unaccusativity syntax-semantics interface (Montrul 2005). Not all research confirms this pattern, though. Montrul (2004) reports no difference between the two groups with aspectual distinctions (syntax-semantics). Similarly, Montrul and Ionin (2012) fail to attest differences between the two groups with the generic interpretation of definite articles (syntax-semantics interface). Keating et al. (2011) attest mixed results for anaphoric resolution (syntax-discourse interface): the heritage speakers were less target-like with overt pronouns, which they interpreted as referring to the subject more than L2 speakers did, whereas L2 speakers deviated more with null pronouns, in that they interpreted them less often as referring to the matrix subject.

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[3] But see Bruhn de Garavito (2002) for a study showing no difference between heritage and L2 speakers with verb movement in Spanish.

To sum up, when it comes to phonology and syntax, the evidence for an advantage for heritage speakers over L2 speakers is quite convincing. For morpho-syntax, there seem to be differential task effects. Phenomena lying at the interface between syntax and other domains seem to be vulnerable in both bilingual populations.

4.2. The Subjunctive

The specific phenomenon of interest for the present study is the subjunctive in Spanish. As described in Section 2, this phenomenon can be considered to pertain to morpho-syntax, the syntax-semantic interface or the syntax-pragmatics interface, depending on the context in which it is used. The subjunctive has been investigated extensively, predominantly in Spanish-English bilingual populations in the U.S. The literature generally shows the subjunctive to be a vulnerable area, particularly in those contexts where mood is variable and depends on semantic and pragmatic factors, and this applies to both heritage speakers (e.g., Silva-Corvalán 1994; Montrul 2009; Van Osch et al. 2017) and L2 speakers of Spanish (Iverson et al. 2008; Borgonovo et al. 2015).

Some studies have compared heritage to L2 speakers on their knowledge of the subjunctive. Montrul and Perpiñán (2011) found that L2 speakers outperformed heritage speakers on a morphology recognition task targeting obligatory subjunctive and on a sentence conjunction task (which was considered more implicit by the authors) containing sentences with *cuando* ('when'), *de manera que* ('so that'), and relative clauses, in which mood selection depends on the context. Mikulski (2010), on the other hand, demonstrated that heritage speakers outperformed L2 speakers in a grammaticality judgment task and an editing task targeting the volitional subjunctive. In an elicited production task, Mikulski and Elola (2013) also found an advantage for heritage speakers over L2 speakers with the subjunctive in advice constructions (e.g., *aconsejar/recomendar* + *SUB* 'to advise/recommend that + SUB'), but no such difference was attested by Lynch (2008) in a spontaneous production task. These different findings may be due to differences in experimental design or possibly to differences w.r.t. the specific subjunctive-targeting contexts, which were not specified in Lynch (2008).

Two studies have used both explicit and implicit knowledge measures of heritage and L2 speakers' knowledge of the subjunctive. Montrul (2011) tested heritage and proficiency-matched L2 speakers using an explicit forced choice task and an implicit oral narrative task. The study included several phenomena, among which (obligatory) choice of mood. The L2 speakers outperformed the heritage speakers on the explicit task, and the reversed pattern was attested in the implicit task. However, this pattern was not confirmed by Potowski et al. (2009), who tested heritage and L2 speakers on the past subjunctive in sentences with indefinite or non-existent antecedents using a written interpretation task, a written grammaticality judgment task and a written production task. On all three tasks, the heritage speakers outperformed the L2 speakers.

No clear conclusion can thus be drawn from these studies, in part because different studies include different contexts for mood and we do not always know which aspects of mood (morpho-syntax, syntax-semantics, syntax-pragmatics) are targeted.

4.3. Problems with Previous Studies

At this point, we need to point out certain problematic issues in previous studies. First of all, in most studies reporting differential task effects (i.e., heritage speakers performing better on implicit tasks, and vice versa on explicit tasks), the explicit tasks contain only written language, whereas the implicit tasks are generally oral production tasks (e.g., Montrul et al. 2008b; Montrul 2011; Bowles 2011). This means that there is a second, possibly confounding factor, namely language mode (oral vs. written). Given that L2 speakers are relatively more familiar with written language, and heritage speakers with spoken language, we cannot unequivocally conclude that the respective advantages for each group are due to the explicitness of the task, and not to the language mode (oral vs. written) in which the items were presented. Montrul et al. (2014) tried to get around this problem by presenting all items only aurally. However, using only aural stimuli may still give the

heritage speakers an advantage over L2 speakers across tasks, given that the former have more experience with spoken language. For this reason, the present study includes a simultaneous bimodal presentation of the items.

Another debatable matter in previous research relates to the way in which heritage speakers and L2 speakers' general proficiency is matched. In order to draw strong conclusions about specific task-based differences between heritage speakers and L2 speakers, it is imperative that the groups do not significantly differ from each other on a general measure of proficiency. Unfortunately, some studies do not match the groups at all (e.g., Lynch 2008; Mikulski 2010; Mikulski and Elola 2013), and those that do often determine proficiency based on unreliable measures such as self-evaluations (e.g., Keating et al. 2011) or course level (e.g., Potowski et al. 2009; Bowles 2011). Now, the question is: what is an appropriate measure of proficiency? Montrul (2005), Montrul and Ionin (2012), and Montrul and Perpiñán (2011) typically apply parts of the DELE (Diplomas de Español como Lengua Extranjera), the proficiency task used by the Spanish Ministry of Education, Culture and Sport to grant official diplomas of competence in the Spanish language (http://www.dele.org). A problem with this task is that it is (1) written and (2) rather explicit in nature (untimed, and focused on form). As pointed out by Valdés (1995), while the DELE may give an accurate indication of L2 proficiency, it may not be the most reliable measure to compare L2 speakers to heritage speakers. After all, if our assumptions about the differences between heritage and L2 speakers are accurate, using exclusively the DELE increases the risk of an underestimation of the relative proficiency of heritage speakers. To avoid this issue, in the present study we include both the DELE and an aural lexical decision task as matching criteria, the latter of which contains spoken language and taps into more implicit knowledge due to the time pressure. If this task constitutes an advantage for one of the groups, we assume the advantage will be for the heritage speakers, who are more familiar with spoken language, and presumably do better on implicit tasks.

5. Research Questions and Hypotheses

This study compares L2 and heritage speakers of Spanish with Dutch as their dominant language, regarding their knowledge of the subjunctive. Our research question is:

> Will L2 speakers and heritage speakers of Spanish with comparable general proficiency levels have differential advantages depending on whether explicit or implicit knowledge of the subjunctive is tested?

Based on previous findings in the area of morpho-syntax, we hypothesize that the L2 speakers will outperform the heritage speakers on an explicit task and vice versa on a task measuring implicit knowledge.

6. Method

This study was part of a bigger project in which both the subjunctive and the indicative were tested. We focus only on the subjunctive-targeting items in this paper, both because of space limitations, and because of the ambiguous predictions in sentences with negation, as discussed in Section 2. For the heritage speaker's results on the indicative see (Van Osch et al. 2017).

6.1. Participants

In total, 27 heritage speakers, 28 L2 speakers and 18 monolingual speakers participated in the study. However, several participants were excluded in order to maximize homogeneity. First of all, a selection was made based on the participants' scores on a Morphology Recognition Task (MRT), which served to check whether participants knew the correct form of the subjunctive following (e.g., Montrul 2009, 2011; Iverson et al. 2008). Only those participants who scored higher than 80% on this task were included following (Iverson et al. 2008). Furthermore, both the DELE and an aural lexical decision task served as selection criteria. Participants were included if they scored higher than 36 on

the DELE, corresponding to a proficiency level of high-intermediate to advanced, and if they had more than 100 (out of 149) items correct on the lexical decision task.[4] One L2 speaker was excluded because she was considerably older than the other participants. After these exclusions, 17 heritage speakers, 21 L2 speakers and 18 monolinguals remained. The L2 and heritage speakers did not differ significantly regarding their scores on the DELE ($t = -0.66$, $p = 0.51$), or the lexical decision task ($t = 0.24$, $p = 0.81$). However, there was a difference in terms of their self-reported proficiency: heritage speakers rated themselves significantly higher than L2 speakers ($t = -4.07$, $p < 0.001$). This difference should be taken with a grain of salt, since self-assessments, especially by heritage speakers, are not very reliable (Benmamoun et al. 2010). The L2 speakers also performed significantly better on the MRT than the heritage speakers ($t = 2.12$, $p = 0.04$), which is not surprising, considering this task is written and explicit in nature. Both bilingual groups differed significantly from the monolingual speakers on all proficiency measures (DELE: heritage speakers (HS) vs. monolinguals: $t = 5.59$, $p < 0.001$, L2 vs. monolinguals: $t = 6.64$, $p \leq 0.001$; lexical decision task: HS vs. monolinguals: $t = 7.87$. $p < 0.001$, L2 vs. monolinguals: $t = 7.54$, $p < 0.001$; self-reports: HS vs. monolinguals: $t = 4.32$, $p < 0.001$; L2 vs. monolinguals: $t = 15.79$, $p < 0.001$) as well as on the MRT (HS vs. monolinguals: $t = 3.59$, $p = 0.002$; L2 vs. monolinguals: $t = 2.11$, $p = 0.04$). The three groups did not differ significantly in age. Table 1 gives an overview of the participants' most important characteristics.

Table 1. Proficiency scores, ages and MRT per group.

Group	*N*	Age	DELE	Lexical Decision Score	Self-Reported Proficiency	MRT Score
Monolinguals	18	26.4	45.22	130.72	5.94	98.97
Heritage speakers	17	25.9	40.94	110.41	5.13	92.16
L2 speakers	21	28.1	40.43	110.95	4.32	96.30

DELE: Diploma de Español como Lengua Extranjera; MRT: Morphology Recognition Task.

An extensive questionnaire gave insight into the participants' linguistic backgrounds.

The heritage speakers (3 male, 14 female) were all university graduates or students at the time of testing. Different varieties of Spanish were included in the sample: mostly peninsular and Mexican Spanish, but also Colombian, Uruguayan and Argentinian Spanish. To our knowledge, no dialectal variation has been reported for the uses of the subjunctive in the contexts discussed in this paper. The majority (16) were second-generation heritage speakers, who had been exposed to both languages from birth as they had one Dutch-speaking parent and one Spanish-speaking parent. While the Spanish-speaking parents spoke mostly Spanish, many of them had also learned Dutch at some point, and spoke some Dutch at home as well. As tends to be the case with heritage speakers, many of the participants experienced a relative drop in input and output in Spanish at home throughout their lives, but for others it remained more or less stable, and in a few cases it even increased. Most heritage speakers reported frequent visits to the home country throughout their lives and a strong emotional bond with both the country and the heritage language. The majority had received some formal instruction in Spanish, either as a subject in primary school, high school or college, or at a Saturday school. Three heritage speakers were enrolled in a bachelor's program of Spanish at the time of testing. There was thus some variability regarding the amount of exposure to explicit instruction in Spanish within the heritage group.

As for their language use at the time of testing, Dutch was clearly the dominant language, especially at work and in contact with friends. At home, about half of the participants reported using both Spanish and Dutch. English was also a commonly used language at university or in the workplace, as well as with friends and in some cases at home as well. When asked about their knowledge of

[4] For reference, consider that the lowest native speaker score was 110.

languages, while most participants considered themselves to be dominant in Dutch, some of them identified as balanced bilinguals in Dutch and Spanish.

The L2 speakers (5 male, 16 female), like the heritage speakers, were all university students or graduates who were exposed to Spanish after the age of 15. Unlike in most L2 studies, they were not all students in the same course. In fact, there was quite some variation regarding the amount and the type of instruction they had received: from only two-and-a-half months to 10 years in total (on average, the total months of instruction was 2 years and 8 months). Unfortunately, we do not have information about the exact contexts of the subjunctive in which the L2 speakers had received explicit instruction. However, since most of them (15 out of 21 participants) reported having received instruction for at least one year, at least these speakers are expected to have been introduced to all three contexts for the subjunctive tested in this study.

The L2 speakers furthermore varied considerably regarding their amount of exposure to naturalistic input in Spanish. Some L2 speakers had spent only 5 months abroad, whereas others had lived in a Spanish-speaking country for almost 4 years. Some participants had been in a relationship with a native speaker or were so at the time of testing, and used considerably more Spanish than Dutch at home than others. Some people also reported Spanish as (one of the) dominant languages at work/school and/or a common language used with friends.

All L2 participants considered themselves native speakers of Dutch. Regarding their self-reported proficiency in Spanish, the majority rated themselves as either advanced or near-native. Given The Netherlands' internationally oriented society, it is no surprise that all participants (heritage and L2 speakers alike) reported advanced to near-native knowledge of English, as well as of other languages (in varying proficiency levels), such as German, French (obligatory subjects in high school), one of the country's minority languages, and in some cases Italian or Portuguese.

The control group, consisting of 18 monolingually raised native speakers of Spanish (5 male, 13 female), were tested in the Netherlands. All of them were recent immigrants, who had arrived less than six months before the time of testing. Their countries of origin were Spain (9), Mexico (4), Colombia (2), Argentina (1), Nicaragua (1) and Venezuela (1). All speakers were native speakers of Spanish, but had learned English as a second language later in life. Their self-reported proficiency in English ranged from intermediate to highly advanced. They had no knowledge of Dutch whatsoever.

6.2. Tasks and Procedure

First of all, an extensive background questionnaire was administered to obtain detailed information about the participants' family situation, their language dominance, their exposure and use of different languages in various environments and their attitudes towards Spanish. Hereafter followed three tasks that were carried out on a laptop: a lexical decision task, an elicited production task and an acceptability judgment task. The lexical decision task served to measure the participants' overall proficiency in Spanish. This task was included in addition to the DELE, a standardized test generally used in Spanish L2 and heritage studies which is explicit in nature and contains only written language. As discussed in Section 4.3, using only the DELE to match the participants' general proficiency could lead to a relative overestimation of the L2 speakers' proficiency, due to their increased familiarity with written language and their putative advantage with explicit tasks. In the lexical decision task, participants were aurally presented with Spanish words and non-words, and had to decide as quickly as possible whether the word they heard was a real Spanish word or not, by pressing either a green or a red button. While we do not know of research attesting to an advantage for early bilinguals over late bilinguals on word recognition tasks, considering that this task is aural and less explicit (given the time pressure) this test was assumed to provide an advantage for the heritage speakers rather than the L2 speakers and thus minimize the risk of a relative underestimation of the heritage speakers' general proficiency. There was a strong and significant correlation between the two proficiency tasks ($r = 0.72$; $p < 0.001$), and a moderately significant correlation between both proficiency tasks and the participants'

self-reported proficiency (self-reports & DELE: $r = 0.57$, $p < 0.001$; self-reports & lexical decision task: $r = 0.62$, $p < 0.001$).

After the lexical decision task followed the elicited production task and the acceptability judgment task, which are described in detail below. At the end of the session, the participants were administered the MRT and the DELE, which were both paper-and-pencil tasks. The MRT contained sentences targeting the subjunctive in obligatory contexts, such as following volitional predicates or the construction *es* + adjective + *que* ... ('It is [adjective] that ... ') followed by both the indicative and the subjunctive form of the verb, between which the participant had to choose. Following previous research (i.e., Montrul 2009, 2011; Iverson et al. 2008), this task was included to check whether the participants had accurate knowledge of the "form" of the subjunctive. After all, in order to deduce anything about participants' accurate "use" of the subjunctive, it is crucial that we know whether they indeed recognize the subjunctive as such. Given that heritage speakers typically lack meta-linguistic knowledge of their heritage language, it is impossible to explicitly ask them in which mood a certain verb is conjugated. Therefore, the MRT introduces the subjunctive forms in obligatory contexts, assuming that heritage speakers are aware that these contexts require the subjunctive. Even though this design may have resulted in the exclusion of some participants based on their inaccurate knowledge of subjunctive "use" in these contexts, at least we can assume that all participants scoring higher than 80% in any case have highly accurate knowledge of "form" as well.

The DELE consisted of a vocabulary part containing 30 fill-in-the-gap sentences, and a cloze test, targeting both vocabulary and grammatical knowledge of Spanish. In total, the experiment took about 2 to 2.5 h to complete. All subjects were paid 10 euros for their participation and signed an informed consent form (file number ethical committee: 2014–2013).

As mentioned earlier, in the two subjunctive tasks all items were presented both written and aurally, to avoid any influence of the language mode of presentation. The recordings were made by a native speaker of Colombian Spanish, who was instructed to speak slowly and clearly. The two tasks were designed in such a way that they would differ maximally on three of the characteristics mentioned by Ellis (2009b): time availability, focus of attention and awareness.

In the elicited production task, participants were presented with short stories in Spanish. After each story, the participants would read aloud the beginning of a sentence, which they were asked to finish in a way that made sense in the provided context. This task was assumed to mostly tap into implicit knowledge. Firstly because there was no time for controlled processing; after 10 s the test automatically proceeded to the next item. Furthermore, the focus of attention was on meaning, rather than form, since the instruction was simply to end the sentence in a way that made sense in relation to the preceding story. And finally, given the inclusion of fillers and the focus on meaning, it was unlikely that people would be conscious of the topic of investigation. A debriefing session confirmed that none of the participants were aware of what they were tested on.

The task contained three conditions for the subjunctive. The first condition contained purely morpho-syntactic uses of mood, in which the subjunctive was syntactically selected by the main verb, which was always a volitional predicate such as *querer* ('to want'), *esperar* ('to hope'), or *aconsejar* ('to advise'), for instance in example (4).

4. *Estoy molesto porque mi esposa nunca limpia la casa. Esta noche de nuevo no me ayuda a lavar los platos. Me enojo y le digo:*
   'I'm annoyed because my wife never cleans the house. This evening once again she does not help me with the dishes. I get angry and I say:'
   Quiero que...
   'I want that ... '

In this case, any answer containing a verb in the subjunctive would be correct, because the main verb *querer* ('want') obligatorily requires a subjunctive verb in the subordinate clause.

In the relative clause condition, the target sentence would always start with either a verb like *buscar* ('to look for') or a reference to the future, like *compraré* ('I will buy'), followed by an indefinite

inanimate object with a relative clause. The context made clear that the antecedent was non-specific (thus targeting subjunctive). An example of an item of this type is (5):

5. *Camilo está de vacaciones en Málaga. Le gustaría mucho comer tapas en un restaurante y ver un show de flamenco. Va al centro antiguo y pregunta a alguien en la calle:*
   'Camilo is on a holiday in Malaga. He would very much like to eat tapas in a restaurant and see a flamenco show. He goes to the old centre and asks someone in the street:'
   Busco un restaurante de tapas donde...
   'I'm looking for a tapas restaurant where . . . '

In this case, the participant could say something like *toquen flamenco* ('they play.SUB flamenco') or any other answer including a subjunctive verb form.

In the third condition, the main clause contained a negated epistemic (e.g., *creer* 'to think'), perception (e.g., *ver* 'to see') or communication predicate (e.g., *decir* 'to say'). The context served to make clear that the speaker was not committed to the truth of the proposition in the embedded clause, targeting subjunctive mood. An example is shown in (6):

6. *Selma camina por la calle y ve a su tía caminando a 20 metros de ella. La llama, pero hay mucho ruido de los coches así que es imposible oír algo.*
   'Selma is walking on the street and sees her aunt walking at a distance of 20 meters. She calls here, but there is a lot of noise from the cars, so that it is impossible to hear anything.'
   Selma no cree que su tía la...
   'Selma doesn't think that her aunt her . . . '

Here, the target answer would be *oiga/escuche* ('hear.3SG.SUB'), or any comparable answer containing a subjunctive verb form.

The task contained 81 items in total: 3 practice items, 9 items in each of the three conditions targeting the subjunctive, 3 × 9 items in which the indicative was the target answer (which are not discussed in this paper), and 24 filler items targeting a different construction, namely word order. The full task is presented in the Supplementary Materials. The items appeared in randomized order.

After a short break, participants continued with the scalar acceptability judgment task, in which they were presented (again, both aurally and written) with similar stories followed by two sentences that only differed from each other regarding the mood of the verb. Each of the sentences had to be rated on a scale from −2 to 2. The instruction stated that −2 indicated: "this sentence sounds very unnatural to me and I would never say this sentence", and 2 indicated: "this sentence sounds completely natural to me and I could say this". This task was assumed to tap into more explicit knowledge of the subjunctive. First of all, there was no time limit whatsoever; whenever the participants were sure about their answer they could press the space bar to proceed to the next item. Second, since both options—indicative and subjunctive—were always presented simultaneously, the focus was on the form of the verb, and it was assumed that this would moreover automatically make the participants aware of the topic they were being tested on. Most participants confirmed this to be the case during debriefing.

The acceptability judgment task contained the same 3 conditions as the elicited production task, and the same types of stories to target the more felicitous mood. Some of the items for this task were based on items used by Borgonovo et al. (2015) and Borgonovo and Prévost (2003).[5] An example for this task, from the relative clause condition, is illustrated in (7):

[5] The items were obtained through personal communication with the authors.

7. *María tiene que dar una presentación sobre Miró para su clase de historia del arte. Quiere dar muchos ejemplos de pinturas de Miró durante la presentación. Va a la biblioteca y le dice a la señora:*
'Maria has to give a presentation about Miró for her art history class. She wants to give many examples of paintings by Miró during the presentation. She goes to the library and tells the woman:'
Busco un libro que ***tiene*** *pinturas de Miró.*
'I'm looking for a book that has. IND paintings by Miró.'

○	○	○	○	○
−2	−1	0	1	2

Busco un libro que ***tenga*** *pinturas de Miró.*

○	○	○	○	○
−2	−1	0	1	2

Half of the target sentences contained regular verbs and the other half irregular verbs, evenly divided over the three conditions. The same goes for present and past tense, except for the relative clause condition, which were all in present tense. In total, the task contained 81 items, just as the elicited production task: 3 practice items, 27 subjunctive-targeting items, 27 indicative-targeting items (which are not discussed in the present paper), and 24 filler items targeting word order. The full task is presented in the Supplementary Materials. The order of the items, as well as the order of the two sentences, was randomized.

7. Results

7.1. Production Task

Of all 1512 responses, 57 were excluded, because (1) there was no (intelligible) response; (2) no verb was included in the response; or (3) the response did not relate to the story in any logical way. The remaining responses were coded as either "subjunctive", "indicative" or "other". In total, there were 950 subjunctive (i.e., correct/felicitous) responses, 448 indicative (i.e., incorrect/infelicitous) responses, and 57 'other' responses, which contained future tenses, conditionals or infinitives. These were excluded from the statistical analysis. The results for the production task are depicted in Figure 1.

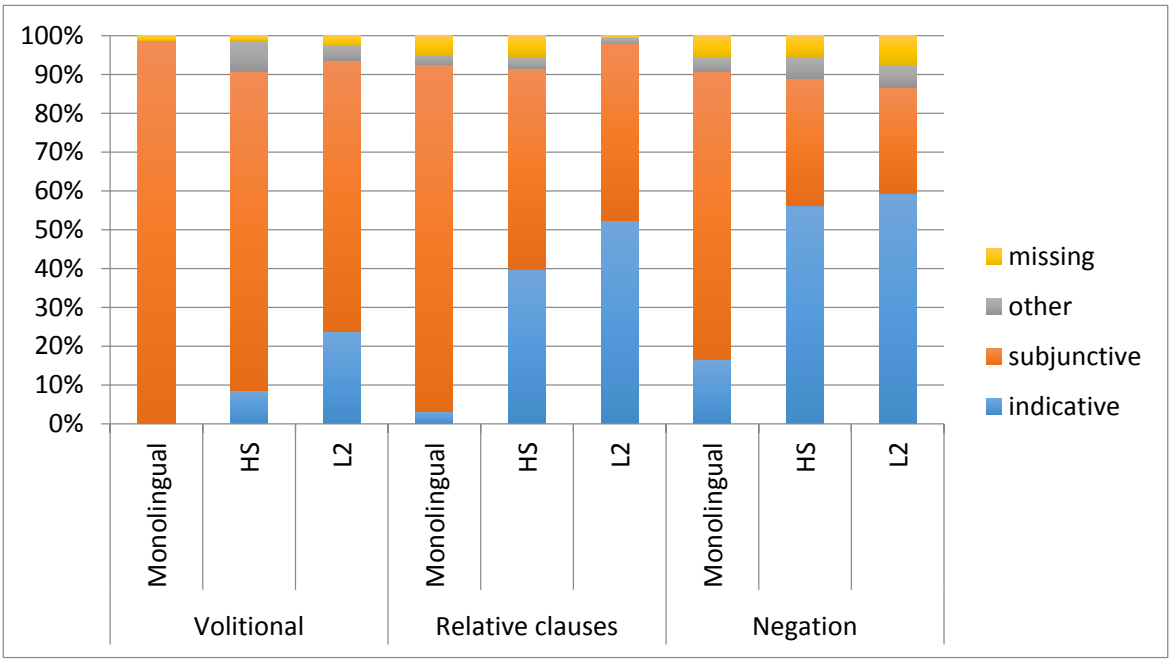

Figure 1. Percentages of indicative (infelicitous), subjunctive (felicitous) and other responses per condition per group. HS: heritage speakers.

To test for quantitative differences between the groups, generalized linear mixed effects models were run in each condition, using the lme4 package from statistical tool R (R Development Core Team 2017). A full overview of all statistical models is presented in the Supplementary Materials. In each analysis, 'group' was the independent variable, with one contrast set between the monolingual group vs. the two bilingual groups and another contrast between the heritage speakers and the L2 speakers. In each model, the random structure included intercepts and slopes for 'item' and 'subject' if this improved the model significantly. For the contrast between the monolingual group and the two bilingual groups, the effect of group was significant in all three conditions (volitional: $\beta = 0.18$, SE = 0.06, $z = 3.27$, $p = 0.002$; relative clauses: $\beta = 4.23$, SE = 0.75, $z = 5.65$, $p < 0.001$; and negated sentences: $\beta = 3.83$, SE = 0.83, $z = 4.62$, $p < 0.001$). For the contrast between the heritage and the L2 speakers, the effect was significant in the volitional condition ($\beta = 0.16$, SE = 0.06, $z = 2.53$, $p = 0.016$), but not in the relative clause condition ($\beta = 0.62$, SE = 0.58, $z = 1.07$, $p = 0.29$) or the negation condition ($\beta = 0.26$, SE = 0.81, $z = 0.32$, $p = 0.75$). This means that in all three conditions, the monolinguals produced the subjunctive relatively more frequently than the two bilingual groups combined and in the volitional condition, the heritage speakers produced the subjunctive significantly more often than the L2 speakers.

7.2. Acceptability Judgment Task

The mean ratings in the acceptability judgment task are depicted in Figure 2.

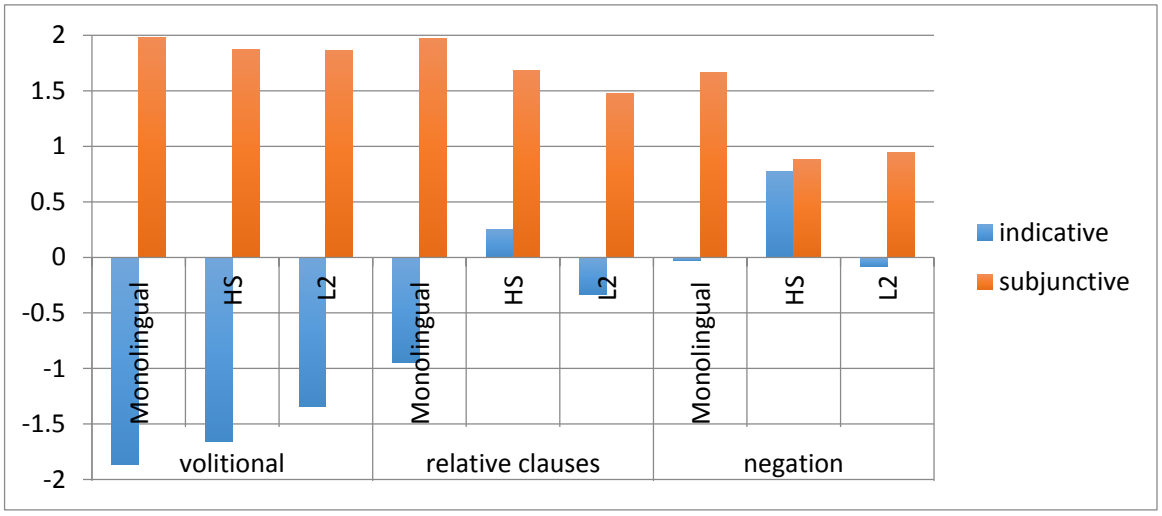

Figure 2. Mean ratings for the subjunctive (felicitous) and indicative (infelicitous) sentences per condition per group. HS: heritage speakers; L2: L2 speakers.

Linear mixed effects analyses were run for the rating for the indicative sentence and the rating for the subjunctive sentence in each condition. Again, 'group' was the independent variable with one contrast set between the monolingual group vs. the two bilingual groups and another contrast between the heritage speakers and the L2 speakers. Random intercepts and slopes were included for 'item' and 'subject', if this improved the model significantly. *p*-Values were calculated using the Kenward–Roger approximation, from the pbkrtest package (Halekoh and Højsgaard 2014).

In the analyses of the ratings for the subjunctive (felicitous) sentence, an effect of group was found in all three conditions, which was marginal in the volitional condition ($\beta = -0.11$, SE = 0.06, $t = -1.93$, $p = 0.058$), and significant in the relative clause ($\beta = -0.39$, SE = 0.14, $t = -2.80$, $p = 0.007$) and the negation condition ($\beta = -0.75$, SE = 0.23, $t = -3.26$, $p = 0.003$), but only for the contrast between monolingual and bilingual speakers. This means that monolingual speakers rated the

subjunctive higher than both bilingual groups, but the two bilingual groups did not rate the subjunctive significantly differently from each other.

In the analyses of the ratings for the indicative sentences, there were also significant effects of group in all three conditions. For the contrast between monolingual and bilingual speakers the effect was significant in the volitional condition ($\beta = 0.36$, SE = 0.17, $t = 2.10$, $p = 0.04$) and in the relative clause condition ($\beta = 0.91$, SE = 0.26, $t = 3.52$, $p < 0.001$). This means that the monolingual controls rejected the indicative more than the two bilingual groups in the volitional and the relative clause condition. For the contrast between the two bilingual groups, the effect was significant in the negation condition ($\beta = -0.86$, SE = 0.34, $t = -2.57$, $p = 0.014$), indicating that in this condition, the L2 speakers rejected the indicative more than the heritage speakers. In the relative clause condition, there was a similar tendency, which was not significant ($\beta = -0.59$, SE = 0.33, $t = -1.76$, $p = 0.08$).

Summing up these results for the judgment task, monolingual speakers show a higher preference for subjunctive than the two bilingual groups, across conditions. L2 speakers are more inclined to reject infelicitous indicative than heritage speakers in the negation condition (and approaching significance in the relative clause condition). Combining the results for the two tasks, we can conclude that there is indeed a task effect: in production, heritage speakers outperform L2 speakers, and the opposite is true in the judgment task.

7.3. Individual Results

Individual results were also explored. For the judgment task, this meant that for each participant in each condition, it was checked whether their average rating for the subjunctive sentences was at least 0.5 points higher than their average rating for the indicative sentences. This cut-off point of 0.5 was chosen because it was the smallest difference between ratings occurring in the monolingual group. For the production task, it was checked for each individual participant in each condition whether they used at least one more subjunctive than indicative. This cut-off point was not based on a monolingual standard; in fact, even in the monolingual group there were two participants who actually used two more indicatives than subjunctives (only in the negation condition). The argument for choosing a difference of 1 (and not, say, two, or three) was that a difference of 1 out of 9 items corresponds roughly to a difference of 0.5 on a scale from −2 to 2, which was the cut-off point in the judgment task.

For the production task, the individual results showed that in the volitional condition, all monolinguals and heritage speakers used the subjunctive more than the indicative, but only 15 out of 21 L2 speakers did so. In the relative clause condition, all monolinguals, 8 out of 17 heritage speakers and 9 out of 21 L2 speakers used subjunctive more frequently than the indicative. In the negation condition, 16 out of 18 monolinguals, 5 out of 17 heritage speakers and 4 out of 21 L2 speakers showed a similar pattern. As for judgment, all participants, except for one L2 speaker, rated subjunctive higher than the indicative in the volitional condition. In the relative clause condition, all monolinguals, 14 out of 17 heritage speakers and 17 out of 21 L2 speakers showed a similar preference. In the negation condition, all monolinguals preferred the subjunctive, but 12 out of 21 L2 speakers and only 4 out of 17 heritage speakers did the same. These results are summarized in Tables 2 and 3.

Table 2. Number of participants per group who produced subjunctive more than indicative.

	Volitional	**Relative Clauses**	**Negation**
Monolinguals	18/18 (100%)	18/18 (100%)	16/18 (88.89%)
Heritage speakers	17/17 (100%)	8/17 (47.1%)	5/17 (29.41%)
L2 speakers	15/21 (71.4%)	9/21 (42.9%)	4/21 (19.05%)

Table 3. Number of participants per group who rated subjunctive higher than indicative.

	Volitional	Relative Clauses	Negation
Monolinguals	18/18 (100%)	18/18 (100%)	18/18 (100%)
Heritage speakers	17/17 (100%)	14/17 (82.35%)	4/17 (23.53%)
L2 speakers	20/21 (95.24%)	17/21 (80.95%)	12/21 (57.14%)

These patterns thus mirror the group results: an advantage for the heritage speakers in the production task, which is most pronounced in the volitional condition, and a clear advantage for the L2 speakers in judgment in the negation condition.

7.4. The Role of Exposure and Instruction

As mentioned in Section 6.1, the amount of instruction and exposure to naturalistic input varied greatly within the L2 group. To explore the role of these two factors, additional analyses were run. For each participant, the number of months of instruction was calculated based on the information provided by the background questionnaire. Similarly, cumulative exposure was calculated by adding up the total amount of time spent in Spanish-speaking countries (including holidays, longer trips, and/or living abroad). With these two variables, another set of mixed effects model was run on the L2 group in all contexts in both judgment and production. In neither task, and in neither context did any of these effects turn out significant.

Another source of considerable variation within the L2 group was the amount of current exposure and use of Spanish, for instance because some of them had a Spanish-speaking partner, or had to use Spanish for their work. The questions in the questionnaire regarding current use and exposure of Spanish and Dutch were formulated in terms of relative frequency. Therefore, this information could not be expressed in a numerical variable and thus could not be included in a statistical analysis. Instead, the individual results of 7 participants who reported being exposed to Spanish equally or more often than Dutch at home or in the workplace were investigated with more scrutiny. However, no particular different behaviour could be deduced for these seven participants: in fact, most of them performed quite poorly on the production task, which would not be expected based on their increased exposure and use of Spanish.

These additional analyses thus provided no evidence for any effect of amount of explicit instruction and/or exposure to naturalistic input on L2 speakers' relative preference for the subjunctive in either task.

8. Discussion

This study tested heritage, L2 and monolingual speakers' implicit and explicit knowledge of the subjunctive in various contexts. Based on previous research comparing heritage and L2 speakers, it was hypothesized that heritage speakers would outperform L2 speakers in the implicit task and vice versa in the explicit task.

The design of our study was innovative in two ways. First of all, we closely matched the two groups' general proficiency levels in Spanish based on both a written explicit proficiency task (the DELE) and an aural implicit proficiency task (a lexical decision task). Including both these tasks as matching criteria reduced the risk of an overestimation of the proficiency of one of the groups due to the language mode they are more familiar with (written for L2 speakers and spoken for heritage speakers) or the type of knowledge they are assumed to possess (explicit for L2 speakers and implicit for heritage speakers). Moreover, unlike other studies, all stimuli were presented simultaneously

aurally and written. This design allowed us to reduce the possibility of a confounding effect of the language mode of presentation (spoken vs. written).[6]

The results showed first of all that the two bilingual groups diverged from the monolingual group in all three conditions: they showed a weaker preference for the subjunctive in both judgment and production. As for differences between the two bilingual groups, task-based differences were indeed attested in two out of three conditions. In the volitional condition, the heritage speakers outperformed the L2 speakers in production, but not in judgment.[7] In the negation condition, L2 speakers outperformed heritage speakers in the judgment task, but not in the production task. These results were confirmed by individual analyses. One might wonder about the interaction between task advantage and subjunctive context.[8] Could it be that heritage speakers are better in production in volitional contexts, because these are more frequent in everyday use, and L2 speakers are better with negation contexts in judgment because these have been part of their instruction and are less frequent in everyday use? As for the second point, as discussed in Section 2, the negation context is rarely extended to other verbs than epistemic verbs in textbooks. Any knowledge that L2 speakers have acquired about the subjunctive in the negation context thus cannot reflect mere repetition of what was offered during instruction. We think that L2 speakers' more explicit and metalinguistic knowledge enables them to recognize the pattern that subjunctive is used to refer to non-assertion (from the perspective of the speaker) and extend it to other verbs. Moreover, even if there is an effect of frequency of occurrence of the specific subjunctive contexts in specific situations, we do not think that this invalidates the argument for differences between the two groups in terms of the type of knowledge they possess. Even if the heritage speakers' advantage with volitional subjunctive in the production task would be due to the fact that this construction is more frequent in spoken language (with which they are more familiar) than in explicit instruction, the fact that they are able to apply this knowledge better than L2 speakers in one task, but not in the other, still implies that the nature of this knowledge is different between the groups. Similarly, even if the L2 speakers were helped because there is more evidence for the negation construction in instructed input (with which L2 speakers are more familiar) than in everyday language use, the fact that they are able to use this advantage only in the judgment task, but not in production, still implies that they have relatively more explicit knowledge of the construction.

These findings thus confirm previously attested task-based differences between heritage and L2 speakers, which until now have extensively been attested for morpho-syntactic phenomena (Montrul 2012), but not for other linguistic domains. Our study suggests that the observation can be extended to the interface between syntax and pragmatics, although more studies targeting different kinds of interface phenomena are needed to be able to generalize our findings to the domain as a whole.

The fact that these task-based differences between the groups were attested even though language mode of presentation (oral vs. written) was controlled for provides even more solid evidence suggesting that these two populations indeed possess different types of knowledge of the subjunctive. Nevertheless, it is important to point out that despite the equal *presentation* (written and aurally) of the items in the present study, our two tasks differed from one another in that only in the implicit task oral production was required. Even though Ellis (2005, 2009b) did not find evidence for a distinction between production vs. judgment in his task battery, it would be interesting to see whether the task effect remains if oral production is taken out of the equation. We would like to suggest future

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[6] An anonymous reviewer pointed out that, to completely control for language mode, one would ideally present two separate versions of the tasks: one aural and one written version. However, this would have required doubling the number of participants. A bimodal presentation therefore seemed the best solution to the effect of language mode.

[7] Interestingly, the morphological recognition task, which was also explicit in nature, and which targeted partially similar contexts as the volitional condition, rendered a significantly higher accuracy on part of the L2 speakers compared to the heritage speakers. However, one of the differences between this task and the judgment task was that the MRT was presented only in written form, not aurally, which may have contributed to the L2 advantage.

[8] Thanks to an anonymous reviewer for pointing this out to us.

researchers to include more online measures to tap into implicit knowledge, such as a self-paced reading/listening task, which does not include any oral production, but still meets the requirements of an implicit task as proposed by Ellis (2005, 2009b), namely: lack of awareness, time pressure and focus on meaning. We moreover agree with Montrul et al. (2008b) that including neuroimaging techniques could be a promising line of research to provide more insight in this matter.

So what does it mean if heritage speakers' knowledge is more implicit in nature and L2 speakers' knowledge is more explicit? As suggested in the introduction, this can mean two things. It could be related to the age at which each group was first exposed to the language. Certain theories assuming a critical period for language acquisition claim that the fundamental difference between early and late acquisition of a language is that while children are able to acquire language implicitly, based on exposure to naturalistic input only, this ability is lost in adults, who therefore can only resort to explicit learning mechanisms (Bley-Vroman 1990; DeKeyser 2000).

But heritage and L2 learners also differ with respect to "manner" of acquisition: while heritage speakers have been predominantly exposed to naturalistic input, and do not receive much explicit instruction in the language, for most L2 speakers it is exactly the other way around. It seems obvious that explicit instruction will lead to more explicit knowledge and naturalistic exposure leads to implicit knowledge. This may be true regardless of age of acquisition. The problem is that with instructed L2 learners, these two possible explanations are generally impossible to tease apart, since they differ from heritage speakers regarding both age and manner of acquisition.

Nevertheless, the data from the present study may shed some new light on this question. As mentioned in Section 6.2, the amount of instruction and exposure to naturalistic input varied greatly within the L2 group. If experience with the language is part of the explanation for the attested task-based effects, we would expect those L2 learners who received the most explicit instruction to do better on the explicit task, and those who were most exposed to naturalistic input to behave more monolingual-like on the implicit task. However, separate statistical and individual analyses did not reveal any effect of the amount of exposure to naturalistic input on L2 speaker's performance in production, or for an effect of the amount of explicit instruction on their performance on an explicit judgment task. We would therefore like to argue that the observed task-based differences are more likely to be related to age of onset of acquisition than to manner of acquisition. Nevertheless, to unambiguously disentangle these two effects, studies should compare heritage speakers to naturalistic L2 learners who have not received any instruction, and who, moreover, have received a similar amount of input as heritage speakers (and are still comparable in terms of general proficiency). This way, the factor "manner" of acquisition can be completely taken out of the equation. We leave these questions for future research.

9. Conclusions

This study compared proficiency-matched heritage and L2 speakers of Spanish on their implicit and explicit knowledge of the subjunctive in Spanish: a multiple interface phenomenon. An acceptability judgment task measured the participant's explicit knowledge on the topic, and an elicited oral production task tapped into implicit knowledge. The results confirmed task-based differences between heritage and L2 speakers of Spanish for the subjunctive in the volitional subjunctive (morpho-syntactic) condition and the negation (syntax-pragmatics interface) condition: while heritage speakers did better on the implicit task, L2 speakers had the advantage in the explicit task. This suggests that differential task effects for these two bilingual groups can be found not only in morpho-syntax as reported in e.g., Montrul (2012), but also in the syntax-pragmatics interface. We also demonstrated that these effects could not be attributed to a confounding effect of the mode in which the tests were administered (aural vs. written), or to the way in which general proficiency in Spanish was measured.

The findings from this study underline the importance of using different task types in bilingual research: relying exclusively on one task may obscure underlying differences between different bilingual populations. Scholars should be aware that different types of tasks tap into fundamentally

different types of knowledge, and depending on one's research question and on the type of population, an explicit task or an implicit task (or both!) will be more suitable. These findings moreover have potential implications for theories about the relationship between age of onset of acquisition and nature of knowledge (implicit vs. explicit).

Supplementary Materials: The following are available online at http://www.mdpi.com/2226-471X/3/3/25/s1, Supplementary 1: EPT Items; Supplementary 2: AJT Items; Supplementary 3: Statistical Models.

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References

Au, Terry Kit-fong, Leah M. Knightly, Sun-Ah Jun, and Janet S. Oh. 2002. Overhearing a language during childhood. *Psychology Science* 13: 238–43.

Benmamoun, Elabbas, Silvina Montrul, and Maria Polinsky. 2010. *Prolegomena to heritage linguistics*. White paper. Champaign, IL, USA: University of Illinois at Urbana–Champaign; Cambridge, MA, USA: Harvard University.

Bialystok, Ellen, and Kenji Hakuta. 1999. Confounded age: linguistic and cognitive factors in age differences for second language acquisition. In *Second language Acquisition and the Critical Period Hypothesis*. Edited by David P. Birdsong. Mahwah: Lawrence Erlbaum, pp. 161–81.

Bley-Vroman, Robert. 1990. The logical problem of foreign language learning. *Linguistic Analysis* 20: 3–49.

Borgonovo, Claudia, and Philippe Prévost. 2003. Knowledge of polarity subjunctive in L2 Spanish. In *BUCLD 27: Proceedings of the 27th annual Boston University Conference on Language Development*. Edited by Barbara Beachley, Amanda Brown and Frances Conlin. Somerville: Cascadilla Press, vol. 1, pp. 150–61.

Borgonovo, Claudia, Joyce Bruhn de Garavito, and Philippe Prévost. 2015. Mood selection in relative clauses. *Studies in Second Language Acquisition* 37: 33–69. [CrossRef]

Bowles, Melissa A. 2011. Measuring implicit and explicit linguistic knowledge. *Studies in Second Language Acquisition* 33: 247–71. [CrossRef]

Bruhn de Garavito, Joyce. 2002. Verb raising in Spanish: A comparison of early and late bilinguals. In *BUCLD 26: Proceedings of the 26th annual Boston University Conference on Language Development*. Edited by Barbora Skarabela, Sarah Fish and Anna H.-J. Do. Somerville: Cascadilla Press, vol. 1, pp. 84–94.

Chang, Charles B., Erin F. Haynes, Yao Yao, and Russell Rhodes. 2008. A tale of two fricatives: Consonantal contrast in heritage speakers of Mandarin. *University of Pennsylvania Working Papers in Linguistics* 15: 37–43.

DeKeyser, Robert M. 2000. The robustness of critical period effects in second language acquisition. *Studies in Second Language Acquisition* 22: 499–533.

DeKeyser, Robert M. 2003. Implicit and explicit learning. In *The Handbook of Second Language Acquisition*. Edited by Catherine J. Doughty and Michael H. Long. Oxford: Blackwell, pp. 312–48.

Ellis, Rod. 2005. Measuring implicit and explicit knowledge of a second language: A psychometric study. *Studies in Second Language Acquisition* 27: 141–72. [CrossRef]

Ellis, Rod. 2009a. *Implicit and Explicit Learning, Knowledge and Instruction. Implicit and Explicit Knowledge in Second Language Learning, Testing and Teaching*. Bristol: Multilingual Matters, vol. 42, pp. 3–25.

Ellis, Rod. 2009b. Investigating learning difficulty in terms of implicit and explicit knowledge. In *Implicit and Explicit Knowledge in Second Language Learning, Testing and Teaching*. Edited by Rod Ellis, Shawn Loewen, Catherine Elder, Hayo Reinders, Rosemary Erlam and Jenefer Philp. Bristol: Multilingual Matters, pp. 31–64.

Flege, James E. 1999. Age of learning and Second-language speech. In *Second Language Acquisition and the Critical Period Hypothesis*. Edited by David P. Birdsong. Hillsdale: Lawrence Erlbaum, pp. 101–32.

Flynn, Suzanne, and Sharon Manuel. 1991. Age-dependent effects in language acquisition: An evaluation of 'critical period' hypotheses. In *Point/Counterpoint: Universal Grammar in the Second Language*. Edited by Lynn Eubank. Amsterdam: John Benjamins, pp. 351–74.

Håkansson, Gisela. 1995. Syntax and morphology in language attrition: A study of five bilingual expatriate Swedes. *International Journal of Applied Linguistics* 5: 153–71. [CrossRef]

Halekoh, Ulrich, and Søren Højsgaard. 2014. A kenward-roger approximation and parametric bootstrap methods for tests in linear mixed models–the R package pbkrtest. *Journal of Statistical Software* 59: 1–30. [CrossRef]

Iverson, Michael, Paula Kempchinsky, and Jason Rothman. 2008. Interface vulnerability and knowledge of the subjunctive/indicative distinction with negated epistemic predicates in L2 Spanish. In *Eurosla Yearbook 8*. Edited by Leah Roberts, Florence Myles and Annabelle David. Amsterdam: John Benjamins, pp. 135–63.

Keating, Gregory D., Bill Van Patten, and Jill Jegerski. 2011. Who was walking on the beach? Anaphora Resolution in Spanish Heritage Speakers and Adult Second Language Learners. *Studies in Second Language Acquisition* 33: 193–221. [CrossRef]

Knightly, Leah M., Sun-Ah Jun, Janet S. Oh, and Terry Kit-fong Au. 2003. Production benefits of childhood overhearing. *Journal of the Acoustic Society of America* 114: 465–74. [CrossRef]

Krashen, Stephen D. 1982. Accounting for child-adult differences in second language rate and attainment. In *Child-Adult Differences in Second Language Acquisition*. Edited by Stephen D. Krashen, Robin C. Scarcella and Michael H. Long. Rowley: Newbury House, pp. 202–26.

Lukyanchenko, A., and K. Gor. 2011. Perceptual correlates of phonological representations in heritage speakers and L2 learners. In *BUCLD 35: Proceedings of the 35th annual Boston University Conference on Language Development*. Edited by Nick Danis, Kate Mesh and Hyunsuk Sung. Somerville: Cascadilla Press, vol. 2, pp. 414–26.

Lynch, Andrew. 2008. The linguistic similarities of Spanish heritage and second language learners. *Foreign Language Annals* 41: 252–381. [CrossRef]

Mikulski, Ariana Maria. 2006. Native Intuitions, Foreign Struggles? Knowledge of the Subjunctive in Volitional Con-structions among Heritage and Traditional FL Learners of Spanish. Ph.D. dissertation, University of Iowa, Iowa City, IW, USA, May.

Mikulski, Ariana Maria. 2010. Receptive volitional subjunctive abilities in heritage and traditional foreign language learners of Spanish. *The Modern Language Journal* 94: 217–33. [CrossRef]

Mikulski, Ariana Maria, and Idoia Elola. 2013. Heritage and Foreign Language Learner Use of the Spanish Subjunctive in Advice. *Heritage Language Journal* 10: 51–82.

Montrul, Silvina. 2004. Convergent outcomes in second language acquisition and first language loss. In *First Language Attrition: Interdisciplinary Perspectives on Methodological Issues*. Edited by Monika S. Schmid, Barbara Köpke, Merel Keijzer and Lina Weilemar. Amsterdam: John Benjamins, pp. 259–80.

Montrul, Silvina. 2005. Second language acquisition and first language loss in adult early bilinguals: Exploring some differences and similarities. *Second Language Research* 21: 199–249. [CrossRef]

Montrul, Silvina. 2006. Incomplete acquisition as a feature of bilingual and L2 grammars. In *Inquiries in Linguistic Development: In honor of Lydia White*. Edited by Roumyana Slabakova, Silvina Montrul and Philippe Prévost. Amsterdam: John Benjamins Publishing Company, pp. 335–59.

Montrul, Silvina. 2008. Incomplete acquisition in Spanish heritage speakers: Chronological age or interfaces vulnerability. In *BUCLD 32: Proceedings of the 32nd annual Boston University Conference on Language Development*. Edited by Harvey Chan, Heather Jacob and Enkeleida Kapia. Somerville: Cascadilla Press, vol. 1, pp. 414–26.

Montrul, Silvina. 2009. Knowledge of tense-aspect and mood in Spanish heritage speakers. *International Journal of Bilingualism* 13: 239–269. [CrossRef]

Montrul, Silvina. 2010. How similar are L2 learners and heritage speakers? Spanish clitics and word order. *Applied Psycholinguistics* 31: 167–207. [CrossRef]

Montrul, Silvina. 2011. Morphological errors in Spanish second language learners and heritage speakers. *Studies in Second Language Acquisition* 33: 163–92. [CrossRef]

Montrul, Silvina. 2012. Is the heritage language like a second language? In *Eurosla Yearbook 12*. Edited by Leah Roberts, Christina Lindqvist, Camilla Bardel and Niclas Abrahamsson. Amsterdam: John Benjamins, pp. 1–29.

Montrul, Silvina, and Tania Ionin. 2012. Dominant language transfer in Spanish heritage speakers and second language learners in the interpretation of definite articles. *The Modern Language Journal* 96: 70–94. [CrossRef]

Montrul, Silvina, and Silvia Perpiñán. 2011. Assessing differences and similarities between instructed heritage language learners and L2 learners in their knowledge of Spanish tense-aspect and mood (TAM) morphology. *Heritage Language Journal* 8: 90–133.

Montrul, Silvina, Rebecca Foote, Silvia Perpiñán, Dan Thornhill, and Susana Vidal. 2006. Full access and age effects in adult bilingualism: An investigation of Spanish accusative clitics and word order. In *Selected Proceedings of the 9th Hispanic Linguistics Symposium*. Edited by Nuria Sagarra and Almeida Jacqueline Toribio. Sommerville: Cascadilla Press, pp. 217–28.

Montrul, Silvina, Rebecca Foote, and Silvia Perpiñán. 2008a. Knowledge of wh-movement in Spanish L2 learners and heritage speakers. In *Selected Papers of the 8th Hispanic Linguistics Symposium*. Edited by Joyce Bruhn de Garavito and Elena Valenzuela. Somerville: Cascadilla Press, pp. 93–106.

Montrul, Silvina, Rebecca Foote, and Silvia Perpiñán. 2008b. Gender agreement in adult second language learners and Spanish heritage speakers: The effects of age and context of acquisition. *Language Learning* 58: 503–53. [CrossRef]

Montrul, Silvina, Justin Davidson, Israel De La Fuente, and Rebecca Foote. 2014. Early language experience facilitates the processing of gender agreement in Spanish heritage speakers. *Bilingualism: Language and Cognition* 17: 118–38. [CrossRef]

Oh, Janet S., Sun-Ah Jun, Leah M. Knightly, and Terry Kit-fong Au. 2003. Holding on to childhood language memory. *Cognition* 86: B53–B64. [CrossRef]

Paradis, Michel. 1994. Neurolinguistic aspects of implicit and explicit memory: implication for bilingualism and second language acquisition. In *Implicit and Explicit Learning of Languages*. Edited by Nick C. Ellis. Cambridge: Academic Press, pp. 393–421.

Potowski, Kim, Jill Jegerski, and Kara Morgan-Short. 2009. The effects of instruction on linguistic development in Spanish heritage language speakers. *Language Learning* 59: 537–79. [CrossRef]

Quer, Josep. 2001. Interpreting mood. *Probus* 13: 81–111. [CrossRef]

R Development Core Team. 2017. *R: A Language and Environment for Statistical Computing*. Vienna: R Foundation for Statistical Computing.

Shanks, David R. 2003. Attention and awareness in "implicit" sequence learning. In *Attention and Implicit Learning*. Edited by Luis Jiménez. Amsterdam: John Benjamins, vol. 48, pp. 11–42.

Silva-Corvalán, Carmen. 1994. The gradual loss of mood distinctions in Los Angeles Spanish. *Language Variation and Change* 6: 255–72. [CrossRef]

Thieroff, Rolf. 2004. The subjunctive mood in German and the Germanic languages. In *Focus on Germanic Typology*. Edited by Werner Abraham. Berlin: Akademie Verlag, pp. 315–58.

Valdés, Guadalupe. 1995. The teaching of minority languages as academic subjects: Pedagogical and theoretical challenges. *The Modern Language Journal* 79: 299–328. [CrossRef]

Van Osch, Brechje, and Petra Sleeman. 2016. Spanish heritage speakers in the Netherlands: Linguistic patterns in the judgment and production of mood. *International Journal of Bilingualism*. [CrossRef]

Van Osch, Brechje, Aafke Hulk, Petra Sleeman, and Suzanne Aalberse. 2017. Knowledge of mood in internal and external interface contexts in Spanish heritage speakers in The Netherlands. In *Multidisciplinary Approaches to Bilingualism in the Hispanic and Lusophone World*. Edited by Kate Bellamy, Michael W. Child, Paz González, Antje Muntendam and M. Carmen Parafita Couto. Amsterdam: John Benjamins, pp. 67–94.

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Article

The Narrative Abilities of an English-Spanish Bilingual with Prader-Willi Syndrome

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Abstract: The aim of this study was to analyze the narrative abilities of a 33-year-old English-Spanish bilingual with Prader-Willi syndrome (PWS). The few previous linguistic studies examining monolinguals with PWS have focused primarily on these individuals' narrative capacity, revealing a performance deficit in this area (Lewis et al. 2002; Garayzábal-Heinze et al. 2012). The present study is novel in that it examines a bilingual speaker and also tests his narrative abilities in both languages. Two wordless picture books from Mayer's (1967, 1969) Frog story series were used as the elicitation method. The PWS bilingual produced, over two experimental sessions, four narratives (two in each language), which were compared to four analogous narratives produced by a 25-year-old typically developing bilingual with a comparable linguistic background and proficiency level in Spanish and English. Following Gonçalves and collaborators' (Gonçalves et al. 2001a, 2001b, 2001c) narrative evaluation protocol, the narratives were analyzed according to three dimensions: narrative structure and coherence, narrative process and complexity, and narrative content and multiplicity. Overall, the results revealed that the PWS bilingual (1) presented a poor narration ability in both languages, with narrative content and multiplicity being the least impaired; (2) showed better narrative abilities during the second experimental session (i.e., narrative abilities improved with experience/practice); and (3) did not show typically developing behavior but a comparable performance to that of monolingual speakers with PWS. These findings suggest that bilingualism should not be discouraged in PWS populations and that special attention should be given to the development of their narrative abilities in their school curriculum.

Keywords: bilingualism; developmental disabilities; Prader-Willi syndrome; narrative abilities

1. Introduction

Individuals with developmental and intellectual disabilities (henceforth DDs and IDs, respectively) are often discouraged from learning two languages simultaneously or from having access to a second language (henceforth L2) under the assumption that this will have a negative effect on the linguistic development of their first language (henceforth L1) (Paradis et al. 2011). This practice not only denies these individuals the possibility of becoming bilingual, but also—in all probability—the option of taking advantage of the general benefits associated with bilingualism (which are discussed in Section 1.1). Now, however, there is a growing body of research focusing on bilingualism in individuals with special needs that is not only questioning this practice but pointing out a completely opposite scenario (i.e., the encouragement of bilingualism and multilingualism). It is undeniable that there are valuable data provided by previous studies that have focused on bilingualism in individuals with DDs; nevertheless, this line of research has been narrowed to Specific Language Impairment (SLI), Autism Spectrum Disorders (ASD), and Down syndrome (DS) (see Kay-Raining Bird et al. 2016 for a complete overview). Thus, in order to have a more comprehensive view of bilingualism in non-typically developing (henceforth non-TD) individuals, it is imperative to expand the focus to other syndromes

and conditions, as is the case with the emerging studies on bilingualism in Williams syndrome (Perovic and Lochet 2015). Accordingly, this study seeks to contribute to this developing field by providing new data from a bilingual speaker with PWS, an understudied DD. In this paper, I analyze the narrative abilities of an English-Spanish bilingual with PWS in both languages in comparison with a typically developing (henceforth TD) English-Spanish bilingual of similar age and sociolinguistic background.

1.1. Bilingualism in Typically Developing Individuals

Even though nowadays it seems that being bilingual is more of an asset than a problem, this has not always been the case. From the early 1920s, when the first studies focused on bilingualism and cognition arose, to the early 1960s, when Peal and Lambert's (1962) revolutionary research work was published, researchers expounded bilingualism's negative effects on intellectual abilities. Studies from this 40-year-period systematically reported the inferior linguistic abilities of bilinguals when compared to monolinguals. As Diaz (1983) and Hakuta and Diaz (1985) summarized, this bilingual disadvantage was mainly reflected in deficient articulation (Carrow 1957), poor vocabulary (Barke and Williams 1938), poor writing skills, and a greater number of grammatical errors (Harris 1948). However, while in verbal tasks researchers repeatedly showed either a bilingual disadvantage or a neutral effect, contradictory findings were found for non-verbal experiments (see Peal and Lambert 1962; Diaz 1983 for a complete review). With the publication of Peal and Lambert's (1962) seminal work, the reliability of previous findings started to be questioned, since, for the first time, a balanced bilingual group matching in terms of class, sex, and age to those of a monolingual group was included in a study (Canadian English-French bilinguals compared to Canadian monolingual French speakers). This special attention to participant selection was crucial as the careless criteria used to determine bilingualism in previous studies could have influenced the negative results obtained for bilinguals. For example, Brunner (1929) determined levels of bilingualism in terms of parents' origin, which today is known to not be a very precise method of determining the degree of bilingualism. Peal and Lambert's results showed that when participants were carefully selected, bilinguals showed an advantage over monolinguals in both verbal and non-verbal tasks. Nevertheless, these findings were not free from controversy and some researchers pointed out that the positive results for bilingualism obtained could have been the result of an involuntary bilingual bias. The authors, in an attempt to include only balanced bilinguals, could have favored the positive effects of bilingualism because they only included bilinguals who obtained a certain result in the intelligence test administered (see Hakuta and Diaz 1985, pp. 322–23, for a complete review of the possible bilingual bias in this study). Be that as it may, since the early 1960s a substantial body of research has revealed that bilingualism seems to lead to different cognitive benefits.

Following Adescope et al.'s (2010) comprehensive review of previous work focused on the cognitive effects of bilingualism, bilinguals appear to have: better attentional control in non-verbal tasks (Bialystok 2001; Emmorey et al. 2008); greater metalinguistic awareness (Galambos and Goldin-Meadow 1990; Yelland et al. 1993) and metacognitive awareness[1] (Ransdell et al. 2006); better optimization of the working memory capacity (Bialystok et al. 2004; Morales et al. 2013); better management of problem-solving skills (Bialystok 1999, 2006); superior abstract or symbolic analysis capacity (Cummins 1976); greater creative thinking (Ricciardelli 1992; Baker 2001); and more diverse communication strategies (Thomas 1992). Recently, different studies have revealed an interaction between bilingualism and certain narrative abilities in both TD and non-TD individuals. Andreou (2015) analyzed the narrative performance of TD bilingual children at the microstructural (morphosyntactic abilities) and macrostructural (coherence and global organization abilities) levels. Her results showed, on the one hand, that bilinguals outperformed monolinguals at a macrostructural level and, on the other hand, that bilingual children developed better global narrative

[1] While metalinguistic awareness refers to the ability to think about the language, metacognitive awareness refers to the capacity to reflect on the learning process itself.

abilities earlier than their monolingual counterparts (9 vs. 11 years old approximately). Better narrative abilities at macrostructural level were also found in bilinguals with SLI (Tsimpli et al. 2016) and with high-functioning autism (Baldimtsi et al. 2016) when compared to their monolingual peers. In addition, studies from the last decade have revealed that bilingualism seems to delay the age of onset of dementia and cognitive aging (Bialystok et al. 2007; Bialystok and Craik 2010). Finally, one obvious, but often undervalued, benefit of bilingualism in scientific research is the intrinsic capacity to communicate and interact in two languages (or more in the case of multilingualism) and all the social benefits associated with it. Being bilingual gives a person the opportunity to have access to another language, to its culture, and, most importantly, to the speakers of that language. In the end, humans are social beings wanting to socialize and be part of a community.

1.2. Bilingualism in Individuals with Developmental and Intellectual Disabilities

Despite the large number of benefits to becoming bilingual, populations with DDs have been discouraged from being raised bilingual or from studying an L2 for fear of increasing their linguistic learning challenges (Cleave et al. 2014). Nevertheless, cases of bilingualism have been attested in individuals with DS (Kay-Raining Bird et al. 2016), ASD (Seung et al. 2006), or SLI (Sanz-Torrent et al. 2008), to name a few, and it is precisely these three conditions on which previous research investigating DDs and bilingualism has almost exclusively focused. Since the aim of this study is to analyze the narrative abilities of a bilingual with PWS, the revision of previous findings is primarily focused on DS. The reason for this is that within the heterogeneity of DDs, PWS and DS are, in principle, closer than PWS and SLI or PWS and ASD. As Cimolin et al. (2010, p. 1) state, "Prader-Willi and Down syndrome are two different chromosomal disorders characterized by some common clinical features, such as obesity, muscular hypotonia, ligament laxity, and mental retardation". SLI differs from DS and PWS in that it is a language disorder "diagnosed when a child's language development is deficient for no obvious reason" (Bishop 2006, p. 217), or, in other words, when it "cannot be explained in terms of mental or physical handicap, hearing loss, emotional disorder, or environmental deprivation" (Bishop 1992, p. 3). Thus, according to this description, individuals with SLI should display, by definition, typical non-verbal abilities and intelligence. Previous research, however, has shown that these individuals are not exempt from experiencing difficulty with some particular non-linguistic tasks, as seems to be the case with visuo-spatial short-term memory tasks (Hick et al. 2005) or mathematical tasks (Cowan et al. 2005; Mainela-Arnold et al. 2011) to name a few. ASD, for its part, is related to impairment of verbal and non-verbal communication, social interactions, and repetitive behaviors and interests (Tager-Flusberg 2004; Faras et al. 2010). Traditionally, ASD has been directly associated with intellectual disabilities, but recent research has revealed that, despite the fact that around 50% of children with an autistic disorder present intellectual disabilities, some individuals may show average or even superior intelligence (see Charman et al. 2011 for an overview).

Previous research that focused on bilinguals with DS is very scarce, and, at its beginning, was based on case study research, which, interestingly enough, revealed homogeneous outcomes: the possibility of becoming bilingual, or even multilingual, and facing the same language difficulties in the different languages. For example, Vallar and Papagno (1993) studied a 23-year-old L1 Italian woman with DS who was also fluent in English (and French to a lesser extent). The authors focused on vocabulary acquisition and their results revealed that the participant's phonological short-term memory appeared to not be impaired, and, in fact, seemed to facilitate the process of vocabulary acquisition. For their part, Woll and Grove (1996) studied the case of two bimodal, bilingual identical twins (English-British Sign Language) with DS whose parents were deaf. These twins were administered different verbal and non-verbal tests and their spontaneous production was analyzed in both languages. The results evidenced that the twins were fluent when signing and that the shortcomings detected were consistent across the two language modalities.

According to Kohnert and Medina (2009) and the recent exhaustive bibliography review by Kay-Raining Bird et al. (2016), apart from case studies, only five group studies analyzing bilingualism

in DS have been carried out[2]. It must be stressed that four out of these five studies were conducted by the same group of researchers and that the participants partially overlapped, with English-French being almost the only bilingual language combination under analysis (see Kay-Raining Bird et al. 2016, p. 7).

Trudeau et al. (2011) carried out a cross-sectional and a longitudinal study with 18 sequential English-French bilinguals with DS. They investigated both expressive and receptive vocabulary in English (L1) and French (L2) and found that the bilinguals' French vocabulary was smaller and had greater variability than their English vocabulary but that it became more uniform as their overall vocabulary size increased. The longitudinal study showed that, while in English a vocabulary growth was detected over time for 13 participants, this was not the case for the L2, since only nine individuals showed progress in French. Regardless, what these results suggest is that under no circumstances did the fact of being exposed to an L2 appear to have a negative effect on the vocabulary acquisition of the L1. In order to evaluate the cognitive effects of being exposed to two languages, Edgin et al. (2011) administered a battery of cognitive tests to both English-Spanish bilinguals with DS and English monolinguals with DS (control group). Results showed parallel performance of both groups for all the measures under analysis. Likewise, Kay-Raining Bird et al. (2005) investigated the language abilities (mainly vocabulary comprehension) of eight bilinguals (English–one other language) with DS in comparison to 14 English monolinguals with DS and they found that both bilinguals and monolinguals with DS shared a similar profile. For their part, Feltmate and Bird (2008) analyzed the morphosyntactic and vocabulary abilities of eight English-French bilinguals with DS and four English monolinguals with DS. Their findings showed no detrimental effects of bilingualism (i.e., bilinguals with DS did not demonstrate linguistic deficits when compared to monolinguals with DS). Two of the aforementioned studies, Kay-Raining Bird et al. (2005) and Feltmate and Bird (2008), also included a TD bilingual group as a comparison baseline. Both studies agreed that while bilinguals with DS did not seem to perform much different from their monolingual counterparts, they did appear to have linguistic difficulties when compared to TD bilinguals. Nevertheless, Cleave et al. (2014) found that, in specific areas, bilinguals with DS did not differ greatly from TD bilinguals, as is the case of the ability to learn new words.

Overall, previous case studies and group studies consistently reveal that bilinguals with DS show different linguistic and cognitive deficiencies when compared to TD bilinguals but not when compared to their monolingual peers. Thus, these results, as well as those from other studies based on bilingualism in individuals with DDs (see Kay-Raining Bird et al. 2016), show that there seems to be no scientific foundation to deny individuals with these special needs the possibility of managing more than one language and, consequently, the opportunity to benefit from the positive cognitive outcomes that appear to derive from being bilingual.

2. Prader-Willi Syndrome

2.1. Clinical Characteristics of the Prader-Willi Syndrome and their Impact on Language/Speech

The Prader-Willi Syndrome (PWS) is a rare disease first described by Prader et al. (1956), and is not related to sex (Burd et al. 1990) or other factors such as race, social class, or geographical origin (Alexander and Hanson 1988; Butler and Thompson 2000). Genetic research has shown that PWS is rarely inherited and the recurrence risk within the same family is normally low (Buiting and Horsthemke 2006). It must be emphasized that although PWS has a relative low incidence (it affects one in every 10,000–15,000 humans) (Lewis et al. 2002; Dimitropoulos et al. 2013), it is one of the most frequent syndromes among those recognized (Alexander and Hanson 1988). In a simplistic way, the reason why this malformation occurs is related to the fact that, at conception, the crossing over that

[2] Both Kohnert and Medina's (2009) and Kay-Raining Bird et al.'s (2016) reviews comprise research papers published mainly in English, and French to a lesser extent. It is possible that other studies have been published in languages other than English or French but have gone unnoticed.

happens between the 23 paternal and the 23 maternal chromosomes, when they line up to form 46 chromosomes, is imperfect, which causes health and cognitive "abnormalities" in the individual. For example, DS, one of the genetic disorders with higher incident rates, is the result of three copies of chromosome 21. Prader-Willi Syndrome, for its part, is the result of problems in chromosome 15, which may have three main manifestations (see Cassidy et al. 2012 for a comprehensive genetic explanation): (1) Chromosomal deletion (the absence of part of the paternal chromosome 15); (2) Uniparental disomy (two maternal copies of chromosome 15); and (3) Imprinting defect (defined by (Cassidy et al. 2012, p.10), as a "defect in the genomic region that controls the imprinting process"). Chromosomal deletion affects about 75% of the PWS population, followed by Uniparental disomy, which causes about 20% of cases and, finally, by Imprinting defect, which only has about 5% incidence (Cassidy et al. 2012; Dimitropoulos et al. 2013).

Even though there is variation in terms of the severity and outcomes, individuals with PWS present specific behavioral, physical, and cognitive characteristics. Their most salient trait is food anxiety, which normally leads to morbid obesity if their insatiable desire to eat is not controlled. They also tend to be stubborn, manipulative, and compulsive, and to experience temper tantrums as well as other behavioral issues. As for physical characteristics, they tend to be short and overweight and to have poor muscle tone (hypotonia) and idiosyncratic facial features. Likewise, intellectual disabilities (ranging from mild to moderate) and delay of language development are rather common in this population (see Greenswag and Alexander 1988; Cassidy et al. 2012 for a comprehensive review of the main characteristics of PWS). Previous studies show that PWS individuals have a mean Intellectual Coefficient (IQ) of 62.3[3] (Curfs et al. 1991) and that their non-verbal IQ is normally higher than their verbal one (Dimitropoulos et al. 2013). Therefore, these results demonstrate that linguistic abilities are not one of their strengths. It should also be emphasized that both receptive and expressive language are impaired, the latter being poorer than the former (Kleppe et al. 1990; Lewis 2006). Similarly, if the Mean Length of Utterance (MLU[4]) is taken as a measure of language productivity, this linguistic skill is also commonly impaired, since PWS individuals' speech samples show shorter MLUs than those of the same age TD peers (Lewis et al. 2002; Lewis 2006).

Succinctly, as Lewis et al. (2002, pp. 287–88) and Dimitropoulos et al. (2013, p. 194) put it, PWS individuals show relative strengths in the following capacities: reading decoding, reading comprehension, receptive vocabulary, visual–spatial skills, picture completion, block design, object assembly, and long-term memory. On the other hand, they show deficiencies in short-time memory, as well as with auditory verbal processing and linear or temporal order processing skills. Additionally, PWS individuals show a poor expressive vocabulary, poor pragmatic abilities, and a considerable language delay, since their first words are produced between 18 months and six years (Lewis 2006), which contrasts with the pattern observed in TD children, who at 18 months start to produce their first signs of grammaticalization and generally by four years their core grammatical system is completed (Serra et al. 2000, p. 51).

Some clinical features of PWS, together with reduced cognitive and phonological abilities, result in some speech idiosyncrasies (Lewis et al. 2002; Lewis 2006). For example, having a narrow overjet and palatal arch, as well as an undersized jaw and some dentition problems, affects their articulatory skills. In accordance with Lewis (2006, p. 274), the principal speech-sound problems of PWS are "sound distortions and omissions, vowel errors, simplification of consonant blends, and difficulty sequencing syllables". In addition, poor muscle tone and abnormal laryngeal growth have an impact on their voice level. Akefeldt et al. (1997) studied the oral motor function, pitch level, and resonance of 11 individuals with PWS and found certain abnormal vocal features. Similar outcomes were found in Munson-Davis (1988), Kleppe et al. (1990), and Defloor et al. (2001). Likewise, nasality has

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[3] Generally, scores under 70 are considered indicators of intellectual disabilities (Koriakin et al. 2013).

[4] MLU is a linguistic measure that expresses linguistic productivity in children. It can be measured by morphemes or words and both options are equally effective to evaluate language development (Parker and Brorson 2005).

also been reported as a common characteristic of this syndrome (Branson 1981; Edmonston 1982). With regard to speech fluency, previous research has revealed that PWS individuals consistently show dysfluency. Defloor et al. (2000) studied the speech fluency of 15 PWS individuals through four different speech modalities (spontaneous, repetition, monologue, and automatic series) and their results revealed "within-word dysfluencies such as part-word repetitions, whole-word repetitions, blocks, prolongations, and broken words" (Defloor et al. 2000, p. 95). These authors defended that these dysfluencies did not obey to stuttering and/or cluttering, but to cognitive and language deficits, a position also defended by Branson (1981); Kleppe et al. (1990); and Lewis (2006).

In sum, previous research on PWS has mainly focused on its clinical, cognitive, and behavioral characteristics while its linguistic abilities have received little attention. Overall, linguistic research has focused on two main topics: speech characteristics and narrative abilities. Having presented an overview of the main findings related to speech characteristics, in the next section I will concentrate on the narrative abilities of the PWS population. I will first provide an overview of the narrative framework that forms this study and I will subsequently scrutinize the narrative abilities of monolingual speakers with PWS.

2.2. Narrative Abilities in Prader-Willi Syndrome

One of the most frequent activities in a person's daily life, to a greater or lesser extent, consists in narrating personal events (Fivush and Nelson 2004; Gonçalves et al. 2011), a capacity that emerges at a very young age as a way to organize human experience (Bruner 1990) and that does not differ significantly from the way fictitious stories are narrated (Anderson and Conway 1993). Given that narrating is a very common and familiar activity for all of us, we might be inclined to believe that it is a relatively simple and straightforward task. Nonetheless, the reality is that narrating properly, either personal or invented stories, is a highly demanding task that entails the integration of linguistic, cognitive, and social domains (Tsimpli et al. 2016). Thus, given the complexity of this activity, even for TD individuals, it should not be surprising that PWS individuals show consistent deficiencies in this respect, as will be detailed later in this section. Children and adult's narrative productions have been extensively used by linguistic researchers to analyze the writer/speakers' narrative abilities and/or their linguistic competence or productivity. It is worth noting that while there are different reliable analysis proposals to evaluate the quality of written or oral narratives produced by TD individuals, the options specifically conceived to analyze the narrative production of individuals with special needs are more limited. In this study, I follow Gonçalves and collaborators' narrative evaluation scheme (Gonçalves et al. 2001a, 2001b, 2001c), which consists in the analysis of three dimensions (narrative structure and coherence, narrative process and complexity, and narrative content and multiplicity), and their corresponding subdimensions, which are presented in Table 1 following the authors' description.

This methodology was originally conceived to evaluate the narrative abilities of individuals with psychological disorders and its reliability was satisfactorily tested in patients with agoraphobia (Gonçalves et al. 2002). Subsequently, it was extended to the assessment of the narrative abilities in individuals with neurodevelopmental disorders such as Williams syndrome, Smith–Magenis syndrome, and PWS (Gonçalves et al. 2011; Garayzábal-Heinze et al. 2012).

Table 1. Gonçalves et al.'s (2001a, 2001b, 2001c) narrative guidelines by dimensions and subdimensions.

Narrative Structure and Coherence	
1. Orientation	Reference to the circumstances that surround an action.
2. Structural sequence	Events are presented in a logical sequence.
3. Evaluative commitment	The narrator shows emotional involvement.
4. Integration	The narrative is presented in an integrated way (it makes sense).
Narrative Process and Complexity	
1. Objectifying	Sensorial information is included.
2. Emotional subjectifying	Reference to emotional states is included.
3. Cognitive subjectifying	The narrator's thoughts are included.
4. Metaphorizing	Metaphors are included.
Narrative Content and Multiplicity	
1. Themes	Variety of themes/topics is included.
2. Events	Variety of events/actions is included.
3. Scenarios	Explicit reference to the atmosphere that surrounds an action.
4. Characters	Variety of characters is included.

It is important to highlight that although a great deal of individual variability exists between the PWS population, some common idiosyncratic narrative features have been identified in previous studies. Lewis et al. (2002) and Garayzábal-Heinze et al. (2012), using different techniques and narrative analysis, studied the narrative abilities of monolinguals with PWS. By means of a narrative retelling task, Lewis et al. (2002) investigated whether 24 participants (eight preschools, eight school-age children, and eight adolescents/adults) included the grammar components and content items presented in the original story in their own narrative production. In addition, and in order to measure the participants' comprehension capacity, participants were asked three factual and three inferential questions. Results revealed important deficits in both narrative abilities and comprehension questions in the three groups. However, these deficiencies were more evident in younger participants, which indicates that they do not disappear with age but rather improve in adulthood, which, in turn, can be interpreted as an experience/practice gain. Garayzábal-Heinze et al. (2012), for their part, compared the narrative abilities of two individuals with PWS with those observed in two individuals with Williams syndrome and two with Smith–Magenis syndrome (all microdeletion syndromes characterized by cognitive impairment and language deficits). Using the well-known picture book *Frog, Where Are You?* (Mayer 1969) to elicit speech samples, participants were asked to explain the story to the examiner, who recorded the sessions. Narratives were transcribed and analyzed according to Gonçalves et al.'s (2001a, 2001b, 2001c) narrative evaluation proposal presented in Table 1. Results showed that all participants, regardless of the syndrome, exhibited poor narrative abilities to different extents. PWS individuals had the lowest performance in both the narrative structure and coherence and the narrative process and complexity dimensions, while the opposite trend was observed in the narrative content and multiplicity dimension: PWS and Williams syndrome participants obtained the highest scores. These results, together with those of Lewis et al. (2002), are evidence that narration is an arduous task for these individuals and point to the need to include this content in their school curriculum.

Since research on the linguistic abilities of individuals with PWS has been sparse and has only addressed monolingual speakers, in this study I investigate the narrative abilities of an English-Spanish bilingual with PWS in comparison to a TD English-Spanish bilingual and to the two Spanish monolingual speakers with PWS in Garayzábal-Heinze et al.'s (2012) study. The results will shed light on how the narrative abilities of a bilingual with PWS compare in the two languages and will represent a first step towards the establishment of a new line of research that may help speech therapists and other intervention professionals to make more informed decisions with regard to PWS and bilingualism. At the same time, the outcomes of this study will contribute to the line of research

initiated by Kay-Raining Bird and collaborators focused on bilingualism in populations with IDs by providing new data from a different DD with ID and from a previously understudied language combination. This type of study is crucial since, as Garayzábal-Heinze et al. (2012, p. 49) argue, the analysis of the narrative production in non-TD individuals with IDs is of particular relevance because it is normally accompanied by an affected language system and this, in the authors' words, "could elucidate about the genetic contributions to language and narrative organization in atypical neurodevelopmental genetically based disorders".

3. The Study

3.1. Research Questions

In this study, I intend to answer the following research questions:

- Research question 1: Does an English-Spanish bilingual with PWS show poor narrative abilities in terms of narrative structure and coherence, narrative process and complexity, and narrative content and multiplicity as previous research has revealed in the case of monolinguals with PWS? Does the bilingual speaker show relative strength in the narrative content and multiplicity dimension compared to the other two dimensions, as Garayzábal-Heinze et al. (2012) found for monolingual Spanish speakers with PWS?
- Research question 2: Are the narrative abilities of an English-Spanish bilingual with PWS comparable in both languages?
- Research question 3: How are the narrative abilities of an English-Spanish bilingual with PWS compared to a TD English-Spanish bilingual?

3.2. Participants

One bilingual with PWS (Yves) and one TD bilingual (Olivia)[5] participated in the study. Both participants were asked to complete a language background questionnaire. Yves is a 33-year-old male English-Spanish bilingual who was diagnosed with Prader-Willi syndrome (Chromosomal deletion) when he was 11 years old. Olivia is a 25-year-old female TD English-Spanish bilingual. Both participants were raised in Ontario (Canada) and are simultaneous English-Spanish bilinguals. In both cases, English is the dominant language and Spanish is the heritage language. They both belong to Spanish-speaking families (both parents) from Spain who maintain Spanish as the family communication language but speak predominantly English in social and professional circles. Olivia lives independently and works in an Anglophone context; Yves lives in an Anglophone group home and visits his family every other weekend. Both participants gave their consent to participate in this study, which was approved by the ethics committee of the University of Ottawa (file reference: #06-16-19).

3.3. Instruments

Besides completing a language background questionnaire, both participants were asked to complete different tasks to evaluate their proficiency level in English and Spanish and their narrative abilities in both languages.

3.3.1. Proficiency Tests

In order to assess the participants' proficiency level in both English and Spanish, they were administered the Oxford Quick Placement Test (UCLES 2001) and a short version of the Wisconsin Spanish Placement Test (2009) (two of the most common standardized tests used in the second language acquisition field to evaluate knowledge of English and Spanish as foreign languages), as well

[5] In order to preserve the participants' anonymity, the two names are fictional.

as separate cloze tests in both English and Spanish (used extensively in the Language Acquisition Research Laboratory at the University of Ottawa). The tests' results, reported in Table 2, revealed that both participants had a high competence in both languages.

Table 2. Cloze and proficiency tests' results for Yves and Olivia.

Participant	Spanish Cloze Test	English Cloze Test	Oxford Proficiency Test (English)	Wisconsin Proficiency Test (Spanish)
Yves	20/20	24/25	49/60	26/36
Olivia	16/20	24/25	58/60	36/36

In English, both participants showed 96% accuracy in the cloze test and were considered advanced speakers of English according to the results from The Oxford Quick Placement Test (Yves showed a C1 level conforming to the CEFR[6] and Olivia a C2 level). In the case of Spanish, results also revealed an advanced level of proficiency, since both participants showed more than 70% of accuracy in the cloze test and in the Wisconsin Spanish Placement Test.

3.3.2. Narrative Elicitation Tasks

Participants were presented with two wordless picture books, *A Boy, a Dog and a Frog* (Mayer 1967) and *Frog, Where Are You?* (Mayer 1969), and were asked to explain the story to the investigator. This elicitation method, popularly known as the Frog story task, has been widely used in linguistic research in both TD and non-TD populations and for different languages (see Strömqvist and Verhoeven 2004 or Slobin 2005 for a bibliography). In both picture books, there are two main characters, a boy and his dog, that look for or try to catch a frog. Both picture books are related but are completely autonomous, since the context and the adventures the characters experience throughout the two picture books are different. In *A Boy, a Dog and a Frog* (25 images) (Mayer 1967), a boy and his dog are on a fishing trip and see a frog they would like to catch. The frog escapes and they both try to chase it. They finally give up and go back home, only to have the frog follow them there. The picture book *Frog, Where Are You?* (25 images) (Mayer 1969) shows the frog escaping from the boy's home during the night, followed by the boy and his dog searching for it in the forest. Before finding the frog, their adventure includes encounters with a variety of animals.

Taking into account the different characters involved and the different situations and contexts depicted by the images, many researchers defend and agree in considering the Frog story series as a legitimate tool to elicit narrative texts (oral and/or written). With the appropriate data analysis tools, these narratives can provide appropriate speech and written samples from which to analyze the participants' narrative abilities.

3.4. Procedure

Data collection took place in four sessions. In the first session, the participants were given the research project details and were both asked to orally narrate *A Boy, a Dog and a Frog* (Mayer 1967) in English and *Frog, Where Are You?* (Mayer 1969) in Spanish. The narratives were all audio recorded. During the second session, the narration languages were reversed so that *A Boy, a Dog and a Frog* (Mayer 1967) was asked to be narrated in Spanish and *Frog, Where Are You?* (Mayer 1969) in English. In both sessions the task procedure was the same: participants were asked to narrate one story first and, once finished, the participant and the investigator talked about trivial things about the story they had just narrated. Once the participants felt comfortable and ready to continue, they were asked to narrate the second story. During the first experimental session participants did not have access

[6] Common European Framework of Reference for Languages.

to the pictures before starting the narrative task, but they did know the title of the story they were about to narrate. During the second experimental session, however, they knew both stories since they had already narrated them in the previous session (though in a different language). Between the first and the second sessions, there was an average of a two-and-a-half-month gap. In sessions three and four, participants completed the language background questionnaire, the two cloze tests, and the two proficiency tests previously mentioned.

3.5. Data Treatment

The eight oral narratives (both participants produced two narratives in Spanish and two narratives in English) were transcribed in CHAT, the transcription system for the CHILDES Project (MacWhinney 2000). Once transcribed, following Gonçalves et al.'s (2001a, 2001b, 2001c) methodology, the narratives were evaluated according to the dimensions and subdimensions presented in Table 1 (see Garayzábal-Heinze et al. 2012, pp. 63–65; Gonçalves et al. 2011, pp. 292–94 for a detailed explanation of the three dimensions and their analysis).

The narratives produced were evaluated by four linguists specialized in the language acquisition field, and each subdimension, following the original scheme, was evaluated on a 5-value Likert scale (1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high). The dependent variable was the mean obtained by the four evaluators for each subdimension (the standard deviation was between 0 and 1.26 for all the subdimensions evaluated).

4. Results

Due to the fact that this is a case study involving two participants, a descriptive data analysis was performed. This type of data analysis is the most extended practice within the field due to the recurrent limited number of participants (Garayzábal-Heinze et al. 2012; Feltmate and Bird 2008). I first present an overview of the characteristics of the narratives and then an analysis of the participants' narrative abilities.

4.1. Characteristics of the Narratives

Table 3 shows the number of words, the mean length of utterances by words (MLUw), and the Type-token ratio for each of the participants' narratives. These three measures reflect, respectively, the length of the transcribed recording, the participants' linguistic productivity, and their vocabulary variation.

Table 3. Length, mean length of utterances by words (MLUw), and Type-token ratio values for each participant and narrative.

Participant	Session	Production	Words	MLUw	Type-Token Ratio
Yves	1	*A Boy, a Dog and a Frog* (English) (Mayer 1967)	162	5.786	0.391
Yves	1	*Frog, Where Are You?* (Spanish) (Mayer 1969)	242	6.368	0.332
Yves	2	*A Boy, a Dog and a Frog* (Spanish)	331	8.711	0.295
Yves	2	*Frog, Where Are You?* (English)	410	7.193	0.272
Olivia	1	*A Boy, a Dog and a Frog* (English)	344	11.097	0.385
Olivia	1	*Frog, Where Are You?* (Spanish)	390	9.750	0.339
Olivia	2	*A Boy, a Dog and a Frog* (Spanish)	243	7.839	0.472
Olivia	2	*Frog, Where Are You?* (English)	301	10.379	0.409

Overall, Olivia showed better linguistic productivity and richer vocabulary than Yves. However, it is interesting to note that, while in Yves' case the narratives' length and MLUw increase through experience/practice (here understood as a convergence of two factors: the knowledge of the characters and the plot of both stories from session 1 to session 2 and the narrative experience itself acquired between sessions) in both languages, the opposite behavior was detected in Olivia. In her case, the narratives are shorter in both languages in the second session when compared to the first. Another

opposite trend observed between the two participants is that while Yves' vocabulary richness decreases after experience/practice, the opposite was observed in Olivia, who showed more vocabulary variation in the second session than in the first. As pointed out by an anonymous reviewer, the most feasible explanation for this opposite trend between participants is that while Olivia is more precise when explaining events (higher vocabulary richness and lower extension in session 2), Yves uses more repeated words (higher extension and lower vocabulary richness in session 2). This "repetition strategy" suggests a poor expressive vocabulary, a limitation that previous studies focused on the expressive language of monolingual speakers with PWS have found to a greater or lesser degree (Edmonston 1982; Kleppe et al. 1990; Van Borsel et al. 2007).

4.2. Narrative Abilities' Analysis

4.2.1. Holistic Narrative Performance

Overall, the results reflect a poorer narrative performance by Yves when compared to Olivia (see Figure 1). While Olivia obtained a global score higher than 50 (maximum score 60) in the four narratives, Yves scored between 31.5 and 35.75 in three narratives (with the exception of the story *Frog, Where Are You?* (Mayer 1969) narrated in English, where he obtained a score of 46.25 out of 60).

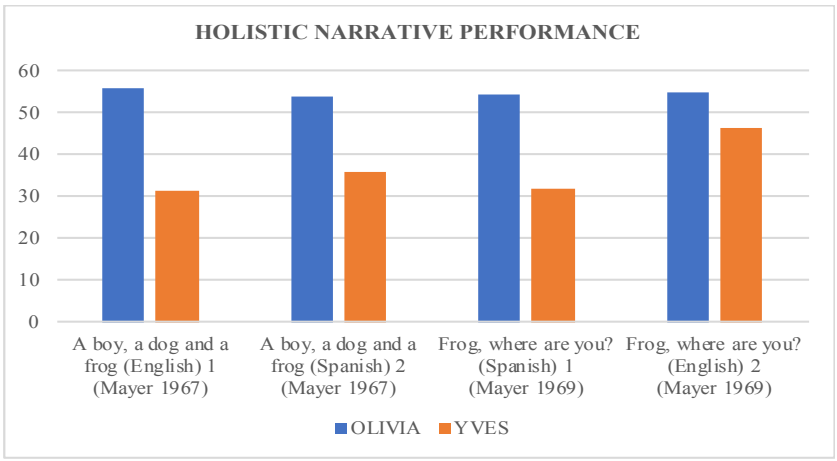

Figure 1. Holistic scores for Olivia and Yves' narrative performance.

4.2.2. Global Narrative Performance by Dimensions

Figures 2 and 3 show, respectively, Olivia's and Yves' global performance for the three analyzed dimensions in each of the four narratives. The findings indicate a high and homogeneous command of the three analyzed dimensions in the case of Olivia, as all her scores, regardless of the narrative and the language, were above 15 (maximum score was 20). Yves, on the other hand, showed specific shortcomings. In fact, as Figure 3 reveals, the most problematic areas for the PWS participant were the ones related to the narrative process and complexity and the narrative structure and coherence dimensions since, with the exception of the story *Frog, Where Are You?* (Mayer 1969) in English, Yves' scores did not exceed 11 points, which is indicative of a poor command of these two dimensions. However, in the case of the narrative content and multiplicity dimension, a slightly better performance was observed as his scores were higher, ranging from 12.75 to 17.25. In what follows, each dimension is analyzed in detail for both Yves' and Olivia's performance.

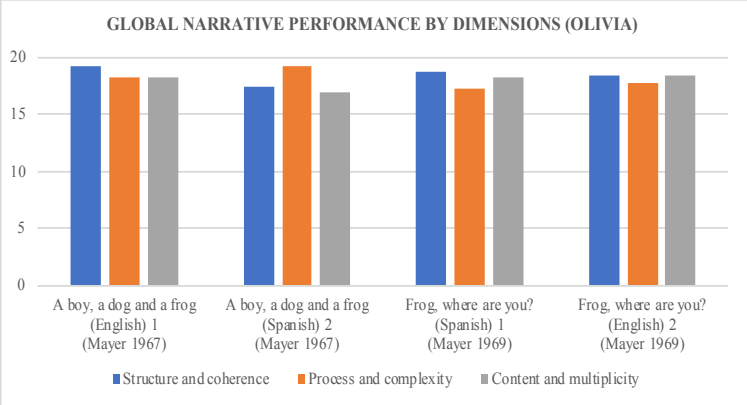

Figure 2. Olivia's global scores by dimensions.

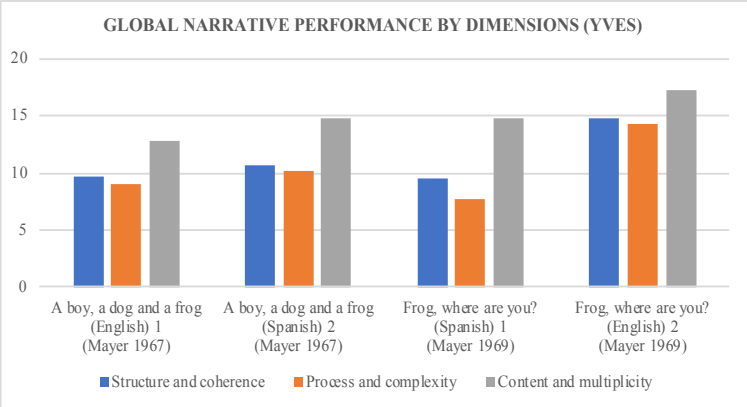

Figure 3. Yves' global scores by dimensions.

4.2.3. Narrative Structure and Coherence Dimension: Analytic Analysis

Overall, Olivia performed within the high range (between 4 and 5 points) in all the narrative structure and coherence subdimensions (see Figure 4). Yves, on the other hand, performed within the average-low range (between 2 and 3 points) for all the subdimensions (except in the case of the story *Frog, Where Are You?* (Mayer 1969) in English, in which he always obtained higher scores as shown in Figure 5). I will delve into this issue with more detail in the discussion section. Globally, it is noteworthy that Yves' lower scores were obtained for the evaluative commitment subdimension, which is indicative of an inability, in this specific case, to get emotionally involved in the narratives.

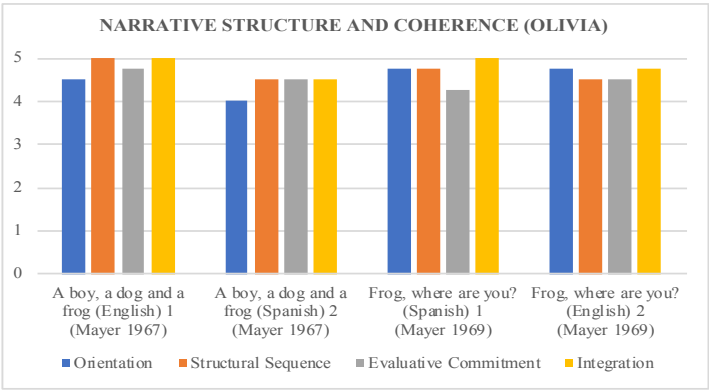

Figure 4. Olivia's scores for the narrative structure and coherence dimension.

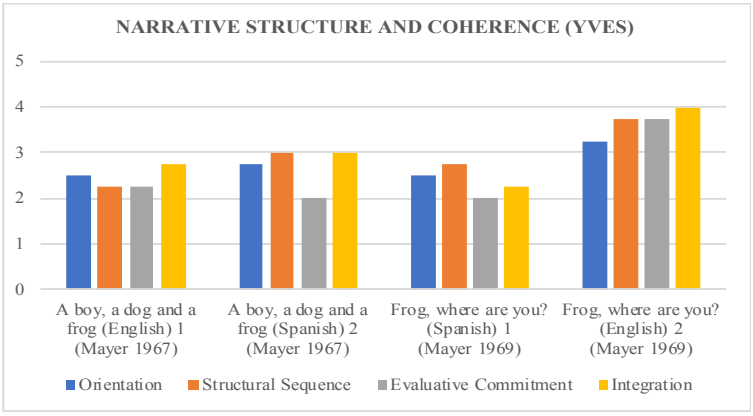

Figure 5. Yves' scores for the narrative structure and coherence dimension.

4.2.4. Narrative Process and Complexity Dimension: Analytic Analysis

When focusing on the narrative process and complexity dimension, again, we observe that Olivia performed in the high range for all the subdimensions under analysis (see Figure 6), while Yves, with the exception of the narrative *Frog, Where Are You?* (Mayer 1969) in English, performed within the average–low range (see Figure 7). In general, Yves' lower scores were obtained when making reference to the cognitive experiences of the different characters (cognitive subjectifying) and when metaphorizing, which is linked to the ability to make inferences.

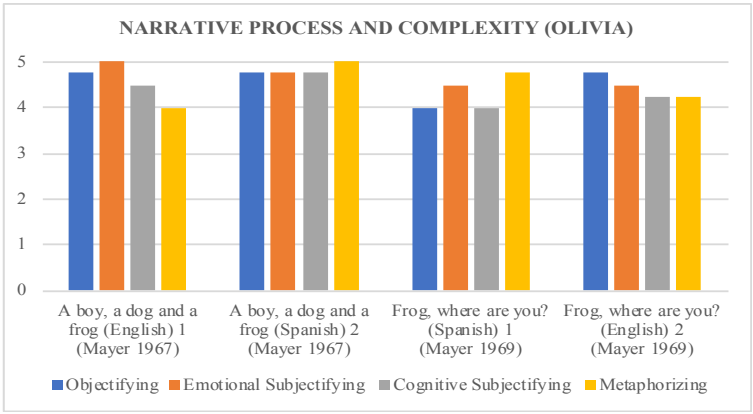

Figure 6. Olivia's scores for the narrative process and complexity dimension.

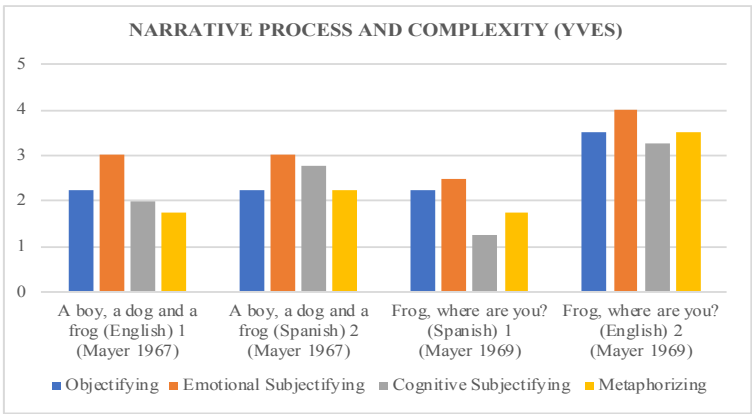

Figure 7. Yves' scores for the narrative process and complexity dimension.

4.2.5. Narrative Content and Multiplicity Dimension: Analytic Analysis

In the narrative content and multiplicity dimension, Olivia performed again within the high range for almost all the subdimensions, since the range of her mean scores were between 3.75 and 5 (see Figure 8). In Yves' case, it is striking that, unlike in the case of the previous dimensions, his scores were, in general, above the 3-point line (see Figure 9), which means at least an average command of the four subdimensions. A more in-depth analysis shows that the specification of characters and events are two of Yves' strengths, since, for these two subdimensions, he performed within the average-high range in all the narratives.

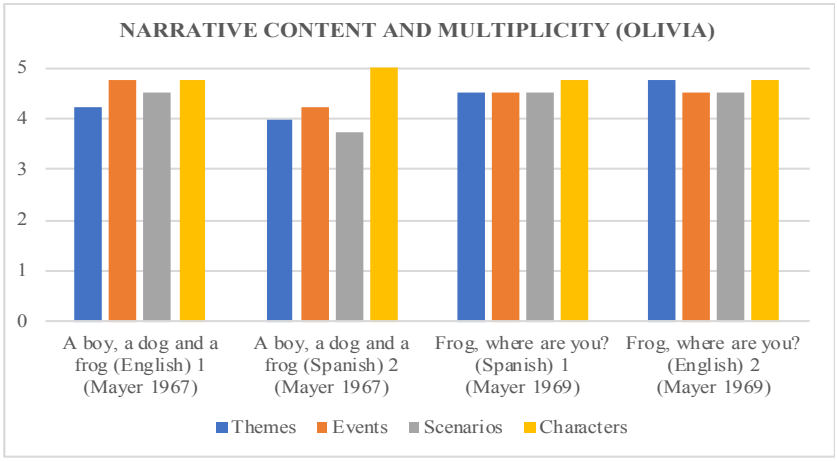

Figure 8. Olivia's scores for the narrative content and multiplicity dimension.

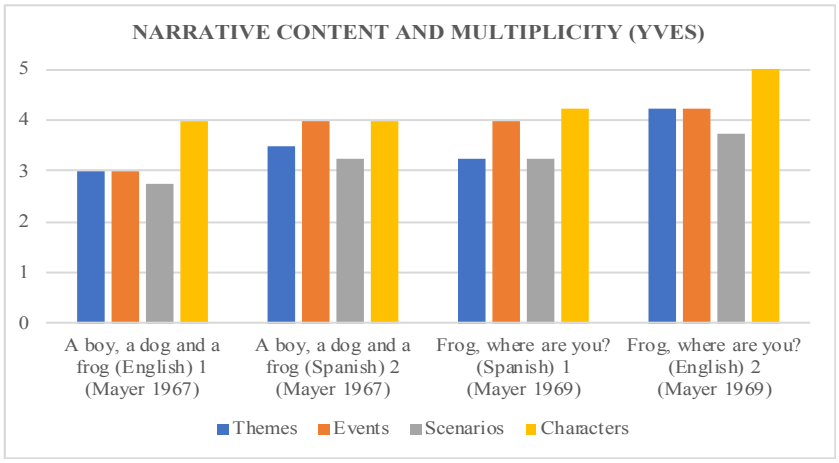

Figure 9. Yves' scores for the narrative content and multiplicity dimension.

5. Discussion

The main objective of this study was to analyze the narrative abilities of an English-Spanish bilingual adult with PWS in both languages in comparison to the narratives produced by a TD English-Spanish bilingual adult with a similar sociolinguistic background. Overall, the results showed a rich narrative capacity in both languages for the TD bilingual (Olivia) and a poor performance for the individual with PWS (Yves). Olivia consistently performed within the high range in the four narratives produced (scores higher than 50 out of 60) while Yves' scores reflected an average command (scores between 30–35 points in all the narratives, with the exception of the narrative *Frog, Where Are You?* (Mayer 1969) in English, in which he obtained 46.25 points). These results showed that Yves' narrative abilities, unlike Olivia's, were lower than what is considered typical development. Thus, this outcome is in line with previous

findings from studies focused on the narrative abilities of monolinguals with PWS, which consistently demonstrated low narrative quality (Lewis et al. 2002; Garayzábal-Heinze et al. 2012).

When differences between narratives were analyzed, it needs to be noted that while Olivia showed homogeneous narrative abilities in the four narratives produced, a better narrative quality became clear for Yves the second time he narrated a story, regardless of the language variable. As shown in Figure 1, the scores for the two stories presented (*A Boy, a Dog and a Frog* (Mayer 1967) and *Frog, Where Are You?* (Mayer 1969)) were higher during the second experimental session. This means that Yves' narrative abilities for *A Boy, a Dog and a Frog* (Mayer 1967) were slightly superior in Spanish (session 2) than in English (session 1), with a difference of 4.25 points. Similarly, a better performance for the narrative *Frog, Where Are You?* (Mayer 1969) was observed in English (session 2) than in Spanish (session 1), with a difference of 14.25 points between the narratives in the two languages. This second-time effect indicates that narrative abilities in the PWS individual seem to improve with experience/practice, a finding consistent, to a certain extent, with Lewis et al.'s (2002) results, where older individuals (more experienced) showed better narrative abilities than the youngest ones (less experienced). Also, these results suggest that Yves has a good long-term memory, as has been defended in previous literature on PWS individuals (Curfs et al. 1991; Dimitropoulos et al. 2013), and that this strength, together with the experience/practice gained between the experimental sessions, will potentially make him more confident the second time he performs the task. Consequently, this will lead him to produce, in general terms, richer narratives during the second experimental session within his intrinsic limitations. If we compare Yves' performance between languages and narratives, it is noteworthy that the difference between the English and Spanish narratives is higher when narrating the story *Frog, Where Are You?* (Mayer 1969). This 10-point difference between the two narratives in the two languages (and between the two sessions) seems to reaffirm the idea that narrative abilities principally improve due to the experience/practice gained, since the story *Frog, Where Are You?* (Mayer 1969) in English was the last one to be produced. Likewise, the data presented in Table 3 showed that the narratives produced in session two were not only richer in terms of narrative abilities, but also in terms of length, language development (MLUw), and vocabulary variation, although not in the same direction for the two participants in this study. While in session two Yves produced longer narratives and showed a greater MLUw but a less rich vocabulary, Olivia produced shorter narratives richer in terms of vocabulary variation. In light of these preliminary results, both Yves and Olivia showed comparable narrative abilities in Spanish and English. Therefore, bilingualism does not appear to have a negative effect on the development of this PWS bilingual's narrative abilities, a finding that supports Kay-Raining Bird et al.'s (2016) claim that bilingualism among non-TD individuals should not be discouraged.

I will now analyze the results in relation to the three dimensions under study: narrative structure and coherence, narrative process and complexity, and narrative content and multiplicity.

Before delving into each of these three dimensions individually, a global perspective on each one of them is presented. Figures 2 and 3 reflect, respectively, Olivia and Yves' global narrative performance for each dimension and for each narrative. The data showed a consistent narrative control by Olivia in the three analyzed dimensions and different levels of performance in Yves' case. Leaving the story *Frog, Where Are You?* (Mayer 1969) in English aside (as he probably showed a better command due to the experience/practice acquired), Yves' narrative abilities, in both languages, could be described according to the following scale: narrative content and multiplicity > narrative structure and coherence > narrative process and complexity. In other words, this PWS bilingual showed better narrative abilities when expressing content than when expressing coherence or complexity. Likewise, coherence abilities were slightly superior to the ones attested to express process and complexity. Due to the fact that this is a case study, results should be considered as a first approximation to the analysis of narrative abilities in bilingual speakers with PWS and should, therefore, be interpreted cautiously. However, interestingly enough, Garayzábal-Heinze et al. (2012) also obtained the gradation scale presented above when analyzing the narrative's abilities of two Spanish monolingual adolescents

with PWS (even though they do not discuss this in their paper). These similar outcomes seem to suggest a tendency that should be confirmed or disproved in future studies including larger samples of monolinguals and bilinguals with PWS. This must by no means be understood as an underestimation of the validity of case study research, whose "power" is often identified as wanting in comparison to large group-based research. Under no circumstances should both approximations be considered opposed but complementary and even necessary in order to have a complete and thorough picture of the phenomenon under analysis. While it is true that large samples and their corresponding statistical analyses provide objective validation to the study, case study research represents, in Flyvbjerg's (2006, p. 228) words, the "force of the example," which is not as valued as it should be taking into account that "more discoveries have arisen from intense observation than from statistics applied to large groups" (Beveridge 1951, quoted here from Flyvbjerg 2006, p. 226).

The following are the results obtained for the three dimensions and their corresponding subdimensions. In the narrative content and multiplicity dimension, Yves performed in the average–high range in all four subdimensions (themes, events, scenarios, and characters) in the four narratives (see Figure 9). This means that Yves' abilities to introduce and change topics (themes), to present different actions (events), to settle the scenario where the narrative takes place (scenarios), and to introduce and involve different characters to the story (characters) were not as impaired as other narrative abilities evaluated in this study. However, if Yves' results are compared to Olivia's performance, some shortcomings are patent. Yves' relative strengths—establishing a sequence of events and incorporating and involving different characters—are illustrated in Example 1 (see Appendixs A and B for complete narrative examples of both participants for the picture book *Frog, Where Are You?* (Mayer 1969) in Spanish).

Example 1. Yves' final fragment on the *Frog, Where Are You?* (Spanish) (Mayer 1969).

Yves' Narrative[7]	English Translation
[. . .]	[. . .]
1. *YVE: #3 el niño vio a un [//] una mofeta.	1. *YVE: the boy saw a skunk.
2. *YVE: pero siguió con la colmena.	2. *YVE: but (he) continued with the hive.
3. *YVE: el #3 perro tiró la colmena.	3. *YVE: the dog threw the hive.
4. *YVE: el niño fue a un agujero en el árbol.	4. *YVE: the boy went to a hole in the tree.
5. *YVE: el búho salió.	5. *YVE: the owl came out.
6. *YVE: el niño cayó.	6. *YVE: the boy fell.
7. *YVE: #4 el perro se escapó de las abejas.	7. *YVE: the dog escaped from the bees.
8. *YVE: el niño se escondió nel [/] nel búho.	8. *YVE: the boy hid from the owl.
9. *YVE: #4 el niño se subió a la roca.	9. *YVE: the boy climbed the rock.
10. *YVE: y dicho +"/.	10. *YVE: and (he) said.
11. *YVE: +" y #3 rana dónde estás.	11. *YVE: and frog where are you.
12. *YVE: #4 el niño se subió en un reno.	12. *YVE: the boy climbed on a reindeer.
13. *YVE: el reno se puso a correr.	13. *YVE: the reindeer started running.
14. *YVE: #3 el reno paró.	14. *YVE: the reindeer stopped.
15. *YVE: y el niño y el perro se cayeron al agua.	15. *YVE: and the boy and the dog fell into the water.
16. *YVE: #5 el niño y el perro escucharon.	16. *YVE: the boy and the dog listened.
17. *YVE: el niño ha dicho al perro que #4 en silencio.	17. *YVE: the boy has told the dog that in silence.
18. *YVE: el niño y el perro fueron a ver detrás del tronco.	18. *YVE: the boy and the dog went to see behind the trunk.
19. *YVE: el niño y el perro encontraron a la rana y su esposa.	19. *YVE: the boy and the dog found the frog and his wife.
20. *YVE: #4 el niño y el perro vieron a la familia de la rana.	20. *YVE: the boy and the dog saw the frog's family.
21. *YVE: el niño y el perro dijeron adiós a las ranas.	21. *YVE: the boy and the dog said goodbye to the frogs.
22. *YVE: y cogió <un una> [//] un bebé rana.	22. *YVE: and (he) took a frog baby.
@End	@End

Leaving structural and coherence issues aside, which will be further discussed later in this section, in this short extract, a good command of events and characters subdimensions was observed. On the

[7] The transcription is presented in CHAT, the transcription system for the CHILDES Project, and reflects faithfully what was said by the participant. All syntactic and morphological mistakes are included and they have not been corrected. The narrative is segmented by utterances and the # + number represents a pause in seconds.

basis that an event is "a narrative sequence that allows the subject to answer the fundamental narrative question 'what happened?'" (Gonçalves et al. 2001c, p. 6) and that the number of events included in a narrative production determines its quality, among other indicators, it could be said that in the narrative of example 1, Yves showed a relatively rich sequence of events within his narrative limitations, which is translatable to the other narratives he produced. From line 1 to line 22 he presented an event per line, with the exception of line 11, where he reproduced what the child in the story was saying and did not introduce a new action. Similarly, in almost every line, he introduced a new character that was rapidly incorporated into the narrated action. All of the animal characters that were presented played a role—albeit brief—and on no occasion were unfoundedly introduced. These outcomes partially coincide with Garayzábal-Heinze et al.'s (2012) results for monolingual speakers with PWS. On the one hand, both Garayzábal-Heinze et al.'s (2012) and this study reflect an acceptable performance in the themes and events subdimensions. On the other hand, the studies show contradictory results for characters. While Garayzábal-Heinze and collaborators found low scores in monolingual speakers, the present study showed high performance for the bilingual speaker. It is premature to attribute this discordant outcome to a possible bilingualism effect given the limited data handled, but it is an issue that should be studied in depth in future research in order to elucidate whether being bilingual could play a role in this respect. Garayzábal-Heinze et al. (2012, p. 58) attributed the low scores observed in monolingual speakers with PWS when introducing variety of characters to "their behaviour problems, namely aggressiveness, stubbornness, emotional lability, and difficulties in adopting the other point of view." When interpreting Yves' results, we could hypothesize that bilinguals with PWS may show a more social and empathic profile than their monolingual counterparts because of their constant alternation between two languages and two cultures. However, it is worth noting that Yves is passionate about animals and has a high level of "expertise" in different animal species and their characteristics. Consequently, given the fact that the characters in the Frog story series are mainly animals, this could have played a role when it comes to Yves' high scores, since, as previous studies have noted, PWS individuals tend to have obsessions (Cassidy 1997; State et al. 1999). Thus, the alternative hypothesis that Yves' special interest in animals could have "helped" him to enrich his narrative because these characters particularly caught his attention cannot be ruled out at this point. In future research, participants should be presented with stories including either human or non-human characters in order to neutralize a possible character bias.

Focusing on the narrative structure and coherence dimension, Yves, unlike Olivia, performed in the average–low range in all four subdimensions under analysis (see Figure 5) with the exception of the story *Frog, Where Are You?* (Mayer 1969) in English. This means that handling orientation (contextualization of the story to make it understandable), structural sequence (organization and sequentialization of the story), evaluative commitment (emotional participation of the narrator), and integration (narrating the story in an integrated way) when narrating was hard for Yves. In fact, it seemed to be especially hard for him to get emotionally involved. Example 2 allows us to exemplify Yves' narrative shortcomings in relation to the narrative structure and coherence dimension (see Appendixs C and D for complete narrative examples of both participants for the text *A Boy, a Dog and a Frog* (Mayer 1967) in English).

Example 2. Yves and Olivia's initial fragment of the story *A Boy, a Dog and a Frog* (English) (Mayer 1967).

Yves	Olivia
1. *YVE: #18 the boy and the dog climbed the tree. 2. *YVE: #3 so <the frog they ran to the fr(og)> [//] they ran to catch the frog. 3. *YVE: they tripped on the branch. 4. *YVE: they fell in the water. 5. *YVE: #5 they landed right beside the frog. 6. *YVE: #4 <the frog they tried> [//] the frog jumped. 7. *YVE: #4 and landed on a branch. 8. *YVE: #5 the boy decided to <put bring the tell> [//] tell the dog to go to the other side. 9. *YVE: and he+ll go to the other. 10. *YVE: #6 one corner to the frog. 11. *YVE: #5 uh the boy caught the dog instead. 12. *YVE: the frog fell. 13. *YVE: #11 the frog was mad. 14. *YVE: #7 the boy and the dog said bye to the frog. 15. *YVE: the frog was sad. 16. *YVE: #7 <the frog> [//] the boy and the dog went back home. [. . .]	1. *OLI: #11 a boy and his dog set out on a fishing trip with a net and bucket in hand. 2. *OLI: #8 the boy and the dog go trekking through the forest to find the perfect spot to catch a frog. 3. *OLI: they spot a frog on the pond on top of a lily pad. 4. *OLI: #5 and they go running towards the frog with their net in order to catch the frog. 5. *OLI: #4 on their way down the boy and the dog trip on a uprooted root. 6. *OLI: and trip. 7. *OLI: #6 they trip. 8. *OLI: and they fall into the pond head first. 9. *OLI: #4 and once the boy resurfaces he is face to face with the frog. 10. *OLI: #4 the boy tries to latch onto the frog. 11. *OLI: but unfortunately the frog jumps #3 right before he+s about to catch him. 12. *OLI: and the frog smirks from a tree trunk not far away. 13. *OLI: #6 the boy and the dog scheme. 14. *OLI: and see what is the best way to catch this frog. 15. *OLI: and they decide to approach the frog from either side. 16. *OLI: #7 and the dog is going to distract the frog while the boy tries to catch the frog with his net. 17. *OLI: unfortunately the frog is smart enough. 18. *OLI: and jumps off the log. 19. *OLI: and the boy only catches his dog in the net. 20. *OLI: #5 the frog is getting angry having to escape the boy+s net. 21. *OLI: #5 and the boy is angry that he hasn+t been able to catch the frog yet. 22. *OLI: #5 so they give up. 23. *OLI: and they #2 go home while the frog looks on sadly. 24. *OLI: #5 the boy and the dog give up. 25. *OLI: and head out with their net dragging behind. [. . .]

When Yves and Olivia's fragments are compared, the reader will quickly notice the different degree of narrative elaboration and, consequently, the narrative abilities of the two participants. Both fragments reflect the same story passage and it is evident that Olivia's narrative is almost twice as long as Yves', a relevant issue that revealed the position each one took with respect to what information was presented and how. Focusing on orientation, it is worth noting that Olivia clearly situates the reader at the beginning of the story by creating the picture of a boy and his dog being ready to enjoy a fishing day out (lines 1 and 2 of Example 2). Opening by presenting and situating the characters establishes the starting point of the story and situates the recipient of the narration, who, with the information given, will be able to recreate such a scenario in their mind and will be able to model it according to the successive information. On the other hand, Yves did not include an opening description to contextualize the story but started by entering directly into one of the first events included in the story. This makes it very difficult for an interlocutor (who cannot see the picture book and is listening to the story for the first time) to make a proper mental representation of the scenario, since they do not possess the minimal necessary information to recreate it. Likewise, whereas in Olivia's narrative the listener constantly receives explicit and descriptive information that helps them to construct an accurate visual image of the different situations described (e.g., *on top of a lily pad* in line 3, *uprooted root* in line 5 or *they fall head first* in line 8 of Example 2), in Yves' case these clues are practically non-existent, since he concentrated mainly on narrating what happened, without going into greater detail. From a structural sequence point of view, it is important to highlight that Yves' narration is limited to a sequence of events not linked at all by discourse markers (e.g., from line 3 to 14 in Example 1, and from line 3 to 6 in Example 2), or, if linked, by using basic copulative (*y* 'and') (e.g., lines 15 and 22 in example 1), adversative (*pero* 'but') (e.g., line 2 in example 1), or consecutive conjunctions (*así que* 'so') (e.g., line 2 Example 2). For the sake of fairness, and although it is true that Olivia's narratives did not include a great deal of discourse markers either, it must be pointed out that

her level of description and the effective way she connected the information made the recipient feel that they were listening to a detailed and linked-up story (an impression that was not present while listening to Yves' narratives, as he did not integrate the information in a very successful way).

Yves' non-TD-narration-style had a direct impact on his narrative structure and coherence quality evaluation, which translated into low scores for orientation, structural sequence, and integration variables (evaluative commitment will be discussed further). As argued in the previous paragraph, the structure and coherence of Yves' narratives were impaired and required the recipient's predisposition to give the narrative a complete meaning. According to Garayzábal-Heinze et al. (2012), when analyzing the narrative structure and coherence dimension of monolinguals with PWS, they found that PWS individuals were able to identify only the beginning of the story but not the development or ending. The results of this study, however, do not seem to support this claim. According to the data obtained here, the development of the story would be less of a problem for this PWS bilingual than providing an introduction and a closing to the story, since his real challenge seems to lie in the latter outcomes. Yves did not offer evident or strong closure to his narratives (see lines 21 and 22 of Example 1), nor a proper introduction (see lines 1 and 2 of example 2). This seems to favor this PWS individual being described as meticulous and analytical rather than having a holistic or global perspective when narrating. Another interesting issue is Yves' low emotional involvement or commitment in his narratives. Whereas Olivia tended to get emotionally involved in her stories by including evaluation adverbs (see lines 11 and 17 of example 2) and even dared to explain the story *A Boy, a Dog and a Frog* (Mayer 1967) in Spanish in the first person as if she were the child in the story, Yves adopted a neutral position towards the characters and limited himself to explaining what happened without getting emotionally involved with either the characters or the facts.

When evaluating Yves and Olivia's narrative process and complexity dimension, four subdimensions were analyzed: objectifying (inclusion of sensorial elements), emotional subjectifying (inclusion of emotional states), cognitive subjectifying (cognitive experiences of the characters) and metaphorizing (inclusion of metaphors). As stated before, this was the most impaired dimension in Yves' narratives and, furthering the idea from the previous paragraph, he seemed not to allow his emotions to "interfere" and play an active role in his narrative process. Thus, his narratives were comparatively less complex and diverse than Olivia's. The next step should be to explore in more depth this dimension in future research in order to elucidate whether, within their intrinsic limitations, bilinguals with PWS outperform monolingual speakers in story structure complexity, as Tsimpli et al. (2016) and Baldimtsi et al. (2016) found for bilinguals with SLI and high-functioning autism spectrum disorder, respectively. Overall, Yves scored in the low range in all subdimensions (see Figure 7), with the exception of the emotional subjectifying variable. The only exception to this was in *Frog, Where Are You*? (Mayer 1969) in English, where he obtained better results in all four dimensions. As a rule, he did not include metaphors and did not provide the reader with a detailed description of the sensorial elements or the characters' thoughts. Nevertheless, he did include some emotional states of the characters (lines 13 and 15 in Example 2), although to a lesser extent and with less detail than Olivia did (see lines 20–23 in Example 2). One possible explanation for the low performance in this dimension could be the idiosyncratic social profile of individuals with PWS, which will condition them to focus primarily on non-social elements (Garayzábal-Heinze et al. 2012). Assuming that this PWS bilingual is more social and empathetic than the PWS monolinguals included in Garayzábal-Heinze et al.'s (2012) study, this more socially oriented attitude would allow him to "socialize" the narratives by including more characters but not delving into more introspective details. Obviously, this possible explanation, as well as the interpretation of other findings and the findings reported in this study, need to be taken cautiously and should be confirmed with more extensive data.

6. Conclusions and Implications for Further Research

To the best of my knowledge, this study is the first to discuss the narrative abilities of an English-Spanish bilingual with PWS in comparison to a TD English-Spanish bilingual. Each participant produced four narratives (two in English and two in Spanish) over two experimental sessions and these narratives were analyzed according to three dimensions: narrative structure and coherence, narrative process and complexity, and narrative content and multiplicity (Gonçalves et al. 2001a, 2001b, 2001c). The results obtained revealed that the bilingual with PWS did not show TD narrative behavior, which is in line with previous studies focusing on the narrative abilities of monolinguals with this syndrome (Lewis et al. 2002; Garayzábal-Heinze et al. 2012).

Another interesting result was that both participants showed comparable narrative abilities in both languages. Thus, a possible interpretation of these results is that bilingualism does not seem to have a negative impact on the development of the narrative abilities of the PWS individual's dominant language, since he is capable of narrating equally in both English and Spanish with the limitations expected from his condition. Therefore, the results from this study do not support the extended practice of denying individuals with PWS access to a second language. Actually, our findings support Kay-Raining Bird et al.'s (2016) defense of promoting bilingualism among non-TD individuals. The limited research carried out within this field has not only proved the ability of these individuals to become bilingual, but has also shown that the second language does not have a negative effect on the development of the first or dominant language. Given that nowadays there exists a tacit agreement among language acquisition researchers to think of bilingualism as an asset rather than a problem, the natural question to be asked is why non-TD individuals, overall, still continue to be denied access to a second language when in fact this access should be facilitated. In future research, it is my intention to test whether, as is the case with TD individuals, bilingual with PWS outperform their monolingual counterparts in different linguistic and non-linguistic abilities.

Another important result was that both participants performed better during the second session of data collection, as is evidenced by their richer narratives. However, this improved performance did not go in the same direction for both participants. While Olivia showed better lexical richness in session two than in session one, Yves exhibited more extended narratives in session two, a greater MLU, and a better control of the narrative abilities in the three analyzed dimensions. This leads to another very interesting finding, which is that while Olivia showed a consistent control of the narrative abilities in the three analyzed dimensions, Yves showed a different level of skillfulness according to the following scale: narrative content and multiplicity > narrative structure and coherence > narrative process and complexity. These results seem to suggest that narrative abilities, which have been revealed as a problematic area for PWS, seem to improve with experience/practice. Therefore, the curricula focused on this population should be carefully oriented towards the development of these abilities in order to make them more effective and, as a consequence, be able to produce "richer" narratives in any or all of the languages they can speak. Research based on the study of bilingualism in non-TD individuals contributes novel data to the field but, more importantly, provides intervention professionals with valuable information that will help them to make informed decisions on how to deal with bilingualism in non-TD bilinguals, as is the case with the PWS bilingual in this study.

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Conflicts of Interest: The author declares no conflict of interest.

Appendix A

@Begin
@Languages: spa
@Participants: YVE Participant, INV Investigator
@ID: spa|praderwillicorpus|YVE|||||Participant|||
@ID: spa|praderwillicorpus|INV|||||Investigator|||
@ID: spa|praderwillicorpus|YVE|33;0.|male|nar||Participant|||
@Comment: Filename 01spa_yves.cha.
@Situation: Frog where are you in Spanish.
*INV: cuando quieras.
*YVE: #35 el niño y el perro pusieron la rana <en un> [//] en un #7 vaso.
*YVE: #4 el niño y el perro se fueron a dormir.
*YVE: #5 el perro y el niño despel [//] habían despertado.
*YVE: y vio que la rana se escapó.
*YVE: #4 perro el niño miraron por todas las partes.
*YVE: #5 y niño y el perro abrieron la ventana.
*YVE: y [/] #3 y xxx habían dicho +"/.
*YVE: +" dónde estás rana.
*YVE: el perro se cayó.
*YVE: el niño se enfadó.
*YVE: y el perro dio besos al niño.
*YVE: #6 luego fueron a un árbol.
*YVE: dijeron +"/.
*YVE: +" dónde estás rana.
*YVE: #4 vinieron [: vieron] un árbol con una <col(mena) oveja> [//] una colmena de ovejas [: abejas].
*YVE: el perro fue la colmena.
*YVE: el niño #5 dicho +"/.
*YVE: +" dónde se xxx en un agujero.
*YVE: #3 el niño vio a un [//] una mofeta.
*YVE: pero siguió con la colmena.
*YVE: el #3 perro tiró la colmena.
*YVE: el niño fue a un agujero en el árbol.
*YVE: el búho salió.
*YVE: el niño cayó.
*YVE: #4 el perro se escapó de las abejas.
*YVE: el niño se escondió nel [/] nel búho.
*YVE: #4 el niño se subió a la roca.
*YVE: y dicho +"/.
*YVE: +" y #3 rana dónde estás.
*YVE: #4 el niño se subió en un reno.
*YVE: el reno se puso a correr.
*YVE: #3 el reno paró.
*YVE: y el niño y el perro se cayeron al agua.
*YVE: #5 el niño y el perro escucharon.
*YVE: el niño ha dicho al perro que #4 en silencio.
*YVE: el niño y el perro fueron a ver detrás del tronco.
*YVE: el niño y el perro encontraron a la rana y su esposa.
*YVE: #4 el niño y el perro vieron a la familia de la rana.
*YVE: el niño y el perro dijeron adiós a las ranas.
*YVE: y cogió <un una> [//] un bebé rana.

@End

Appendix B

@Begin
@Languages: spa
@Participants: OLI Participant, INV Investigator
@ID: spa|praderwillicorpus|OLI|||||Participant|||
@ID: spa|praderwillicorpus|INV|||||Investigator|||
@ID: spa|praderwillicorpus|OLI|25;0.|female|nar||Participant|||
@Comment: Filename 01spa_olivia.cha.
@Situation: Frog where are you in Spanish.
*OLI: el niño Pablo y su perrito están mirando a una rana y es por la noche justo antes de ir+se a la cama.
*OLI: #4 ya cuando Pablo está durmiendo con su perrito en la cama sale la rana de el jarrón #3 despacito.
*OLI: y cuando se despierta Pablo se da cuenta que se ha escapa(d)o la rana.
*OLI: #6 Pablo y su perrito se ponen a buscar por el cuarto a ver si ven dónde se ha ido la rana.
*OLI: pero no le encuentran.
*OLI: buscan en las botas.
*OLI: y no está la rana.
*OLI: #3 se ponen a llamar a la rana a ver si vuelve a casa.
*OLI: #5 mientras que llaman a la rana se cae el perrito de la ventana.
*OLI: y se cae afuera.
*OLI: #4 antes de que se vaya a escapar el perrito también Pablo baja con sus botas puestas.
*OLI: y va a coger su perrito a ver si está bien.
*OLI: #6 y se van a la búsqueda de la rana por afuera.
*OLI: los dos se ponen a llamar a la rana a ver si viene.
*OLI: #7 Pablo se va hacia el bosque a ver si se ha ido por allí la rana.
*OLI: #4 miran por todos sitios en abujeros [: agujeros] en la tierra.
*OLI: y llaman a la rana.
*OLI: pero no viene.
*OLI: #4 en vez de una rana sale una ardilla #3 que se enfada con Pablo porque le ha estorbido [: estorbado].
*OLI: #3 Pablo sigue buscando por los árboles a ver si está.
*OLI: y el perrito ha hecho caer un abejorro.
*OLI: #5 los dos se meten en peligro porque las abejas se ponen a seguir al perrito.
*OLI: y un búho asusta a Pablo.
*OLI: y que le hace caer+se del árbol.
*OLI: #5 el búho estando enfadado se pone a seguir a Pablo.
*OLI: #4 Pablo sigue buscando [//] llamando a la rana.
*OLI: pero no sale.
*OLI: #5 no sale la rana.
*OLI: pero sale un ciervo.
*OLI: #4 y Pablo se monta al ciervo.
*OLI: y el ciervo se pone a correr.
*OLI: #3 y justo antes de caer+se de una colina para el ciervo.
*OLI: y se cae Pablo y el perrito #4 en un lago pequeño.
*OLI: pero parecen que no se han hecho mucho daño.
*OLI: #5 y siguen buscando a la rana a ver si está en el tronco.
*OLI: y ahí está la rana con su novia.
*OLI: y la rana y la novia han tenido muchos bebés.

*OLI: #5 ah no!
*OLI: la rana era hijo de los papás.
*OLI: y ahora se va Pablo con su rana a casa.
@End

Appendix C

@Begin
@Languages: eng
@Participants: YVE Participant, INV Investigator
@ID: eng|praderwillicorpus|YVE|||||Participant|||
@ID: eng|praderwillicorpus|INV|||||Investigator|||
@ID: eng|praderwillicorpus|YVE|33;0.|male|nar||Participant|||
@Comment: Filename 01eng_yves.cha.
@Situation: A boy a dog and a frog in English.
*YVE: #18 the boy and the dog climbed the tree.
*YVE: #3 so <the frog they ran to the fr(og)> [//] they ran to catch the frog.
*YVE: they tripped on the branch.
*YVE: they fell in the water.
*YVE: #5 they landed right beside the frog.
*YVE: #4 <the frog they tried> [//] the frog jumped.
*YVE: #4 and landed on a branch.
*YVE: #5 the boy decided to <put bring the tell> [//] tell the dog to go to the other side.
*YVE: and he+ll go to the other.
*YVE: #6 one corner to the frog.
*YVE: #5 uh the boy caught the dog instead.
*YVE: the frog fell.
*YVE: #11 the frog was mad.
*YVE: #7 the boy and the dog said bye to the frog.
*YVE: the frog was sad.
*YVE: #7 <the frog> [//] the boy and the dog went back home.
*YVE: #15 the frog watched <where they were uh> [//] where the dog and the boy were going.
*YVE: #6 decided to follow the dog and the boy.
*YVE: #5 he followed the footprints.
*YVE: #3 went into the house.
*YVE: #5 went up the stairs.
*YVE: saw the boy in the tub.
*YVE: #7 he decided to come to the tub.
*YVE: #4 and landed on the dog+s head.
*INV: that + s it.
*INV: that + s the end?
*YVE: no.
*INV: there are no more slides.
*YVE: oh no?
*INV: no.
*INV: so we are done?
*INV: what + s the end of the story?
*YVE: #10 the frog <what> [//] stayed with the boy and dog.
*INV: ok.
*INV: is there something that you want to add?
*YVE: no.

*INV: no that + s it.
*INV: ok thank you very much.
@End

Appendix D

@Begin
@Languages: eng
@Participants: OLI Participant, INV Investigator
@ID: eng|praderwillicorpus|OLI|||||Participant|||
@ID: eng|praderwillicorpus|INV|||||Investigator|||
@ID: eng|praderwillicorpus|OLI|25;0.|female|nar||Participant|||
@Comment: Filename 01eng_olivia.cha.
@Situation: A boy a dog and a frog in English.
*OLI: #11 a boy and his dog set out on a fishing trip with a net and bucket in hand.
*OLI: #8 the boy and the dog go trekking through the forest to find the perfect spot to catch a frog.
*OLI: they spot a frog on the pond on top of a lily pad.
*OLI: #5 and they go running towards the frog with their net in order to catch the frog.
*OLI: #4 on their way down the boy and the dog trip on a uprooted root.
*OLI: and trip.
*OLI: #6 they trip.
*OLI: and they fall into the pond head first.
*OLI: #4 and once the boy resurfaces he is face to face with the frog.
*OLI: #4 the boy tries to latch onto the frog.
*OLI: but unfortunately the frog jumps #3 right before he + s about to catch him.
*OLI: and the frog smirks from a tree trunk not far away.
*OLI: #6 the boy and the dog scheme.
*OLI: and see what is the best way to catch this frog.
*OLI: and they decide to approach the frog from either side.
*OLI: #7 and the dog is going to distract the frog while the boy tries to catch the frog with his net.
*OLI: unfortunately the frog is smart enough.
*OLI: and jumps off the log.
*OLI: and the boy only catches his dog in the net.
*OLI: #5 the frog is getting angry having to escape the boy + s net.
*OLI: #5 and the boy is angry that he hasn+t been able to catch the frog yet.
*OLI: #5 so they give up.
*OLI: and they #2 go home while the frog looks on sadly.
*OLI: #5 the boy and the dog give up.
*OLI: and head out with their net dragging behind.
*OLI: #4 and the frog is left alone #3 somewhat lonely.
*OLI: #3 the frog realizes how lonely he is and how much fun he had with the boy and the dog that he tracks down the pair with their footprints all the way back to their house.
*OLI: #6 meanwhile the boy is having a bath with his dog to get cleaned upfrom all the day + s adventures.
*OLI: and the frog catches them having a bath.
*OLI: and joins them.
*OLI: #5 and they all take the bath happily ever after.
@End

References

Adesope, Olusola O., Tracy Lavin, Terri Thompson, and Charles Ungerleider. 2010. A Systematic Review and Meta-Analysis of the Cognitive Correlates of Bilingualism. *Review of Educational Research* 80: 207–45. [CrossRef]

Akefeldt, Arne, B. Akefeldt, and Christopher Gillberg. 1997. Voice, speech and language characteristics of children with Prader-Willi syndrome. *Journal of Intellectual Disability Research* 41: 302–11. [CrossRef] [PubMed]

Alexander, Randell C., and James W. Hanson. 1988. Overview. In *Management of Prader-Willi Syndrome*. Edited by Louise R. Greenswag and Randell C. Alexander. New York: Springer, pp. 3–14. [CrossRef]

Anderson, Stephen J., and Martin A. Conway. 1993. Investigating the structure of autobiographical memories. *Journal of Experimental Psychology* 19: 1178–96. [CrossRef]

Andreou, Maria D. 2015. The Effects of Bilingualism on Verbal and Non Verbal Cognition: The Micro- and Macro-Structure of Narratives in the Weak and the Dominant Language of the Bilingual Child. Unpublished Ph.D. dissertation, Aristotle University of Thessaloniki, Tshessaloniki, Greece, September.

Baker, Colin. 2001. *Foundations of Bilingual Education and Bilingualism*. Clevedon: Multilingual Matters.

Baldimtsi, Eleni, Eleni Peristeri, Ianthi Maria Tsimpli, and Ageliki Nicolopoulou. 2016. Bilingual Children with High Functioning Autism Spectrum Disorder: Evidence from Oral Narratives and Non-verbal executive Function Tasks. In *Proceedings of the 40th Annual Boston University Conference on Language Development*. Edited by Jennifer Scott and Deb Waughtal. Somerville: Cascadilla Press, pp. 18–31.

Barke, Ethel M., and D.E. Parry Williams. 1938. A further study of the comparative intelligence of children in certain bilingual and monoglot schools in South Wales. *British Journal of Educational Psychology* 8: 63–77. [CrossRef]

Bialystok, Ellen. 1999. Cognitive complexity and attentional control in the bilingual mind. *Child Development* 70: 636–44. [CrossRef]

Bialystok, Ellen. 2001. Against isolationism: Cognitive perspectives on second language research. In *The Past, Present, and Future of Second Language Research: Selected Proceedings of the Second Language Research Forum*. Edited by Xenia Bonch-Bruevich, William J. Crawford, John Hellermann, Christina Higgins and Hanh Nguyen. Somerville: Cascadilla Proceedings Project, pp. 97–103.

Bialystok, Ellen. 2006. Effect of bilingualism and computer video game experience on the Simon task. *Canadian Journal of Experimental Psychology* 60: 68–79. [CrossRef] [PubMed]

Bialystok, Ellen, and Fergus I. M. Craik. 2010. Cognitive and linguistic processing in the bilingual mind. *Current Directions in Psychological Science* 19: 19–23. [CrossRef]

Bialystok, Ellen, Fergus I. M. Craik, Raymond Klein, and Mythili Viswanathan. 2004. Bilingualism, aging and cognitive control: Evidence from the Simon task. *Psychology & Aging* 19: 290–303. [CrossRef]

Bialystok, Ellen, Fergus I. M. Craik, and Morris Freedman. 2007. Bilingualism as a protection against the onset of symptoms of dementia. *Neuropsychologia* 45: 459–64. [CrossRef] [PubMed]

Bishop, Dorothy V. M. 1992. The underlying Nature of Specific Language Impairment. *The Journal of Child Psychology and Psychiatry* 33: 3–66. [CrossRef] [PubMed]

Bishop, Dorothy V. M. 2006. What Causes Specific Language Impairment in Children? *Current Directions in Psychological Science* 15: 217–21. [CrossRef] [PubMed]

Branson, C. 1981. Speech and language characteristics of children with Prader-Willi Syndrome. In *The Prader-Willi Syndrome*. Edited by Vanja A. Holm, Stephen Sulzbacher and Peggy L. Pipes. Baltimore: University Park Press, pp. 179–83.

Bruner, Jerome. 1990. *Acts of Meaning*. Cambridge and London: Harvard University Press.

Brunner, Edmund. D. 1929. *Immigrant Farmers and Their Children*. New York: Doubleday, Doran & Company.

Buiting, Karin, and Bernhard Horsthemke. 2006. Molecular Genetic Findings in Prader-Willi Syndrome. In *Management of Prader-Willi Syndrome*. Edited by Merlin G. Butler, Philip D. K. Lee and Barbara Y. Whitman. New York: Springer, pp. 58–73. [CrossRef]

Burd, Larry, Barbara Vesely, John Martsolf, and Jacob Kerbeshian. 1990. Prevalence study of Prader-Willi syndrome in North Dakota. *American Journal of Medical Genetics* 37: 97–99. [CrossRef] [PubMed]

Butler, Merlin G., and Travis Thompson. 2000. Prader–Willi Syndrome: Clinical and Genetic Findings. *The Endocrinologist* 10: 3S–16S. [CrossRef]

Carrow, Sister M. A. 1957. Linguistic Functioning of Bilingual and Monolingual Children. *Journal of Speech and Hearing Disorders* 22: 371–80. [CrossRef] [PubMed]

Cassidy, Suzanne. B. 1997. Prader-Willi syndrome. *Journal of Medical Genetics* 34: 917–23. [CrossRef] [PubMed]

Cassidy, Suzanne. B., Stuart Schwartz, Jennifer L. Miller, and Daniel J. Driscoll. 2012. Prader-Willi syndrome. *Genetics in Medicine* 14: 10–26. [CrossRef] [PubMed]

Charman, Tony, Andrew Pickles, Emily Simonoff, Sharon Chandler, Tom Loucas, and Gillian Baird. 2011. IQ in children with autism spectrum disorders: Data from the special needs and autism project (SNAP). *Psychological Medicine* 41: 619–27. [CrossRef] [PubMed]

Cimolin, Veronica, Manuela Galli, Graziano Grugni, Luca Vismara, Giorgio Albertini, Chiara Rigoldi, and Paolo Capodaglio. 2010. Gait patterns in Prader-Willi and Down syndrome patients. *Journal of Neuro Engineering and Rehabilitation* 7: 28. [CrossRef] [PubMed]

Cleave, Patricia, Elizabeth Kay-Raining Bird, Natacha Trudeau, and Ann Sutton. 2014. Syntactic bootstrapping in children with Down syndrome: The impact of bilingualism. *Journal of Communication Disorders* 49: 42–54. [CrossRef] [PubMed]

Cowan, Richard, Chris Donlan, Elizabeth J. Newton, and Delyth Lloyd. 2005. Number skills and knowledge in children with specific language impairment. *Journal of Educational Psychology* 97: 732–44. [CrossRef]

Cummins, James. 1976. The influence of bilingualism on cognitive growth: A synthesis of research findings and explanatory hypotheses. *Working Papers on Bilingualism* 9: 1–43.

Curfs, Leopold. M.G., A. Wiegers, Janice Sommers, Martine Borghgraef, and Jean-Pierre Fryns. 1991. Strengths and weaknesses in the cognitive profile of youngsters with Prader-Willi syndrome. *Clinical Genetics* 40: 430–34. [CrossRef] [PubMed]

Defloor, Truus, John Van Borsel, and Leopold Curfs. 2000. Speech fluency in Prader-Willi Syndrome. *Journal of Fluency Disorders* 25: 85–98. [CrossRef]

Defloor, Truus, John Van Borsel, Leopold Curfs, and Marc de Bodt. 2001. Aerodynamic and Acoustic Characteristics of Voice in Prader-Willi Syndrome. *Journal of Voice* 15: 284–90. [CrossRef]

Diaz, Rafael M. 1983. Thought and Two Languages: The Impact of Bilingualism on Cognitive Development. *Review of Research in Education* 10: 23–54. [CrossRef]

Dimitropoulos, Anastasia, Angela Ferranti, and Maria Lemler. 2013. Expressive and receptive language in Prader-Willi syndrome: Report on genetic subtype differences. *Journal of Communication Disorders* 46: 193–201. [CrossRef] [PubMed]

Edgin, Jamie O., A. Kumar, Goffredina Spanò, and Lynn Nadel. 2011. Neuropsychological effects of second language exposure in Down syndrome. *Journal of Intellectual Disability Research* 55: 351–56. [CrossRef] [PubMed]

Edmonston, Nellie K. 1982. Management of speech and language impairment in a case of Prader-Willi syndrome. *Language, Speech, and Hearing Services in the School* 13: 241–45. [CrossRef]

Emmorey, Karen, Gigi Luk, Jennie E. Pyers, and Ellen Bialystok. 2008. The source of enhanced cognitive control in bilinguals. Evidence from Bimodal Bilinguals. *Psychological Science* 19: 1201–6. [CrossRef] [PubMed]

Faras, Hadeel, Nahed Al Ateeqi, and Lee Tidmarsh. 2010. Autism spectrum disorders. *Annals of Saudi Medicine* 30: 295–300. [CrossRef] [PubMed]

Feltmate, Krista, and Elizabeth Kay-Raining Bird. 2008. Language learning in four bilingual children with Down Syndrome: A detailed analysis of vocabulary and morphosyntax. *Canadian Journal of Speech-Language Pathology and Audiology* 32: 6–20.

Fivush, Robin, and Katherine Nelson. 2004. Culture and language in the emergence of autobiographical memory. *Psychological Science* 15: 573–77. [CrossRef] [PubMed]

Flyvbjerg, Bent. 2006. Five Misunderstandings about Case-Study Research. *Qualitative Inquiry* 12: 219–45. [CrossRef]

Galambos, Sylvia J., and Susan Goldin-Meadow. 1990. The effects of learning two languages on levels of metalinguistic awareness. *Cognition* 34: 1–56. [CrossRef]

Garayzábal-Heinze, Elena, Magdalena Capó, Esther Moruno, Óscar Gonçalves, Montserrat Fernández, Maria Lens, and Adriana Sampaio. 2012. Uncommon genetic syndromes and narrative production—Case Studies with Williams, Smith-Magenis and Prader-Willi Syndromes? *International Journal of Developmental Disabilities* 58: 48–65. [CrossRef]

Gonçalves, Óscar F., Margarida R. Henriques, and Gisela Cardoso. 2001a. *Structure and Narrative Coherence Evaluation Manual*. Braga: Universidade do Minho.

Gonçalves, Óscar F., Margarida R. Henriques, Alexandra Alves, and Carla Rocha. 2001b. *Process and Narrative Complexity Evaluation Manual*. Braga: Universidade do Minho.

Gonçalves, Óscar F., Margarida R. Henriques, Luisa Soares, and Anabela Monteiro. 2001c. *Narrative Content and Multiplicity Evaluation Manual*. Braga: Universidade do Minho.

Gonçalves, Óscar F., Margarida R. Henriques, Alexandra Alves, and Luisa Soares. 2002. Analyzing structure, process and content in narratives of patients diagnosed with agoraphobia. *International Journal of Clinical and Health Psychology* 2: 389–406.

Gonçalves, Óscar F., Ana P. Pinheiro, Adriana Sampaio, Nuno Sousa, Montse Fernández, and Margarida R. Henriques. 2011. Autobiographical narratives in Williams Syndrome: Structural, process and content dimensions. *Journal of Developmental and Physical Disabilities* 23: 289–302. [CrossRef]

Greenswag, Louise R., and Randell C. Alexander. 1988. *Management of Prader-Willi Syndrome*. New York: Springer. [CrossRef]

Hakuta, Kenji, and Rafael M. Diaz. 1985. The relationship between degree of bilingualism and cognitive ability: A critical discussion and some new longitudinal data. In *Children's Language*. Edited by Keith E. Nelson. Hillsdale: Erlbaum, vol. 5, pp. 319–44.

Harris, Chester W. 1948. An exploration of language skill patterns. *Journal of Educational Psychology* 32: 351–64. [CrossRef]

Hick, Rachel, Nicola Botting, and Gina Conti-Ramsden. 2005. Cognitive abilities in children with specific language impairment: Consideration of visuo-spatial skills. *International Journal of Language & Communication Disorders* 40: 137–49. [CrossRef]

Kay-Raining Bird, Elizabeth, Patricia L. Cleave, Natacha Trudeau, Elin Thordardottir, Ann Sutton, and Amy Thorpe. 2005. The language abilities of bilingual children with Down syndrome. *American Journal of Speech-Language Pathology* 14: 187–99. [CrossRef]

Kay-Raining Bird, Elizabeth, Fred Genesee, and Ludo Verhoeven. 2016. Bilingualism in children with developmental disorders: A narrative review. *Journal of Communication Disorders* 63: 1–14. [CrossRef] [PubMed]

Kleppe, Sallie A., Kerri Misaki Katayama, Kenneth G. Shipley, and David R. Foushee. 1990. The speech and language characteristics of children with Prader-Willi Syndrome. *Journal of Speech and Hearing Disorders* 55: 300–9. [CrossRef] [PubMed]

Kohnert, Kathryn, and Amelia Medina. 2009. Bilingual children and communication disorders: A 30-year research retrospective. *Seminars in Speech and Language* 30: 219–33. [CrossRef] [PubMed]

Koriakin, Taylor A., Mark D. Mccurdy, Aimilia Papazoglou, Alison E. Pritchard, T. Andrew Zabel, E. Mark Mahone, and Lisa A. Jacobson. 2013. Classification of intellectual disability using the Wechsler Intelligence Scale for Children: Full Scale IQ or General Abilities Index? *Developmental Medicine and Child Neurology* 55: 840–45. [CrossRef] [PubMed]

Lewis, Barbara A. 2006. Speech and Language Disorders Associated with Prader-Willi Syndrome. In *Management of Prader-Willi Syndrome*. Edited by Merlin G. Butler, Philip D. K. Lee and Barbara Y. Whitman. New York: Springer, pp. 272–83. [CrossRef]

Lewis, Barbara A., Lisa Freebairn, Shauna Heeger, and Suzanne B. Cassidy. 2002. Speech and language skills of individuals with Prader-Willi syndrome. *American Journal of Speech-Language Pathology* 11: 285–94. [CrossRef]

MacWhinney, Brian. 2000. *The CHILDES Project: Tools for Analyzing Talk*, 3rd ed. Mahwah: Lawrence Erlbaum Associates.

Mainela-Arnold, Elina, Martha W. Alibali, Kristin Ryan, and Julia L. Evans. 2011. Knowledge of mathematical equivalence in children with specific language impairment: Insights from gesture and speech. *Language, Speech, and Hearing Services in Schools* 42: 18–30. [CrossRef]

Mayer, Mercer. 1967. *A Boy, a Dog and a Frog*. New York: Dial Press.

Mayer, Mercer. 1969. *Frog, Where Are You?* New York: Dial Press.

Morales, Julia, Alejandra Calvo, and Ellen Bialystok. 2013. Working memory development in monolingual and bilingual children. *Journal of Experimental Child Psychology* 114: 187–202. [CrossRef] [PubMed]

Munson-Davis, Joyce A. 1988. Speech and Language Development. In *Management of Prader-Willi Syndrome*. Edited by Louise R. Greenswag and Randell C. Alexander. New York: Springer, pp. 124–33.

Paradis, Johanne, Fred Genesee, and Martha Crago. 2011. *Dual Language Development and Disorders: A Handbook on Bilingualism and Second Language Learning*. Baltimore: Paul H Brookes.

Parker, Matthew, and Kent Brorson. 2005. A comparative study between mean length of utterance in morphemes (MLUm) and mean length of utterance in words (MLUw). *First Language* 25: 365–76. [CrossRef]

Peal, Elizabeth, and Wallace E. Lambert. 1962. The relation of bilingualism to intelligence. *Psychological Monographs* 76: 1–23. [CrossRef]

Perovic, Alexandra, and Solene Lochet. 2015. Grammatical morphology in bilingual Williams syndrome: A single case study. Paper presented at Bi-SLI 2015, Tours, France, July 2–3.

Prader, Andrea, Alexis Labhart, and Heinrich Willi. 1956. Ein Syndrome von Adipositas, Kleinwuchs, Kryptochismus und Oligophrenie nach myatonieartigem Zustand in Neugeborenenalter. *Schweizerische Medizinische Wochenschrift* 86: 1260–61.

Ransdell, Sarah, Marie-Laure Barbier, and Toomas Niit. 2006. Metacognitions about language skill and working memory among monolingual and bilingual college students: When does multilingualism matter? *International Journal of Bilingual Education and Bilingualism* 9: 728–41. [CrossRef]

Ricciardelli, Lina A. 1992. Creativity and bilingualism. *Journal of Creative Behavior* 26: 242–54. [CrossRef]

Sanz-Torrent, Mònica, Elisabet Serrat, Llorenç Andreu, and Miquel Serra. 2008. Verb morphology in Catalan and Spanish in children with Specific Language Impairment: A developmental study. *Clinical Linguistics and Phonetics* 22: 459–74. [CrossRef] [PubMed]

Serra, Miquel, Elisabet Serrat, Rosa Solé, Aurora Bel, and Melina Aparici. 2000. *Adquisición del Lenguaje*. Barcelona: Ariel.

Seung, HyeKyeung, Siraj Siddiqi, and Jennifer H. Elder. 2006. Intervention outcomes of a bilingual child with autism. *Journal of Medical Speech-Language Pathology* 14: 53–63.

Slobin, Dan I. 2005. Relating narrative events in translation. In *Perspectives on Language and Language Development: Essays in Honor of Ruth A. Berman*. Edited by Dorit Ravid and Hava Bat-Zeev Shyldkrot. Dordrecht: Kluwer, pp. 115–29. [CrossRef]

State, Matthew W., Elisabeth M. Dykens, Beth Rosner, Andres Martin, and Bryan H. King. 1999. Obsessive-compulsive symptoms in Prader-Willi and "Prader-Willi-like" patients. *Journal of the American Academy of Child & Adolescent Psychiatry* 38: 329–34. [CrossRef]

Strömqvist, Sven, and Ludo Verhoeven. 2004. *Relating Events in Narrative: Typological and Contextual Perspectives*. Mahwah: Lawrence Erlbaum Associates.

Tager-Flusberg, Helen. 2004. Do Autism and Specific Language Impairment Represent Overlapping Language Disorders? In *Developmental Language Disorders. From Phenotypes to Etiologies*. Edited by Mabel L. Rice and Steven F. Warren. Mahwah: Lawrence Erlbaum Associates, pp. 31–53. [CrossRef]

Thomas, Jaqueline. 1992. Metalinguistic awareness in second-and third-language learning. In *Cognitive Processing in Bilinguals*. Edited by Richard J. Harris. Amsterdam: North Holland, pp. 531–45. [CrossRef]

Trudeau, Natacha, Elizabeth Kay-Raining Bird, Ann Sutton, and Patricia L. Cleave. 2011. Développement lexical chez les enfants bilingues avec Trisomie 21 [Lexical development in bilingual children with Down syndrome]. *Enfance* 2011: 383–404. [CrossRef]

Tsimpli, Ianthi M., Eleni Peristeri, and Maria Andreou. 2016. Narrative production in monolingual and bilingual children with specific language impairment. *Applied Psycholinguistics* 37: 195–216. [CrossRef]

UCLES. 2001. *Quick Placement Test*. Oxford: Oxford University Press.

Vallar, Giuseppe, and Costanza Papagno. 1993. Preserved vocabulary acquisition in Down's syndrome: The role of phonological short-term memory. *Cortex* 29: 467–83. [CrossRef]

Van Borsel, John, Tom Defloor, and Leopold M. G. Curfs. 2007. Expressive Language in persons with Prader-Willi Syndrome. *Genetic Counseling* 18: 17–28. [PubMed]

Wisconsin Spanish Placement Test. 2009. Madison: University of Wisconsin.

Woll, Bencie, and Nicola Grove. 1996. On language deficits and modality in children with Down syndrome: A case study of twins bilingual in BSL and English. *Journal of Deaf Studies and Deaf Education* 1: 271–78. [CrossRef] [PubMed]

Yelland, Gregory W., Jacinta Pollard, and Anthony Mercuri. 1993. The metalinguistic benefits of limited contact with a second language. *Applied Psycholinguistics* 14: 423–44. [CrossRef]

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Article

Clitic Production in Bilingual Children: When Exposure Matters

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Abstract: The aim of this work is to investigate how bilingual children perform with respect to monolingual children in a task eliciting direct object clitic pronouns in Italian. Clitic production is considered a good clinical marker for Italian monolingual children suffering from specific language impairment (SLI) (Bortolini et al. 2006). Moreover, this task is reported to be particularly challenging for early second language children (EL2), who are less accurate than their peers in this task (Vender et al. 2016). Even though the typology of errors committed by the two populations (non-impaired bilinguals and SLI children) is generally different, it can be difficult to keep them apart from each other and, as a consequence, to identify a language impairment in bilingual children. However, it has been suggested that the difficulties exhibited by EL2 children in clitic production are related to their competence in their L2 and that they should disappear as soon as their mastery of the L2 increases. To test this prediction, we assessed clitic production in a group of 31 bilingual children having Italian as their L2 (mean age 10;2), comparing their performance to that of a group of 33 Italian monolingual children (mean age 10;2). The bilingual children used their L1 on a daily basis, as assessed by means of a bilingual exposure questionnaire, and had on average eight years of exposure to Italian; moreover, they performed similarly to monolinguals in a receptive vocabulary task, indicating that their competence in Italian was good. Consistently with our predictions, we found that bilingual children performed very accurately in the clitic elicitation task, similarly to monolinguals, confirming that the deficits previously found in EL2 children were not related to bilingualism itself, but more likely to their still incomplete competence in Italian.

Keywords: clitic production; early second language learners; bilingualism; specific language impairment

1. Introduction

It is well-known that bilingual children, especially in the first stages of the acquisition of their second language, can perform more poorly than monolinguals in specific linguistic domains. Beyond vocabulary and lexical access, one of the areas that is most vulnerable is the comprehension and especially the production of structures that are complex from the morphosyntactic point of view (Bialystok 2009; Sorace et al. 2009; Vender et al. 2016). For this reason, the production of clitic pronouns, which requires a quite sophisticated linguistic competence, has been found to be problematic in early second language learners acquiring different Romance languages, including Italian, as will be reviewed in the following section.

We begin this discussion by focusing on the properties of Italian clitic pronouns, which present some levels of complexity that make their acquisition particularly challenging also for monolingual children.[1]

1.1. The Production of Clitic Pronouns: Typical Development

Firstly, clitics are not salient from the phonological point of view, being monosyllabic, unstressed, and thus phonologically weak. In addition, they are not phonologically independent, since they cannot occur in isolation, but must always be coupled with an adjacent verb, as exemplified in (1).

1. Il nonno **la** segue
   The grandfather $CL_{3S.FEM}$ follows[2]
   'The grandfather follows her.'

At the morpho-syntactic level, they carry information about gender and number, yielding four different forms, as follows: *lo* (masculine singular), *la* (feminine singular), *li* (masculine plural), and *le* (feminine plural). Moreover, they can occupy different positions in the sentence, depending on the finiteness of the verb; they can be proclitic, when they precede a finite verb, as in (1), or enclitic, when they follow a non-finite verb, as in (2).

2. Il nonno vuole seguir**la**
   The grandfather wants to follow.$CL_{3SG.FEM}$
   'The grandfather wants to follow her.'

Proclitics occupy a special position in the clause, preceding the verb, as they move from the canonical post-verbal position proper to internal arguments in Italian, giving rise to a non-canonical subject–object–verb word order, which is marked in Italian. Concerning their internal syntactic structure, object clitics are analyzed as the head of an impoverished DP (determiner phrase) and originate as internal complements of the VP (verb phrase). As this head carries a strong accusative feature, it requires syntactic checking, thus triggering a complex movement operation (see, for instance, Belletti 1999 for a detailed syntactic analysis).[3]

Finally, clitics have a special status from a pragmatic perspective, as they can be used felicitously only to refer to a salient antecedent, which has already been introduced in the discourse (Ariel 1994). It is worth noticing that only a sentence containing a clitic, as in (1), is an appropriate answer to a question like the one in (3). A response containing the full DP in place of the clitic, as in (4), is pragmatically infelicitous, although it is grammatical.

3. Cosa fa il nonno alla bambina?
   'What does the grandfather do to the girl?'

4. Segue la bambina
   pro follows the girl
   'He follows the girl.'

With compound tenses, like the Italian "passato prossimo", the past participle must agree with the clitic for both the number and gender, as in (5). Contracted forms like the one reported in (6) are very common in Italian with the singular clitics, both masculine and feminine, whereas they are not allowed with plural clitics, as shown by the ungrammaticality of (7).

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[1] The pronominal system of Italian comprises three classes of pronouns, including strong pronouns, weak pronouns and clitics (Cardinaletti and Starke 1999). Italian clitics can be classified as accusative, dative, genitive, partitive, locative or nominative. This paper focuses only on accusative or Direct Object (DO) clitics (clitics henceforth) which constitute the topic of our study.

[2] For the glosses, we adopted the following abbreviations: CL: clitic; IndCL: indirect clitic; PP: past participle; FEM: feminine; M: masculine; SG: singular; PL: plural; *pro*: null pronominal subject.

[3] In contrast with the movement analysis of clitics, the base generation account proposes that clitics are directly generated in the preverbal position (see Borer 1986 for a survey and references).

5. Il nonno l**a** ha seguit**a**
   The grandfather $CL_{3SG.FEM}$ has $follow_{PP.3SG.FEM}$
   'The grandfather has followed her.'

6. Il nonno l' ha seguit**a**
   The grandfather $CL_{3SG.FEM}$ has $follow_{PP.3SG.FEM}$
   'The grandfather has followed her.'

7. *Il nonno l' ha seguit**e**
   The grandfather $CL_{3PL.FEM}$ has $follow_{PP.3PL.FEM}$
   'The grandfather has followed them.'

The presence of these different levels of complexity explains why the proper mastery of clitics is particularly demanding, especially from an acquisitional perspective. Indeed, clitics are normally acquired later than the other pronouns; typically developing monolingual children generally start to produce clitics around the age of two, but they can variably be omitted, especially in spontaneous speech. This optional stage of clitic omission, which is reported also in other languages (see Costa and Lobo 2007 for European Portuguese, Wexler et al. 2004 for Catalan, and Pérez-Leroux et al. 2018 for French) is normally over at the age of 3–4 years old, with constant improvements as children grow up (Leonini 2006; Tedeschi 2009). Moreover, when children produce (pro)clitics, they correctly place them before the verb, in an adultlike fashion. Substitution errors, where the clitic is wrongly inflected for number or gender, are instead occasionally observed until the age of 3–4 years old (Guasti 1993/1994; Caprin and Guasti 2009; Moscati and Tedeschi 2009).

Finally, agreement errors between the clitic and the past participle are generally not observed, even from the youngest age, suggesting that the syntactic complexity of the movement operations implied in clitic derivation are not significantly affected by agreement (Belletti and Guasti 2015; but see Pirvulescu and Belzil 2008 for a study on clitics and past participle agreement in French, where it is shown that three-year-old children do not mark past participle agreement at all).

1.2. The Production of Clitic Pronouns: Children with Specific Language Impairment

For the purposes of this paper, it can be useful to mention how children with Specific Language Impairment (SLI) typically perform in clitic production. Specific language impairment is a neurodevelopmental genetic disorder that affects approximately 7% of preschool children and is characterized by language abilities that are below age expectations, despite normal cognitive abilities and the absence of physical and neurological deficits (Leonard 2014). Children with SLI display indeed a considerable delay in their linguistic competence, affecting, in particular, the phonological, lexical, and morphosyntactic domain.

The production of clitic pronouns in languages endowed with a clitic pronominal system is one of the areas that are crosslinguistically reported as vulnerable in SLI (Tsimpli et al. 2017). In Italian, for instance, the period of optional use of the clitic is more prolonged than in typically developing children and can persist even at age 6 (Bortolini et al. 2006; Bortolini et al. 2002; Leonard and Dispaldro 2013). Although this stage is generally over at 7 years of age, difficulties are found in school-aged children, who still tend to avoid the clitic and replace it with a full DP, an option which is grammatical but not appropriate from the pragmatic point of view (Arosio et al. 2014).

Clitic production is therefore considered a good clinical marker for SLI in Italian, with high degrees of sensitivity and specificity (Bortolini et al. 2006; Arosio et al. 2014).

Beyond Italian, difficulties with clitics in SLI have been found in other languages, including Greek (Chondrogianni et al. 2015), Romanian (Avram et al. 2013), Spanish (Bedore and Leonard 2001), and French (Hamann et al. 1996), among others.

1.3. The Acquisition of Clitics in Early L2 and Bilingual Children

Given its complexity, the acquisition of clitics is expected to be one of the areas in which early second language learners (EL2) should display difficulties, especially if their competence in the L2 is still not mature. Indeed, it has been reported that object clitic constructions are particularly hard to master for EL2 individuals across different languages (Tsimpli and Mastropavlou 2008). Deficits are reported both in simultaneous bilinguals (Karpava 2017) and in sequential bilinguals (Chondrogianni et al. 2015).

In Italian, difficulties with clitics have been reported by Guasti et al. (2013), who found that preschool children with Arabic as an L1 and who were acquiring Italian as an L2 were more impaired in clitic production than their monolingual peers, uttering more often a full DP in place of the pronoun.

More recently, (Vender et al. 2016) administered a clitic elicitation task to 120 preschool EL2 children that were exposed to Italian as their L2 (3.5 years in average) and were speaking Albanian, Arabic, or Romanian as their first language, and compared their performance to that of 40 monolingual Italian children. The authors aimed not only to compare monolingual and EL2 children in clitic production, but also to evaluate the role of exposure to Italian, as well as competence in the L2, as predictors of the performance in the task. Precise information about the subjects' exposure to Italian was collected by means of a questionnaire gathering data concerning the participants' age of first exposure to Italian, quantity of exposure, and traditional and cumulative length of exposure (TLE, CLE).[4] In addition, children's competence in Italian was assessed by means of a receptive vocabulary task (PPVT-R) and a comprehension task (Comprendo; Cecchetto et al. 2012).

The results indicated that EL2 children, similarly to monolingual children with SLI and consistently with what has been reported by the previous studies discussed above, had difficulties in clitic production, uttering a wrong clitic instead of the correct one more often than monolinguals, with a prevalence of gender over number errors. Interestingly, no effect of a transfer from the L1 to the L2 was reported (see Grüter and Crago 2012 for a detailed discussion concerning transfer from the L1 in clitic production). Conversely, the role of exposure and competence in Italian (including both vocabulary and comprehension) was crucial in predicting performance. The production of target clitics was indeed significantly correlated with the amount of exposure to Italian, as well as with competence in Italian, thus suggesting that children having a higher (i.e., in quantity) and longer (i.e., in time) exposure and a better competence in Italian performed more accurately than the children being less exposed and less competent in their L2.

These results have two important implications, concerning on the one side the issue related to the identification of SLI in EL2 children, and on the other side, the development of linguistic competence in the L2, especially in relation to exposure factors.

The first aspect regards the identification of language disorders in EL2 children, which is one of the most important challenges raised by bilingualism, especially in a multilingual society where EL2 learners have been growing in number due to a consistent increase in migration fluxes over the last decades. As anticipated above, bilingual children typically perform more poorly than monolinguals in specific domains, displaying difficulties both at the syntactic and at the morphosyntactic level, which, crucially, are significantly compromised in SLI too. As a consequence, it can be very difficult to correctly interpret the linguistic difficulties of EL2 and bilingual children and to ascertain if they are due to the presence of a real impairment or more simply to a still immature linguistic competence. The absence of diagnostic tools that are standardized for the identification of SLI in bilinguals further complicates the situation, often leading to over-diagnoses or under-diagnoses of the impairment (Vender et al. 2014).

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[4] Traditional length of exposure is calculated as the child's chronological age minus their age at first exposure to the L2, whereas CLE is a composite measure that considers other variables to determine the actual exposure to the L2 over time (amount of language spoken to and by the child with parents and siblings, at school, during holidays, etc., see Unsworth et al. 2012).

For this reason, research has focused on the study of clinical markers of SLI, in order to verify if they can be reliably used also with EL2 and bilingual children. In this sense, the results put forward by Vender et al. (2016) suggest that monolingual and EL2 children's profiles in clitic production differ in quantitative and qualitative terms. Although EL2 children underperformed the monolinguals, producing a lower number of clitics, they did not omit the pronoun (which constitutes the typical behavior of SLI children), but produced an incorrect (wrongly inflected) clitic instead.

On the other side, if Vender et al.'s (2016) study emphasizes the relationship between performance and competence/exposure to Italian, it also elicits the reasonable prediction that difficulties with clitic production should diminish and possibly disappear once a sufficient degree of exposure and competence in Italian is reached by the children. If this prediction were borne out, the result would be particularly welcome in the light of identifying SLI in older children, since, as discussed above, difficulties with clitics are also found in school-aged children with SLI.

With the aim of verifying this prediction, we developed a study aiming to test the clitic production in two groups of typically developing children, namely: a group of monolingual Italian children and a group of bilingual children with long exposure and good competence in L2 Italian.

2. Materials and Methods

2.1. Participants

The experimental protocol was administered to 64 children divided into two groups, 33 monolingual Italian children (mean age 10;0 years old, standard deviation, SD = 1.0) and 31 bilingual children with Italian as their L2 (mean age 10;2 years old, SD = 1.3). An independent-sample t-test revealed that there were no significant differences in the age of the subjects ($t(62) = 0.563$, $p = 0.576$).

Both monolingual and bilingual children were recruited in the same public schools in the area of Trento and Verona (Northern Italy), and they had neither diagnosed nor referred cognitive deficits, nor language problems, hearing disorders, nor reading difficulties. Moreover, all children had normal or corrected-to-normal vision. The study was approved by the local ethics committee and conducted in accordance with the standards specified in the 2013 Declaration of Helsinki.

Concerning bilingual children, all participants had Italian as their L2 and spoke another language at home; their first languages were Romanian (10 children), Arabic (8 children), Albanian (4), Indian (2), Spanish (1), Ghanaian (1), Nigerian (1), Moldovan (1), Serbian (1), Polish (1), and Macedonian (1). In order to gain a precise knowledge about the bilingual children's exposure to their L1 and to Italian, we administered a questionnaire, the bilingual language exposure questionnaire, which was developed on the basis of the Italian adaptation of the Utrecht Bilingual Language Exposure Calculator (Unsworth et al. 2012; see Vender et al. 2016 for a study deploying the Italian version of the questionnaire). The questionnaire was filled in by parents to collect data concerning the bilinguals' age of first exposure (AFE) to Italian; their current quantity of exposure (QE) to the L2 and their length of exposure, including both TLE and CLE

In our sample, we included only bilingual children who used their home language on a daily basis and were exposed to Italian as a second language before the age of 5 (17 of the children were actually first exposed to their L2 before the age of 3). Moreover, as a cutoff, we included only bilinguals with at least 5 years of exposure to Italian and 3 years of scholastic attendance in Italy; the traditional length of exposure is on average 7.96. In terms of percentage, children were currently more exposed to Italian than to their L1 (the average percentage of exposure to the L2 is 64%), which is related to the fact that all of the children attended the school in Italy, with Italian as a vehicular language, for 8 hours a day, 5 days a week.

The relevant data are reported in Table 1.

Table 1. Mean and standard deviation (SD) of the exposure factors to Italian of the bilingual children.

	Mean	Standard Deviation
Age of first exposure (in years)	2.24	1.82
Quantity of exposure (in percentage)	0.64	0.10
Traditional length of exposure (in years)	7.96	1.98
Cumulative length of exposure (in years)	2.33	0.70

As for the socioeconomic status (SES) of the participants, we considered parental education, as follows: parents were asked to provide information concerning their educational level and we assigned one point for primary education (i.e., primary school and middle school), two points for secondary education (i.e., high school), and three points for higher education (i.e., university). The individual SES of the children was calculated using the average of the two parents' levels of education. An independent sample t-test was carried out on these data revealing that there were no significant differences in the SES of the subjects ($t(62) = 1.429$, $p = 0.158$).

2.2. Materials

All of the children were administered a set of preliminary tasks in order to ensure cognitive comparability and to have a more precise picture of their reading abilities and linguistic competence. Subsequently, children were administered the clitic production task. Each child was individually tested in a quiet room by the first author, and each testing session lasted approximately 45 min. A description of the materials that were used follows below. As for the coding procedure, all tests were coded twice by the first and the last author, and the few disagreements in the coding were resolved after a discussion between the coders. Measures of interrater reliability have been provided for each of the tasks administered.

2.2.1. Preliminary Tasks

Nonverbal intelligence

To assure that all subjects had a normal cognitive level, we administered the Raven's Colored Progressive Matrices test (Raven et al. 1998). This task is designed to assess the subject's nonverbal visuo-spatial reasoning. The child is asked to complete a set of 36 matrices of geometric figures, each presented with one entry missing, by selecting the correct entry from a set of six answer choices. Results were calculated as standard scores based on the Italian standardization (Belacchi et al. 2008).

Reading abilities

In order to exclude the presence of reading disorders or learning disabilities, all children had to score within the normal range for their age/class of education in accuracy and fluency in reading. We tested both word and nonword reading, administering the Prova di lettura di parole e di nonparole included in the *Batteria per la Valutazione della Dislessia e della Disortografia Evolutiva* (DDE-2, Sartori et al. 2007, tasks 2 and 3) and text reading, using the *Prove di Lettura MT per la Scuola Elementare-2* (Cornoldi and Colpo 1998), which are standardized for children attending the primary school, and the *Nuove prove di lettura MT per la Scuola Media Inferiore* (Cornoldi and Colpo 1995), which are standardized for children attending the junior secondary school.

Receptive Vocabulary

To have a standardized measure for the subjects' lexical abilities, we administered the Peabody Picture Vocabulary Test by Dunn and Dunn (2000), adopting the Italian standardization by Stella et al. (2000). PPVT-R is a picture-selection task in which the child is asked to point to a picture out of an array of four corresponding to a word uttered by the experimenter.

Phonological Awareness

To have a measure of the subjects' phonological awareness we administered a task assessing nonword repetition, since the ability to repeat invented words is considered one of the most sensitive measures of phonological awareness allowing to assess the subject's phonological ability independently of lexical factors, as it happens with real word repetition tasks. Our nonword repetition task consisted of 40 items of increasing complexity ranging from two to five syllables in length: 10 disyllable, 10 trisyllable, 10 four-syllable and 10 five-syllable nonwords (whereby nonword lengths are representative of Italian lexicon). The stimuli of each block were made up to have the same syllable structures and the same number of phonemes, in order to guarantee homogeneity. The list of nonwords was carefully designed in compliance with the phonotactic rules of Italian, assembling both high and low frequency type syllables taken from a database on Italian syllable frequency (Stella and Job 2001). As recommended by Dollaghan and Campbell (1998), no consonants or vowels occurred more than once within each nonword, to assure that each of the phonemes constituting the nonword is recalled independently. Each nonword started with a consonant and ended with a vowel, following the typical pattern of Italian words. Primary stress was always assigned to the penultimate syllable, which is the most common stress pattern in Italian. Finally, none of the stimuli corresponded to an existing Italian lexical word, to avoid any influence of the participant's vocabulary.

The forty nonwords were preceded by two training items to let the children familiarize with the task. Subjects could hear the nonword only once; their responses were audio-recorded and separately analyzed by the two coders. Each phoneme was scored "correct" or "incorrect" in relation to its target phoneme; 1 point is assigned for each correctly repeated phoneme, and 0 points are assigned for mistakes. Phoneme substitution, omission or addition were considered errors. The interrater reliability was 96.5%.

Morphological Competence

To provide a measure of the subjects' morphological competence we administered a nonword pluralization task developed on the basis of Berko (1958) Wug Test and adapted to the more complex context of Italian. In our task, children were asked to provide the plural of invented words, modeled after the phonotactic structures of Italian, divided in five conditions which corresponded to distinct declension classes of noun pluralization in Italian and entailing different levels of complexity (see Vender et al. 2017 for a more detailed description of the task and Vender et al. 2018 and Melloni et al. (2017) for two studies on bilinguals). In a typical example, the child was presented with the picture of an invented character and was told: *Questa è la muva* ('This is the *muva*': the experimenter points to the picture of the invented character). *Adesso ce ne sono due* ('Now we have two of them': the experimenter points to the picture of two identical characters). *Queste sono* . . . ('These are . . . ': pause for the child to complete the sentence). The child's task was to complete the sentence with the relevant plural form (target: *le muve*). The task comprised 15 items; 1 point was attributed to each correct inflection, whereas no points were attributed to incorrect pluralizations. The interrater reliability between the first and the last author was 99%.

Working Memory

We administered two tasks to assess the subjects' working memory (WM) abilities: a Forward Digit Span Task (FDS) and a Backward Digit Span Task (BDS), both taken from the *Working Memory Test Battery for Children* (Pickering and Gathercole 2001) and adapted to Italian (Vender 2017). The FDS involved the spoken presentation of sequences of digits: the experimenter uttered a sequence of digits of increasing length (starting from only one digit) and the child was asked to repeat the digits exactly in the same order as they were presented. All digits were uttered in even monotone at the rate of 1 per second. Each block was composed by 6 items; when the first four trials of one block were correctly recalled, the fifth and the sixth trials were omitted and the child was presented with

trials of the subsequent block. Testing stopped when the child committed three errors within the same block. As for the scoring system, we assigned 1 point for each item correctly recalled, including the omitted trials, and no points were given for wrong repetitions. Since it involves the recall of verbal material, this task taps the Phonological Loop in Baddeley's Working Memory Model (Baddeley 1986; Baddeley 2000). In the BDS, the experimenter uttered a sequence of digits of increasing length (from a minimum of 2 to a maximum of 7) and the child had to recall the digits in the reverse order, starting from the last digit heard and ending with the first. This test involves the simultaneous execution of two tasks: the subject has to store and recall the sequence of digits in forward order, as the experimenter presented it, and then he has to manipulate it in order to reproduce the sequence in backward order. As a consequence, this task taps not only the Phonological Loop but also the Central Executive of Baddeley's WM model. The administration of the task and the scoring system were the same as for the FDS task. The inter-rater reliability between the first and the last author was 100%.

2.2.2. Clitic Elicitation Task

Production of accusative clitic pronouns has been examined by means of an elicitation task, whose design was very similar to the one in Vender et al. (2016), as will be discussed below. In both tasks, the child was shown some pictures displayed on a computer screen and told a short story that always involved one character doing something to one or two other characters. When the first picture appeared, the characters of the story were introduced to the subject. When the second picture appeared, the child was told that one character wanted to perform an action addressed to the other/s. After being shown the third picture, in which the character performed the action, the child was asked to answer a question about what the character did, which was intended to elicit the clitic pronoun.

Descriptions were digitally recorded by a feminine Italian native speaker and played through loudspeakers connected to the PC. Pragmatic felicity was achieved by inserting all elicited utterances in a supportive context. A sample trial is reported below, as follows:

> Experimenter: *In questa storia ci sono un nonno e una bambina. La bambina esce di casa e il nonno non sa dove va. Il nonno vuole seguire la bambina. Cosa fa il nonno alla bambina?* ('In this story there are a grandfather and a girl. The girl is leaving home and the grandfather doesn't know where she is going. The grandfather wants to follow the girl. What does the grandfather do to the girl?')
>
> Target answer: *La segue.* ('He follows her.')

We elicited 32 sentences, each containing one of the four Italian DO third-person clitics, *la* (feminine singular), *lo* (masculine singular), *le* (feminine plural), and *li* (masculine plural). Two sentence types were used; half of the sentences are in the simple present (Italian "presente") and half in the present perfect (Italian "passato prossimo"), where the past participle has to agree in number and gender with the clitic. All verbs used in the task were obligatorily transitive, regular, and highly frequent, in order to avoid possible lexical retrieval difficulties for the bilingual children: *lavare* 'to wash', *salutare* 'to greet', *abbracciare* 'to hug', *accarezzare* 'to caress', *asciugare* 'to dry', *aiutare* 'to help', *spiare* 'to peek at', *vestire* 'dress up', *seguire* 'to follow', *bagnare* 'to drench', *tirare* 'to pull', *pettinare* 'to comb', *sgridare* 'to scold', *catturare* 'to catch', *spaventare* 'to frighten' and *chiamare* 'to call'. As emphasized above, all these verbs have a regular past participle form in Italian. In total, there were four items for each of the four clitics in the simple present; the same in the present perfect.

In order to make the protocol as simple as possible, the characters involved in the stories were well known and highly stereotyped figures recurring throughout the task: four agents performing the different actions (a mother, a father, a grandmother, and a grandfather) and eight patients undergoing the actions (a little boy, a little girl, a boy, a girl, two little boys, two little girls, two boys, and two girls). Moreover, female agents were always paired with male patients and vice versa.

The 32 experimental trials were randomly ordered. The task was preceded by a familiarization section consisting of six training items; in the first and in the second training item, the child was told

that a puppet would answer the questions and that she had to pay attention and do the same with the remaining items. In the following four training items, the child was invited to answer the question; if she didn't produce a clitic pronoun, she was invited to do so by the experimenter. Conversely, no feedback was given in the experimental items.

The experimental trials were intertwined with eight trials eliciting the production of the third person singular reflexive clitic pronoun *si* 'itself'; half sentences elicited an utterance in the simple present and half in the present perfect, and they involved the same characters and actions as the experimental trials eliciting the DO clitic. The verbs used were taken from the list of the 16 verbs used throughout the experiment, which allow a reflexive construction in Italian *asciugarsi* 'to dry oneself', *lavarsi* 'to wash oneself', *vestirsi* 'to dress oneself', and *pettinarsi* 'to comb oneself'. An example is provided below, as follows:

> Experimenter: *Qui ci sono un bambino e una mamma. Il bambino si è sporcato e la mamma è arrabbiata. Il bambino vuole lavarsi. Cosa fa il bambino*? ('In this story there are a little boy and a mother. The little boy is dirty and the mother is upset. The little boy wants to wash himself. What does the little boy do?')
>
> Target answer: *Si lava.* ('He washes himself.').

The design was the same used in Vender et al. (2016), in which all four clitics were tested, but only with 12 items and limited to the simple present condition. Moreover, the verbs used were in part different, including *baciare* 'to kiss' and *rincorrere* 'to chase', in addition to *lavare* 'to wash', *seguire* 'to follow', *tirare* 'to pull', and *pettinare* 'to comb', which were used also in the present study.

As for the coding procedure, the children's responses were classified in different categories on the basis of the tense used in the sentence. In the simple present, following Vender et al. (2016), the subjects' responses were coded in six categories. We classified Target as the sentences containing the correctly inflected clitic (e.g., *La segue* '*pro* $CL_{3SG.FEM}$ follows'), whereas we classified under Gender/Number Error the sentences containing a clitic wrongly inflected either for gender or number or for both gender and number (e.g., *Lo segue* '*pro* $CL_{3SG.M}$ follows', where the clitic is wrongly inflected for gender; *Le segue* '*pro* $CL_{3PL.FEM}$ follows', where the clitic is wrongly inflected for number; *Li segue* '*pro* $CL_{3PL.M}$ follows', where the clitic is wrongly inflected for both gender and number). Ungrammatical sentences in which the clitic was not produced were considered Omissions (e.g., **Segue* '*pro* follows__'), whereas sentences with a full DP replacing the clitic, which are grammatical but pragmatically infelicitous, were classified as Full DP (e.g., *Segue la bambina* '*pro* follows the girl'). We further classified as Indirect Clitic grammatical sentences containing a dative clitic instead of the accusative (*Le va dietro* '*pro* $IndCL_{3SG.FEM}$ goes after'). Finally, other utterances not fitting in any of the previous categories were coded as Other (e.g., *È preoccupato* '*pro* is worried').

In the present perfect, instead, responses were coded in nine categories. As in the simple present, there were Target (e.g., *L**a** ha seguit**a**/L'ha seguita* '*pro* $CL_{3SG.FEM}$ has followed')[5], Gender/Number Error (e.g., *L**o** ha seguit**o**/L'ha seguito* '*pro* $CL_{3SG.M}$ has followed'), Omission (e.g., **Ha seguito* '*pro* has followed__'), Full DP (e.g., *Ha seguito la bambina* '*pro* has followed the girl'), Indirect Clitic (e.g., *Le è andato dietro* '*pro* $IndCL_{3SG.FEM}$ went after'), and Other (e.g., *Era preoccupato* '*pro* was worried'). Furthermore, we included three additional categories. Firstly, we labeled as Non-Target PP the responses where the subject uttered a contracted form of the clitic with a Non-Target PP (e.g., *L'ha seguit**o*** '*pro* $CL_{3SG.M/FEM}$ has $followed_{SG.M}$'); in this case, it is not possible to determine whether the clitic was wrong and agreed with the PP, or whether the clitic was correct and the PP was wrongly inflected. We further classified Wrong Contraction as the sentences containing a contraction of the plural clitic, which is ungrammatical in Italian (e.g., **L'ha seguite* '*pro* $CL_{3PL.FEM}$ has $followed_{PL.FEM}$')

[5] As discussed above, contracted forms like *L'ha seguita* are widely used in Italian with singular clitics, both masculine and feminine, and therefore we accepted them as target productions.

and Agreement Error as sentences with the correct clitic but a wrongly inflected PP (e.g., **L**a** ha seguit**o*** '*pro* $CL_{3SG.FEM}$ has $followed_{SG.M}$'). The interrater reliability was 100%.

2.3. Research Questions and Predictions

The main aim of our research, comparing the performance of monolingual and bilingual children in a clitic production task, was to verify the prediction put forward by Vender et al. (2016) about the effects of exposure and competence in the L2 on performance. As our children had a longer exposure to Italian than those in Vender et al. (2016), including at least three years of school attendance in Italy, we expected them to perform similarly to the monolingual children, reporting significantly reduced or no difficulties with clitic production, contrary to what is commonly found with children with a lower exposure. This could be particularly important for the identification of language disorders in bilingual children, given that, as discussed above, clitic production is a reliable clinical marker for SLI in Italian.

Furthermore, we aimed at assessing the impact of the other factors, including exposure and competence in Italian vocabulary, phonological awareness, morphological competence, and working memory, on the children's performance in the clitic elicitation task.

3. Results

3.1. Preliminary Measures

The results of the preliminary measures (means and standard deviations), including the Raven, the reading tests, the phonological and morphological tests, and the working memory tests, are reported in Table 2.

Table 2. Number, mean (SD) age in years, means (SDs) of z scores on the Raven, on the speed and accuracy of reading words, pseudo-word and text, mean (SDs) of raw scores of the PPVT-R, of the nonword repetition task, on the morphological competence task (nonword pluralization), and on the working memory (WM) tasks (forward and backward digit span tasks).

	Monolingual Children	**Bilingual Children**
No.	33	31
Age	10.0 (1.0)	10.2 (1.3)
Raven	0.47 (0.79)	0.19 (0.82)
PPVT-R	102.70 (20.59)	95.94 (13.30)
Word speed	0.30 (0.64)	0.25 (0.80)
Word accuracy	0.31 (0.85)	0.03 (0.94)
Pseudo-words speed	0.31 (0.62)	0.63 (0.68)
Pseudo-words accuracy	0.17 (0.82)	0.32 (0.78)
Text speed	0.25 (0.38)	0.14 (0.46)
Text accuracy	0.48 (0.70)	0.26 (0.45)
Nonword repetition	0.94 (0.03)	0.92 (0.95)
Morphological competence	0.71 (0.16)	0.74 (0.20)
Forward digit span	29.12 (4.76)	28.33 (4.22)
Backward digit span	13.09 (4.11)	13.87 (4.69)

A series of independent-sample t-tests were carried out showing that the two groups did not differ for their nonverbal cognitive level measured by the Raven task ($t(62) = 1.367$, $p = 0.177$) nor for their language proficiency assessed by the PPVT-R ($t(62) = 1.549$, $p = 0.126$), indicating that the subject groups had comparable cognitive level and language proficiency, as far as the receptive vocabulary concerns, thus confirming that bilingual children's competence in Italian was good. No differences amongst the two groups were found concerning reading abilities, including speed in word reading ($t(62) = 0.263$, $p = 0.793$), accuracy in word reading ($t(62) = 1.272$, $p = 0.208$), speed in nonword reading ($t(62) = 1.943$, $p = 0.057$), accuracy in nonword reading ($t(62) = 0.737$, $p = 0.464$), speed in text reading ($t(62) = 0.986$, $p = 0.328$), and accuracy in text reading ($t(62) = 1.423$, $p = 0.160$)

Monolinguals and bilinguals performed similarly in the nonword repetition task (t(62) = 1.413, $p = 0.164$) and in nonword pluralization (t(62) = 0.671, $p = 0.505$), indicating that they had comparable phonological and morphological competence in Italian. Finally, no significant differences were found in the two working memory tasks, the forward digit span (t(62) = 0.692, $p = 0.492$) and the backward digit span (t(62) = 0.699 $p = 0.487$), suggesting that bilinguals' verbal working memory was similar to that of monolinguals.

3.2. Clitic Elicitation Task

As discussed above, we coded responses in the clitic elicitation task in six categories for the simple present and nine for the present perfect. Means and standard deviations in each of these categories are reported in Table 3.

Table 3. Mean (and SDs) of responses in the clitic production task for each group.

	Monolingual Children	**Bilingual Children**
Simple present		
Target	0.95 (0.14)	0.94 (0.13)
Gender/number error	0.00 (0.01)	0.01 (0.03)
Omission	0.01 (0.02)	0.01 (0.03)
Full DP	0.04 (0.12)	0.02 (0.05)
Indirect clitic	0.00 (0.01)	0.00 (0.00)
Other	0.00 (0.01)	0.02 (0.09)
Present Perfect		
Target	0.94 (0.13)	0.92 (0.13)
Gender/number error	0.00 (0.00)	0.00 (0.01)
Omission	0.00 (0.01)	0.02 (0.09)
Full DP	0.04 (0.09)	0.02 (0.03)
Indirect clitic	0.00 (0.01)	0.00 (0.01)
Other	0.01 (0.03)	0.01 (0.03)
Non-target PP	0.00 (0.01)	0.01 (0.03)
Wrong contraction	0.00 (0.01)	0.00 (0.01)
Agreement error	0.01 (0.02)	0.02 (0.04)

DP: Determiner Phrase; PP: past participle.

Data show that the two groups displayed a ceiling and similarly accurate performance in the production of clitic pronouns, both in the simple present and in the present perfect. A series of independent-sample t-tests confirmed that the two groups performed similarly in the present; no differences were found concerning the percentage of target structures (e.g., *La segue*) between the two groups (t(62) = 0.671, $p = 0.505$). Errors were very infrequent both for monolinguals and bilinguals, without differences in Gender/Number Errors (t(62) = 1.505, $p = 0.141$), Omissions (t(62) = 0.950, $p = 0.346$), Full DPs (t(62) = 0.587, $p = 0.559$), Indirect Clitics (t(62) = 0.969, $p = 0.336$), and Other (t(62) = 1.135, $p = 0.261$).

No differences were found in the present perfect, in which the two groups produced a similar rate of Target structures (t(62) = 0.796, $p = 0.492$). Again, errors were very rare and comparable amongst groups: no differences were found in Gender/Number Errors (t(62) = 1.485, $p = 0.161$), Wrong Contractions (t(62) = 1.091, $p = 288$), Non-Target PPs (t(62) = 0.794, $p = 0.430$), Agreement Errors (t(62) = 1.369, $p = 0.178$), Omissions (t(62) = 0.904, $p = 0.369$), Full DPs (t(62) = 0.898, $p = 0.363$), Indirect Clitics (t(62) = 0.044, $p = 0.965$), and Other (t(62) = 0.586, $p = 0.765$).

After having established that the two groups performed similarly in clitic production, we ran a Pearson correlations test on all the data (considering both monolinguals and bilinguals) to analyze how performance in the task, considering both target structures and errors, was related to the preliminary measures, including phonological awareness (nonword repetition), working memory (forward and

backward digit span), morphological competence (nonword pluralization), nonverbal intelligence (Raven task), and receptive vocabulary (PPVT-R).

Firstly, we found that phonological awareness was positively correlated to the production of target clitics in both the present ($r = 0.346$, $p < 0.01$) and in the present perfect ($r = 0.398$, $p < 0.001$); it was negatively correlated with Gender/Number Errors, both in the present ($r = -0.359$, $p < 0.01$) and in the present perfect ($r = -0.317$, $p < 0.01$), with Omissions both in the present ($r = -0.264$, $p < 0.05$) and in the present perfect ($r = -0.318$, $p < 0.05$), and with Other both in the present ($r = -0.270$, $p < 0.05$) and in the present perfect ($r = -0.263$, $p < 0.05$). Moreover, it was negatively correlated with Agreement Errors ($r = -0.300$, $p < 0.05$).

As for WM, we found that both the FDS and the BDS tasks were positively correlated with Target structures in the present perfect ($r = 0.286$, $p < 0.05$) and ($r = 0.293$, $p < 0.05$), respectively, whereas FDS was negatively correlated with Gender/Number Errors in the present perfect ($r = -0.274$, $p < 0.01$).

Performance in the morphological task was negatively correlated with Wrong Contractions ($r = -0.345$, $p < 0.01$). Considering nonverbal intelligence, instead, we found only a negative correlation with the production of Full DPs, both in the present ($r = -0.261$, $p < 0.01$) and in the present perfect ($r = -0.249$, $p < 0.05$). Finally, no correlations were found with the receptive vocabulary.

Summarizing, the production of target clitics is related to phonological awareness and working memory skills (as for the present perfect), confirming the importance of both variables in clitic production. More particularly, if phonological awareness has a central importance in both conditions, the role of WM emerges only in the most difficult one, in which more resources are required for the production of the target structure.

Finally, as for the bilingual children, we carried out further analyses aimed to identify the potential correlations between clitic production and the L2 exposure measures collected through the questionnaire (i.e., age of first exposure, quantity of exposure, and cumulative and traditional length of exposure) and we found only a significant correlation between age of first exposure and other structures in the present ($r = 0.381$, $p < 0.05$).

4. Discussion

The main goal of this study was to compare the performance of bilingual and monolingual typically developing children in a clitic elicitation task. As discussed throughout this paper, the production of clitic pronouns is a demanding task, especially for (monolingual) language impaired children, and it is thus identified as a good clinical marker for SLI in Italian. Nevertheless, EL2 children still acquiring their second language are also reported to display deficits in this test, which makes the identification of language disorders in EL2 children an especially delicate matter.

In order to verify if an increased amount of exposure to the L2 positively affects the performance in clitic production, we examined the skills of a group of 10 year old bilinguals, with almost eight years of average exposure to Italian and at least three years of school attendance in Italy. The competence in Italian of the bilingual children who took part in this study was similar to that of their monolingual peers in each of the language levels tested, including receptive vocabulary (PPVT-R), phonological awareness (nonword repetition) and morphological awareness (nonword pluralization). Further, bilinguals scored as monolinguals in verbal working memory tasks (forward and backward digit span tasks). Interestingly, bilinguals performed similarly to monolinguals also in the clitic production task, both in the simple present, which is the easiest condition, and in the present perfect, in which gender/number agreement between the clitic and the past participle must be realized, increasing the processing costs of the whole task. Both groups of children showed indeed a ceiling performance, indicating that they had fully mastered the clitic production. Furthermore, errors were sporadic and qualitatively similar across the two groups.

This result confirms our prediction indicating that children with long exposure and good competence in L2 Italian are perfectly able to produce clitic pronouns, and thus suggesting that the difficulties reported in previous studies were not due to bilingualism per se, but, arguably, to exposure

factors. In other words, difficulties with clitics are expected to arise in children who have been exposed to their L2 only recently, and whose L2 competence is still developing. On the contrary, bilingual children with longer exposure and better competence in L2 Italian should master clitic production and behave as monolinguals in this respect.

This result has also important implications for what concerns the identification of language disorders in bilingual children. As discussed above, deficits in clitic production persist also in school-aged children with SLI, who tend to produce a much lower number of target structures than their peers, replacing the target pronoun with a Full DP. The fact that a bilingual child with a long exposure to Italian exhibits problems in producing the correct clitic can be interpreted as signaling the presence of a language impairment.

Of course, it is difficult to determine the exact amount of exposure required by a bilingual child to master clitic production, and further research would be needed to provide more precise indications. However, research suggests that three years of exposure might not be sufficient, given that in Vender et al. (2016)'s study, EL2 children with an average exposure of 3.5 years to Italian underperformed monolinguals, whereas our results indicate that children exposed on average by 8 years (range 4.69–11.97) display a monolingual-like performance. What is important to notice is that both studies underline the importance of evaluating exposure factors for a correct interpretation of the linguistic behavior of bilingual children; it would not be appropriate to administer a clitic elicitation task without considering at least the age of first exposure to the L2 and length of exposure. For instance, a nine-year-old child exposed to Italian for just two years cannot be expected to show a perfect mastery of clitic production and to perform similarly to an age-matched child with four years of exposure. Exposure factors appear to be even more significant for children with a lower exposure, as indicated by Vender et al. (2016), whereas they cease to play a predictive role as children reach a native-like performance in clitic production, as demonstrated by the absence of significant correlations between performance and exposure in the present study. Indeed, we only found a significant correlation between the age of first exposure and production of irrelevant sentences, indicating that children exposed later to Italian tend to exhibit more difficulties in coping with the task.

What seems to play a more preeminent role in determining performance are instead other aspects of (monolingual and bilingual) children's linguistic profile, as evidenced by the correlational analysis we ran, which revealed that phonological awareness, assessed by a nonword repetition task, and working memory skills, measured with a forward and a backward digit span task, correlate with performance in clitic production. Specifically, the production of target clitics is related to phonological awareness and working memory skills as for the present perfect, confirming the influence of both variables on clitic production. More particularly, if phonological awareness is fundamental in both conditions, the role of WM emerges only in the present perfect condition, whereby more processing resources are required for the production of the target structure (Moscati and Rizzi 2014; Pirvulescu and Belzil 2008).[6]

Moreover, the results of the correlational analysis provided us with some clues in order to interpret the typology of errors committed by the children: subjects with a low phonological awareness are more prone to inflect the clitic in the wrong way, to omit it or to produce irrelevant structures, which are commonly seen as 'avoidance strategies' (Vender et al. 2016). Children with a low phonological memory (measured by the FDS) have more problems in producing the correct clitic in the present perfect, which is the most difficult condition. Children with a low morphological competence tend to commit more often wrong contractions, which are ungrammatical in Italian and depend on an illicit morpho-phonological operation. Finally, children with low nonverbal intelligence seem to be less

[6] Focusing on the acquisition of different agreement configurations by Italian monolingual children, Moscati and Rizzi (2014, p. 79) analyse the derivational complexity of clitic/past participle agreement whereby agreement is checked through a movement chain spanning over two distinct phases, "thus plausibly engaging extra computational resources in terms of operative memory requirements".

sensitive to the pragmatic constraints that determine the infelicity of sentences containing the Full DP, instead of the clitic.

These results, highlighting the role played by phonological and, to some extent, by morphological competence, confirm that the difficulties in clitic production are related to their complexity at the phonological and morphological level. Moreover, the correlations with the FDS and the BDS scores seem to suggest that clitic production requires good WM skills, being an expensive task in terms of processing resources. This is in line with what was hypothesized by Prévost (2006), who proposed that the production of object clitics imposes a heavy load on the subject's processing abilities, related both to the projection of fully-fledged representations and to the non-canonical position occupied by clitics as a result of syntactic movement (see Grüter and Crago 2012; Mantione 2016) for studies conducted with EL2 and dyslexic children, respectively, providing further support to Prevost's hypothesis and to the importance of WM factors in clitic production).

Finally, adopting a processing account for clitic production can also explain why EL2 children, as reported by the studies discussed above (Section 3.1), exhibit marked difficulties in this task, since processing is reported to be more costly in an L2, especially in the first stages of its acquisition (Grüter and Crago 2012).

5. Conclusions

The present study confirms the predictions in Vender et al. (2016) that the exposure factors to L2 Italian play a key role to achieve full mastery of clitic production, and that bilingual children with adequate exposure to L2 Italian overcome the difficulties attested at previous stages of L2 acquisition. This result is relevant not only for a better comprehension of the maturational stages leading to the full mastery of complex syntactic structures in L2 Italian, but also for the possible identification of language deficits in these bilingual children. As explained in the Introduction, the production of DO clitics is a clinical marker of SLI in Italian, and the difficulties found in children with SLI persist until school age, with impaired children avoiding clitic production mainly through full DP substitution. Our research reveals that school aged bilingual children with long exposure to the environment language show, on the contrary, a monolingual profile, matching their peers even in the most difficult condition (i.e., present perfect constructions requiring agreement between the clitic pronoun and the past participle form of the verb). This result, we believe, is especially relevant in the light of the growing need to correctly diagnose language impairments in multilingual societies, where children learning the environment language in schools or kindergartens run the risk of language impairment misdiagnosis. Specifically, as noted by Paradis (2005) and Vender et al. (2014), the lack of standardized tools for bilinguals opens the unwelcome scenario where SLI deficits are misdiagnosed in bilinguals still in the process of acquiring their second language, resulting in overdiagnosis or "mistaken identity". On the other hand, a second, more probable scenario is the one where language impairments are neglected by educators and attributed to incomplete mastery of the L2, resulting in underdiagnosis or "missed identity". In this light, identifying the linguistic profile of typically developing bilingual children with long exposure to the L2 is of crucial importance, and our results could lay the groundwork for the development of fine-grained diagnostic tools for SLI in school aged L2 Italian children.

Of course, this study represents only a preliminary step in this direction and suffers from some limitations. Firstly, the homogeneity of the bilingual group here considered is mined by the subjects' various L1s, which could affect their performance in the task, possibly due to L1 influence or transfer effects (it is worth noting, however, that the role of the L1 has been found to be irrelevant in previous studies). A future study could replicate the present one with bilingual subjects having the same L1 and, purposely, compare the profile of two groups of bilingual children, i.e., one group with a L1 having a pronominal clitic system close to Italian (e.g., Spanish) and another group with a L1 lacking a pronominal clitic system altogether (e.g., English), in order to more carefully evaluate the role of transfer effects in clitic production. Another limitation along these lines comes from the different ages of exposure of the subjects, a factor that, in principle, might be relevant for evaluating the acquisition of

clitics, since monolingual children master them very early and the difficulties in (sequential) bilinguals might be due to a late age of first exposure. Although the results of the correlation analysis in the present study point in a different direction, manifesting no correlation between the age of exposure and clitic production, it could be interesting to study clitic production in adults and compare their profile with that of children exposed to Italian L2 for an equal amount of time.

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References

Ariel, Mira. 1994. Interpreting anaphoric expressions: a cognitive versus a pragmatic approach. *Journal of Linguistics* 30: 3–42. [CrossRef]

Arosio, Fabrizio, Chiara Branchini, Lina Barbieri, and Maria Teresa Guasti. 2014. Persistency of direct object clitic omission in Italian school age children with SLI. *Journal of Clinical Linguistics and Phonetics* 28: 1–25.

Avram, Larisa, Anca Sevcenco, and Ioana Stoicescu. 2013. Clinical markers of specific language impairment and developmental dyslexia in Romanian: the case of Accusative clitics. In *Topics in Language Acquisition and Language Learning in a Romanian Context*. Selected Papers from Bucharest Colloquium of Language Acquisition (BUCLA). Edited by Larisa Avram and Anca Sevcenco. Bucharest: Editura Universitatii din Bucuresti, pp. 129–59.

Baddeley, Alan D. 1986. *Working Memory*. Oxford: Oxford University Press.

Baddeley, Alan D. 2000. The episodic buffer: A new component of working memory? *Trends in Cognitive Science* 4: 417–23. [CrossRef]

Bedore, Lisa M., and Laurence B. Leonard. 2001. Grammatical Morphology Deficits in Spanish-Speaking Children with Specific Language Impairment. *Journal of Speech, Language, and Hearing Research* 44: 905–24. [CrossRef]

Belacchi, Carmen, Teresa Gloria Scalisi, Eleonora Cannoni, and Cesare Cornoldi. 2008. *Manuale CPM. Coloured Progressive Matrices. Standardizzazione italiana*. Firenze: Giunti OS Organizzazioni Speciali.

Belletti, Adriana. 1999. Italian/romance clitics: Structure and derivation. In *Clitics in the Language of Europe*. Edited by H. van Riemsdijk. Berlin: Mounton de Gruyter, pp. 543–79.

Belletti, Adriana, and Maria Teresa Guasti. 2015. *The Acquisition of Italian: Morphosyntax and Interfaces in Different Modes of Acquisition*. Amsterdam: John Benjamins.

Berko, Jean. 1958. The child's learning of English morphology. *Word* 14: 150–77. [CrossRef]

Bialystok, Ellen. 2009. Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition* 12: 3–11. [CrossRef]

Borer, Hagit. 1986. *The Syntax of Pronominal Clitics*. Syntax and Semantics 19. Orlando: Academic Press.

Bortolini, Umberta, M. Cristina Caselli, Patricia Deevy, and Laurence B. Leonard. 2002. Specific language impairment in Italian: First steps in the search of a clinical marker. *International Journal of Language and Communication Disorders* 37: 77–93. [CrossRef] [PubMed]

Bortolini, Umberta, Barbara Arfé, Cristina M. Caselli, Luisa Degasperi, Patricia Deevy, and Laurence B. Leonard. 2006. Clinical marker for specific language impairment in Italian: The contribution of clitics and non-word repetition. *International Journal of Language and Communication Disorders* 41: 695–712. [CrossRef] [PubMed]

Caprin, Claudia, and Maria Teresa Guasti. 2009. The acquisition of morphosyntax in Italian: A cross-sectional study. *Applied Psycholinguistics* 30: 23–52. [CrossRef]

Cardinaletti, Anna, and Michal Starke. 1999. The Typology of Structural Deficiency: A Case Study of the Three Classes of Pronouns. In *Clitics in the Languages of Europe*. Edited by Henk C. van Riemsdijk. Berlin: Mouton De Gruyter, pp. 145–233.

Cecchetto, Carlo, Alberto Di Domenico, Maria Garraffa, and Costanza Papagno. 2012. *Comprendo. Batteria per la Comprensione di Frasi Negli Adulti*. Milano: Raffaello Cortina Editore.

Chondrogianni, Vasiliki, Theodoros Marinis, Susan Edwards, and Elma Blom. 2015. Production and on-line comprehension of definite articles and clitic pronouns by Greek sequential bilingual children and monolingual children with specific language impairment. *Applied Psycholinguistics* 36: 1155–91. [CrossRef]

Cornoldi, Cesare, and Giovanni Colpo. 1995. *Nuove Prove di Lettura MT per la Scuola Media Inferiore*. Firenze: Edizioni OS.

Cornoldi, Cesare, and Giovanni Colpo. 1998. *Prove di Lettura MT per la Scuola Elementare-2*. Firenze: Edizioni OS.

Costa, João, and Maria Lobo. 2007. Clitic omission, null objects or both in the acquisition of European Portuguese. In *Romance Languages and Linguistic Theory 2005*. Edited by Sergio Baauw, Frank Drijkonongen and Manuela Pinto. Amsterdam: John Benjamins, pp. 59–72.

Dollaghan, Chris, and Thomas F. Campbell. 1998. Nonword repetition and child language impairment. *Journal of Speech, Language and Hearing Research* 41: 1136–46. [CrossRef]

Dunn, Lloyd M., and Leota M. Dunn. 2000. Peabody–Test di Vocabolario Recettivo. In *Adattamento Italiano e Standardizzazione a Cura di*. Edited by Giacomo Stella, Claudia Pizzoli and Patrizio E. Tressoldi. Torino: Omega Edizioni.

Grüter, Theres, and Martha Crago. 2012. Object clitics and their omission in child L2 French: The contributions of processing limitations and L1 transfer. *Bilingualism: Language and Cognition* 15: 531–49. [CrossRef]

Guasti, Maria Teresa. 1993/1994. Verb syntax in Italian child grammar: Finite and nonfinite verbs. *Language Acquisition* 3: 1–40. [CrossRef]

Guasti, Maria Teresa, Alessandra Maggioni, and Mirta Vernice. 2013. Disturbi specifici del linguaggio, bilinguismo e acquisizione di L2. In *Nuovi Contesti D'acquisizione e Insegnamento: L'italiano Nelle Realtà Plurilingui*. Atti del Convegno CIS 2012, Bergamo. Edited by Roberta Grassi. Perugia: Guerra Edizioni, vol. 9, pp. 189–97.

Hamann, Cornelia, Luigi Rizzi, and Uli Frauenfelder. 1996. On the acquisition of the pronominal system in French. In *Generative Perspectives on Language Acquisition*. Edited by Harald Clahsen. Amsterdam: John Benjamins, pp. 309–34.

Karpava, Sviatlana. 2017. Object clitic production by simultaneous Russian-Cypriot Greek bilinguals. *Selected Papers on Theoretical and Applied Linguistics from ISTAL* 22: 230–50.

Leonard, Laurence B. 2014. *Children with Specific Language Impairment*, 2nd ed. Cambridge: MIT Press.

Leonard, Laurence B., and Marco Dispaldro. 2013. The Effects of production demands on grammatical weaknesses in specific language impairment: the case of clitic pronouns in Italian. *Journal of Speech, Language, and Hearing Research* 56: 1272–86. [CrossRef]

Leonini, Chiara. 2006. The Acquisition of Object Clitics and Definite Articles: Evidence from Italian as L2 and L1. Unpublished Ph.D. dissertation, Università degli studi di Siena, Siena, Italy.

Mantione, Federica. 2016. On the Production of Functional Categories in Children with Dyslexia: A Study on Pronouns, Articles and Prepositions. Unpublished Ph.D. dissertation, University of Verona, Verona, Italy.

Melloni, Chiara, Maria Vender, and Denis Delfitto. 2017. Nonword Pluralization: Evidence for an Advantage of Bilingualism in Albanian-Italian and Romanian-Italian Bilingual Children. Presented at the 14th Generative Approaches to Second Language Acquisition Conference (GASLA14), Southampton, UK, April 7–9.

Moscati, Vincenzo, and Luigi Rizzi. 2014. Agreement configurations in language development: A movement-based complexity metric. *Lingua* 140: 67–82. [CrossRef]

Moscati, Vincenzo, and Roberta Tedeschi. 2009. The delay of Italian past participle agreement. Presented at BUCLD 33, the 33rd annual Boston University Conference on Language Development, Boston, MA, USA, October 31–November 2; Sommerville: Cascadilla Press, pp. 370–90.

Paradis, Johanne. 2005. Grammatical Morphology in Children Learning English as a Second Language Implications of Similarities with Specific Language Impairment. *Language, Speech and Hearing Services in Schools* 36: 172–87. [CrossRef]

Pérez-Leroux, Ana Teresa, Mihaela Pirvulescu, and Yves Roberge. 2018. *Direct Objects and Language Acquisition*. Cambridge Studies in Linguistics. Cambridge: Cambridge University Press.

Pickering, Sue, and Susan E. Gathercole. 2001. *Working Memory Test Battery for Children*. London: Pearson Assessment.

Pirvulescu, Mihaela, and Isabelle Belzil. 2008. The acquisition of past participle agreement in Québec French. *Language Acquisition* 15: 75–88. [CrossRef]

Prévost, Philippe. 2006. The phenomenon of object omission in child L2 French. *Bilingualism: Language and Cognition* 9: 263–80. [CrossRef]

Raven, James, John H. Court, and John C. Raven. 1998. *Raven Manual, Section 1 (General overview) and Section 2 (Coloured Progressive Matrices)*. Oxford: Oxford Psychologist Press.

Sartori, Giuseppe, Remo Job, and Patrizio E. Tressoldi. 2007. *Batteria per la Valutazione della Dislessia e della Disortografia Evolutiva-2 [Battery for the Assessment of Dyslexia and Developmental Dysorthography-2]*. Firenze: Giunti OS Organizzazioni Speciali.

Sorace, Antonella, Ludovica Serratrice, Francesca Filiaci, and Michela Baldo. 2009. Discourse conditions on subject pronoun realization: testing the linguistic intuitions of older bilingual children. *Lingua* 119: 460–77. [CrossRef]

Stella, Giacomo, Claudia Pizzoli, Claudia Patrizio, and Patrizio Tressoldi. 2000. *PEABODY—Test di vocabolario recettivo—P.P.V.T.—R. Peabody Picture Vocabulary Test—Revised*. Torino: Omega Edizioni.

Stella, Vitantonio, and Remo Job. 2001. Le sillabe PD/DPSS. Una base di dati sulla frequenza dell'italiano scritto. *Giornale Italiano di Psicologia* 3: 633–39.

Tedeschi, Roberta. 2009. Acquisition at the Interfaces. A Case Study on Object Clitics in Early Italian. Ph.D. dissertation, LOT Publications, Utrecht, The Netherlands.

Tsimpli, Ianthi Maria, and Maria Mastropavlou. 2008. Feature interpretability in L2 acquisition and SLI: Greek clitics and determiners. In *The Role of Formal Features in Second Language Acquisition*. Edited by Juana M. Liceras, Helmut Zobl and Helen Goodluck. London: Routledge, pp. 143–83.

Tsimpli, Ianthi Maria, Eleni Peristeri, and Maria Andreou. 2017. Object Clitic production in monolingual and bilingual children with Specific Language Impairment. *Linguistic Approaches to Bilingualism* 7: 394–430. [CrossRef]

Unsworth, Sharon, Froso Argyri, Leonie Cornips, Aafke Hulk, Antonella Sorace, and Ianthi Tsimpli. 2012. The role of age of onset and input in early child bilingualism in Greek and Dutch. *Applied Psycholinguistics* 33: 1–41. [CrossRef]

Vender, Maria. 2017. *Disentangling Dyslexia: Phonological and Processing Impairment in Developmental Dyslexia*. Frankfurt: Peter Lang.

Vender, Maria, Maria Teresa Guasti, Maria Garraffa, and Antonella Sorace. 2014. Bilingualism and Specific Language Impairment: Similarities and Differences. In *Inquiries into Linguistic Theory and Language Acquisition*. Edited by Carla Contemori and Lena Dal Pozzo. Siena: CISCL Press, pp. 217–28.

Vender, Maria, Maria Garraffa, Antonella Sorace, and Maria Teresa Guasti. 2016. How early L2 children perform on Italian clinical markers of SLI: A study of clitic production and nonword repetition. *Clinical Linguistics & Phonetics* 30: 150–69.

Vender, Maria, Federica Mantione, Silvia Savazzi, Denis Delfitto, and Chiara Melloni. 2017. Inflectional morphology and dyslexia: Italian children's performance in a nonword pluralization task. *Annals of Dyslexia* 67: 401–26. [CrossRef] [PubMed]

Vender, Maria, Shenai Hu, Federica Mantione, Silvia Savazzi, Denis Delfitto, and Chiara Melloni. 2018. Inflectional morphology: evidence for an advantage of bilingualism in dyslexia. *International Journal of Bilingual Education and Bilingualism*. [CrossRef]

Wexler, Kenneth, Anna Gavarró, and Vicenç Torrens. 2004. Feature checking and object clitic omission in child Catalan and Spanish. In *Romance Languages and Linguistic Theory*. Edited by Reineke Bok-Bennema, Bart Hollebrandse, Brigitte Kampers-Manhe and Petra Sleeman. Amsterdam: John Benjamins, pp. 253–70.

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Typological Differences in Morphological Patterns, Gender Features, and Thematic Structure in the L2 Acquisition of Ashaninka Spanish

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Abstract: It has been widely argued that morphological competence, particularly functional morphology, represents the bottleneck of second language acquisition (Jensen et al. 2017; Lardiere 1998, 2005; Slabakova 2008, 2009, 2013). In this study, we explore three challenging aspects of the morphology of Spanish among advanced L1 Ashaninka—L2 Spanish speakers: (i) the acquisition of proclitics and enclitics with inflected verbs; (ii) the distribution of accusative clitics according to the thematic role of the direct object in anaphoric and doubling structures; and (iii) the distribution of clitic forms and their association with gender features. Our results show evidence of the L2 acquisition of clitic structures in L2 Spanish speakers, and no difference between native and L2 speakers regarding sensitivity to thematic roles. However, there are statistically significant differences between groups in the distribution of the gender specification of the clitic antecedents or doubled determiner phrases (DPs). We take these results as evidence in support of the view that morphological patterns can be acquired (proclitics vs. suffixes) as well as preferences for mapping thematic roles onto clitics, but subtle differences in the continuum of preferences for mapping gender features are more difficult to acquire.

Keywords: clitic features; functional morphology; second language acquisition; contact; typology

1. Introduction

Morphological competence has been identified as the bottleneck of second language acquisition (Jensen et al. 2017; Lardiere 1998, 2005; Slabakova 2008, 2009, 2013). Slabakova (2008) argued that the main challenge for L2 acquisition is the mapping of functional features onto morphology. Proponents of this view have traditionally focused on difficulties in the process of assembly of syntactic features and their morphological representation. Assembly may be rendered especially difficult when the L1 lacks the overt morphology present in the L2, as is the case for tense among L1 Chinese–L2 English learners, especially if the L2 learners have other syntactic resources to convey temporal meaning, such as adverbial adjuncts (Lardiere 1998).

Second language acquisition of morphology may be further complicated when the L1 lacks a syntactic feature that lies at the interface of syntax, morphology and the lexicon in the L2, as is the case with noun gender marking among L1 English–L2 Spanish learners (Hawkins and Franceschina 2004). Even in cases in which the L1 and the L2 exhibit gender as a syntactic feature that triggers agreement between a noun and other categories, differences in gender feature values assigned to corresponding lexical items (a masculine noun in the L1 is feminine in the L2) may result in difficulties in L2

acquisition (Sabourin et al. 2006). Even among advanced L2 learners, evidence of difficulties with gender assignment can be found in the longer reaction times to grammaticality judgments than those of monolinguals (Kirova 2016). These differential results have been attributed to the fact that gender involves the assignment of features to a lexical item as well as the syntactic operation agreement. While L2 learners may be able to master syntactic agreement, its assignment presents challenges especially when gender feature values are non-congruent in L1 and L2 (Sabourin et al. 2006; Kirova 2016). Difficulties in the L2 acquisition of gender features affects not only nouns but also pronominal forms. In the case of accusative clitics, in addition to evidence of difficulties in the acquisition of gender among L2 learners (Grüter 2005; Mayer and Sánchez 2016), there is evidence from child monolingual acquisition of French that clitics marked for gender (third person) are more difficult to acquire than those not marked for it (first and second person) (Delage et al. 2016).

Difficulties in the integration of lexical items, morphemes, and syntactic features are not the only challenges for the development of morphological competence in a second language. Typological differences in morphological patterns also pose challenges in second language acquisition. Differences between agglutinative languages and synthetic ones have been argued to be at the base of difficulties in the acquisition of L2 morphology (Montrul 2001). In some cases, these differences include crosslinguistic differences in phonological patterns. As Abramsson (2003) notes, acquisition of word-final morphology may be affected by the lack of codas in L1 among Chinese L1–Swedish L2 learners. Difficulties in L2 acquisition of morphology in contexts of typological differences can be related to the role that processing of (morpho) syntactic patterns has in L2 acquisition (Pienemann 1998). To acquire morphological patterns that diverge from those in their L1, L2 learners need to be able to recognize them as part of a new morphological template (Freynik et al. 2017). On the basis of evidence from previous studies, at least two sources of difficulties that L2 learners have to overcome to develop morphological competence have emerged: (i) the integration of morphology and other language components (syntax, phonology, and the lexicon) and (ii) crosslinguistic differences in morphological patterns or templates. Determining the extent to which the development of morphological competence in a second language is affected by crosslinguistic differences in the integration of morphology and other language components and by differences in morphological templates, even among advanced early L2 learners, is the main goal of this paper.

Research on the acquisition of direct object argument markers in Spanish as a second language by speakers of Ashaninka presents the ideal situation to study both factors. Spanish and Ashaninka have gender marking in direct object morphemes and exhibit differences in their morphological templates. While in Ashaninka, subject markers are prefixes and object markers are suffixes, as shown in (1), Spanish requires syntactic proclitics with inflected verbs and enclitics with non-inflected verbs, as shown in (2) and (3) respectively.[1]

1. No-kib-ak-e-ro
   1SG.A-wash-PERF-REAL-3F.O
   'I washed it.'

2. Lo lav-é
   CL.3MSG wash-PERF.1SG
   'I washed it.'

[1] We use the following abbreviations: A = agent, CL = clitic, DEM = demonstrative. DET = determiner, DIM = diminutive, DIR = directional, DOM = differential object marking, DP = determiner phrase, EP = epenthetic, F/FEM = feminine, FOC = focus, FUT = future tense, GERUND = gerund, INDEF = indefinite, INF = infinitive, LOC = locative, M = masculine, NM = non-masculine, NOM = nominative, O = object, 1 = first person, 3 = third person, PARTIC = participle, PERF/PFV = perfective, PL = plural, POSS = possessive, PREP = preposition, PRO = pronoun, PST = past tense, R = recipient, REAL = Realis, REFL = reflexive, REL = relativizer, S = intransitive subject, SG = singular, STAT = stative, T = Theme, TOP = topic, PST = past tense.

3. Quier-o ver-lo
want-1SG see.INF-CL.3MSG
'I want to see it.'

At the surface level, sentences such as (1) and (2) show the opposite order regarding argument marking; in Ashaninka, subject marking is pre-verbal while object marking is post-verbal. In Spanish, the direct object is a proclitic, and the subject is marked as a suffix. This inverse ordering of morphological markers should, in principle, present difficulties for second language acquisition as proposed by Pienemann (1998) if processing strategies in the L1 play a role in the recognition of morphological patterns in the L2. Furthermore, this surface order is altered in the case of the uninflected verb in (3)—the direct object is an enclitic, and there is no subject marking on the verb.

In addition to these differences, two other important distinctions between Ashaninka and Spanish in contact with Ashaninka must be noted, one related to the morphological expression of gender in direct object marking and the other one related to thematic roles. Contact varieties of Spanish exhibit gender agreement between determiners and nouns. However, unlike in other varieties of Peruvian Spanish where accusative clitics have a stricter correspondence between the clitic form and gender features of their referents (*lo* for masculine noun phrases (NPs) and *la* for feminine NPs), some Contact Spanish varieties exhibit a scalar system of accusative clitics (*le* > *lo* > *la*) in which *le* and *lo* may have masculine or feminine antecedents (Mayer 2017; Mayer and Sánchez 2016). Native dominant speakers of this type of Contact Spanish are the source of input for L2 learners of Ashaninka Spanish and exhibit a preference for *le* over *lo* for masculine referents and some uses of *la* for feminine referents, which remains available, although limited, in the input for L2 learners.

Concerning thematic structure, we assume a difference in the degree of affectedness of patient and theme objects (Næss 2004). In (2), the patient object undergoes a change, whereas in (3), the theme object remains unchanged. While, in most varieties of Spanish, thematic roles do not seem to be an important source of differentiation between *le* and *lo/la*, in Ashaninka, masculine themes and patients can be marked with either *-ro* (fem) or *-ri* (masc) (Payne 1981; Reed and Payne 1986; Mihas 2010, 2015) but there is a gender-neutral marker, *-ni*, for third person theme objects (Mihas 2015, p. 200). The existence of such distinction in Ashaninka could be the source of some form of transfer among the L2 learners.

Despite these differences, as we will see in the next subsection, both Ashaninka and Spanish allow for doubling of a strong pronoun or, in some cases, a DP, with an object marking morpheme (a suffix in Ashaninka, a clitic in Spanish), making the differences in morphological templates and the assembly of features the focus of the difference between the two languages.[2]

In this study, we explore three challenging aspects of the morphology of Spanish among advanced L1 Ashaninka–L2 Spanish speakers with an early age of acquisition of Spanish who live in a contact situation, as follows: (i) the acquisition of proclitics and enclitics with inflected verbs in doubling and non-doubling structures as they show evidence of the acquisition of a diverging morphological pattern; (ii) the distribution of clitic forms and their association with gender features, as evidence of the integration of morphological forms at the interface with the lexicon and syntax; and (iii) the distribution of accusative clitics according to the thematic role of the direct object, as it pertains to the integration of morphology and argument structure. Even if early advanced L2 learners living in a contact situation show difficulties in these three areas and also exhibit different patterns from those of Spanish-dominant simultaneous bilinguals who are their source of input, we will be able to determine the extent to which each aspect under study presents a challenge for L2 acquisition.

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[2] We use the term DP as per the DP-hypothesis (Abney 1987) in the generative framework. It is usually labeled NP in other frameworks.

1.1. Theoretical Linguistic Background for Ashaninka and Spanish Languages

1.1.1. Ashaninka Morphosyntax

Ashaninka is part of the Arawakan language family. Regarding its case typology, it exhibits nominative-accusative alignment in transitive clauses and fluid transitivity or split intransitive alignment in intransitive clauses (Payne and Payne 2005; Mihas 2015, p. 5). The basic constituent order is either verb-subject (VS) or verb-object (VO) with verbal suffixes obligatorily marking agent/subject (A/S) and patient/object (P/O) arguments. While the subject of a transitive clause receives A-marking, the subject of an intransitive clause receives S-marking. Marking of both arguments is either pre- or post-verbally and is governed by their respective semantic roles. The basic word order for intransitive clauses is verb–intransitive subject, and for transitive clauses it is verb–object.

Nominative-accusative alignment in Ashaninka requires obligatory verbal agreement of both arguments in the main transitive clauses as shown in Examples (4). The A argument (transitive subject) is a prefix on the verb and the O argument (transitive object) a suffix (Mihas 2015). The transitive object markers *-ri* (M) and *-ro* (NM) are suffixes marked for person and gender with the non-masculine object marker as the default feminine marker (Mihas 2015, p. 200). Note that the semantic roles, agent (4a) and experiencer (4b), even with verbs of perception (4c) receive the same marking.

4. a. No-pichov-ak-e-ro pichori pichori
1SG.A-grind-PFV-REAL-3NM.O
'I ground it [leaves] with my hands, pichori pichori 'grinding action'.'

b. No-ñ-i-ri
1SG.A-see-REAL-3M.O
'I saw him.'

c. No-yo-tz-i-ro
1SG.A-know-EP-REAL-3NM.O
'I knew it.'

However, transitivity is not fixed and is mostly determined by the lexical meaning of the verb root. Ashaninka makes generous use of valency increasing and decreasing suffixes with some verbal roots allowing for fluid transitivity which is expressed in morphology and syntax. Moreover, as shown in (5), ambitransitive verbal roots may or may not show the morphological marking of their increased or decreased value of valency (Mihas 2015, p. 194).

5. a. N-a-ak-i kaniri
1SG.S-take-PERF-REAL manioc
'I obtained manioc roots.'

b. N-a-ak-i-ri
1SG.A-take-PERF-REAL-3M.O
'I took him [as a spouse].'

While subjects are marked obligatorily on the verb, object arguments receive verbal marking depending on grammatical function, i.e., semantic role (patient, theme) and information status. Object arguments can be crossreferenced by an overt pronoun, as in (6a), with demonstratives in the post-verbal (6b) and pre-verbal (6c) positions. As a general rule, overt coreferential DPs always appear to be right dislocated, as in (5a) (Mihas 2015, pp. 409, 199–200).

6. a. Y-ook-ai-t-an-ak-i-ri irirori i-piyatsa-t-a
3M.A-abandon-IMP-EP-DIR-PFV-REAL-3M.O 3M.FOC 3M.S-disobey-EP-REAL
'They abandoned him, too, [because] he disobeyed.'

b. Pi-yo-tz-i-ri iyoka?
2A-know-EP-REAL-3M.O DEM.NOM.M
'Do you know this one (masculine)?'

c. Rora no-saa-tz-i no-shipok-i-ri
DEM.NOM 1SG.S-sweat-EP-REAL SG.A-bathe.with.herbs-REAL-3M.O
'Those [patients] I steam-bathe; I bathe them with herbs.'

In ditransitive argument structures, the theme can be marked in two ways, with one of the gender-specifying object suffixes *-ri* or *-ro*, as in (7a), or with the gender-neutral specific theme marker, *-ni*, as in (7b) (Mihas 2015, pp. 200–2).

7. a. Iro p-ak-e-na-ro
3NM.TOP give-PFV-REAL-1SG.R-3NM.T
'She was the one who gave it to me.'

b. Iroñaakano-tyank-i-ni-ri aisatzi no-tomi saik-atsi-ri
now 1SG.A-send-REAL-3T-3M.R also 1SG.POSS-son be.at-STAT-REL
Irimashi-ki
NAME-LOC
'I sent it [money] to my son, who is living in Lima.'

The suffixes *-ri* (M) and *-ro* (NM) are used to mark either of the two gender classes on some nouns, adjectives, demonstratives, third-person pronouns and verbal S and O agreements. While masculine gender is used to refer to mixed groups of people and animals, specific groups can receive gender-specific marking. A basic distinction in allocating gender on nouns is sex for human nouns and animacy for inanimates. For the latter, the animate/inanimate distinction is based on cultural assumptions related to their mythology, and inanimates are marked by the non-masculine default. Also, gender agreement is quite complex due to the existence of plenty of exceptions (cf. Mihas 2015, pp. 330–32).

In sum, Ashaninka marks transitive objects with bound morphemes in the form of verbal affixes, which are syncretically specified for person and gender. In addition, free personal pronouns occurring in either pre-verbal or post-verbal positions are used to mark information structure, but overt NPs are always post-verbal. As we will see in the next section, these structures have corresponding ones in Spanish. The existence of three common surface orders (pre- and post-verbal strong pronouns as well as doubled post-verbal NPs) in both languages may contribute significantly to the acquisition of Spanish clitic doubled and dislocated structures by Ashaninka–Spanish bilinguals. Thus, Ashaninka shares the following attributes with Spanish: (1) a set of features including number and gender mapped onto a bound morpheme; (2) the existence of overt pronouns co-occurring with bound argument-marking morphemes; and (3) the possibility of restructuring word order pragmatically by marking information structures with pre- and post-verbal overt pronouns co-occurring with verbal agreement, as well as by NP doubling.

1.1.2. Spanish Morphosyntax

Spanish is part of the Romance family. It is similar to Ashaninka with respect to nominative-accusative alignment and subject and object verbal agreement marking. Spanish has a set of optional subject pronouns and gender and number-specifying direct object clitics. Spanish clitics have been identified as morphological markers (Suñer 1988) at the phonology, morphology, syntax, semantics, and information structure interface (Belloro 2007; Mayer 2017; Ordóñez and Repetti 2006; Spencer and Luís 2012; Zwicky 1985). They play an important role in argument marking (Harris 1995).

Typically,[3] clitic pronouns or direct object clitics are phonologically unstressed pronouns; they show gender and number features and are dependent on a verbal host. With single inflected verbs, they occur in anaphoric agreement as proclitics as in (8).

8. Ella lo /la v-ió
PRO.3FSG CL.3MSG /CL.3FSG see-PST.3SG
'She saw him/it, her/it.'

In structures with inflected and uninflected verbs such as restructuring constructions, clitics can occur in either position, as enclitics attached to the non-finite verb, as in (9a), and as proclitics preceding the finite verb in the form of clitic climbing, as in (9b).

9. a. Ella quiere v-er.lo/la
PRO.3FSG want-3SG see-INF.CL.3MSG/CL.3FSG
'She wants to see him/it, her/it.'

b. Ella lo/la quier-e v-er
PRO.3FSG CL.3MSG/CL.3FSG want-3SG see-INF
'She wants to see him/it, her/it.'

Clitic doubling (CLD), as in (10), that is, co-occurrence of a clitic with a referential full DP is accepted in some varieties and restricted to pronominal DPs in most. In doubling constructions, strong pronouns or full DPs are usually preceded by the differential object marker a, also known as Kayne's Generalization (Kayne 1975).

10. Lo v-i a él / Juan
CL.3MSG see-PST.1SG DOM PRO.3MSG / Juan
'I saw him, Juan.'

Like Ashaninka, Spanish marks information structure by word order rearrangement in terms of clitic left dislocation (CLLD) (11a) and clitic right dislocation (CLRD) (11b).

11. a. A Juan lo vi ayer
DOM Juan CL.3MSG see-PST.3SG yesterday
'As for Juan, I saw him yesterday.'

b. Lo vi ayer a Juan
CL.3MSG see-PST.3SG yesterday DOM Juan
'I saw him, Juan, yesterday.'

As shown above, Spanish exhibits a highly complex interaction of differential object marking (DOM) and feature-specifying clitics to identify the grammatical functions of the object arguments. The thematic roles of these arguments depend on the subcategorization frames of the predicate and play an important part in the conceptualization of its meaning (Dryer 1986; Jackendoff 1990; Andrews 2007; a.o.).

For the purpose of this study we are only concerned with the main thematic roles which include the agent (typically assigned to the external argument or subject); patient (typically assigned to internal arguments or direct objects) as the main active participatory roles with transitive verbs (e.g., kill) as in (12) where all patient objects [+human, +animate,−animate] undergo a change; and theme (also typically assigned to internal arguments or direct objects) with perception verbs (e.g., see) as in (13) where the direct object arguments [+human, +animate, −animate] remain unchanged exhibiting marginal to no participation in the verbal action. Both examples show no difference in case marking

[3] We are grateful to an anonymous reviewer for bringing the stressed nature of accusative clitics in Rioplatense Spanish clitic clusters to our attention.

based on the semantic roles. They only differ with regard to animacy where human objects receive obligatory case marking, animate objects receive optional marking, and inanimate objects receive no case marking at all.

12. Clara mata a Juan / (a) la mosc-a / el tiemp-o
Clara kill.3SG DOM Juan / (DOM) DET.FSG fly-FSG / DET.MSG time-MSG
'Clara kills Juan / the fly / time.'

13. Clara ve a Juan / (a) la mosc-a / el tiemp-o
Clara see.3SG DOM Juan / (DOM) DET.FSG fly-FSG/DET.MSG time-MSG
'Clara sees Juan / the fly / time.'

One of the main characteristics that may result in differences in morphological marking of internal arguments is the affectedness of the object (Dalrymple and Nikolaeva 2011; Hopper and Thompson 1980; Mayer 2017; Næss 2004). Patient objects are directly affected by the verbal action through a volitional agent and manifest a visible change of state. The optionality of marking animate nonhuman objects and the lack of morphological marking of inanimates shows that affectedness is (a) gradient and (b) strongly correlated with the semantic features, animacy and definiteness of the object NP. However, unlike Ashaninka which distinguishes between patients and themes with different argument markers on ditransitive verbs, as shown in examples (7a and b), most varieties of Spanish do not exhibit sensitivity to semantic roles in the selection of a clitic form in doubling expressions. In most varieties, patients and themes do not receive specialized clitic forms in Spanish. As we will see below, this might not reflect the input that Ashaninka L1–L2 Spanish speakers receive from native speakers of Spanish in contact with Ashaninka as there seems to be some preference for forms like *le* for themes and *lo* for patients among them.

The complex combination of different morphosyntactic templates, feature-specifying clitics and differential morphological case-marking based on verbal lexical semantics in Spanish in contact with Ashaninka presents Ashaninka L2 learners with an intricate morphological and syntactic path of acquisition that may result in residual non-target forms even among advanced learners.

1.2. Research Questions and Hypothesis

Given the main differences between Ashaninka and Spanish with respect to the morphosyntactic patterns, feature specification and semantic roles involved in the marking of the internal arguments presented above, in this paper, we explore the following research questions, as they pertain to the oral production of advanced early L2 learners living in a contact situation:

1. How do differences in morphological patterns between L1 and L2 affect the L2 acquisition of internal argument marking (Spanish cliticization)?
2. Do gender features that require assembly at the interface of the lexicon, syntax and morphology present difficulties for the acquisition of clitic structures?
3. Is the L2 acquisition of internal argument clitics affected by sensitivity to thematic roles in the L1?

We formulated the hypotheses below:

1. Differences in morphological templates (suffixes vs. proclitics) should present difficulties in second language acquisition. If morphology, per se, is the bottleneck of second language acquisition, irrespectively of the integration or assembly of features from different components, we would expect that even at higher levels of proficiency, L2 learners will exhibit some residual difficulties with cliticization.
2. Feature assembly that requires the interface of syntax, morphology and lexicon, such as the assembly of gender features in pronominal clitics, presents difficulties for second language learners, even if the L1 has such features. If the main challenge in second language acquisition of morphology stems from difficulties in the integration of different language components, we expect L2 learners to show difficulties with gender assembly.

3. Mapping of semantic roles onto morphology should also be difficult in L2 acquisition, as it requires some level of integration of different language components, especially if the L1 exhibits some differences from the L2.

If our first hypothesis is correct, we expect to find significant differences between L2 learners and Spanish-dominant native speakers with respect to the availability of proclitics with inflected verbs. Support for our second hypothesis would come from differences between native and L2 speakers in the distribution of clitics. L2 learners should exhibit a higher frequency of clitics unmarked for gender and a lower frequency of clitics that correspond to the gender of their antecedents. Finally, support for our third hypothesis would come from differences in the mapping of semantic roles onto Spanish clitics between natives and L2 learners that reflect L1 patterns.

2. Materials and Methods

The data presented here are part of fieldwork data collected in 2016 in two native Ashaninka communities in Peru in the Satipo and Puerto Ocopa areas of the Junín province in the Amazonian region of Peru: Arizona Portillo and Puerto Ocopa.

2.1. Participants

For this study, we analyzed the oral production of dominant Spanish native speakers (N = 9) (SN) and advanced L1 Ashaninka–L2 Spanish speakers (N = 18) (L2) matched for proficiency (Australian National University, Dr. Mayer, ANU Ethics Protocol 2016/502, Record number: 8473 and Rutgers, The State University of New Jersey, Dr. Sánchez, Rutgers, IRB Protocol number: El7-168). Both groups were living in a contact situation at the time of the interviews. Participants in both groups scored 8 or higher out of 10 in the proficiency test. Of the total of 27 participants, 13 were drawn from Arizona Portillo and 14 from Puerto Ocopa.

Dominant Spanish speakers reported Spanish as their first and childhood language. Two of them stated that they had no knowledge of any other language, and three stated that they had some basic understanding of English. Four stated they had some very basic knowledge of Ashaninka and one participant had some knowledge of Yanesha. As shown in Table 1, seven out of the nine dominant Spanish native speakers came from Arizona Portillo and two from Puerto Ocopa, six females, and three males. Three participants, one female, and one male as well as the only older participant, a 67-year-old male, had primary education (Prim). Three females had secondary education (Sec), and two females and one male had higher education (HE). For the latter, HE refers to an Agricultural Technical Institute in the Puerto Ocopa Community, where students are taught in both languages, Spanish and Ashaninka.

Table 1. Spanish native speakers (SN) by age, location, education, and gender.

SN (9)	Origin		Education			Gender	
Age	**Arizona Portillo**	**Puerto Ocopa**	**Prim**	**Sec**	**HE**	**F**	**M**
18–35	6	2	2	3	3	6	2
36–80	1	0	1	0	0	0	1
Total	7	2	3	3	3	6	3

Prim: Primary; Sec: Secondary; HE: Higher Education.

The numbers of L2 Spanish participants were even across the two age groups and communities, with six from Arizona Portillo and twelve from Puerto Ocopa, as shown in Table 2. The age of acquisition of Spanish in this group ranged from 6 to 15 years old, and in some cases, this coincided with exposure to Spanish through the school system. Gender distribution was the same as for the SN group, albeit with doubled numbers, with twelve females and six males, distributed evenly across both age groups. The distribution of education was the reverse for the age groups. The younger generation had one male with primary education, three with secondary education—one female and

two males—and five with higher education—four females and one male. The older generation included four females with primary education, four with secondary education—two females and two males—and a female with higher education. Higher education refers to the participants from the Agricultural Technical Institute in the Puerto Ocopa Community.

Table 2. Advanced L2 Spanish speakers by age, location, education, and gender.

L2 (18)	Origin		Education			Gender	
Age	**Arizona Portillo**	**Puerto Ocopa**	**Prim**	**Sec**	**HE**	**F**	**M**
18–35	3	6	1	3	5	5	4
36–80	3	6	4	4	1	7	2
Total	6	12	5	7	6	12	6

At the time of the data collection, all participants were living in their communities and were actively involved in maintaining the livelihood and safeguarding the security of their communities through nightly border controls. Except for three older participants, all others claimed to be able to read and write in Spanish, and very few younger L2 bilinguals, specifically in Puerto Ocopa, claimed to be able to read and write in Ashaninka.

Both communities are rural, but the Arizona Portillo community is relatively close to Satipo, which is the major trading town in the province. This community is quite small, with around 60 families, led by an indigenous leader who is a linguist and strong advocate for intercultural bilingual education. Most adults work either in Satipo or close to Satipo while tending to their fields after work. Different from most Ashaninka communities, they accept speakers of other indigenous languages into their community. Community bilingualism is supported by the community and the local primary school. Arizona Portillo is one of the very few Ashaninka communities where the students in the bilingual primary school are taught by an Ashaninka-speaking teacher. The community of Puerto Ocopa is quite large with around 200 families and very healthy community bilingualism. They have educational and medical infrastructure, the latter in the form of a small hospital and an ambulance. The local bilingual primary and secondary school is run by Quechua-speaking nuns who live in the convent that houses orphans and children sent to attend school from remote Central Amazonian communities. Ashaninka is not taught due to a lack of certified Ashaninka teachers, but it is spoken during recess and at home. The Agricultural Technical Institute is unique in its approach of combining technical knowledge about sustainable local agriculture and nursing with indigenous language and culture. Students study their subjects in both languages, Spanish in oral and written form and Ashaninka mostly in oral form, despite the availability of a unified alphabet.

2.2. Instruments and Procedures

To investigate the research questions, we used a questionnaire about language history, preferences for language use and attitudes towards Ashaninka and Spanish, followed by a picture-based elicitation task, both orally administered and followed by a written Spanish proficiency test (see Appendix A for all instruments). The short Spanish proficiency test was adapted from the cloze test section of the DELE version used in Cuza et al. (2013). The biographic questionnaire and the oral narrative of the frog story based on the pictures were recorded. For this study, only the latter was transcribed using CHILDES in ELAN software (The Language Archive, Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands). All transitive verbs with clitics and null arguments were coded according to (i) morphological patterns (proclitics vs. enclitics); (ii) the gender of the antecedent or doubled DP; and (iii) the thematic role of the object. For this study, participants were divided into two groups: SN and L2 on the basis of the biographical data from the questionnaire. Both groups were matched for proficiency using the results of the language proficiency test with a cutoff point of 8 or higher

out of 10 points. All participants except for three older illiterate people filled in the proficiency test themselves after the oral narration. Participants' proficiency in Ashaninka was not tested.

3. Results

3.1. Acquisition of Morphological and Syntactic Patterns

Concerning the distribution of proclitics and enclitics, L2 acquirers showed no statistically significant differences from contact L1 speakers who were their source of input (Table 3). A chi-square test did not confirm independence of preference ($\chi 2(2, N = 335) = 0.05$, $p = 0.97$).

Table 3. Proclitics vs. enclitics.

	SN	L2
Proclitics	93 (88%)	199 (87%)
Enclitics	12 (11%)	28 (12%)
Other	1 (1%)	2 (1)%
Total	106 (100%)	229 (100%)

The following are examples of sentences with a proclitic and an enclitic produced by second language learners:

14. Proclitics

Le	bot-ó	al	agua
CL.3SG	throw-PST.3SG	LOC-DET.MSG	water

'He threw him into the water.'

15. Enclitics

Y	el	niño	<(es)t-á>[/]	(es)t-á	llev-ándo-le
and	the	boy	be-3SG	be-3SG	carry-GERUND-CL.3SG

'And the boy is bringing it.'

As we will see below, there were only two cases of reduplication of an internal argument in a restructuring context involving a proclitic and an enclitic (20) which was the only indication of some residual difficulty with cliticization (see the Discussion).

The distribution of clitic structures in the narratives of the two groups did not differ significantly either (Table 4). A chi-square test did not confirm independence of preference ($\chi 2(4, N = 335) = 5.87$, $p = 0.20$).

Table 4. Clitic structures.

	SN	L2
Anaphoric	66 (62%)	126 (55%)
CLD	32 (30%)	73 (32%)
CLLD	4 (4%)	23 (10%)
CLRD	4 (4%)	5 (2%)
Reduplication	0 (0%)	2 (1%)
Total	106 (100%)	229 (100%)

CLD: Clitic doubling; CLLD: clitic left dislocation; CLRD: clitic right dislocation.

The group of L2 learners produced sentences with anaphoric clitics (16) as well as sentences with CLD (17), CLLD (18), CLRD (19) and two cases of reduplication which are exemplified in (20):

16. Anaphoric
El perro también lo mir-ó amargo
the dog also CL.3MSG see-PST.3SG bitter
'The dog too looked at him upset.'

17. CLD
El niño le alz-a al perr-it-o
the boy CL.3SG carry-3SG DOM-DET.MSG dog-DIM-MSG
'The boy picks up the little dog.'

18. CLLD
Al otro sap-it-o le habían dejado porque
DOM-DET.MSG other toad-DIM-MSG CL.3SG have left-PARTIC behind because
era muy gruñón
be.3.PST very grumpy
'They had left the other toad behind because he was very grumpy.'

19. CLRD
Aquí le está carg-ado la tortug-a al sap-o.[4]
here CL.3SG be.3SG carry-PARTIC DET.FSG turtle-FSG DOM-DET.MSG toad-MSG
'Here, the turtle has carried the toad.'

20. Reduplication
Para que lo pued-e describir-le
for that CL.3MSG can-3SG describe.CL.3SG
'So that he can describe him.'

Furthermore, there were no statistically significant differences between the two groups with respect to the distribution of the clitic forms, nor with respect to clitic omission, as shown in Table 5. A chi-square test did not confirm independence of preference ($\chi 2(4, N = 334) = 2.20$, $p = 0.69$).

Table 5. Distribution of clitics and null pronouns.

	SN	**L2**
le	56 (52.8%)	131 (57.4%)
lo	42 (39.6%)	81 (35.6 %)
la	5 (4.7%)	6 (2.6%)
l'	2 (1.9%)	8 (3.5%)
null	1 (1%)	2 (0.9%)
Total	106 (100%)	228 (100%)

We take this to indicate that even though the frequency of the feminine form *la* was very low in this task among native and L2 learners, it is not completely absent from the oral production of some individuals in both groups.

As in previous studies of Spanish in contact with indigenous languages such as Quechua and Shipibo in Peru based on data from oral narratives (Mayer and Sánchez 2016, 2017), the distribution of direct object clitics shows a hierarchical pattern in which the clitic *le* is more frequent, followed by *lo*, *la* and *l'* before vowels, as the following examples from native speakers show:

[4] The verbal form *está cargado* is a form of past tense found also in other contact varieties of Spanish in Peru (Sánchez 2015).

21. El ñiño **le** ha conseguido a los dos, a los
the boy CL.3SG has get-PARTIC DOM DET.MPL two, DOM DET.MPL
perr-it-os, la ran-a y la tortug-a
dog-DIM.MPL DET.FSG frog-FSG and DET.FSG turtle-FSG
'The boy has gotten both of them, the little dogs, the frog and the turtle.'

22. El ñiño **lo** abr-ió <el> [//] la caj-a
the boy CL.3MSG open-PST.3SG DET.MSG DET.FSG box-FSG
'The boy opened the box.'

23. En realidad <**las**> [//] **los** quiere a tod-os
in reality CL.3FPL CL.3MPL love-3SG DOM all-MPL
'In reality (s)he loves them all.'

24. La tortug-a **l'** está molest-ando al sap-o
DET.FSG turtle-FSG CL.3SG is-3SG bother-GERUND DOM-DET.MSG toad-MSG
'The turtle is bothering the toad.'

The preference for *le* has been attributed in some of those previous studies to the fact that the L1 of the substratum languages (Quechua and Shipibo) lacks gender. This is not the case for Ashaninka speakers as internal argument morphemes in Ashaninka are marked for gender. Different from Spanish though, feminine gender is marked in Ashaninka as the default gender, whereas masculine is the default in Spanish.

As mentioned above, among doubling structures, the most frequent was CLD with a higher frequency of *le* followed by *lo* and very low numbers of *la* and *l'* among Spanish-dominant speakers and L2 learners (Table 6).

Table 6. Clitics according to clitic doubling structure.

	CLD		**CLLD**		**CLRD**	
	SN	**L2**	**SN**	**L2**	**SN**	**L2**
le	19 (50%)	50 (68%)	1 (25%)	11 (48%)	4 (100%)	4 (80%)
lo	11 (34%)	21 (29%)	2 (50%)	11 (48%)	0 (0%)	1 (20%)
la	1 (3.5%)	1 (1.5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
l'	1 (3.5%)	1 (1.5%)	1 (25%)	1 (4%)	0 (0%)	0 (0%)
Totals	32 (100%)	73 (100%)	4 (100%)	23 (100%)	4 (100%)	5 (100%)

3.2. Acquisition of Gender

Even though, like SN speakers, L2 learners showed a preference for *le* with masculine antecedents, there were statistically significant differences between the two groups with respect to the distribution of the gender specification of the clitic antecedents and doubled DPs ($\chi 2(1, N = 327) = 22.45$, $p = 0.0002$). L2 learners had significantly more masculine antecedents and doubled DPs than SN natives and therefore, had a higher frequency of clitics with masculine antecedents than SNs ($\chi 2(8, N = 327) = 28.86$, $p = 0.000$), as shown in Figure 1 below.

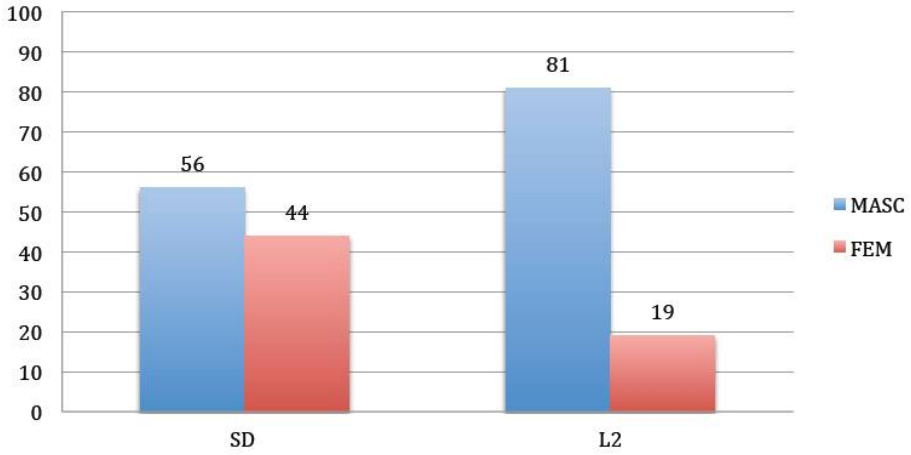

Figure 1. Gender of antecedents and doubled determiner phrases (DPs) of the clitic *le* in percentages.

It is important to highlight that some of the referents in the story that were meant to elicit feminine DPs, such as *la tortuga* 'the.FEM turtle-FEM' or *la rana* 'the.FEM frog.FEM', were produced sometimes by L2 learners as headed by a masculine determiner as in:

25. Empez-ó a morder-le a-l ran-it-a
begin-PST.3SG to bite.INF-CL3.SG DOM-DET.MSG frog-DIM-FSG
'(He) began to bite the little frog.' (L2-AP50)

Notice that in (25), while feminine gender assignment is evidenced by the feminine suffix *-a* after the diminutive infix *-it*, the differential object marker shows the masculine form *al*. This suggests some residual difficulties in gender agreement inside the DP. As we will discuss below, this difficulty affected nouns with congruent gender assignment in Ashaninka and Spanish as well as nouns with non-congruent gender assignment in the two languages.

In terms of the antecedents of anaphoric clitics, SN speakers exhibited, as expected, a slight preference for *lo/la* (34) over *le* (32) with almost even numbers for *lo* for masculine (14) and feminine (15) antecedents and very low numbers for *la* with feminine (4) and masculine (1) DPs. As corroborated by ($\chi 2(3, N = 86) = 9.7$, $p = 0.000$), the distribution for L2 learners was significantly different with *le* (76) preferred over *lo/la* (52). The masculine clitic *lo* was strongly preferred for masculine referents (38) over feminine (9); the gender-specific *la* marked feminine (3) over masculine (2).

The following are examples of *lo* with masculine and feminine antecedents from Spanish-dominant speakers (26 and 27) and examples of *le* with masculine and feminine antecedents from L2 speakers (28 and 29):

26. *Lo* + masc
Lo est-á agarr-ando
CL.3.MSG be-3SG grab-GERUND
'(S/he) is grabbing him.'
(Antecedent: el sapo 'DET.MSG toad-MSG.')

27. *Lo* + fem
Vuelv-e, lo bot-a
come back-3SG CL.3MSG throw out-3SG
'Comes back and throws it out.'
(Antecedent: *la* rana 'DET.FSG frog-FSG.')

28. *Le* + masc
Le met-e en la caj-a
CL.3SG put-3SG PREP DET.FSG box-FSG
'He puts him in the box.'
(Antecedent: el sapo 'DET.MSG toad-MSG')

29. *Le* + fem
Quer-rá morderle no s-é
want-FUT-3SG bite-INF.CL3SG not know-1SG
'He might want to bite her; I don't know.'

We take this to indicate that in this language contact situation, there is a continuum of the assembly of gender features and clitics in oral production that goes from the mapping in anaphoric structures of masculine and feminine features onto *lo* among the SN speakers to a preference for the unmarked clitic *le* among the L2 learners who produced a lower number of feminine antecedents overall. This seems to indicate that in this contact situation, the mapping of gender features onto clitics in oral production remained unstable, even among native speakers, but with a higher frequency of anaphoric *le*, the clitic unmarked for gender, among L2 learners.

Table 7 shows that the distribution of *le* with feminine antecedents in all structures was slightly lower among L2 learners than amongst SNs and that both the SNs and the L2 learners exhibited low numbers and low percentages of *la* with feminine antecedents or doubled DPs.

Table 7. Clitics according to the gender of the antecedent or the doubled DP.

	SN		**L2**
le + fem	18 (17%)	*le* + fem	22 (10%)
le + masc	38 (36%)	*le* + masc	106 (48%)
lo + fem	24 (23%)	*lo* + fem	15 (7%)
lo + masc	17 (16%)	*lo* + masc	65 (29%)
la + fem	4 (4%)	*la* + fem	3 (1%)
la + masc	2 (2%)	*la* + masc	3 (1%)
l' + fem	0 (0%)	*l'* + fem	1 (0.5%)
l' + masc	2 (2%)	*l'* + masc	6 (3%)
other	0 (0%)	other (*se* + fem)	1 (0.5%)
	105 (100%)		222 (100%)

The following examples from L2 learners illustrate the distribution of each clitic with feminine and masculine antecedents or doubled DPs:

30. *Le* + fem
El niño **le** mir-a la caj-a
the boy CL.3SG look-3SG DET.FSG box-FSG
'The boy looks at the box.'

31. *Le* + masc
El niñ-o **le** agarr-a al sap-o
the boy-MSG CL.3SG grab-3SG DOM-DET.MSG toad-MSG
'The boy grabs the toad.'

32. *Lo* + fem
Lo abr-ió la caja
CL.3MSG open-PST-3SG DET.FSG box-FSG
'(S)he opened the box.'

33. *Lo* + masc
Y la tortuga **lo** renieg-a al sapo
and DET.FSG turtle-FSG CL.3MSG scold-3SG DOM-DET.MSG toad-MSG
'And the turtle scolds the toad.'

34. *La* + fem

Se	da cuenta		la	tortuga	más	allá	cuando	el
REFL.3SG	recognize-3SG		DET.FSG	turtle-FSG	more	there	when	DET.MSG
dueñ-o		est-aba	ahí	esper-ándo-**la**				
owner-MSG		be-PST.3SG	there	wait-GERUND-CL.3FSG				

'He recognises the turtle further away when the owner was there waiting for her.'

35. *La* + masc

La	ha	gust-a(d)o	el	niñ-o	un	sap-it-o
CL.3FSG	have-3SG	like-PARTIC	DET.MSG	boy-MSG	INDEF.MSG	toad-DIM-MSG

'The boy liked a toad.'

36. *L'* + fem

L'	hecho	asust-ar	la	grand-e
CL.3FSG	do-PST-PARTIC	frighten-INF	DET.FSG	big-SG

'He frightened the big one.'

37. *L'* + masc

O	**l'**	ha	mat-ado	ahí
or	CL.3MSG	have-3SG	kill-PARTIC	there

'Or he has killed him there.'

We interpret these results as giving partial support for our second hypothesis in the sense that, while SNs and L2 learners showed unstable patterns of gender feature assignment to clitics, L2 learners showed a higher frequency of the unmarked clitic *le* in anaphoric contexts than SNs. They also showed a higher frequency of masculine antecedents than SNs, some of which can be attributed to the use of a default masculine determiner inside the DP, as exemplified in (25). Unlike cliticization, which did not seem problematic for either of the two groups, the mapping of gender features onto clitic forms remains subject to some residual variation in both groups in oral production.

3.3. Sensitivity to Thematic Roles

Concerning the third hypothesis, L2 acquirers did not differ from SNs in their sensitivity to thematic roles ($\chi 2(6, N = 331) = 3.21$, $p = 0.784$) which indicates they have a similar distribution of preference of *le* for themes and patients.

Table 8 shows the distribution of clitics according to the theme role. This indicates that L2 Spanish learners showed a slight preference for *lo* over *le* in marking theme and also, one instance of the abbreviated form *l'* was shown. Both groups did not use the feminine gender specific clitic *la* for the theme role.

Table 8. Clitics according to thematic role (theme).

	SN	**L2**
le + theme	19 (70%)	42 (66%)
lo + theme	8 (30%)	21 (33%)
la + theme	0 (0%)	0 (0%)
l' + theme	0 (0%)	1 (1%)
Totals	27 (100%)	64 (100%)

The examples below show the use of *le* as an enclitic to mark a masculine theme by an L2 acquirer in (38), and in (39), and the anaphoric *lo* referring to a masculine indefinite determiner by an SN speaker is shown.

38. *Le* + theme

Este	el	perro	el	niño	está	observándo**le**
this	DET.MSG	dog-MSG	DET.MSG	boy-MSG	be-3SG	watch-PARTIC-CL.3SG

'Ehem, the boy is watching the dog.'

39. *Lo* + theme

Allá	en	mi	pueblo	**lo**	llama-mos	bals-a
there	in	POSS	Village-MSG	CL.3MSG	call-1PL	raft-FSG

'There in my village we call it raft.'

The distribution of clitics according to the patient role is shown in Table 9. In line with the previous result, L2 Spanish learners showed a clear preference for *le* over *lo* for the patient role with a lower number for the feminine gender specific *la* and a slightly higher percentage for the phonologically reduced form *l'*. SN speakers, on the other hand, exhibited only a slight preference for *le* over *lo* to mark the patient role.

Table 9. Clitics according to thematic role (patient).

	SN	**L2**
le + patient	37 (47%)	89 (55%)
lo + patient	34 (44%)	60 (37%)
la + patient	5 (6%)	6 (4%)
l' + patient	2 (3%)	7 (4%)
Total	(100%)	(100%)

The examples below illustrate the use of two preferred clitics to mark the patient role by an L2 learner (40) and by a native speaker (41).

40. *Le* + patient

La	tortuga	lo	ha	visto	como	**le**	ha
DET.FSG	turtle-FSG	CL.3MSG	have-3SG	see-PARTIC	how	CL.3SG	have-3S
empujado							
push-PARTIC							

'The turtle saw that he had pushed him.'

41. *Lo* + patient

Pero	el	sap-o	**lo**	mat-ó
but	DET.MSG	toad-MSG	CL.3MSG	kill-PST.1SG

'But the toad, I kill him.'

In the distribution of thematic roles in anaphoric clitics, L2 Spanish learners showed a slightly higher preference for patient over theme roles than SN speakers, although both groups showed a higher frequency of patient roles, probably due to the nature of the actions depicted in the pictures (kick, bite, etc.):

42. a. SN
Patient (67%) > Theme (33%)

b. L2
Patient (72%) > Theme (28%)

The scalar systems for the distribution of thematic roles in doubling structures showed differences between both groups.

43. a. SN
Theme: CLD (23.6%) > CLLD (2.5%) > CLRD (0%)
Patient: CLD (67.5%) > CLRD (10%) > CLLD (7.5%)

b. L2
Theme: CLD (23.7%) > CLRD (2.97%) > CLLD (1.98%)
Patient: CLD (48.51%) > CLLD (21%) > CLRD (1.78%)

These differences, however, do not seem to affect the general preference in both groups for *le* over *lo* with both thematic roles. We take these results to be evidence in support of the view that morphological patterns can be acquired (proclitics vs. suffixes) as well as preferences for mapping thematic roles onto *le* and *lo*, but subtle differences in the continuum of preferences for mapping gender features are more difficult to acquire.

4. Discussion

The results do not support our first hypothesis. On the contrary, they show evidence of the acquisition of cliticization in the L2 Spanish of Ashaninka speakers with only two tokens of reduplication as an indication of possible residual difficulty with cliticization patterns.[5] They indicate that advanced L2 learners do not exhibit residual transfer effects, such as suffixation of internal arguments, and only exhibit minimal evidence of compensatory strategies, such as reduplication, that allow them to mark internal arguments as pre- and post-verbal clitics. If L2 learners had experienced more difficulties in the acquisition of procliticization due to suffixation of internal arguments with inflected verbs in their L1, we would expect reduplication to be more frequent among advanced learners. Notice that, in Example (20), the proclitic and the enclitic are not identical, which leads us to think that the proclitic and the enclitic are not exact copies. Reduplication, rather than an actual process of syntactic copy and deletion (Chomsky 1993), seems to be a way of marking the internal argument of the lower verb in the clause below, even though cliticization has taken place. Of course, further research on this is needed to examine whether L2 learners with lower levels of proficiency exhibit more evidence of this strategy. If we assume that clitics in anaphoric and restructuring contexts are syntactic clitics that involve movement (Kayne 1975; Torrego 1996) and the ones in CLD structures are considered morphological agreement markers in Spanish (Mayer 2017; Sánchez and Zdrojewski 2013; Suñer 1988; Torrego 1998), then L1 Ashaninka–L2 Spanish advanced speakers show evidence in their oral production of having acquired both clitic movement and pre-verbal internal argument marking.

At first glance, these results seem to question the Bottleneck Hypothesis (Slabakova 2008) by challenging the notion that functional morphology, per se, is difficult to acquire. However, we would like to propose that there is an important difference between the acquisition of the morphosyntactic patterns of cliticization and the specification of features with which morphemes are associated. Advanced L2 learners showed ample evidence of procliticization, with inflected verbs and encliticization with non-finite forms used in the input. Our results are consistent with work that has shown evidence of successful acquisition of morphosyntactic patterns, such as clitic climbing (Duffield and White 1999; Pérez-Leroux et al. 2011). This supports the view that the acquisition of cliticization as a syntactic property is not affected by the lack of such processes in the L1 or by the existence of different morphological patterns.

Concerning the second hypothesis, according to which the assembly of gender features and the morphosyntactic properties of clitics should generate difficulties in L2 acquisition, our hypothesis was confirmed, although the answer to our research question was more complex than anticipated. The SN data revealed a situation in which SN speakers who serve as sources of input for L2 learners showed some instability in the gender marking of clitics, although they showed a scalar system, whereby *le* > *lo* > *la*. L2 learners also revealed a similar scalar system. L2 learners had higher levels of masculine antecedents in their overall production and evidence of masculine determiners with feminine nouns. This happened with non-congruent nouns in the L1 and the L2, such as *mashero* 'toad' (non-masculine) and *sapo* 'toad' (masculine), and even with nouns with congruent gender assignment, such as *pirinto*, *obanto* 'frog' (non-masculine in Ashaninka), and *rana* 'frog' (feminine in Spanish). These results do not support simple cross-language gender matching based on differing gender defaults in both

[5] Although clitic reduplication might be the result of residual L1 representations, it has also been attested in monolingual Spanish in non-contact varieties, as mentioned by an anonymous reviewer.

languages. Similar to Spanish in contact with Quechua and Shipibo, which are both languages without gender (Mayer and Sánchez 2016, 2017), L1 Ashaninka–L2 Spanish learners' data also showed a higher frequency of *le* unmarked for gender as anaphoric clitics than SN data. However, in doubling structures, L2 learners showed higher percentages of *lo* with masculine DPs than with feminine ones in comparison with SN speakers. This could be attributed to the higher percentage of masculine DPs in their narratives. Our findings are consistent with the evidence from previous L2 and L1 studies that have attributed difficulty with gender assignment to difficultygenerating a new lemma (Jiang 2000, p. 51) with the gender feature specification of nouns in the L2 (Franceschina 2001; Kirova 2016). Lemmas harbor the relevant semantic and syntactic specifications belonging to the phonetic form. It is possible that such specific grammatical information may be part of L2 learners' lexical knowledge but not yet of their lexical competence[6]. L2 learners may be located at an intermediate stage where they match the L2 lexical form with the L1 lemma information, which usually lacks the language-specific morphological information of the L2 lexical item. In fact, it is also possible to conceive that the activation of the L1 lemma information may sometimes block the activation of the L2 lemma in production. In a context of language contact, SNs, despite being native speakers, may also experience some degree of variation when extracting, processing and integrating the syntactic, semantic and specific morphological information of a word with its concept that affects the mapping of gender features onto clitics. As mentioned in the introduction, evidence for this difficulty with third person clitics has also be found in French L1 monolingual acquisition (Delage et al. 2016).

No sensitivity to thematic roles was found in the distribution of anaphoric clitics, as shown in the scalar systems in (42) providing no evidence to support our third hypothesis. This could be because differences in internal argument marking between themes and patients in Ashaninka only take place in ditransitive structures and our data was limited to transitive structures. In doubling structures, CLD structures had higher percentages of patients than of themes in both groups (43). Numbers for the other doubling structures were too low for any meaningful comparisons to be drawn.

Overall, our findings suggest that among advanced L2 learners living in a contact situation, differences in morphological markings in the L1 and syntactic cliticization in the L2, and differences in thematic role sensitivity for internal argument marking, do not generate long-lasting, residual effects. On the other hand, the assembly of gender features with functional elements, such as clitics, which are at the interface of the lexicon, syntax, and morphology, reveal long-term, residual difficulties for L2 acquisition and could remain somewhat variable even among native speakers living in that same contact situation. We take this to indicate that the acquisition of morphological templates, per se, is not the main stumbling block for L2 acquisition. The mapping of features onto morphology that requires the formation of new lemmas in the L2 may be affected by blocking, which results in default masculine assignment to functional categories related to argument structure, even when the nouns heading the argument antecedent or the doubled argument are congruent in gender in the L1 and the L2. Further research is needed to determine the extent to which Spanish L2 speakers with low proficiency in Ashaninka, which was not tested here (a limitation of this study), and high proficiency in Spanish exhibit different patterns in gender marking.

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[6] While speakers may have the ability to receptively associate lexemes and lemmas, which we understand as exhibiting knowledge of a word, lexical competence here is understood as the ability to activate words and associate lexemes and lemmas for receptive and productive tasks in a target manner.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Instruments and materials used in this study.

- Oral narration of the Frog story (Mayer and Mayer 2003; adapted by Sánchez 2003)

- Ethnobiographic interview questions

Only for official use Questionnaire# ___

Project: "Case-marking and argument structure in Spanish in contact with Andean and Amazonian languages"

Questionnaire

Instructions:

Please answer the following questions as sincerely as possible. In some cases, you are asked to mark an x next to the appropriate answer; in others, you are asked to provide a brief answer. If there are questions that do not apply to you, please leave them in blank. The questionnaire is two pages long.

Bio Information

1. Initials _____
2. Age _____
3. Sex _____
4. Country and city of birth: _____

Level of study

1. Elementary ____ Secondary ____ Technical or vocational ____College ____
2. Years of college studies
   (please circle: 1st 2nd 3rd 4th 5th 6th Postgraduate)
3. Mayor: _____
4. Undecided (You may write a provisory major)

Languages

Before answering, read the following:

Mother tongue is the language that you are exposed to and speak from when you are born until you are three years old. You may not be proficient in that language, but it is your mother tongue.

1. To which language were you exposed (languages you spoke) from 0–3?

_____

2. Which language have you spoken since you were 3?

_____

3. Were you exposed to other languages (other than your mother tongue) from 3–12? Which one(s)?

_____

4. Mark where: (a) At home____ (b) In school____ (c) Another context_____
5. Which language did you speak from 3 to 12?

_____

6. Mark where: (a) At home_____ (b) In school_____ (c) Another context_____
7. Which language do you consider to be your mother tongue (spoken from 0–3)?

_____

8. Which language do you consider to be your second language? (the one you spoke and were addressed in after the age of 3).

_____

9. Indicate the languages that you speak in the following situations:
    a. At home _____
    b. At work _____
    c. With family and friends_____

11. What do you think of
    a. Speaking only Spanish
    b. Speaking only Asháninka
    c. Speaking Asháninka and Spanish

12. Do you think that Asháninka is appreciated in Peru?

__ Agree __Partially agree ___Disagree

Thanks for participating

_____

- Spanish language proficiency test

_____

Prueba de dominio (Proficiency test)

Va a escuchar unas oraciones y *le* voy a dar varias palabras. O, lea las oraciones abajo y escoja *la* que *le* parece mejor para cada oración.

Ejemplo:

O. Abrió *la* ventana y miró: en efecto, mucho _____ salía de las casas.
    a. zorro b. serpiente c. cuero d. fuego

1. Al oír del accidente de su amigo, Paco se puso _____.
    a. alegre b. cansado c. hambriento d. triste

2. Aquí está tu café, Juanito. No te quemes, que está muy _____.
    a. dulce b. amargo c. agrio d. caliente

3. Al romper los anteojos, Juan se asustó porque no podía _____ sin ellos.
    a. discurrir b. oír c. ver d. entender

4. ¡Pobrecita! Está resfriada y no puede _____.

a. salir de casa b. recibir cartas c. respirar con dificultad d. leer las noticias

5. Era una noche oscura sin _____.
   a. estrellas b. camas c. lágrimas d. nubes
6. Para saber *la* hora, don Juan miró el _____.
   a. calendario b. bolsillo c. estante d. reloj
7. Nos dijo mamá que era hora de comer y por eso _____.
   a. fuimos a nadar b.nos sentamos c. comenzamos a fumar d. nos acostamos pronto
8. ¡Cuidado con ese cuchillo o vas a _____ el dedo!
   a. cortarte b. torcerte c. comerte d. quemarte
9. Sus amigos pudieron haberlo salvado, pero *lo* dejaron _____.
   a. ganar b. parecer c. morir d. acabar
10. A *la* mujer no le gustó el cambio de domicilio pues no le gustaba _____.
    a. callejear b. el puente c. esa estación d. ese barrio

References

Abney, Steven. 1987. The English noun phrase in its sentential aspect. Ph.D. dissertation, Massachusetts Institute of Technology, Cambridge, MA, USA, June 8.

Abramsson, Niclas. 2003. Development and Recoverability of L2 Codas: A Longitudinal Study of Chinese-Swedish Interphonology. *Studies in Second Language Acquisition* 25: 313–49. [CrossRef]

Andrews, Avery D. 2007. The major functions of the noun phrase. In *Language Typology and Syntactic Description*. Edited by Timothy Shopen. Cambridge: Cambridge University Press, pp. 132–223.

Belloro, Valeria. 2007. Spanish Clitic Doubling: A Study of the Syntax-Pragmatics Interface. Ph.D. dissertation, State University of New York, New York, NY, USA, October 26.

Chomsky, Noam. 1993. A minimalist program for linguistic theory. In *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*. Edited by Ken Hale and Samuel J. Keyser. Cambridge: The MIT Press, pp. 1–52.

Cuza, Alejandro, Ana Teresa Pérez-Leroux, and Liliana Sánchez. 2013. The role of semantic transfer in clitic drop among simultaneous and sequential Chinese-Spanish bilinguals. *Studies in Second Language Acquisition* 35: 93–125. [CrossRef]

Dalrymple, Mary, and Irina Nikolaeva. 2011. *Objects and Information Structure*. Cambridge: Cambridge University Press.

Delage, Hélène, Stephanie Durrleman, and Ulrich H. Frauenfelder. 2016. Disentangling sources of difficulty associated with the acquisition of accusative clitics in French. *Lingua* 180: 1–24. [CrossRef]

Dryer, Matthews S. 1986. Primary objects, secondary objects, and antidative. *Language* 62: 808–45. [CrossRef]

Duffield, Nigel, and Lidia White. 1999. Assessing L2 knowledge of Spanish clitic placement: Converging methodologies. *Second Language Research* 15: 133–60. [CrossRef]

Franceschina, Florencia. 2001. Morphological or syntactic deficits in near-native speakers? An assessment of some current proposals. *Second Language Research* 17: 213–47. [CrossRef]

Freynik, Suzanne, Kira Gor, and Polly O'Rourke. 2017. L2 processing of Arabic derivational morphology. *The Mental Lexicon* 12: 21–50. [CrossRef]

Grüter, Theres. 2005. Comprehension and production of French object clitics by child second language learners and children with specific language impairment. *Applied Psycholinguistics* 26: 363–91. [CrossRef]

Harris, James. 1995. The morphology of Spanish clitics. In *Evolution and Revolution in Linguistic Theory*. Edited by Héctor Campos and Paula Kempchinsky. Washington: Georgetown University Press, pp. 168–97.

Hawkins, Roger, and Florencia Franceschina. 2004. Explaining the acquisition and non-acquisition of determiner-noun gender concord in French and Spanish. In *The Acquisition of French in Different Contexts: Focus on Functional Categories*. Edited by Philippe Prévost and Johanne Paradis. Amsterdam and Philadelphia: John Benjamins, pp. 175–206.

Hopper, Paul J., and Sandra A. Thompson. 1980. Transitivity in grammar and discourse. *Language* 56: 251–99. [CrossRef]

Jackendoff, Ray. 1990. *Semantic Structures*. Cambridge: Massachusetts Institute of Technology Press.

Jensen, Isabel N., Roumyana Slabakova, and Marit Westergaard. 2017. The Bottleneck Hypothesis in second language acquisition: A study of L1 Norwegian speakers' knowledge of syntax and morphology in L2 English. In *Proceedings of the 41st Annual Boston University Conference on Language Development*. Edited by Maria LaMendola and Jennifer Scott. Somerville: Cascadilla Press, pp. 333–46.

Jiang, Nan. 2000. Lexical representation and development in a second language. *Applied Linguistics* 21: 47–77. [CrossRef]

Kayne, Richard S. 1975. *French Syntax. The Transformational Cycle*. Current Studies in Linguistics Series; Cambridge: The MIT Press.

Kirova, Alena. 2016. Lexical and Morphological Aspects of Gender and Their Effect on the Acquisition of Gender Agreement in Second Language Learners. Ph.D. dissertation, The State University of New Jersey, Rutgers, NJ, USA, January.

Lardiere, Donna. 1998. Dissociating syntax from morphology in a divergent L2 end-state grammar. *Second Language Research* 14: 359–75. [CrossRef]

Lardiere, Donna. 2005. On morphological competence. In *Proceedings of the 7th Generative Approaches to Second Language Acquisition Conference (GASLA 2004)*. Edited by Laurent Dekydtspotter, Rex A. Sprouse and Audrey Liljestrand. Somerville: Cascadilla Proceedings Project, pp. 178–92.

Mayer, Elisabeth. 2017. *Spanish Clitics on the Move, Variation in Time and Space*. Berlin: Mouton de Gruyter.

Mayer, Mercer, and Marianna Mayer. 2003. *One Frog too Many*. New York: Puffin.

Mayer, Elisabeth, and Liliana Sánchez. 2016. Object agreement marking and information structure along the Quechua-Spanish contact continuum. *Revista Española de Lingüística Aplicada/Spanish Journal of Applied Linguistics* 29: 544–81. [CrossRef]

Mayer, Elisabeth, and Liliana Sánchez. 2017. Variability at the interfaces: Clitics in Bilingual and Monolingual Andean Spanish. *International Journal of Bilingual Education and Bilingualism*. [CrossRef]

Mihas, Elena. 2010. Essentials of Ashéninka Perené Grammar. Ph.D. dissertation, The University of Wisconsin-Milwaukee, Milwaukee, WI, USA, December.

Mihas, Elena. 2015. *A Grammar of Alto Perené (Arawak)*. Mouton Grammar Library. Berlin: Mouton de Gruyter.

Montrul, Silvina. 2001. First-language-constrained variability in the second-language acquisition of argument-structure-changing morphology with causative verbs. *Second Language Research* 17: 144–94. [CrossRef]

Næss, Åshild. 2004. What markedness marks: The markedness problem with direct objects. *Lingua* 114: 1186–212. [CrossRef]

Ordóñez, Francisco, and Lori Repetti. 2006. Stressed enclitics. In *New Analyses in Romance Linguistics: Phonetics, Phonology and Dialectology*. Edited by Jean-Pierre Y. Montreuil. Amsterdam and Philadelphia: John Benjamins, pp. 167–81.

Payne, David L. 1981. *Phonology and Morphology of Axininca Campa*. SIL Publications in Linguistics, 66. Dallas: SIL and University of Texas at Arlington.

Payne, Judith. K., and David L. Payne. 2005. The pragmatics of split intransitivity in Ashéninka. *Revista Latinoamericana de Estudios Etnolingüsticos* 10: 37–56.

Pérez-Leroux, Ana Teresa, Alejandro Cuza, and Danielle Thomas. 2011. Clitic placement in Spanish–English bilingual children. *Bilingualism: Language and Cognition* 14: 221–32. [CrossRef]

Pienemann, Manfred. 1998. *Language Processing and Second Language Development: Processability Theory*. Amsterdam and Philadelphia: John Benjamins.

Reed, Judy, and David L. Payne. 1986. Asheninka (Campa) pronominals. In *Pronominal Systems*. Edited by Ursula Wiesemann. Tübingen: Günther Narr Verlag, pp. 323–31.

Sabourin, Laura, Laurie A. Stowe, and Ger J. de Haan. 2006. Transfer effects in learning a second language grammatical gender system. *Second Language Research* 22: 1–29. [CrossRef]

Sánchez, Liliana. 2003. *Quechua-Spanish Bilingualism*. Amsterdam and Philadelphia: John Benjamins.

Sánchez, Liliana. 2015. Convergence in feature mapping: Evidentiality, Aspect and nominalizations in Quechua-Spanish bilinguals. In *Sociolinguistic Change Across the Spanish-speaking World: Case Studies in Honor of Anna Maria Escobar*. Edited by Kim Potowski and Talia Bugel. Berlin: Peter Lang, pp. 93–118.

Sánchez, Liliana, and Pablo Zdrojewski. 2013. Restricciones semánticas y pragmáticas al doblado de clíticos en el español de Buenos Aires y de Lima. La variación en la gramática del español actual. *Lingüística* 29: 271–320.

Slabakova, Roumyana. 2008. *Meaning in the Second Language*. Berlin: Walter de Gruyter.

Slabakova, Roumyana. 2009. Features or parameters: Which one makes second language acquisition easier, and more interesting to study? *Second Language Research* 25: 313–24. [CrossRef]

Slabakova, Roumyana. 2013. What is easy and what is hard to acquire in a second language: A generative perspective. In *Contemporary Approaches to Second Language Acquisition*. Edited by M María del Pilar García Mayo, María Juncal Gutiérrez Mangado and María Martínez-Adrián. Amsterdam and Philadelphia: John Benjamins, pp. 5–28.

Spencer, Andrew, and Ana R. Luís. 2012. *Clitics. An Introduction*. Cambridge Textbooks in Linguistics. Cambridge: Cambridge University Press.

Suñer, Margarita. 1988. The role of agreement in clitic-doubled constructions. *Natural Language and Linguistic Theory* 6: 391–434. [CrossRef]

Torrego, Esther. 1996. On the nature of clitic doubling. In *Evolution and Revolution in Linguistic Theory*. Edited by Héctor Campos and Paula Kempchinsky. Washington: Georgetown University Press, pp. 399–418.

Torrego, Esther. 1998. *The Dependencies of Objects*. Cambridge: MIT Press.

Zwicky, Arnold M. 1985. Clitics and Particles. *Language* 61: 283–305. [CrossRef]

languages

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Article

On Convergence, Ongoing Language Change, and Crosslinguistic Influence in Direct Object Expression in Catalan–Spanish Bilingualism

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Abstract: The present study explores two morphological differences in direct object expression between Spanish and Catalan: Differential Object Marking (DOM), and the accusative clitics *el* /l/ vs. *ho* /u/. Both phenomena are regulated by semantic features, such as animacy and specificity/definiteness. The study experimentally tested 57 Catalan–Spanish bilinguals with different degrees of language dominance in their comprehension and production of these Catalan constructions in order to explore the degree of structural convergence. The results show that with respect to DOM, bilinguals systematically accept ample optionality, creating a new language variety, the bilingual variety, with properties similar and different from both Spanish and Catalan. With respect to the accusative clitics, a certain degree of functional interference in the grammar of Spanish-dominant bilinguals is found. These results illustrate, on the one hand, structural convergence in DOM, culminating in an internal language change accelerated by language contact, and, on the other hand, incipient language transfer from the dominant language in the expression of accusative clitics.

Keywords: accusative clitics; DOM; language convergence; Catalan; Spanish; definiteness; bilingualism; language change; crosslinguistic influence

1. Introduction

Catalan and Spanish languages have been in contact for centuries, but the linguistic contact has never been as intense as in the last half of the 20th century–beginning of 21st century, where, as a result of large waves of migration as well as linguistic and educational policies, practically everybody born and raised in Catalonia in the last 40 years has become bilingual to some degree. This has created a bilingualism continuum (Perpiñán 2017) that ranges from strong dominance in one of the languages and passive use of the other, to a more balanced bilingualism; in this gradation of bilingualism, I also include certain types of second language acquisition, particularly child L2 acquisition. Catalonia has around 7 million inhabitants, of whom only 31% declare to have Catalan as their first language, whereas 55% of Catalans have Spanish as their first language. However, 65% of the people born in Catalonia use both languages habitually (Idescat 2013), so a considerable percentage of the population may use their second language as their habitual language. This intense and extensive contact in both society and in the bilingual mind raises the question of linguistic influence and/or structural convergence between Catalan and Spanish, and the eventuality of language change. The goal of the present paper is to examine functional interference/convergence in bilingual grammar related to grammatical complexity and its possible outcomes, such as simplification, convergence, and potential language change.

This study takes into account intralinguistic factors as well as extralinguistic ones in order to characterize the different varieties of Catalan that have emerged in this bilingual context. In particular,

it explores the role of language dominance, measured as a compound variable that averages language use, language preference and identity, family linguistic background and onset of bilingualism, and the robustness or vulnerability of certain grammatical domains in the linguistic competence of bilinguals. Some of the questions that arise in the study of acquisition in a stable bilingual community relate to the role of the language used by the majority of individuals versus that used by the minority (Gathercole and Thomas 2009), and the crosslinguistic influences or possible changes that one or both languages may undergo as a result of prolonged contact.

From one perspective, Trudgill (1989) proposed that language contact situations produce erosion or simplification of the internal development of languages, resulting in loss of morphology, and increases in regularity, analyticity, transparency, and redundancy; this has been mostly attested by the development of pidgin languages, a special circumstance in which a language is learned by non-native speakers. McWhorter (2007) has applied controversial metrics of complexity in the study of languages which have been massively learned by second language learners, such as English or Mandarin, and has concluded that all of these languages have suffered some sort of simplification as a result of incomplete learning by non-native speakers. Under this construct of complexity, which takes into account overspecification, structural elaboration and irregularity, a language that contains Differential Object Marking (DOM) in animate, specific direct objects is more complex (more overspecified and more elaborated) than grammar that does not mark DOM.

Another possible outcome of this intense contact is convergence. Silva-Corvalán (1986, 1994, 2008) reflected on the limits of syntactic convergence by proposing that bilingual speakers do not modify the abstract syntactic structure of the receding language; that is, the transfer of features from one language to another does not involve syntax, but it can involve lexicon and pragmatics. These observations resemble those proposed by the interface hypothesis (Sorace and Filiaci 2006; Sorace 2011), which sustains that bilingual speakers, particularly near-native speakers, L1 attritors, child bilinguals and heritage speakers, present optionality and/or protracted indeterminacy in structures involving an interface between syntax and other cognitive domains, but that structures that only require syntactic computations remain fairly stable. Continuing with the analysis at the individual level, and using second language acquisition models, it has been proposed that L2 learners are not able to acquire inflectional morphology or functional features that do not exist in L1 speakers (Hawkins and Chan 1997). Other authors believe that semantics are universal and that the only difficulty in the acquisition process is in the reassembly of semantic features into functional morphology (Lardiere 2008; Slabakova 2009. Building on this idea, Sánchez (2003, 2015) proposed the concepts of functional interference and functional convergence—there is functional interference when "the activation of functional features in one language, triggered by input in the other language, generates syntactic change in the bilingual grammars" (Sánchez 2003, p. 13). This happens when language A has functional features that are (I) not present in language B; (II) associated with a different functional category in language B; (III) bundled with other functional features in language B; or (IV) any combination of (I), (II), and (III). Functional convergence, on the other hand, is "the specification of a common set of features shared by the equivalent functional categories in the two languages spoken by a bilingual" (Sánchez 2003, p. 15). The main difference between the two processes is the result—convergence produces a new specification of features in the two languages spoken by a bilingual, whereas in functional interference, the set of features and functional categories from language A are adopted in language B.

In this study, we draw concepts from both related frameworks, language contact and second language acquisition, to better investigate the expression of Catalan direct objects and their semantic properties in bilingualism/language contact situations. Our general research question is whether the expression of direct objects in Catalan is affected by the intense contact with Spanish. For instance, we question whether Spanish-dominant early bilinguals are able to fully master functional categories and their semantic distribution in their non-dominant language, Catalan. We also question whether simplification, optionality, or indeterminacy takes place necessarily in a language contact situation,

specifically regarding the expression of direct objects in the Catalan spoken by different types of bilinguals. We focus on the feature definiteness/specificity and how it is expressed in Catalan direct objects by speakers whose dominant/native language is Spanish, Catalan, or both. These are questions that are usually investigated separately, either at the society level in the field of contact linguistics, or at the individual level in the field of second language acquisition. However, we believe that our understanding about bilingualism will benefit from a more holistic view in which the study of the bilingual speakers and their grammar contributes to the characterization of the bilingual variety spoken in the society and vice versa. Taking into account these two approaches, one can evaluate possible ongoing language change resulting from language contact and/or incomplete acquisition. For instance, Silva-Corvalán (1994) proposed that language-contact situations accelerate diachronic changes that are already taking place in monolingual varieties, such as the extension of *estar* in U.S. Spanish. A further assumption we make is that the individual forms of grammar used by different types of bilinguals represents the several linguistic varieties existent in the community, and that these varieties, in turn, can represent the different stages of a possible linguistic change.

2. The Linguistic Phenomena

In this study, we investigate two linguistic phenomena in relation to the expression of direct objects in Catalan that considerably differ from Spanish: the presence/absence of Differential Object Marking (DOM), and the clitization of the third person masculine singular object. The behavior of these two phenomena is determined, among other features, by the specificity/definiteness of the object. This study is a first approximation of the statuses of these two Catalan language phenomena in bilingualism.

2.1. Differential Object Marking

Differential Object Marking is the overt morphology that identifies direct objects in many unrelated languages of the world; in Romance languages, DOM is an innovation from Latin, that was created after the case system was lost and was probably present already in Vulgar Latin (Meier 1947). It is systematically found in Spanish and Romanian, and more restrictively in Catalan, Sardinian, and Portuguese (Salvador and Saldanya 1993). According to Aissen (2003), the distribution of DOM is primarily determined by two parameters: animacy and definiteness/specificity. In Spanish, animate and specific (definite) direct objects are marked with the preposition *a*, whereas in Standard Catalan,[1] direct objects do not present any special identifying mark in these contexts:

1. [+animate, +specific]

a.	En Joan	buscava	(*a)	la Maria	ahir a la tarda	Catalan
b.	Juan	buscaba	*(a)	María	ayer por la tarde	Spanish

'John was looking for Mary yesterday evening.'

However, in Catalan, strong personal pronouns (2a) and some indefinite pronouns (2b) require or accept the preposition *a* (Bel 2002):

[1] An anonymous reviewer questioned the idea of "Standard Catalan" because there are virtually no monolingual varieties of Catalan, and s/he considers that the standard variety takes bilingual Catalan into account. This is not the case, as "Standard" or "Normative" Catalan is an ideal and unmarked variety, geographically speaking, created to unify and standardize the language, and serves as a reference model for the media, school, and administrative contexts. It was initially proposed by Fabra and seconded by the Institut d'Estudis Catalan (IEC) at the beginning of the XXth century (Segarra 1987).

2. a. Et buscava *(a) tu
CL.AC.2P.S. Looked DOM you
'He was looking for you.'

b. He vist (a) tothom
Have1P.S. seen (DOM) everybody
'He has seen everybody.'

This preposition also appears in Catalan topicalized animate objects, in clitic left or right dislocations, which is a recommended use of DOM by Catalan grammarians, such as Solà (1994) and Ruaix i Vinyet (1994):

3. (A) la Maria ahir a la tarda la buscava en Joan
(DOM) the Maria yesterday in the evenning CL.3p.FEM.AC searched the Joan
'It is Maria who Joan was looking for yesterday evening.'

This preposition is more widespread in Balearic Catalan (Escandell-Vidal 2009), which has been present since the XVII century and is used also in non-animate contexts:

4. Colliu-les, a les peres que ja són madures (De Borja Moll 1968)
Harvest.IMP CL.AC.3P.P. (DOM) the pear that already are ripe
"Harvest them, the pears that are already ripe.'

Its use in non-topicalized constructions is accepted in cases of ambiguity (5) by the conservative Fabra normative (Fabra 1918), which also states the need for a preposition with strong personal pronouns. This normative does not accept other uses of DOM in Catalan.

5. El perseguia com el gat a la rata
CL.AC.3P.S. chased as the cat (DOM) the rat
'S/He would chase him as the cat to the rat.'

Nonetheless, this preposition is widely extended in spoken and colloquial registers in Catalan (Sancho Cremades 2002), to the extent that Hualde (1992) stated that "for most speakers, in the spoken language, all human direct objects are marked by the preposition *a*" (p. 86). The origin and extension of this preposition have been largely debated, as to whether it is the result of the internal evolution of Catalan or the influence from Spanish. Its use in dislocated contexts or parallel constructions occurred in Medieval Catalan (Pereda i Parramon 1986, 1987), and thus it was never considered to be the result of an influence from Spanish but rather, an internal Catalan process (Rohlfs 1971). Other more innovative uses might have been influenced by Spanish, so its actual widespread use could be the result of internal as well as external factors (Salvador and Saldanya 1993). We hope that our study, although it was not originally conceived with this purpose, helps to shed some light into these issues.

In Spanish, DOM is regulated by a combination of semantic features, such as definiteness, specificity, aspect, topicality, agentivity, and affectenedness (Torrego 1998). It is obligatory with [+animate] and [+specific] objects, and variable with inanimate and non-specific indefinite objects (López 2012), animacy being the dominant trigger for DOM (Leonetti 2004). However, there are exceptions to this rule and a certain vagueness in the criteria that regulates the use of DOM, not only in Spanish but also in other languages with DOM (Aissen 2003). Syntactically speaking, it is proposed that DOM objects project an additional higher functional projection outside the VP (Rodríguez-Mondoñedo 2008; Torrego 1998), and that DOM objects must move outside the VP to either be case-marked in the specifier (*v*P) or to mark specificity. Thus, if Catalan does not project this functional projection, the role of Spanish-dominant bilinguals is to unlearn, suppress, or unspecify this category when using Catalan. Finally, we need to add that the preposition *a* is used both in Catalan and Spanish as the dative marker, and that it is obligatory in both languages in dative contexts. According to Salvador and Salvador and Saldanya (1993), the isomorphism between DOM and prototypical indirect objects and similarities in form and function may contribute to the expansion of *a* in direct object (DO) contexts in Catalan as well.

2.2. Clitization of Direct Objects

Catalan pronominalizes singular direct objects with three possible types of clitic pronouns: (I) the clitic represented by the morpheme, /l/, for definite accusative forms in the third person, (see Table 1 for its singular forms); (II) the neutral clitic, *ho* /u/; and (III) the partitive, *en/n/*. Spanish, on the other hand, has the single form *lo* that subsumes all uses for masculine, singular objects.

Table 1. Catalan accusative definite clitic, singular forms.

	Masculine	**Feminine**
Proclisis (before the verb)	*el*	*la*
Reduced form	*l'*	*l'*
Enclisis (after the verb)	*-lo*	*-la*
Reduced form	*'l*	*'l*

(I) The clitic, /l/, agrees in gender and number with the object and is restricted to definite objects, animate (6a) or inanimate (6b). This pronoun varies according to its position (proclitic or enclitic), and the phonological environment. With finite verbal forms, clitics need to be in proclisis (6a, 6b); with imperatives, the clitic is always in its enclitic form (6c). With infinitives and gerunds of periphrastic tenses (restructuring contexts), the pronoun can appear in either form (6d, 6d'; optional clitic climbing).

6. a. Has vist el Marc? No, no *l'* he vist
Have (you) seen the Marc No, no CL. have.1S seen
'Have you seen Marc? No, I haven't seen him.'

b. Comprarás el llibre? Sí, *el* compraré quan tingui diners
Will.buy.2S. the book? Yes, CL will.buy.1S. when have.1S. money
'Will you buy the book? Yes, I will buy it whenever I have money.'

c. Compra el llibre! Compra'*l*!
Buy.2S.IMP the book Buy.2S.IMP CL
'Buy the book! Buy it!'

d. Vas comprar el llibre? Sí, vaig comprar-*lo* ahir
Go.2S buy the book Yes, go.1S buy CL yesterday

d'. Vas comprar el llibre? Sí, *el* vaig comprar ahir
'Did you buy the book? Yes, I bought it yesterday.'

(II) The invariable *ho* is used to refer to subordinate clauses (7a) or to the neuter determinants/pronouns, *això* o *allò*, which refer to 'this thing', 'that thing' (7b).

7. a. En Joan va dir {que vindria}. En Joan *ho* va dir
The Joan go.3S say that would.come The Joan CL go.3S say
'Joan said that he would come. Joan said it.

b. No diguis això. No ho diguis
Not say.2P.S this. Not CL say.2P.S.
'Do not say these things. Do not say them.'

Additionally, *ho* also pronominalizes attributive complements that are introduced with copulative or semicopulative verbs, such as in (8a). However, according to Fabra (1956) and to Roca (1992), when the nominal predicate is a definite NP, then the [+def] clitic appears (8b):

8. a. En Pere és mestre. En Pere *ho* és (Fabra 1956)
The Pere is teacher. The Pere CL is
'Pere is a teacher. He is so.'

b. En Pere és el mestre d'Espot. En Pere *l'*és (Fabra 1956)
The Pere is the teacher of Espot. The Pere CL is
'Pere is the teacher of Espot. He is so.'

Crucially, the clitic *ho* is not available for definite masculine objects:

9. Qui va rebre el regal? *Ho* va rebre en Joan
Who go.3S receive the present? CL go.3S. receive the Joan
'Who received the present? Joan received it.'

All these Catalan examples (6)–(9) are subsumed by the clitic *lo* in Spanish:

10. a. ¿Has visto a Marc? No, no *lo* he visto.

b. ¿Comprarás el libro? Sí, *lo* compraré cuando tenga dinero.

c. ¡Compra el libro! ¡Cómpra*lo*!

d. ¿Compraste el libro? Sí, *lo* compré ayer.

e. Joan dijo que vendría. Juan *lo* dijo.

f. No digas eso. No *lo* digas.

g. Pere es maestro. Pere lo es.

h. Pere es el maestro de Espot. Pere lo es.

i. ¿Quién recibió el regalo? *Lo* recibió Juan.

(III) The partitive *en* is used in Catalan for bare NPs (11a), and quantified direct objects (11b); this pronoun does not exist in Spanish.

11. a. Deixa'm diners. No en tinc
Let me money. Not CL have.1S.
'Let me some money. I don't have any'.

b. No tens quatre cases, *(*en*) tens tres
Not have.2 four houses, CL have.2S three
'You don't have four houses, you have three.'

Nonetheless, the feature [±definite] is also present in Standard Spanish[2] clitics but is only relevant in certain constructions such as topicalizations, in which reduplication with a clitic is obligatory. Thus, a dislocated definite object reduplicates with the clitic *l* (12a). According to Roca (1992), dislocation of an indefinite direct object yields an ungrammatical term, so a dislocation such as (12b) is neither possible in Catalan, nor in Spanish. This is so precisely due to the impossibility of the accusative clitic referring to an indefinite object, and not to the fact that indefinites cannot be dislocated (see Roca 1992 for independent evidence). In addition, Arregi (2003) observed that unrestricted scope indefinites can

[2] Although related, we will not discuss DO clitic doubling constructions in Porteño Spanish, in which direct object doubling is possible as long as the NP is definite or specific (Jaeggli 1982, 1986; Suñer 1988).

undergo clitic left dislocation (CLLD), as in (12c), whereas indefinites with restricted scope cannot undergo CLLD, as in (12d):

12. a. El libro, *(*lo*) leí (Valenzuela 2007, p. 21)
The book CL I-read
'The book, I read.'

b. Un libro, (*lo) leí (Valenzuela 2007, p. 21)
A book CL I-read
'A book, I read.'

c. Algunos libros, Juan los leyó ayer (Arregi 2003)
Some books Juan CL read yesterday
'Some books, Juan read yesterday.'

d. *Algo, Juan lo leyó ayer (Arregi 2003)
Something Juan CL read yesterday
'Something, Juan read yesterday.'

Bare NP objects, on the other hand, can be dislocated, as in (12e), resulting in a null object construction:

e. Dinero, no tengo (Roca 1992, p. 257)
Money, not I-have
'Money, I do not have.'

Under certain syntactic conditions, Spanish can use a null *pro* or null variable (Campos 1986):

f. ¿Compraste regalos? Sí, compré *e*. (Campos 1986, p. 354)

Notice that Campos (1986) talks in his paper about 'indefinite object drop', but in reality, he only gives examples with bare nouns, not with NPs with the indefinite article because they work somewhat differently. That is, the null *pro* that Campos (1986) proposes for Spanish seems to work for bare NPs, but not for indefinite NPs;[3] Campos (1986) clarifies that quantified NPs do not share the same properties. As we saw in (11), Catalan uses the partitive clitic *en* with quantified direct objects and indefinites with a partitive interpretation.

All these data emphasize the idea that the clitic *l*—and its Spanish equivalents *lo/los/la/las*—are always marked as [+def], and can only refer to definite NPs in both Spanish and Catalan (Roca 1992). The main difference is that Catalan has more specialized morphosyntactic forms for expressing other semantic features, i.e., the partitive clitic to refer back to quantified or indefinite direct objects with a partitive meaning (Perpiñán 2017), and the unspecified or neuter clitic /u/, different from *l*, which is not marked with the [+def] feature. Catalan and Spanish do not present crosslinguistic differences with respect to the position of the clitic (Uriagereka 1995). For this reason, we believe that the debate between theories of clitic placement is not crucial in this study. Whether the clitic is generated in an argumental position and then raises to a higher functional projection (Kayne 1991), or it is generated in a position outside the verb phrase and associated with the argument through a Spec-Head agreement relationship (Jaeggli 1982, 1986; Sportiche 1996) is unrelated to the bilinguals' task to keep both languages separate, as the same syntactic theoretical assumptions would be adopted for the two languages. The real difficulty, then, resides in the morphophonological expression of the feature [±definite], as Catalan and Spanish have different feature mappings between the forms and the semantic properties.

[3] This issue needs further research regarding Spanish theoretical syntax and goes beyond the scope of this paper.

3. Previous Studies

3.1. The Acquisition of Differential Object Marking

We know very little about DOM in Catalan and Catalan–Spanish bilingualism since it is not a characteristic feature of Catalan grammar. We know that this is a vulnerable feature in Spanish and other heritage languages which has undergone erosion in animate, specific direct objects and attrition in first generation immigrants in the US (Montrul 2004; Montrul and Bowles 2009; Montrul and Sánchez-Walker 2013; Montrul et al. 2015). Guijarro-Fuentes and Marinis (2009) investigated Spanish DOM in Catalan-dominant bilinguals and English–Spanish bilinguals and found residual optionality in both groups, particularly in the acquisition of interpretable features that relate to the discourse context, such as specificity. Catalan bilinguals produced more errors of commission of the preposition *a*, whereas English–Spanish bilinguals produced more errors of omission of the direct object marker; thus, Catalan speakers overused the personal *a*. Since neither Catalan nor English present DOM in their standard varieties, the authors concluded that the acquisition of interpretable features is not prone to crosslinguistic influence as both L1 groups behaved differently, and that language contact does not influence the path of acquisition for the DOM.

On the other hand, studies on monolingual first language acquisition have shown that DOM in Spanish is fully acquired by the age of three (Rodríguez-Mondoñedo 2008). This author analyzed the data of four Spanish-speaking monolingual children from the CHILDES database (MacWhinney 2000), aged 0;9–3;01 and found that DOM first appears between 1;9 and 2;4 of age, and by age 3, children have 98% accuracy in DOM during spontaneous production. In a different study, Ticio (2015) investigated seven bilingual children, English–Spanish speakers, aged 1;1–3;6. One of them, Yasmin, from the Llinàs-Grau database is being raised in Barcelona and is exposed to Catalan at daycare. Yasmin only marked one direct object and produced a commission error. According to Ticio, this child left seven accusative objects unmarked, which resulted in ungrammaticalities. One of the examples this author provides as an error is the following: '*Vamos a buscar el pez aquí*', ('We are going to look for the fish here', p. 82), produced at 2;5. However, this sentence is perfectly grammatical according to my own intuition. In any case, Ticio (2015) data accuracy rating in DOM usage in these children is around 26%, which is much less compared to the data found for monolingual L1 acquisition. To summarize, all studies on child and adult L2 acquisition, as well as simultaneous and sequential bilingualism have shown significant differences between the acquisition of DOM in a monolingual context compared to its acquisition in an L2 or multi/bilingual context; in a bilingual context, we find protracted development and incomplete acquisition, and we find attrition in L1 migrant generations. All this evidence indicates that DOM is a vulnerable feature in bilingual grammar.

3.2. The Acquisition of Direct Object Clitics

The acquisition of clitics in Catalan has been studied almost exclusively for L1 children. Gavarró et al. (2010) and Gavarró et al. (2006) found direct object clitic omission in early child acquisition, with higher omission rates in Catalan than Spanish. Omission has also been attested in Italian (Guasti 1993), French (Jakubowicz et al. 1996, 1997), and in Specific Language Impairment (SLI) for a long period of time (Jakubowicz et al. 1998). The delay and optionality in the appearance of object clitics has been explained as the result of computational complexity since omission or avoidances can alleviate the processing load (Hamann and Belletti 2006), or as the result of other linguistic properties of the language, such as participle agreement (Gavarró Anna et al. 2011); this is the explanation provided by these authors to account for the differences in omission rates between Catalan (a language with participle agreement) and Spanish (no participle agreement). However, Tarrés and Bel (2015), in a study of L2 Catalan children (7-year-olds from Portuguese families in Andorra) found that the use of dative and accusative clitics in L2 Catalan is very similar to that of monolingual Catalan children (around 66% of correct suppliance, 18% of omissions), with no errors in gender, number, or position, despite the fact that

Portuguese has a different position for these clitics. Similar results were found in a follow-up study with more participants, this time also with francophone children (Tarrés and Bel 2017).

In regard to child L2 acquisition, Paradis (2004) investigated object expression in L2 children, aged 7, (L1 English-L2 French) after two years of French schooling in Montreal and found the use of direct object clitics in about 40% of the possible cases. Omission and clitic position errors are typical in post-puberty L2 Spanish individuals (Duffield et al. 1998; Liceras 1985). This has raised the question of whether the difficulties lie in the acquisition of syntax or in the acquisition of the morphological properties of the clitics; Santoro (2007) found that the morphology of clitics develops later than their syntactic properties. Similarly, Arche and Domínguez (2011), in a study of clitic acquisition of L2 Spanish by English speakers, observed asymmetries between production and comprehension results in an intermediate group, concluding that the appropriate syntactic representation was in place whilst morpho-phonological difficulties remained, supporting the Missing Surface Inflection Hypothesis (Prévost and White 2000). Valenzuela (2007) took into account the semantics of the clitics in an investigation of L2 Spanish CLLD by English-speaking learners, in particular, the specificity of antecedents. She found that while the syntax was acquired properly, the learners overgeneralized the clitic in non-specific contexts, displaying vulnerability at the interpretive level. In another study on the acquisition of Spanish CLLD, Slabakova et al. (2012) proposed an order of acquisition in which narrow syntactic properties are acquired first, followed by syntax-semantics interface properties, and the last properties to be acquired are those of the syntax-discourse interface. Although the present study does not investigate CLLD, these results can serve as an indication of the developmental stages in the acquisition of clitics.

4. Research Questions

The linguistic descriptions and comparisons between the two languages clearly show that the Catalan clitic system is morphologically more complex than the Spanish system, with more pairings of semantic properties mapped onto different functional forms. In this study, we focus on the morphological consequences of the semantic feature [±definite] and investigate whether its morphological expression in bilingual Catalan is affected by intense contact with Spanish language. In particular, we question whether Spanish-dominant early bilinguals are able to acquire a new functional category (/l/ vs. /u/) and its appropriate semantic distribution in Catalan. On the other hand, DOM in Spanish has an intricate semantic system that regulates its appearance; this use of DOM is, prima facie, more complex in Spanish than in Catalan, since, in Standard Catalan, it is mainly regulated by syntax, i.e., it is required in determined syntactic contexts such as topicalizations and with strong pronouns. Thus, Spanish-dominant bilinguals need to reduce their grammatical system and disregard the semantic and pragmatic distribution of DOM. Given these two situations involving the acquisition of one new category—that is, complexifying the grammar vs. the unlearning of one category, simplifying the system—we wonder which process prevails in bilingual grammar, factoring in the role of language dominance.

If simplification always takes place in language contact situations, as McWhorter (2007) and Trudgill (1989) predicted, then we can expect bilingual varieties to have a reduced clitic system with no morphological distinction for definiteness, as well as a grammar system with no DOM specification. If crosslinguitic influence takes place as a consequence of feature activation in bilinguals, then we should find functional interference or functional convergence, as Sánchez (2003) hypothesized. Then, we would expect the activation of functional features in Catalan, triggered by input in Spanish, to result in new configurations of features and feature mappings influenced by Spanish, and finally, we would expect the formation of new structures in Catalan. These new structures may consist of a reassembly of features in semantically or grammatically similar structures, in the form of, for instance, the clitic *ho* in [+definite] contexts, *l* in [−definite] contexts, or DOM in non-topicalized contexts. If functional convergence takes place, then we should find a common set of features shared by the bilinguals that are equivalent in the two languages—that is, a fusion of functional features from the two languages

(Sánchez 2003, 2015). In order to investigate these hypotheses, and given the scarcity of the data on Catalan–Spanish bilingualism, we conducted an exploratory experimental study with data from three different types of bilinguals and two linguistic tasks.

5. The Study: Methodology

5.1. Participants

Fifty-seven young Catalan—Spanish speakers, most of them with a university degree, between the ages of 20–36 (*M* (29.1), *SD* (4.7)) participated in this study. This range of ages was selected so that all participants had been schooled in Catalan, under the Catalan immersion linguistic policy, first established in 1983. The idea of this law is to guarantee that all children know both languages well at the end of the obligatory school system. In order to assess the linguistic profiles of the participants, they completed an exhaustive linguistic background questionnaire (more details below), which classified them into three groups:

Group 1: Catalan-dominant speakers (n = 22), who live in the central area of Catalonia (Manresa and surroundings). All these speakers identified themselves as Catalan and not Spanish, and only one of them considered himself to be a balanced bilingual speaker, although the background questionnaire (see below) classified this speaker as Catalan-dominant.

Group 2: Bilingual speakers (n = 15), whose L1 is Catalan or who were raised through the one parent/one language strategy and live in the metropolitan area of Barcelona, mostly in Sant Adrià de Besòs and surrounding areas. These are speakers who have been exposed continuously to both languages since birth.

Group 3: Spanish-dominant speakers (n = 20), who live in the same neighborhoods in the Metropolitan area of Barcelona that individuals in group 2 do, come from a Spanish family background and use Spanish predominantly.

The goal of this classification was to represent different linguistic populations identified in the last linguistic survey carried out in Catalonia, as explained in the introduction. These three groups represent different points on a bilingual continuum (Perpiñán 2017; Silva-Corvalán 2003), and we believe they can represent different stages in a possible linguistic change.

5.2. Materials

5.2.1. Linguistic Background Questionnaire

This questionnaire consisted of approximately 50 questions regarding language use, language preference, family origins, amount of exposure to each language, linguistic identification, onset of acquisition of the two languages, and self-evaluation in different linguistic skills in both languages. It was administered on the internet through a survey platform. The data from this task classified the bilingual speakers in the groups described in Section 5.1.

5.2.2. Acceptability Judgment Task

The Acceptability Judgment Task (AJT), administered on the same web platform, consisted of a total of 120 pairs of sentences that tested different linguistic constructions. In this study, we analyzed 40 target pairs of sentences, 20 for DOM and 20 for the definite accusative clitic. Participants were instructed to read the pair of sentences and judge the second sentence according to the context introduced by the first one on a 4-point scale: 1 = "sona malament" (sounds bad), 4 = "sona bé" (sounds good). Sentence pairs were counterbalanced for grammaticality; the main independent variables were type of structure, masculine definite clitic and DOM, and each structure had 4 conditions: two grammatical and two ungrammatical. Each structure was analyzed independently. There were 5 tokens per condition and structure (2 structures × 4 conditions × 5 tokens = 40 pairs of sentences). Table 2 presents one example from each category of the DOM structures.

Table 2. Sample of experimental stimuli in the Acceptability Judgment Task (AJT) for Differential Object Marking (DOM) structures.

Personal *a*	**+Definite**	**−Definite**
−DOM	Què fan els pares? Passegen la seva filla.	Què fan els pacients? Esperen una infermera.
+DOM (ungrammatical)	Què fan els pares? *Passegen **a** la seva filla.	Què fan els pacients? *Esperen **a** una infermera.
English Translation	'What do the parents do? 'They walk her daughter.'	'What do the patients do? They are waiting for a nurse.'

Sentences for the DOM condition manipulated the variable [±definite] and the presence or absence of DOM with transitive verbs. The purpose of these sentences was to empirically assess the acceptability of the DOM in Catalan, in bilingual contexts, in declarative, neutral-context sentences. We only included [+human] objects; all subjects of these sentences were also [+human].

As for the structure masculine clitic, we only included masculine definite antecedents (2 animate, 3 inanimate), and manipulated the order of the clitic structures and the presence of the definite clitic /*l*/, the indefinite one *ho* /u/ and the ungrammatical null clitic. The combination of variables is exemplified in Table 3.

Table 3. Sample of experimental stimuli in the AJT for masculine clitic structures.

Masculine Clitic	**Definite Clitic /l/**	***Indefinite /u/ or *Ø***
Proclisis	Qui va rebre el regal? **El** va rebre el Joan.	Qui va rebre el regal? **Ho** va rebre el Joan.
Enclisis	Qui va rebre el regal? Va rebre'**l** el Joan.	Qui va rebre el regal? Va rebre el Joan.
English Translation	'Who received the present? Joan received it.'	

5.2.3. Oral Production Task

The Oral Production Task (OPT) consisted of a total of 50 scenarios in which a picture was presented, followed by a question about the picture and a guided response that included the transitive verb and the DP to be used. There were 5 contexts with definite human direct objects favouring the presence of DOM according to Spanish grammar (Figure 1), and 5 disfavouring DOM with indefinite human direct objects (Figure 2). The DPs provided in the task, which were the direct object of the transitive verb, always included the definite or indefinite article.

Figure 1. Context eliciting Differential Object Marking (DOM) with a definite direct object.

13. Figure 1—Translation from Catalan
What do journalists do?
Expected/Possible Response
Escolten la presidenta d'Alemanya
'They listen to the president of Germany.'

Figure 2. Context eliciting (no) DOM with an indefinite direct object.

14. Figure 2—Translation from Catalan
What have these women done?
Expected/Possible Response
Han saludat una veïna
'They have greeted a neighbour.'

In order to elicit accusative clitics, we included 5 contexts in which a definite masculine singular object was expected to be clitized (Figure 3), and 5 contexts in which a definite feminine singular was expected to be clitized (Figure 4). The tense of these sentences was always in the indefinite preterite, which is an analytical verbal form in Catalan and allows for both enclisis and proclisis.

Figure 3. Context eliciting the accusative masculine clitic.

15. Figure 3—Translation from Catalan
Who won the prize?
Expected/Possible Response
El *va guanyar la noia/Va guanyar-**lo** la noia*
'The girl won it.'

We also included 5 scenarios in which the accusative clitic elicited was feminine:

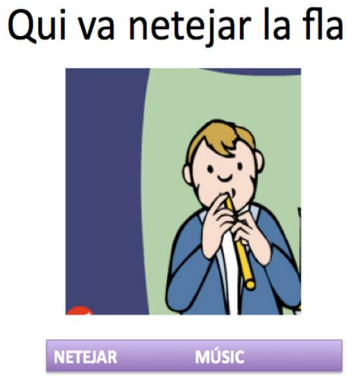

Figure 4. Context eliciting the accusative feminine clitic.

16. Figure 4—Translation from Catalan
Who cleaned the flute?
Expected/Possible Response
La *va netejar el músic/Va netejar-**la** el músic*
'The musician cleaned it.'

6. Results

6.1. Linguistic Background Questionnaire

Responses from the linguistic background questionnaire were transformed into a numerical value—responses that favored Catalan were coded with 1 (for instance, if the family is originally from Catalonia, if they live outside the metropolitan area of Barcelona, if they identified themselves with Catalan, etc.), and responses that favored Spanish were coded as 0; responses that favored both were coded as 0.5. This calculation served to classify the participants into the abovementioned groups. If the score ranged from 0 to 4.5, the participant was classified as "Spanish-dominant" ($M = 1.75$, $SD = 1.39$); if the total score ranged from 5 to 9.5, the participants were classified as "Bilingual" ($M = 7.93$, $SD = 2.03$), and if the score ranged from 10 to 13, the participant was classified as "Catalan-dominant" ($M = 12.2$, $SD = 1.25$). A one-way ANOVA with the mean scores from the Linguistic Background Questionnaire showed a robust effect of the variable group ($F(2,54) = 244.58$, $p < 0.001$), and the post-hoc test proved that the three groups were statistically different ($p < 0.001$). This is a reliable way of classifying types of bilinguals, similar to the one developed by Birdsong et al. (2012), particularly when proficiency does not necessarily account for degree of bilingualism. Official Catalan proficiency tests, which were deliberately avoided in this study, measure explicit, normative, and standardized knowledge typically taught in the classroom that often differs from street usage.

6.2. Acceptability Judgment Task

The participants judged the pairs of sentences on a scale from 1 (sounds bad) to 4 (sound good); the results from each participant were averaged by condition and group and analyzed with a repeated measures ANOVA by linguistic structure.

6.2.1. Differential Object Marking Results

In the DOM sentences, we manipulated two variables: the absence/presence of the preposition *a* and the [±definiteness] of the direct object. The between subjects factor was the bilingual group to which the participant was assigned by means of the linguistic background questionnaire. The average ratings by condition and group are shown in Figure 5. Overall, we can see that all participants largely accepted all sentences, with or without the preposition.

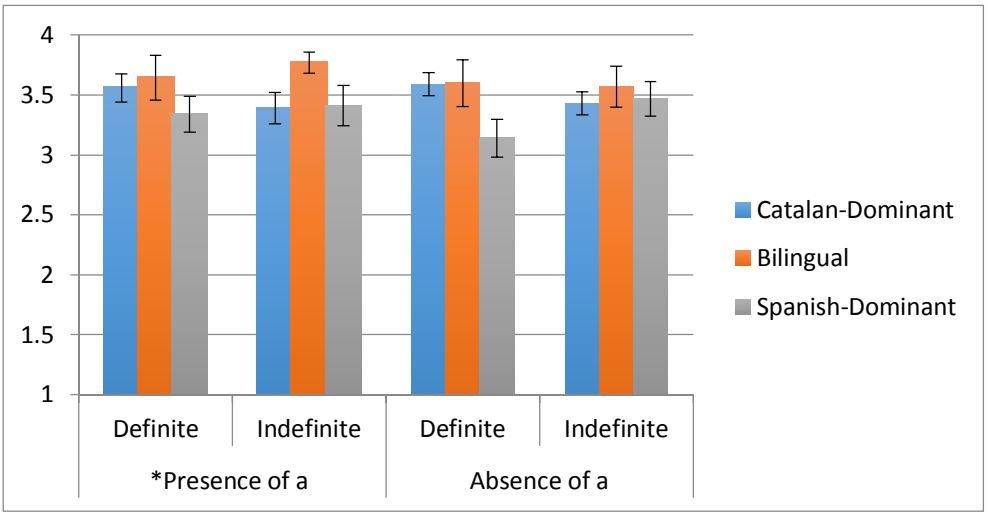

Figure 5. Average ratings for DOM structures, Acceptability Judgment Task (AJT).

The results of the repeated measures ANOVA showed no significant effect of *definiteness* ($F(1,54) = 0.66$, $p > 0.1$), and no significant effect of the presence/absence of the preposition *a* ($F(1,54) = 0.166$, $p > 0.1$). There was no interaction between *definiteness* and preposition *a* ($F(1,54) = 0.037$, $p > 0.1$), as it would have been expected, pointing towards the idea that our participants, independently of the group they belong to, do not regulate the presence/absence of the DOM according to the definiteness of the direct object. The group factor was also not significant ($F(2,54) = 2.31$, $p > 0.1$). There was only one significant interaction in the results, and that was between *definiteness* and group ($F(2, 54), = 6.29$, $p < 0.05$). This interaction showed that overall, Spanish-dominant bilinguals rated the definite sentences lower, whereas the Catalan-dominant bilinguals rated these sentences significantly higher, independently of the presence/absence of a DOM.

6.2.2. Accusative Clitics

As for the accusative clitics, grammatical sentences were submitted to a repeated measures ANOVA, and the results showed that position has a significant effect in the grammatical data ($F(1,54) = 8.08$, $p = 0.006$), as well as the bilingual group ($F(2,54) = 3.671$, $p < 0.05$), and the interaction between position and bilingual group ($F(2,54) = 3.306$, $p < 0.05$). By looking at the descriptive data represented in Figure 6, we can see that proclisis received lower acceptance rates in the non-Catalan-dominant groups; all groups responded similarly in the enclisis syntactic condition. The post-hoc tests with the Bonferroni correction further indicated that the only groups that differed were the Catalan-dominant bilinguals and the Spanish-dominant bilinguals, and only in the proclisis condition ($p = 0.012$); the balanced bilinguals, on the other hand, did not differ from either of the other two groups ($p > 0.1$).

With respect to the ungrammatical sentences, we conducted a multivariate ANOVA, which indicated that, as for the omission of the obligatory clitic, there was a significant difference between groups ($F(2,54) = 4.082$, $p = 0.022$); the Bonferroni correction indicated that the Spanish-dominant bilinguals differed from the Catalan-dominant bilinguals ($p = 0.23$). Finally, with respect to the ungrammatical *ho* /u/, the results of the ANOVA showed a significant difference between groups ($F(2,54) = 23.294$, $p < 0.001$), and the post-hoc test further showed that the only different group was the Spanish-dominant bilinguals ($p < 0.001$), whereas Catalan-dominant and balanced bilinguals did not differ from each other ($p = 1$). This result is easily observable in Figure 6, which shows clearly how the Spanish-dominant group accepted the sentences with the clitic *ho* as grammatical.

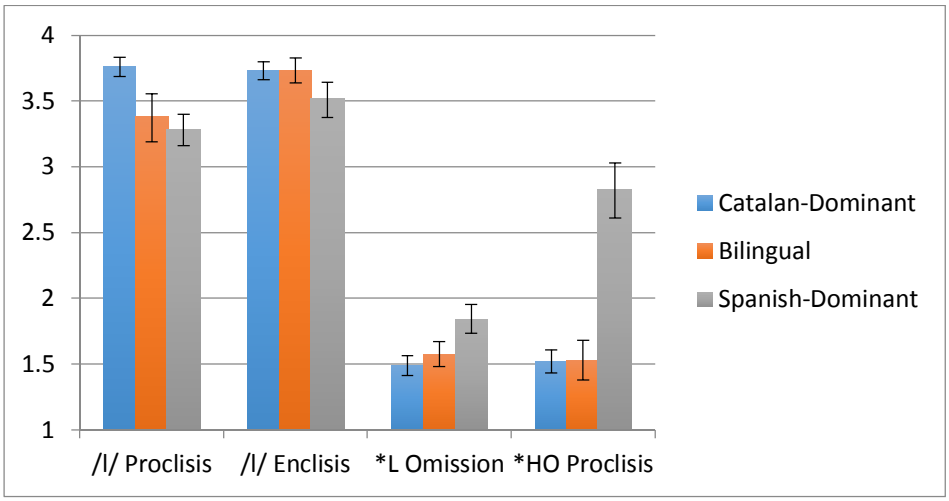

Figure 6. Average ratings for accusative clitic structures, AJT.

6.3. Production Results

The sentences elicited in the oral task were coded according to the structure produced, and in the case of the DOM contexts, participants could produce or leave out the preposition *a*; as for the accusative clitics, sentences were coded according to the position of the clitic, whether the clitic was produced or omitted, and by the clitic produced. The percentages of structures produced for each construction were calculated by token and participant and then averaged by condition and group.

6.3.1. Production of Differential Object Marking

As described in the methodology section, the production task presented definite and indefinite human direct object contexts, which could elicit the presence/absence of a DOM. Table 4 displays the percentages of production/omission of the preposition according to the semantic features of the DO and the group of bilinguals.

Table 4. Percentages and (counts) of absence/presence of DOM by group and context.

	*Presence of DOM	Absence of DOM
Definite Direct Object (DO)		
Catalan-Dominant *n* = 21	22% (23)	78% (82)
Balanced Bilinguals *n* = 15	37% (28)	60% (45)
Spanish-Dominant *n* = 19	38% (36)	55% (52)
Indefinite DO		
Catalan-Dominant	13% (14)	71% (75)
Balanced Bilinguals	25% (19)	63% (47)
Spanish-Dominant	41% (39)	50% (47)

Raw data were submitted to a Chi-square test of independence to examine the relationship between definiteness and the presence/absence of DOM. The results were not significant ($p < 0.1$); for this reason,

we decided to collapse the data and remove the consideration of whether the context was definite or indefinite. We resubmitted the collapsed data to another Chi-square test to evaluate the relationship between the presence/absence of DOM and the group. This resulted in a significant difference (χ^2 (2, 507) = 25.144, $p < 0.001$), confirming that, overall, Spanish-dominant bilinguals produced more DOMs and omitted less prepositions across contexts than the Catalan-dominant bilinguals.

6.3.2. Production of Clitics

Generally speaking, all participants produced the target construction most of the time, and all groups overwhelmingly preferred proclisis over enclisis. Spanish-dominant speakers seemed to use less proclisis than the other two groups, but this difference did not reach statistical significance. In contrast to what we observed in the AJT, there was very little production of the clitic *ho* /u/ in a definite context; interestingly enough, this ungrammatical and very scarce appearance of /u/ was produced by Spanish-dominant bilinguals not only in masculine, but also in feminine contexts. The frequency of clitic production by each type of bilingual is displayed in Table 5.

Table 5. Percentages of type of clitic produced.

	Proclisis	**Enclisis**	***ho***	**Omission**
Feminine DO				
Catalan-Dominant	92.4%	6.7%	0%	0.9%
Balanced Bilinguals	93.3%	6.7%	0%	0%
Spanish-Dominant	78.9%	8.4%	5.3%	2.1%
Masculine DO				
Catalan-Dominant	90%	5.7%	0.9%	1.9%
Balanced Bilinguals	90.7%	2.7%	0%	0%
Spanish-Dominant	77.9%	2.1%	3.2%	5.3%

A multivariate ANOVA indicated no statistical significant differences between groups for any of the conditions/structures investigated; all contrasts and post-hoc correlations for between subjects tests had significance levels of $p > 0.5$.

7. Discussion

The first interesting pattern that we observed in the results is the asymmetry between acceptability and production data, whereby acceptability data are significantly more distant from the standard grammar than the production data, with higher rates of acceptance of innovative variants and more optionality than in production data. I interpret this not as a task or methodological effect, per se, as an anonymous reviewer suggests, but as a result of the type of knowledge that participants engage with when responding to each task. Indeed, these results are expected, as comprehension occurs before production, and hence, new varieties need to be first understood and accepted in order for the speaker to produce them. It could be the case that these non-standard forms with /u/ in definite contexts, for instance, are only heard by the Spanish-dominant bilinguals, and hence, accepted, but not produced, by them. One can hypothesize that adult second language learners, with whom the Spanish-dominant bilinguals are in constant contact, produce these non-standard forms, and then, Spanish-dominant bilinguals incorporate them into their receptive knowledge of the language but not into their productive system.

With respect to DOM, all participants overwhelmingly accepted all sentences, with or without DOM, in definite and indefinite contexts. That is, there is a generalized variability with respect to Catalan DOM, which results in [+human] direct objects optionally appearing with or without the preposition *a*, in all groups of bilinguals. This is a very interesting outcome that suggests functional convergence in the grammar of all types of bilinguals—the three groups presented similar results, accepting the ungrammatical presence of DOM at the same time that they accepted the absence of DOM

in their Catalan grammar, a result that cannot be accounted for by simply assuming crosslinguistic interference from Spanish. Recall that the absence of the preposition *a* in definite direct objects is completely unacceptable in Spanish, and variable in indefinite contexts. This indicates that the bilinguals' intuitions regarding Catalan are different from both Standard Catalan and Standard Spanish—bilinguals accept a new distinctive variety that shares features from both Catalan and Spanish, but that also differs from both. This is precisely the definition of functional convergence according to Sánchez (2003, 2015): a fusion of functional features from the two languages that creates a new bilingual variety. In this case, the DOM in the bilingual grammar presents pure optionality in [+human, ±definite] direct objects. We can only speculate whether this optionality is *emerging* in the Catalan-dominant bilinguals, as in the grammar of L1 attriters, and *residual* in the grammar of the Spanish-dominant bilinguals, as in near-native adult L2 learners (Sorace 2005). It remains for future research whether the Spanish grammar of these bilinguals (Spanish spoken in Catalonia, or the bilingual Spanish) also present optionality in DOM use. If this were the case, then we would have a clear case of convergence of both languages, where bilinguals, instead of keeping the two grammars separate in their minds, have fused them, merging the restrictions and idiosyncrasies both languages. This alleviates the cognitive load required to maintain and suppress each language individually. In that sense, linguistic convergence is promoted through processing economy considerations (Muysken 2000). The frequent activation of both languages favors the combination of rules, that is, functional convergence (Sánchez 2003), in this case resulting in optionality. If the input these bilinguals receive in both languages also presents instability and variation in DOM, then this further reinforces the optionality. Moreover, the necessity of DOM in certain syntactic contexts in Standard Catalan (with dislocations, with strong pronouns, etc.) also reinforces the presence of this preposition in the grammar.

The findings from the production data with respect to DOM are somewhat different from those from the AJT given that the Catalan-dominant group omitted the preposition significantly more often in definite and indefinite contexts compared to the Spanish-dominant group, at the same time that the Spanish-dominant group produced DOM significantly more frequently. These results are more conservative than those of the AJT in the sense that they conform more closely to the grammar of Standard Catalan on one side, and the grammar of Spanish on the other, indicating some degree of transfer from Spanish into Catalan in the production of Spanish-dominant bilingualism. Taken together, the DOM results lead us to conclude that the definiteness/specificity feature is not relevant in the distribution of DOM in Catalan, not even for Spanish-dominant bilinguals. This lack of a definiteness effect is expected in Catalan as DOM in Standard Catalan is regulated by syntactic restrictions and not semantic ones. This finding would not be expected in a language with heavy crosslinguistic influence from Spanish. Thus, this variety with optional DOM is by no means simply the result of feature transfer from Spanish, the dominant language, but rather, the outcome of an internal evolution together with external factors.

To sum up, in regard to DOM in Catalan, the results in the AJT are far from being categorical and display ample optionality in all types of bilinguals, with no clear preference or rejection for sentences with (ungrammatical) or without (grammatical) DOMs. In fact, all sentences were accepted as equally grammatical—those with the preposition and those without it—independently from the semantic context in which the preposition appears/is omitted. All types of bilinguals accept DOM as part of their Catalan variety, or at least clearly accept it as 'sounds good'. The presence of DOM does not result in any type of ungrammaticality in the Catalan competence of these speakers, at least not in [+human] contexts. These results go even further than Hualde's claim which proposed that spoken Catalan is a DOM language in human contexts, since our participants also accepted DOM in written Catalan. It is evident that the grammar of Catalan has evolved to the point of optionally accepting DOM in all human direct object contexts, at the same time that the etymological option in which DOM is absent is simultaneously retained—a mixture of both grammars coexist in the bilingual mind as they are reinforced by input from both languages, to the point of fusing their characteristics.

It remains for further research whether we would find the same results in [−human] and [−animate] contexts. At the same time that Catalan seems to be a DOM language with human direct objects, it is equally plausible without the preposition in the same contexts. This variability cannot be accounted for only by crosslinguistic influence or functional interference from Spanish, as Spanish grammar would reject these ungrammatical DOM sentences. Guijarro-Fuentes and Marinis (2009) reached similar conclusions with Spanish data from Catalan-dominant bilinguals, as they overused the preposition *a* in inappropriate contexts, a fact that could not be explained by crosslinguistic influence. These authors further concluded that language contact does not influence the path of acquisition for DOM, a statement with which we do not completely agree. Whereas it is true that crosslinguistic influence from Spanish cannot be the only explanation of the present Catalan grammar of bilinguals, we would like to point out that language contact outcomes do not need to have a unique directionality, that is, influence from the majority language to the minority language. It can be the case, as we have found here, that bilinguals find creative solutions to cope with the pressure of keeping two languages in continuous activation. The combination of constraints from the two languages can be one of those solutions. Our bilingual speakers have created a new variety in which Catalan DOM is optional in definite and indefinite contexts. It seems that both solutions, the Catalan option without DOM and the Spanish option with DOM, are similarly available and coexist in the bilingual mind and the bilingual community. It remains for further research to investigate whether the Spanish spoken in Catalonia also presents signs of optionality with respect to DOM use and only then can we conclude that signs of convergence appear in both languages in contact.

Thus, the coexistence of these two languages, that is, the language contact, have afforded this optionality in Catalan and hence, the new bilingual variety. This is in accordance with Silva-Coravalán's claim regarding language change in language contact situations—we believe that bilingualism favours the creation of new contact varieties, and thus, promotes or accelerates language change. Recall that the presence of DOM was already attested for in Medieval Catalan and probably also in Vulgar Latin, so external forces (the presence of Spanish) are basically accelerating an already ongoing internal process. This change does not incorporate foreign elements into the grammar but expands the contexts in which the vernacular DOM can appear. Although we do not yet know the exact new distribution of DOM in bilingual Catalan, we do not believe this is necessarily a matter of language simplification; in contrast, if anything, it would be a case of language complexification as it is adding/expanding a new morphological marker. Still, until this phenomenon is investigated in other semantic, pragmatic, and syntactic contexts, we can only speculate about this issue.

With respect to the definite accusative clitics, the AJT and the production data showed that the Spanish-dominant speakers do not exactly accept/produce proclisis at the same rates as the Catalan-dominant speakers, an issue that we will not address in depth here and remains for further research; on the other hand, Spanish-dominant bilinguals also accepted ungrammatical omissions of clitics more frequently than Catalan-dominant speakers. However, these differences did not reach statistical significance. These two features have also been found in data from adult L2 learners (Duffield et al. 1998; Duffield et al. 2002; Duffield and White 1999; Liceras 1985), in which the L2 learners had difficulties with clitic climbing and omitted obligatory clitics. Differences aside, it is interesting that we found similar results in the Catalan of Spanish-dominant bilinguals, whose first language shares linguistic features with Catalan (clitic climbing and obligatory definite clitics). Thus, although not reaching statistical significance, we see a pattern here represented by a bilingualism outcome: even when the two languages at play behave similarly, the non-dominant language can present typical characteristics of developmental grammar.

As for the indefinite clitic *ho* in ungrammatical contexts, we found large differences in acceptance rates in the AJT in the grammar of Spanish-dominant bilinguals compared to the other two groups. For these speakers, *ho* is a seemingly plausible substitute of the clitic /l/ in definite contexts, thus, the semantic distinction of this clitic [+definite] is not correctly mapped with the appropriate functional category and its morphological spell out. Conversely, the production of *ho* in inappropriate contexts

is very scarce, showing again that the general intuition of bilinguals is more accommodating to innovative varieties; however, their production is more unadventurous and abides more closely by the rules of the standard grammar. Interestingly enough, the sparse ungrammatical production of *ho* appears in masculine and feminine contexts, indicating that Spanish-dominant speakers may consider the clitic *ho* a gender-neutral pronoun that is also available for definite contexts. We believe that the acceptance of *ho* by the Spanish-dominant speakers is not an internal evolution of the Catalan language or a combination of constraints but is due to crosslinguistic influence from Spanish. Indeed, Catalan-dominant speakers as well as balanced bilinguals do not accept this option in their native Catalan grammar, as the use of *ho* in definite environments is an external influence from Spanish that has not been incorporated, at least not yet, into the bilingual system. We believe that the fact that Spanish does not distinguish between definite and indefinite direct object clitics and that the Spanish archimorpheme *lo* subsumes all the uses, increasing the frequency of this clitic in the input favors the activation of an underspecified clitic *lo* in the Catalan grammar of Spanish-dominant bilinguals that morphologically maps onto *ho* /u/ in Catalan.

Thus, these two structures (DOM and /l/ vs. /u/) have different natures in terms of language contact phenomena and are at different stages on a potential language change path. Both, nonetheless, are somewhat affected by the intense contact with Spanish. Catalan DOM is clearly undergoing language change through language convergence, whereas the status of *ho* is that of circumstantial influence from Spanish to Catalan. Both phenomena start at the level of comprehension/acceptance, and later may expand to the production system and be incorporated into bilingual grammar. Both innovative phenomena are first found, or found with a higher frequency, in the Catalan grammar of Spanish-dominant bilinguals, and are later adopted by the balanced bilinguals. As mentioned before, it could be the case that these innovative forms start out in the grammar of child L2 learners who remain dominant in their first language, or even in the grammar of adult L2 learners, not depicted here. In any case, we believe that Spanish-dominant bilinguals are the agents of linguistic change.

The final logical question is why some features permeate and change in a bilingual context while others do not seem to do so easily, even when they share the same semantic distinctions. This intralinguistic question would vary from language to language, but we believe that vulnerable or difficult elements for L2 learners would also be difficult and susceptible to change in language contact situations. Many studies have demonstrated that Spanish DOM is a vulnerable feature in L2, heritage languages and has been subject to attrition in immigrant communities (Montrul and Sánchez-Walker 2013; Montrul et al. 2015). If DOM has been reported to be vulnerable in other asymmetrical bilingualism situations, we can only presume that it will also be difficult in the bilingual context at hand. Furthermore, its distribution in Catalan language has been expanding in certain contexts along the history of Catalan language as an internal phenomenon, and more variability in the input is already apparent. This (re)distribution of DOM in Catalan has been accelerated by contact with Spanish. On the other hand, the distribution of /u/ vs. /l/ has not presented variability in the Catalan language and remains stable in the grammar of Catalan-dominant and balanced bilinguals, in the sense that they do not accept its appearance in inappropriate contexts. We can only imagine that this external feature will not permeate into bilingual Catalan grammar, as its inclusion is not favored by the internal evolution of the language. With respect to the final research question regarding the directionality of language change, we can now conclude that the attested optionality does not necessarily imply simplification or erosion. Catalan has expanded its use of DOM and has created a new redistribution of feature-form mappings. These mappings may remain indeterminate for some time, but in any case, we do not believe this constitutes an instance of language simplification.

8. Conclusions

This study investigated the expression of direct objects in the Catalan grammar of three different types of Catalan–Spanish bilinguals: Catalan-dominant, balanced, and Spanish-dominant bilinguals. It focused on the expression of DOM on one hand, and the distribution of /l/ vs. /u/ clitics, on the

other. Both linguistic phenomena are regulated by semantic distinctions in terms of definiteness and/or specificity. This study concluded that the acquisition of definiteness and/or specificity do not present major problems for non-native speakers, as all speakers had a good understanding of the intricacies of the structures. We observed that DOM has been expanded to further syntactic structures in the grammar of all of the groups of bilinguals that we investigated, and that /u/ is anecdotally used in definite contexts by Spanish-dominant bilinguals. Following Sánchez (2003, 2015) terminology, we analyzed these findings as examples of functional convergence in the case of DOM, and as functional interference in the case of /u/. The combination of constraints from Catalan and Spanish, that is, functional convergence, has created a new language variety, the bilingual variety. As opposed to Trudgill (1989) and McWhorter (2007), we do not believe this is a case of language simplification, since Catalan is expanding its use of DOM and in a way, complexifying its grammar and the (re)distribution of DOM. This is, though, a case of ample optionality and indeterminacy, which is now a native feature of bilingual grammar. We consider this to be an example of diachronic change accelerated by the intense contact with Spanish, as hypothesized by Silva-Corvalán (1994). We further hypothesize that the agents of this language change are the less dominant bilinguals in Catalan, that is, the child L2 learners of Catalan who remain Spanish-dominant speakers, or even more likely, the adult L2 learners of Catalan who were not depicted in this study.

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References

Aissen, Judith. 2003. Differential Object Marking: Iconicity vs. Economy. *Natural Language & Linguistic Theory* 21: 435–83.

Arche, María J., and Laura Domínguez. 2011. Morphology and syntax dissociation in SLA: A study on clitic acquisition in Spanish. In *Linguistik Aktuell/Linguistics Today*. Edited by Alexandra Galani, Glyn Hicks and George Tsoulas. Amsterdam: John Benjamins Publishing Company, vol. 178, pp. 291–320.

Arregi, Karlos. 2003. Clitic Left Dislocation Is Contrastive Topicalization. *University of Pennsylvania Working Papers in Linguistics* 9: 31–44.

Bel, Aurora. 2002. Les funcions sintàctiques. In *Gramàtica del Català Contemporani I, II i III*. Edited by Joan Solà, M. Rosa Lloret, Mascaró Joan and Manuel Pérez Saldanya. Barcelona: Editorial Empúries, pp. 1075–147.

Birdsong, David, Libby M. Gertken, and Mark Amengual. 2012. *Bilingual Language Profile | An Easy-to-Use Instrument to Assess Bilingualism*. Austin: COERLL, University of Texas at Austin.

Campos, Héctor. 1986. Indefinite Object Drop. *Linguistic Inquiry* 17: 354–59.

De Borja Moll, Francesc. 1968. *Gramàtica Catalana: Referida Especialment a Les Illes Balears*. Palma de Mallorca: Moll.

Duffield, Nigel, Silvina Montrul, Joyce Bruhn de Garavito, and Lydia White. 1998. Determining L2 Knowledge of Spanish Clitics On-Line and Off-Line. Paper presented at Annual Boston University Conference on Language Development, Boston, MA, USA, November 2–4; vol. 22, pp. 177–88.

Duffield, Nigel, and Lydia White. 1999. Assessing L2 Knowledge of Spanish Clitic Placement: Converging Methodologies. *Second Language Research* 15: 133–60. [CrossRef]

Duffield, Nigel, Lydia White, Joyce Bruhn De Garavito, Silvina Montrul, and Philippe Prévost. 2002. Clitic Placement in L2 French: Evidence from Sentence Matching. *Journal of Linguistics* 38: 487–525. [CrossRef]

Escandell-Vidal, M. Victoria. 2009. Differential object marking and topicality: The case of Balearic Catalan. *Studies in Language* 33: 832–85. [CrossRef]

Fabra, P. 1918. *Gramàtica Catalana*. Barcelona: Institut d'Estudis Catalans.

Fabra, P. 1956. *Gramàtica Catalana*. Barcelona: Teide.

Gavarró, Anna, Meritxell Mata, and Eulàlia Ribera. 2006. L'omissió dels clítics d'objecte i partitius en el català infantil: dades espontànies. In *La Gramàtica Pronominal del Català: Variació, Evolució, Funció = The Grammar of Catalan Pronouns: Variation, Evolution, Function*. Edited by Claus D. Pusch and Susann Fischer. Aachen: Shaker, pp. 27–46.

Gavarró, Anna, Vicenç Torrens, and Ken Wexler. 2010. Object Clitic Omission: Two Language Types. *Language Acquisition* 17: 192–219. [CrossRef]

Gavarró Anna, Maria Teresa Guasti, Laurice Tuller, Philippe Prévost, Adriana Belletti, Luca Cilibrasi, Hélène Delage, and Mirta Vernice. 2011. The acquisition of partitive clitics in Romance five-years-olds. *Iberia* 3: 1–19.

Guasti, Maria Teresa. 1993. Verb Syntax in Italian Child Grammar: Finite and Nonfinite Verbs. *Language Acquisition* 3: 1–40. [CrossRef]

Guijarro-Fuentes, Pedro, and Theodoros Marinis. 2009. The Acquisition of the Personal Preposition a by Catalan-Spanish and English-Spanish Bilinguals. In *Selected Proceedings of the 11th Hispanic Linguistics Symposium*. Edited by Joseph Collentine, Maryellen García, Barbara Lafford and Francisco Marcos Marín. Somerville: Cascadilla Proceedings Project, pp. 81–92.

Hamann, Cornelia, and Adriana Belletti. 2006. Developmental patterns in the acquisition of the complement clitic pronouns. *Rivista di Grammatica Generativa* 31: 39–78.

Hawkins, Roger, and Cecilia Yuet-hung Chan. 1997. The Partial Availability of Universal Grammar in Second Language Acquisition: The "Failed Functional Features Hypothesis". *Second Language Research* 13: 187–226. [CrossRef]

Hualde, Jose Ignacio. 1992. *Catalan*. London: Routledge.

Idescat. 2013. Generalitat de Catalunya. Idescat (Institut d'Estadística de Catalunya). Available online: https://www.idescat.cat/ (accessed on 14 December 2017).

Jaeggli, Osvaldo. 1982. *Topics in Romance Syntax*. Dordrecht: Foris Publications.

Jaeggli, Osvaldo. 1986. Three issues in the Teory of Clitics: Case, Doubled NPs and Extraction. In *Syntax and Semantics: The Syntax of Pronominal Clitics*. Edited by Hagit Borer. Orlando: Academic Press, vol. 19, pp. 15–42.

Jakubowicz, Celia, Natascha Müller, Ok-Kyung Kang, Beate Riemer, and Catherine Rigaut. 1996. On the Acquisition of the Pronominal System in French and German. *Proceedings of the Annual Boston University Conference on Language Development* 20: 374–85.

Jakubowicz, Celia, Natascha Müller, Beate Riemer, and Catherine Rigaut. 1997. The Case of Subject and Object Omissions in French and German. In *Proceedings of the Annual Boston University Conference on Language Development*. Somerville: Cascadilla Press, vol. 21, pp. 331–42.

Jakubowicz, Celia, Lea Nash, Catherine Rigaut, and Christophe-Loic Gerard. 1998. Determiners and Clitic Pronouns in French-Speaking Children with SLI. *Language Acquisition* 7: 113–60. [CrossRef]

Kayne, Richard S. 1991. Romance Clitics, Verb Movement, and PRO. *Linguistic Inquiry* 22: 647–86.

Lardiere, Donna. 2008. Feature assembly in second language acquisition. In *The Role of Formal Features in Second Language Acquisition*. Edited by Juana Liceras, Helen Goodluck and Helmut Zobl. Mahawah: Lawrence Erlbaum, pp. 106–40.

Leonetti, Manuel. 2004. Specificity and Differential Object Marking in Spanish. *Catalan Journal of Linguistics* 3: 75–114. [CrossRef]

Liceras, Juana M. 1985. The Value of Clitics in Non-Native Spanish. *Second Language Research* 1: 151–68. [CrossRef]

López, Luis. 2012. *Indefinite Objects Scrambling, Choice Functions, and Differential Marking*. Cambridge: The MIT Press.

MacWhinney, Brian. 2000. *The CHILDES Project: Tools for Analyzing Talk*, 3rd ed. Mahwah: Lawrence Erlbaum Associates.

McWhorter, John. 2007. *Language Interrupted: Signs of Non-Native Acquisition in Standard Language Grammars*. Oxford: Oxford University Press US.

Meier, Harri. 1947. O problema do acusativo preposicional no catalão. *Boletim de Filologia* 8: 237–60.

Montrul, Silvina. 2004. Subject and Object Expression in Spanish Heritage Speakers: A Case of Morphosyntactic Convergence. *Bilingualism: Language and Cognition* 7: 125–42. [CrossRef]

Montrul, Silvina, and Melissa Bowles. 2009. Back to basics: Incomplete knowledge of Differential Object Marking in Spanish heritage speakers. *Bilingualism: Language and Cognition* 12: 363–83. [CrossRef]

Montrul, Silvina, Rakesh Bhatt, and Roxana Girju. 2015. Differential object marking in Spanish, Hindi, and Romanian as heritage languages. *Language* 91: 564–610. [CrossRef]

Montrul, Silvina, and Noelia Sánchez-Walker. 2013. Differential Object Marking in Child and Adult Spanish Heritage Speakers. *Language Acquisition* 20: 109–32. [CrossRef]

Gathercole, Virginia C. Mueller, and Enlli Môn Thomas. 2009. Bilingual first-language development: Dominant language takeover, threatened minority language take-up. *Bilingualism: Language and Cognition* 12: 213–37. [CrossRef]

Muysken, Pieter. 2000. *Bilingual Speech*. Cambridge: Cambridge University Press.

Paradis, Johanne. 2004. The Relevance of Specific Language Impairment in Understanding the Role of Transfer in Second Language Acquisition. *Applied Psycholinguistics* 25: 67–82. [CrossRef]

Pereda i Parramon, Joan. 1986. Contribució a l'estudi de les preposicions en el Tirant lo Blanch (Primera part). *Llengua & Literatura* 1: 51–109.

Pereda i Parramon, Joan. 1987. Contribució a l'estudi de les preposicions en el Tirant lo Blanch (Segona part). *Llengua & Literatura* 2: 19–66.

Perpiñán, Silvia. 2017. Catalan-Spanish bilingualism continuum: The expression of non-personal Catalan clitics in the adult grammar of early bilinguals. *Linguistic Approaches to Bilingualism* 7: 477–513. [CrossRef]

Prévost, Philippe, and Lydia White. 2000. Missing Surface Inflection or Impairment in Second Language Acquisition? Evidence from Tense and Agreement. *Second Language Research* 16: 103–33. [CrossRef]

Roca, Francesc. 1992. Object Clitics in Spanish and Catalan. In *Catalan Working Papers in Linguistics*. Girona: Universitat de Girona, pp. 245–80.

Rodríguez-Mondoñedo, Miguel. 2008. The acquisition of Differential Object Marking in Spanish. *Probus* 20: 111–45. [CrossRef]

Rohlfs, Gerhard. 1971. Autour de l'accusatif prépositionnel dans les langues romanes. *Revue de Linguistique Romane* 35: 312–34.

Ruaix i Vinyet, Josep. 1994. *Observacions Crítiques i Pràctiques Sobre el Català D'avui*, 1st ed. Moià: Ruaix, vol. 1.

Salvador, Vicent, and Manuel Pérez Saldanya. 1993. Transitivité et interférence linguistique: La construction a + complément d'objet direct en espagnol et en catalan. In *Contrastes*. Monogàfic sobre estudis hispànics. Barcelona: Universitat de Barcelona, pp. 39–67.

Sánchez, Liliana. 2003. *Quechua-Spanish Bilingualism: Interference and Convergence in Functional Categories*. Amsterdam: John Benjamins.

Sánchez, Liliana. 2015. Crosslinguistic influences in the mapping of functional features in Quechua-Spanish Bilingualism. In *The Acquisition of Spanish in Understudied Language Pairings*. Edited by Tiffany Judy and Silvia Perpiñán. Amsterdam: John Benjamins, pp. 19–48.

Sancho Cremades, Pelegrí. 2002. La preposició i el sintagma preposicional. In *Gramàtica del Català Contemporani I, II i III*. Edited by Joan Solà, M. Rosa Lloret, Mascaró Joan and Manuel Pérez Saldanya. Barcelona: Editorial Empúries, pp. 1689–796.

Santoro, Maurizio. 2007. Second Language Acquisition of Italian Accusative and Dative Clitics. *Second Language Research* 23: 37–50. [CrossRef]

Segarra, Mila. 1987. *Història de la Normativa Catalana*, 2nd ed. Barcelona: Enciclopèdia Catalana.

Silva-Corvalán, Carmen. 1986. Bilingualism and Language Change: The Extension of *estar* in Los Angeles Spanish. *Language* 62: 587–608. [CrossRef]

Silva-Corvalán, Carmen. 1994. The Gradual Loss of Mood Distinctions in Los Angeles Spanish. *Language Variation and Change* 6: 255–72. [CrossRef]

Silva-Corvalán, Carmen. 2003. Linguistic consequences of reduced input in bilingual first language acquisition. In *Linguistic Theory and Language Development in Hispanic Languages*. Edited by Silvina Montrul and Francisco Ordóñez. Somerville: Cascadilla Press, pp. 375–97.

Silva-Corvalán, Carmen. 2008. The Limits of Convergence in Language Contact. *Journal of Language Contact* 2: 213–24. [CrossRef]

Slabakova, Roumyana. 2009. Features or parameters: Which one makes second language acquisition easier, and more interesting to study? *Second Language Research* 25: 313–24. [CrossRef]

Slabakova, Roumyana, Paula Kempchinsky, and Jason Rothman. 2012. Clitic-doubled left dislocation and focus fronting in L2 Spanish: A case of successful acquisition at the syntax-discourse interface. *Second Language Research* 28: 319–43. [CrossRef]

Solà, Joan. 1994. *Sintaxi Normativa: Estat de la Qüestió*. Barcelona: Empúries.

Sorace, Antonella. 2005. Selective optionality in language development. In *Syntax and Variation: Reconciling the Biological and the Social*. Edited by and Leonie Cornips and Karen P. Corrigan. Amsterdam: John Benjamins, pp. 55–80.

Sorace, Antonella. 2011. Pinning down the concept of interface in bilingualism. *Linguistic Approaches to Bilingualism* 1: 1–33. [CrossRef]

Sorace, Antonella, and Francesca Filiaci. 2006. Anaphora Resolution in Near-Native Speakers of Italian. *Second Language Research* 22: 339–68. [CrossRef]

Sportiche, Dominique. 1996. Clitic Constructions. In *Phrase Structure and the Lexicon*. Edited by Johan Rooryck and Laurie Zaring. Dordrecht: Kluwer Academic Publishers, pp. 213–76.

Suñer, Margarita. 1988. The Role of Agreement in Clitic-Doubled Constructions. *Natural Language & Linguistic Theory* 6: 391–434.

Tarrés, Mònica, and Aurora Bel. 2015. L'adquisició del català en infants portuguesos: Un estudi sobre l'ús i el coneixement dels pronoms clítics. *Zeitschrift Für Katalanistik* 28: 261–81.

Tarrés, Mònica, and Aurora Bel. 2017. Optionality in Sequential Bilingualism: Production of Catalan Adverbial Clitics by Children of Different L1s. Paper presented at IASCL, Lyon, France, July 17–21.

Ticio, Emma. 2015. Differential object marking in Spanish-English early bilinguals. *Linguistic Approaches to Bilingualism* 5: 62–90. [CrossRef]

Torrego, Esther. 1998. *The Dependencies of Objects*. Cambridge: MIT Press.

Trudgill, Peter. 1989. Language Contact and Simplification. *Nordlyd* 15: 115–21.

Uriagereka, Juan. 1995. Aspects of the Syntax of Clitic Placement in Western Romance. *Linguistic Inquiry* 26: 79–123.

Valenzuela, Elena. 2007. L2 Ultimate Attainment and the Syntax-Discourse Interface: The Acquisition of Topic Constructions in Non-Native Spanish and English. Ph.D. dissertation, McGill University, Montréal, QC, Canada.

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Article

Monosyllabic Place Holders in Child Acquisition of Spanish as a Second Language

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Abstract: Monosyllabic place holders (MPHs) have been studied extensively in first-language (L1) acquisition of Spanish and other Romance languages. However, the study of MPHs in second-language (L2) acquisition, both by children and adults, has received much less attention. This study provides evidence for the presence of MPHs in the L2 Spanish of two L1 Moroccan Arabic children living in Spain. The age difference between the children (10;9 for Rachida and 6;10 for Khalid) allows us to address the issue of whether the younger child would use MPHs, as is the case in L1 acquisition. However, what the data show is that both children used MPHs, although Khalid's MPH rate was slightly higher than Rachida's. Therefore, based on these findings we argue that MPHs can constitute a strategy available for all child learners of Spanish.

Keywords: child second-language acquisition; acquisition of Spanish; Moroccan Arabic; monosyllabic place holder (MPH); determiner phrase

1. Introduction

The study of monosyllabic place holders (MPHs)[1] is one of the main issues in research with respect to first-language (L1) acquisition of Spanish and other Romance languages, and has been studied extensively by linguists and psychologists. This article is focused on the use of MPHs in the L2 acquisition of Spanish by children.

Monosyllabic place holders are linguistic elements, mainly vowel-like, which appear in the utterances of many children. They have been identified as appearing: (1) before nouns in the position of determiners and prepositions; (2) before adjectives and adverbs in the position of auxiliaries, copulas, and negative particles; and (3) before some sentences as interrogatives, in the position of complements. These three examples come from Italian, as a very detailed analysis of the position and meaning of MPHs has been performed for this language.

1. torna [a] babbo
   He comes back [a] daddy
   'Daddy comes back.' (Raffaello, 1;9,26;[2] taken from Bottari et al. 1993–1994, p. 337)

2. [a] fredda
   [a] it's cold
   'It's cold.' (Viola, 2;1;17; taken from Bottari et al. 1993–1994, p. 338)

[1] A list of abbreviations is provided in the back matter.
[2] These numbers stand for the age of children: the first is the number of years; the second, months, and the third, days. Therefore, 1;9,26 means 1 year, 9 months and 26 days. This notation is used throughout the article.

3. [e] (dove) tà (sta)?
   [e] (where) it-stays
   'Where does it stay?' (Viola, 2;1,17; taken from Bottari et al. 1993–1994, p. 339)

It has been reported that these elements appear earlier (by some months) in children learning Romance languages as compared to children learning Germanic languages (Lleó 1997, 2001a, 2001b; Lleó and Demuth 1999).

The reference to these linguistic elements can be found in the early research on language acquisition. For example, Karmiloff-Smith (1979) studied the primary acquisition of French and English, assuming a psychological constructivist perspective. She proposed two possible explanations about these elements, which have a semantic and a phrasal function: (1) they allow children to distinguish proper nouns (not preceded by these vowel-like elements) from common ones; and (2) they are metalinguistic or metacommunicative, because they allow children to distinguish between thing-like words (which can be preceded by these elements) and action-like words.

These elements have been also called fillers (Peters 1985), schwa fillers or protomorphemes (Peters and Menn 1993), protoarticles (Lleó 1997), amalgams or phonoprosodic forms (López Ornat 1997), and monosyllabic place holders (Bottari et al. 1993–1994). The latter is the term we prefer. In our opinion, it is the most accurate and extensive term, since not all vowels are schwa but they are all monosyllabic elements, and what they all share is the feature of occupying a specific position in the structure of the sentence.

Bottari et al. (1993–1994) studied the acquisition of Italian as an L1. They gathered several explanations for these schwa-like elements appearing in the acquisition process of Italian for some children. The three hypotheses they analyze are: (1) the phonetic-imitative hypothesis (they stem from imitation); (2) the structural-inference hypothesis (they are morphophonologically underspecified functional heads); and (3) the strong morphophonological hypothesis (they are phonologically altered realizations of specific morphophonological items). The hypothesis they defend is the second: MPHs are morphophonologically underspecified functional heads that represent some basic functions of the related real morphemes, like their positions in the structural representation of the sentence. This is also the hypothesis we support, although we consider that the importance of phonetic imitation in the use of MPHs should not be disregarded (see Section 3.3).

According to Bottari et al. (1993–1994), MPHs constitute evidence of the learning process that concludes in the acquisition of free morphology. These elements are in complementary distribution with free morphemes, since they occupy the place of close-class items such as articles, prepositions, clitics, copulas, modals, negative operators, and interrogative pronouns. MPHs identify a position, that is to say, they have a syntactic function since they do not appear randomly, they do not replace lexical items, and they do not precede free grammatical morphemes. They consist of abstract formal features in which not all the features of adult language appear but they maintain the syntactic feature of being the heads of phrases, even if their morphological realizations are not target-like. MPHs are, for them, proof against the hypothesis of a "prefunctional" grammatical period in child language and they share their vocalic features with specific morphemes. Therefore, they can be considered as true attempts to use morphemes.

1.1. Monosyllabic Place Holders in L1Acquisition of Spanish

1.1.1. Spanish Determiner Phrases

According to the literature surrounding the L1 acquisition of Spanish and the instances that we located in our research (see Section 3.1.2), MPHs are always in the place of determiners (Ds), preceding a noun, as in (1).

There is no complete agreement among researchers about which categories can be found in Spanish determiners. A discussion of which elements can be classified into Ds and the features of each is outside the expected limits of this work. We refer the reader to Eguren (1989, 2006), Demonte (1999),

Laca (1999), Leonetti (1999), Real Academia Española (2009) and our previous work (Nicolás 2016). According to Eguren (1989), determiners are formed by articles, demonstratives, possessives,[3] cardinal numerals, and some quantifiers and indefinites; the Real Academia Española (2009) includes in D articles, demonstratives, pronominal possessives and nominal quantifiers. Nevertheless, we would like to point out some characteristics of the articles in Spanish, since most of the MPHs we have analyzed can be understood as instances of an article.

Articles are part of the set considered as determiners in Spanish. Spanish has two classes of articles: definite and indefinite. Definite articles have two different forms in the singular: *el* 'the' (masculine), *la* 'the' (feminine).[4] Masculine and feminine articles have plural forms: *los* 'the' (masculine) and *las* 'the' (feminine). There are also two contracted words formed by a preposition and the article *el*: *al* (*a* + *el*) and *del* (*de* + *el*). Excepting these contracted forms, definite articles are unstressed and proclitic, phonologically-dependent grammatical elements. Indefinite articles have two different forms for each gender in the singular (masculine *un* 'a, an', feminine *una* 'a, an') and two forms in the plural (masculine *unos* 'some', feminine *unas* 'some').

The D is the head of the determiner phrase (DP). The D agrees with the noun (N) in gender and number. The N has two genders, masculine and feminine, and two numbers, singular and plural. This is a rather complex system in which not all nouns have two genders or two numbers; it depends on the specific N. Adjectives (As) agree with Ns in gender and number and they are organized in a system with two genders (masculine and feminine) and two numbers (singular and plural).

1.1.2. Monosyllabic Place Holders in L1 Acquisition of Spanish

Primary Research Works

The research by López Ornat et al. (1994) was the first study on MPHs in the L1 acquisition of Spanish, where they referred to MPHs as *amalgamas* or *unidades-no-analizadas* (amalgams or non-analyzed units). An example appears in (4):

4. Aópa
   (a ópa)
   MPH FEM-SING *[r]opa* N FEM-SING
   'The clothes.' (Ángela, 1;9; taken from López Ornat et al. 1994, p. 116)

They considered that acquisition could be broken up into four phases: (1) a pregrammatical phase from ages 1;6 to 2;0, in which children imitate and do not make mistakes; (2) a phase from ages 2;0 to 2;6 where children omit mandatory grammatical marks or make mistakes in the selection of grammatical marks; (3) a phase from ages 2;6 to 3;00, with overgeneralized rules; and (4) a phase from ages 3;0 to 3;6, with flexible rules. A two-word stage in the first phase has been documented, in which children produce two-word outputs with an ambiguous meaning. Children learning Spanish produce amalgams of articles + nouns in this two-word stage, a stage in which a pre-placed sound coming from the unstressed article appears.

Aguirre Martínez (1995) agreed with Bottari et al. (1993–1994) in the idea that the placement of MPHs implies the discovery of the position in which determiners are generated in adult language and in the fact that the non-systematic appearance of these forms can be due to performance factors. She proposed the term "*formas comodín*" ("wildcard forms").

In the framework of the Minimalist Program and research about the relationship between MPHs and feature typology, we can find works by Bartra (1997) and Lleó (2003). Bartra (1997) studied the appearance of a neuter vocalic element schwa in certain contexts in child language acquisition and

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[3] The issue of whether possessives belong to the category of Ds is disputed. Abney (1987) considers that they are specifiers of an empty D because they cannot license an empty N, despite the morphological variability.

[4] A neuter gender feature can be found in articles and other Ds in Spanish but its use is rather complex since Ns cannot be neuter. An example of a demonstrative with a neuter gender feature can be found in (12).

gives this element a crucial linguistic status because this protoclass, which expresses an interpretable feature, can be considered as the realization of the feature [+referential], a precursor to the complement and D. By contrast, Lleó (2003) argued that these vowels (which are not always schwa according to her, but more often [a] and [e]) activate not only interpretable features, such as definition, but also non-interpretable features, such as gender. Lleó (2003) considered that gender was the first feature acquired, at least at the same time as definition; the difference between singular and plural appears early but not before the difference of gender. The reason for the early acquisition of gender consists, according to her, in "morphophonetic transparency", because many masculine nouns in Spanish end with *–o* and many feminine nouns end with *–a*. She proposed that these filling syllables are differentiated in two ways: (1) into protoarticles or definite and indefinite articles; and (2) into masculine and feminine gender.

As Liceras (2002) pointed out, Bartra's hypothesis is not substantially different from the hypothesis defended by López Ornat (1997), although they subscribe to different theoretical frameworks. López Ornat (1997), from a constructivist point of view, proposed the existence of a pregrammatical system which projects some "*amalgamas prenominales*" ("prenominal amalgams") or phonoprosodic forms of vN (vowel + noun) and vV (vowel + verb), which are precedents of a full grammatical category. López Ornat (1997) research was based on data from María's longitudinal output (from the ages of 1;7 to 2;1) and looked for phonoprosodic features which distinguish pre-nominal phrases (pre-NPs) from pre-verbal phrases (pre-VPs): the pre-NP phonoprosodic form would include a gender feature. According to her, the change from the pregrammatical representation to the grammatical one is supported by phonoprosodic knowledge and grows gradually through these elements—non-morphological outputs that work as primitive NPs (or pre-NPs) which will turn into NPs and join together phonological materials from articles and nouns. The process from the use of pre-NPs to grammaticalization is made up of three stages (not four, as was claimed in López Ornat et al. (1994)); the first and second stages are considered pregrammatical, while in the third one they are considered as a linguistic structure. These stages are 0N, vN and bare NP (without adjectives, pronouns, neuter case, nor ambiguous nouns). The sequence vN, which is the one we are addressing here, maintains the grammatically correct word order within the NP and differentiates the masculine and feminine values to a great extent.

Vowels and Features

Researchers do not agree regarding the timbre of the vowels in Spanish MPHs. Aguirre Martínez (1995) claimed that most vowels are [a], but Mariscal (1997) claimed that children prefer [e] and other vowels like [a]. Lleó (2003) argued that vowels were more [a] and [e] than [ə]. Torrens and Wexler (2001), in their research about children with specific language impairments (SLI) learning Spanish and Catalan, showed that these children used [ə] instead of articles.

Another point of controversy among researchers is the consistency in the use of vowels and its relationship with gender. Some researchers (Bottari et al. 1993–1994; Liceras et al. 2000) coincided in the idea that there is no consistency in the selection of the vowel, at least at the beginning. Liceras et al. (2000) considered that the unstressed vowels found in child language are MPHs which do not agree at the beginning with the nouns they precede and gradually become [a] for feminine and [e] for masculine. These MPHs constitute, for them, the proof that children learning Spanish activate the non-interpretable feature [word marker/gender] typical of nouns, adjectives, and determiners (Bernstein 1993). This is in contrast to the proposal of Bartra (1997) who suggested the activation of an interpretable feature in logical form, that is to say, their semantic content [+referential]. According to Liceras et al. (2000), the activation of the feature [+word marker/gender] is a process which is only explicit in the mother tongue because adults, as with many children acquiring an L2, rarely share the intuition of child L1 learners. However, as we will propose later in this article (see Section 3.1.1), our data show that children acquiring Spanish as an L2 use these MPHs too. López Ornat (1997), on the contrary, stated that these forms include a gender-specification feature with vowel consistency.

Mariscal (2001) did not find a clear relationship between vowels and the gender of the noun they accompany, and she pointed out that there are individual preferences in favor of some forms or others. She studied the acquisition process of NPs in Spanish through experimental data of four children aged under three (from 1;10 to 2;07). The data she analyzed showed that these vowels are randomly combined with masculine and feminine nouns and they gradually adjust to adult articles and other determiners; children alternate the use of *pe*, *epe*, *ope*, and *(a/e) pe* (instead of *el/un pez* o *pez* 'fish'). She claimed that acquisition of all categories is a gradual process in which, as acquisition moves forward, variability decreases. This gradual process had an intermediate stage of vowels preceding nouns in three of the four children, following the stage of determiner omissions and occurring before the stage of the full realization of determiners. Gender and definition are realized in different ways depending on each child.[5] These filling syllables, according to her, are early forms that approach articles but are phonologically underspecified; the production of these forms is a type of phonoprosodic bootstrapping. The acquisition of the determiner category would be produced gradually: first, the position and some phonological features are acquired, and then phonetic, morphological and semantic details.

As Tolchinsky et al. (2003) pointed out, the claim by Mariscal (2001) reinforces the previous existence of the position that MPHs and determiners are to fill, which supports in fact the idea of an innate pattern. The only data that could prove, for them, the fact that the category is not acquired, would be the appearance of the lexical forms fulfilling the category determiner in a position forbidden by the category (that is, an N appearing linearly before a D), but this datum has never appeared. This datum would have the form of (5):

5. Mesa a
   N FEM-SING MPH FEM-SING
   table the
   'The table.'

Prosody of Monosyllabic Place Holder

The prosodic aspect of MPHs is another main issue being discussed. The phonoprosodic hypothesis defended by Mariscal (2001) was also defended by Veneziano and Sinclair (2000), who explained the appearance of MPHs on the basis of the role of phonology and prosody and suggested that these vocalic elements appearing in the first child outputs are the result of an organization of the phonoprosodic regularities of the language. Children add a vocalic element in order to reach the iambic pattern of the kind vowel, consonant, vowel (consonant) in which the first vowel is occupied by the MPH.

Lleó and Demuth (1999) and Lleó (2003) also defended the prosodic bootstrapping hypothesis, the idea that prosody facilitates the way to syntax and triggers syntactic structures. Lleó (2003) considered that protoarticles provided the necessary syllables to complete the binary foot; the abundant individual differences found in the use of MPHs could be based on the morphoprosody of the target language.

Serra and Sanz (2003) also addressed the prosodic aspect of the MPHs. They studied the Serra-Solé corpus and this vocalic element schwa, which coexists in child language with adult-like forms of articles, prepositions and auxiliaries; these forms appear, according to them, not only in the substitution of one category but of two or more. These elements can be considered an articulatory or fluency fill, an element with a prosodic cause and not exclusively a protogrammatical vocalic element because they can be found in children aged between 12 and 24 months, with a tendency to be located at the beginning of the melodic sentence.

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[5] The existence of these individual differences is one of the reasons why she argues against the idea of an acquisition process guided by innate patterns of behavior. She also claims that through continuist generative grammar it is understood that an output such as *a pé* is the combination of a D and N and, therefore, the theory confers adult syntactic categories to child language, which is not justified.

Monosyllabic Place Holders and Their Relationship with Noun-Drop

Noun-drop (N-drop) constructions are DPs without an overt N but in which the D and A agree with the null N, as in (6):

6.	la	[Ø]	roja
	ART FEM-SIN	N FEM SIN	A FEM-SIN
	the	[Ø]	red
	'The red one.'		

The relationship between MPHs and N-drop was studied by Liceras et al. (2000), who analyzed the data from Magín and María (L1 Spanish) and Adil and Madelin (child L2 Spanish in a natural context). These data had been partially analyzed by Liceras et al. (1998b) and Rosado (1998). Liceras et al. (2000) propose that MPHs were incompatible with N-drop in L1 acquisition, where a relationship between the feature [+word marker/gender] and N-drop seems to be found. This statement is the result of an empirical observation and also the logical consequence of the theories by Snyder and Senghas (1997) and Snyder et al. (1999). According to Snyder and Senghas (1997) and Snyder et al. (1999) proposals, N-drop constructions appear in child L1 data when checking the morphological realization of gender in determiners is possible and, specifically, after the appearance of vowel [a] in this grammatical category. If MPHs constitute precisely the stage previous to the morphological realization of gender and number in determiners, they seem to be incompatible with Noun-drop (N-drop).

Liceras et al. (2000) tried to demonstrate that MPHs disappear when the feature [+word marker/gender] is projected. In the L1 data analyzed, the gender disagreements in N-drop constructions (this is to say, the use of *e* with feminine nouns and *a* with masculine nouns) stop appearing at age 2;1, which shows, in their views, that children do not use these vowels as gender markers in the first stages of acquisition but as MPHs; as soon as children project DPs the abstract feature [+word marker/gender] is assigned. They did not find any cases of MPHs in N-drop constructions with adjectival phrases (APs) (although one *e* in Magín was found before age 2;00) nor any cases with prepositional phrases (PPs) and complementizer phrases (CPs). It looks like children drop MPHs in order to project a DP which incorporates the feature [+word marker/gender]; when this feature is activated in the L1, gender disagreements stop. No direct relationship between the acquisition of the DP paradigm in L2 Spanish and N-drop is found according to Liceras et al. (2000). We should retain this proposal, which will be incorporated in the discussion about the results of our study (see Section 3.1.3).

1.2. Monosyllabic Place Holders in L2 Acquisition of Spanish

As can be appreciated in the previous section, MPHs have been extensively studied in the L1 acquisition of Spanish. By contrast, the study of MPHs in the acquisition of Spanish as an L2 has not received as much attention. Nevertheless, some works can be found comparing the L1 and L2 (child and adult) acquisition of Spanish.

Regarding child L2 acquisition, Liceras et al. (1998a) and Rosado (1998, 2000) analyzed L1 and L2 Spanish data (L2 data collected in natural and institutional contexts) and studied N-drop with complements such as AP, PP and CP, as well as MPHs. One of the main differences between L1 and L2 acquisition, as claimed by Liceras et al. (1998a), is the appearance of MPHs in L1 but not in L2. Rosado (2000), on the contrary, located two MPHs in the child L2 data she studied, and she considered they might constitute "anecdotal examples". The instances are (7) and (8):

7.	a	rosas	
	MPH FEM-SING	N FEM-PL	
	'The roses.'		(taken from Rosado 2000, p. 74)
8.	o	gorro	
	MPH MAS-SING	N MAS-SING	
	'The hat.'		(taken from Rosado 2000, p. 74)

However, this work shows examples that contradict Rosado's claim, given that several MPH cases can be drawn up in our corpora, both for Rachida and Khalid (see Section 3.1.1).

Rosado (2000) also studied data from two children learning Spanish as a foreign language in Canada and she located some MPHs. She considers that these MPHs do not share their "nature" with the MPHs found in L1 acquisition, but these forms come from the L2 these children have already learnt, French. These children used the forms *a* and *e* (the same forms as children learning Spanish as an L1) but also some forms that she thinks were taken literally from French (*le* 'the', *son* 'his, her' . . .) or that have been formed with elements from French and Spanish (*lel* 'French the + Spanish the´, *tun* 'Spanish you + French a?' . . .). Most of these forms agree in gender with the noun they precede, as in (9) and (10):

9. A Cuabeza
   MPH FEM-SING *cabeza* N FEM-SING
   'A head.' (taken from Rosado 2000, p. 86)

10. lel león
    MPH? MAS-SING N MAS-SING
    'The lion.' (taken from Rosado 2000, p. 86)

Liceras et al. (2000) also proposed that one of the main differences between L1 and L2 data is the absence of MPHs in L2. According to them, the reason resides in the fact that children learning an L2 have a phonological sophistication that does not allow them to process the input in the same way as child L1 learners. This could explain the fact that L2 learners do not mark Spanish DPs with the feature [+word marker/gender], in contrast to L1 speakers.

Another significant difference that can be found between L1 and L2 acquisition in children is related to N-drop and the acquisition of the determiner paradigm in Spanish. Liceras et al. (2000) did not find many instances of N-drop constructions in L2 and some of them were not correct.

There are few works in the literature about the acquisition of Spanish DPs in adults. In the adult acquisition of Spanish, Liceras et al. (1998b) proposed that the acquisition of gender markers cannot be clearly related to the appearance of N-drop.

Rosado (2007) studied the acquisition of clitics and articles by adults learning Spanish as a foreign language and speaking English and French as mother tongues, and adults learning Spanish as a second language and speaking a Chinese dialect as a mother tongue. She did not find any MPHs in those data.

2. Materials and Methods

2.1. Materials

This research about MPHs is part of a broader study of DPs in two children acquiring Spanish as an L2 and speaking Dariya or Moroccan Arabic as an L1. The corpora containing the data from both children, Rachida and Khalid, were formed by two longitudinal corpora based on semi-spontaneous production data elicited via interviews carried out by us over 16 months, using a number of drawings or illustrated tales. Drawings were provided by the director of the study, Juana M. Liceras, and were used previously in the project "The specific nature of non-native grammar and the principles and parameters theory" (Social Sciences and Humanities Research Council of Canada (SSHRCC), project #410-96-0326 (1996–1999)).

Our corpus comprises 49 interviews of between 15 and 30 min each. Interviews were conducted in two periods separated by the summer holidays: the first period was from 26 January 1999 to 17 June 1999; and the second period was from 19 October to 16 May 2000. In total, 11 interviews were recorded in the first period for each child; in the second period 14 interviews were recorded with Khalid and 13 with Rachida (one less due to the girl's absence). According to the information provided by the Santiago Ramón y Cajal School (Alcorcón, Madrid, Spain) where the recordings were made, both children had just arrived in Spain when the recording sessions began. The director of the school, the children's parents and both children gave their oral consent to make the recordings.

Rachida was born in Morocco on 20 April 1988; she was aged 10;9 when the research began and 12;00 when it ended. Her mother tongue was Moroccan Arabic, and she also had some knowledge of French. According to the director of the school, she had just arrived in Spain when the interviews began. In accordance with the Moroccan school system, a child of her age would have studied two or three years of classical Arabic (basic level) and a year of French (very basic level) (ElKadiri and Nicolás 2015).

Khalid was born in Morocco on 20 March 1992, and he was aged 6;10 when the research began and 8;1 when it ended. His mother tongue was Moroccan Arabic and he had just arrived in Spain when the recordings began. He would have not had any formal education in classical Arabic or French while in Morocco (ElKadiri and Nicolás 2015).

2.2. Methodology

The use of longitudinal corpora with semi-spontaneous production is a methodology with two main advantages, as pointed out by Unsworth (2005): (1) it is an activity that the participants are familiar with and which is exclusively based on spoken language (something more accurate for children); and (2) it requires a focus on the content and not the form, so that children are careful with what they say and not how they say it. The clear disadvantage of this methodology is the fact that sometimes the data collected can be minimal or not significant. This risk is minimized when the linguistic phenomenon analyzed is very productive in the spoken language, such as for DPs. It should not be forgotten than longitudinal studies are designed with the idea of providing data that can show a change in the use of the phenomenon and, eventually, allow for the establishment of stages in the acquisition process. In our opinion, the methodology we chose is successful in these two senses, with respect to productivity and graduation: the number of DPs was high enough as to allow us to make significant inferences, and data have shown changes in the process of acquisition of the Spanish DP and the elements that comprise it.

All interviews were transcribed and codified in CHAT format from CHILDES (MacWhinney 2000), and frequencies of use were calculated with CLAN.[6]Interview recordings are available through TalkBank (MacWhinney 2007).[7] A coded version, that includes morphological codes developed by the author, is also available upon request.

2.3. Research Questions and Hypotheses

The different ages of the two children (10;9 for Rachida, and 6;10 for Khalid at the beginning of the data collection) allowed us to investigate the role of age in the process and attainment of acquisition. Our research has the added benefit, on the one hand, that there are very few studies dealing with the similarities and differences between L1 acquisition and child L2 acquisition and, on the other hand, that there are no data available with this child L1–child L2 combination.

In a broader study concerning the acquisition of DPs in these children (Nicolás 2016) we compared our child L2 data on the acquisition of Spanish DPs with (1) L1 acquisition data; (2) data from children with a SLI; (3) L2 acquisition data from other children; and (4) adult L2 acquisition data. Our research questions focused on three areas: (1) the role of previous linguistic experience and the importance of L1 transfer; (2) the acquisition of DP features and the acquisition of gender and number in Ds, Ns and As; and (3) the role of age in the acquisition of the DP (the difference between child and adult L2 acquisition) and final attainment. The study of MPHs is related to two of these research questions: the role of age in the acquisition of DPs and the acquisition of DP features. Other hypotheses were related to the relationship of MPHs with gender agreement within the DP, N-drop constructions are what we call prosodic nominal assemblies (PNAs).

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[6] CHILDES is the child language component of the Talkbank system, a system for sharing and studying conversational interactions, which is available on the web. CHAT is the format used in corpora's interviews in the Talkbank system, which are analyzed through the CLAN program.

[7] Corpora transcripts and recordings are available at http://talkbank.org/access/SLABank/Spanish/Nicolas.html.

- Question 1. MPHs and the role of age in the acquisition of DPs

Regarding the role of age in the acquisition of DPs, we defended the idea that the process of acquisition of DPs in Khalid (who was aged 6;10 at the beginning of our research and 8;1 at the end) went through similar stages to those of children acquiring Spanish as an L1, which was not the case of Rachida (who was 10;9 at the beginning of our research and 12 at the end). Thus, we assumed that, in the case of Khalid, the acquisition process would be similar to that found in children learning Spanish as an L1, while we would not find this kind of process in Rachida.

This hypothesis was based on the difference in age between Khalid and Rachida, which supported the idea that Khalid's acquisition process was a non-native child's acquisition process, while Rachida's acquisition process was a non-native adult's acquisition process.[8] Many proposals have been made about the age of the critical period, that is to say, the age in which it is considered that non-native adult language acquisition begins. Some researchers have put the upper limit at no more than 10 years of age, Krashen (1973) proposed 5 years; DeKeyser (2000) and Johnson and Newport (1989) proposed 7; Bialystok and Miller (1999), Schwartz (2004), Unsworth (2005)[9]and Meisel (2008) agreed to fix 8 years of age as the limit;[10] Penfield and Roberts (1959) put the limit at 9; and Hulk and Cornips (2005) suggested a period from 4 to 7 years of age. Other researchers, such as Long (1990) and Lenneberg (1960, 1967) think that the critical period is more extended. Long proposed 15 years of age, and Lenneberg suggested the period of puberty as an upper limit.[11] Therefore, we assume that Rachida (aged 10;9) went through an adult language acquisition process and Khalid (aged 6;10) went through a child language acquisition process. Johnson and Newport (1989, 1991) and DeKeyser (2000) also provide support for our claim, since they state that children learning an L2 before the age of 8 years can be classified in the group of native speakers in several tasks related to some syntactic phenomena.

- Question 2. MPHs and the acquisition of DP features

The L2 acquisition of morphology in children has been addressed from two opposite points of view, which can be illustrated with the research works carried out by Schwartz (2004) and Meisel (2008). Meisel (2008) claimed that in the morphological domain, the language-acquisition process of a child learning an L2 is similar to the acquisition of adults learning an L2 and different from the acquisition of native children. In contrast, Schwartz (2004) stated that in the syntactic domain, the acquisition of children learning an L2 is similar to the acquisition of adults learning an L2, while in the morphological domain the acquisition of children learning an L2 is similar to the acquisition of native children.

Following Schwartz (2004) in this case, we consider that the process of acquisition of morphology in Khalid follows that of a non-native child's language-acquisition process similar to that of children acquiring Spanish as an L1. Therefore, we assumed we would find intermediate morphological stages in Khalid that were only typical features of native acquisition and not of adult acquisition, such as MPHs or what we call PNAs (see Section 3.3). We hypothesized that we would find a substantially larger number of MPHs in Khalid than in Rachida (if she had any at all). In order to corroborate this statement, we analyzed all the examples of MPHs in both children.

Another hypothesis related to this question was that phonological distinctions in the L2 can be available to non-native children, who can analyze Spanish phonetics as native children do, and not to

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[8] However, it should be noted that variability is a feature of stages of the acquisition process, even in native acquisition, where not all children follow the same path (Peters 1983).

[9] Unsworth (2005), in particular, considers that at most four grammatical principles are in place.

[10] In fact, Meisel (2008) prefers a second stage, the age of seven, since he considers that choosing an earlier age is more convenient methodologically. He also points out that the age of the critical period is not the same for syntax, morphology, and phonology; he proposes that the age limit for morphology and syntax is between three and four years of age. Therefore, according to him, the acquisition process in Khalid could have been classified as non-native adult acquisition since the boy was aged over four.

[11] After the critical period, some researchers (Bley-Vroman 1990) postulate that L2 acquisition is accomplished through general problem-solving processes and not through linguistic procedures.

adults. In this way, the definite article, an unstressed and enclitic element in Spanish, can be joined with the noun in a sole morphological unit, generating MPHs as well as PNAs. However, we should take into account the fact that some researchers state that the phonological critical period appears very early. For example, Long (1990), proposed 6 years of age, that is to say, prior to the age of Khalid when he was first exposed to Spanish.

- Question 3. MPHs and gender agreement within the DP

Following Liceras et al. (2000), who studied the link between MPHs and N-drop in L1 acquisition, we considered that a relationship could be documented between the use of MPHs and the feature [+word marker/gender]. We proposed that MPHs constitute a first stage of acquisition in L2 in which the gender feature was gradually being activated. When the feature [+word marker/gender] was completely activated, both MPHs and gender mismatches among the elements of the DP stop appearing: MPHs were gradually being replaced by the correct morphology of the determiners and gender errors linked to the DP elements were disappearing. We understood this relationship between the feature [+word marker/gender], on the one hand, and MPHs and gender agreement within the DP, on the other hand, as a gradual process in which the boundaries among different stages cannot always be clearly delimited.

This hypothesis could be verified if we could prove that gender mistakes in the DP were directly proportional to MPHs.

- Question 4. MPHs and N-drop constructions

Liceras et al. (2000), following Snyder and Senghas (1997) and Snyder et al. (1999), stated that if MPHs constitute the stage previous to the morphological realization of gender and number in Ds in L1 acquisition, they should be incompatible with N-drop (see MPHs and their Relationship with Noun-Drop in Section 1.1.2). The referent of N should be recovered through the gender and number features of D; if D does not have a gender feature, the N-drop structure should not be allowed. MPHs should disappear when the feature [+word marker/gender] is projected. However, no direct relationship was found between the acquisition of the DP paradigm in L2 Spanish and N-drop.

We proposed, as it was mentioned in the previous question, that a gender feature could be found in some MPHs because the feature [+word marker/gender] is gradually being activated in L2 acquisition. Therefore, we assumed that MPHs could be compatible with N-drop constructions in L2 acquisition.

- Question 5. MPHs and Prosodic Nominal Assemblies

Our last question and hypothesis were associated with PNAs, a phenomenon which has not been studied previously and which will be analyzed in Section 3.3. Given the fact that both MPHs and PNAs seem to represent an earlier stage in the overall acquisition of Ds, we proposed that all of them would appear in the same stage of the acquisition process. Consequently, our previous discussion about the use of MPHs in Questions 1 and 2 could be extended to the use of PNAs.

3. Results

3.1. Monosyllabic Place Holders: Occurrences and Features

3.1.1. Number of Occurrences

The total number of MPHs we found in our corpora was not very large for any of the children, but it was slightly higher in Khalid's corpus (24 instances) than in Rachida's corpus (16 instances). We did find a substantial difference between the children in the temporal extent of these MPHs, which appeared in Rachida for the last time in interview 12 (at age 11;5) while, by contrast, an MPH was

found in interview 24 in Khalid (at age 8;1). It should be noted that we found MPH instances instead of definite and indefinite articles.

A graph of the appearance of MPHs in Rachida and Khalid's corpora is provided in Figure 1.

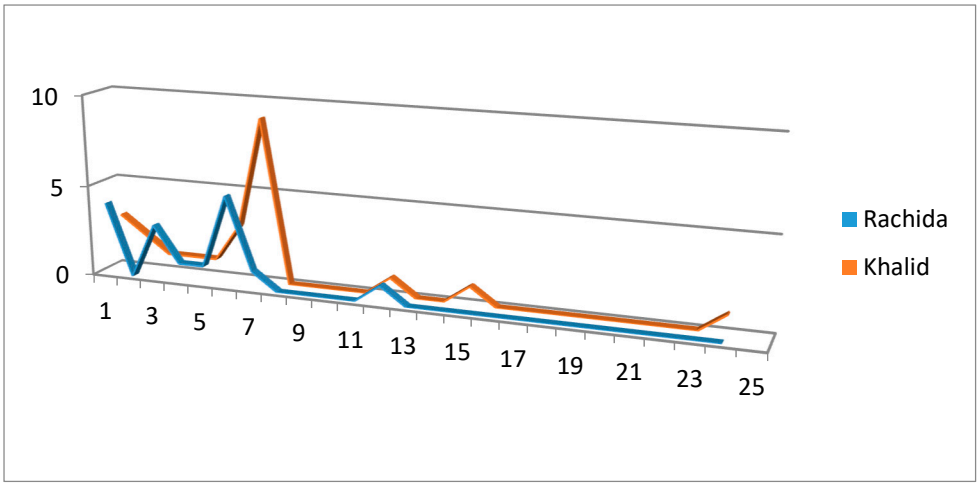

Figure 1. Number of occurrences of monosyllabic place holders (MPHs).The horizontal axis represents interview numbers; the vertical axis represents numbers of occurrences.

This graph evidences two facts: (1) there were not many differences between the children; and (2) both children shared the same pattern: most of the occurrences were found in the first period of the corpora (the first 11 interviews) and decreased with time.

On one hand, our hypothesis that MPHs should be more numerous in Khalid's corpus than in Rachida's corpus is not supported by these data (Question 2, Section 2.3). In this regard, we should accept that the difference of age between Rachida and Khalid cannot support the idea that each child represents a different type of language acquisition (adult and child, respectively), at least with the data provided by their use of MPHs (Question 1, Section 2.3). On the other hand, the pattern found in both corpora is noteworthy: most of the interviews contained between one and seven instances, with a peak around the sixth and seventh interviews. On this point we should remember the hypothesis pointed out by Liceras et al. (1998b): children stop using MPHs to project a DP with the feature [+word marker/gender]; when this feature is activated, gender disagreements stop appearing. This hypothesis can be verified if we are able to prove a directly proportional relationship between gender mismatches and MPHs (see Question 3, Section 2.3 and Section 3.1.1).

3.1.2. Data per Vowel Timbre

A review of the vowels accounted for in Rachida's corpus shows that MPHs were mainly [a] (6 instances) and [e] (6 instances), as in (11) and (12), even though we found some other forms that seemed to attain the characteristics of MPHs, such as [i][12] (2 instances), as in (13) and (14), and [o] (2 instances), as in (15) and (16):

11.	A	espada	ése . . .	es del niño
	A MPH FEM-SIN	N FEM-SIN	DEM MAS-SIN	
	The	sword	this	is from the boy
	'This sword is from the boy.'			(Rachida, 10;11)

[12] According to Herrero Muñoz-Cobo (1999), Moroccan Arabic has three vocalic phonemes: /a/, /ə/ and /o/; [i] and [e] are allophones of /ə/, while [o] and [u] are allophones of /o/; the pronunciation of /a/ goes from [a] to [æ]. This could perhaps explain these uses of [i].

12. Eto e rey de marroquino
DEM NEUT MPH MAS-SIN N MASC-SIN
This the king of Morocco (?)
'This, the King of Morocco.' (?) (Rachida, 10;9)

13. E i rey
E[s] COP 3ª P SIN MPH MAS-SIN? N MAS-SIN
Is the king
'He is the king.' (Rachida, 10;9)

14. i Paloma
MPH MAS-SIN? N FEM-SIN
the dove
'The dove.' (Rachida, 10;10)

15. INV: ¿De qué color está vestida? (INV: Which color is she dressed in?)
O rosa
MPH MAS-SIN A FEM-SIN
the pink
'In pink.' (Rachida, 10;10)

16. Son o libros
COP 3ª P PL MPH MAS-SIN N MAS-PL
are the books
'They are the books.' (Rachida, 10;11)

In Khalid's corpus, 11 instances of [a], 8 of [e], 2 of [o], and 2 of [u] were located, as well as an instance in which the vowel was accompanied by a plural morpheme (17):

17. as piedras
MPH FEM-PL N FEM-PL
the stones
'The stones.' (Khalid, 8;1)

The use of vowels was inconsistent in many cases in both corpora, as can be inferred from examples (18)–(21) from Khalid's corpus, in which the same noun appeared with different vowels, even in the same interview:

18. a ratón
MPH FEM-SIN N MAS-SIN
the mouse
'The mouse.' (Khalid, 7;1)

19. e ratón
MPH MAS-SIN ratón[n]N MAS-SIN
the mouse
'The mouse.' (Khalid, 7;1)

20. a papel
MPH FEM-SIN N MAS-SIN
the paper
'The paper.' (Khalid, 7;1)

21. e papel
MPH MAS-SIN N MAS-SIN
the paper
'The paper.' (Khalid, 7;1)

The vowel timbre was sometimes overtly discordant with the noun gender, as in (22) and (23) with feminine nouns and in (24)–(29) with masculine nouns. This second type has a more widespread

use in Rachida's corpus, which conforms to the direction of gender mistakes in the determiners in this corpus.

22. e boca
MPH MAS-SIN N FEM-SIN
the mouth
'The mouth.' (Khalid, 6;10)

23. e Navidad
MPH MAS-SIN N FEM-SIN
the Christmas
'The Christmas.' (Rachida, 10;9)

24. a niño
MPH FEM-SIN N MAS-SIN
the boy
'The boy.' (Rachida, 10;11)

25. a sol
MPH FEM-SIN N MAS-SIN
the sun
'The sun.' (Rachida, 10;11)

26. a caballo
MPH FEM-SIN N MAS-SIN
the horse
'The horse.' (Rachida, 10;11)

27. a papel
MPH FEM-SIN N MAS-SIN
the paper
'The paper.' (Rachida, 10;11)

28. a rojo
MPH FEM-SIN A MAS-SIN
the red
'The red one.' (Khalid, 6;11)

29. a hermano
MPH FEM-SIN N MAS-SIN
the brother
'The brother.' (Khalid, 7;1)

The vowel timbre is occasionally the same as the article with which the noun agrees, being definite or indefinite, as in (30)–(33):

30. e gorro
MPH MAS-SIN N MAS-SIN
the hat
'The hat.' (Rachida, 10;10)

31. a espada
MPH FEM-SIN N FEM-SIN
the sword
'The sword.' (Rachida, 10;11)

32. u gato
MPH MAS-SIN N MAS-SIN
the cat
'The cat.' (Khalid, 6;10)

33. a chica
MPH FEM-SIN N FEM-SIN
the girl
'The girl.' (Khalid, 7;1)

3.1.3. Features

The instance in (32) could suggest that MPHs are not always strictly vocalic elements appearing in the position of determiners before they appear with all their morphological realizations, but they are more like phonetic approaches to a given morphological realization of a D, whether they are definite or indefinite. The lack of phonetic concretion of these MPHs is supported by the fact that they are unstressed elements in which the vowel timbre is precisely the most prominent part of the determiner and, therefore, the most recognizable and reproducible part.

Regarding the gender features of MPHs, we agree with Liceras et al. (1998b) in the hypothesis that when the feature [+word marker/gender] is activated, gender disagreements stop appearing (Question 3, Section 2.3). This hypothesis could be verified if we can prove that gender mismatches are directly proportional to MPHs. The analysis of gender disagreements in DPs in both corpora supports this claim. Some brief notes about the gender feature in the Dariya DP can be useful at this point in order to determine the potential impact of transfer: definite articles have no gender in Dariya (*al* or *a* 'the') and indefinite articles are formed with the definite article and the form of the numeral *one* placed after N (Herrero Muñoz-Cobo 1999); Ns and As have two gender features (masculine and feminine).

The number of gender mistakes in Ns and As was low, especially in Khalid's corpus (in both periods) and also in Rachida's (mainly in period 2). In the first period, gender mistakes made by Rachida in Ns and articles do not show a definite direction (masculine instead of feminine or feminine instead of masculine) beyond what would be expected at random. Contrary to Ns and As, both children made many gender mistakes in Ds, a fact that could be expected if we considered the transfer from Dariya. However, these mistakes were not in the direction we predicted (masculine instead of feminine) but on the contrary (feminine instead of masculine). In period 1, this trend was statistically significant: $\chi^2(1) = 15.38$, $p<0.001$, in Rachida, and $\chi^2(1) = 60.84$, $p<0.001$, in Khalid. In the second period, the number of gender mistakes was lower for both children and there were no significant differences in the direction of mistakes; $\chi^2(1) = 0.62$, $p = 0.431$, in Rachida; and $\chi^2(1) = 1.60$, $p = 0.206$, in Khalid.

Therefore, we can conclude that the statistical significance of gender mistakes in Ds coincides with the appearance of MPHs, which can constitute evidence of the relationship between MPHs and gender agreement: at the same time that gender mismatches stop being significant, MPHs cease to appear. Nevertheless, we should take this conclusion with caution since the concurrence of two facts can show that they are related but the co-appearance can also be due to chance.

3.2. Monosyllabic Place Holders and Noun-Drop

In L1 and L2 child language-acquisition data of Spanish analyzed by Liceras et al. (2000), they found a unique instance of MPH with N-drop with an adjectival phrase (an *e* in Magín's data), before age 2;0. However, four instances can be located in our corpora: two in Khalid's corpus, and two in Rachida's corpus. Instances (34) and (35) are repeated here and analyzed more carefully; they show N-drop constructions with APs. Instances (36) and (37) show N-drop constructions with PPs.

34. INV: ¿De qué color está vestida? (INV: Which color is she dressed in?)
O [color] rosa
MPH MAS-SIN N MAS-SIN A MAS-SIN
the [color] pink
'In pink.' (Rachida, 10;10)

35. a [Ø] rojo
    MPH FEM-SIN N MAS SIN A MAS-SIN
    the [Ø] red
    'The red one.' (Khalid, 6;11)

36. INV: ¿Qué libros te gustan más de los que tienes? (INV: Which books do you like the most of the ones you have?)
    E [libro] de matemáticas
    MPH MAS-SIN N MAS-SIN PP
    the [book] of Maths
    'The book of Maths.' (Rachida, 11;5)

37. INV: ¿Qué María? (INV: Which María?)
    E [profesora] de música
    MPH MAS-SIN N FEM-SIN PP
    the [teacher] of Music
    'The teacher of Music.' (Khalid, 7;6)

Only these four instances have been located in our corpora. The instances in (35) and (37) show a mismatch between the vowel of the MPH and the vowel we could expect if D appears in its full morphological realization. We do not consider that these four instances are anecdotal since we have found two different kinds of complements in N-drop constructions and the instances are located in both corpora. It looks like N-drop constructions are compatible de facto with MPHs in L2 acquisition (Question 4).

3.3. Monosyllabic Place Holders and Prosodic Nominal Assemblies

We propose the term prosodic nominal assemblies (PNAs) to name the phonetic amalgams formed by a definite article and a noun beginning by a vowel, in which the article is joined to the noun in a proclitic way. By contrast with MPHs, where the vowel is the part of the D which remains in place, in PNAs the consonant is the part of the D which is joined to the N. Monosyllabic Place Holders and PNAs share the feature of being the heads of phrases, even if their morphological realizations are not target-like, and constitute evidence of the learning process that leads to the acquisition of free morphology.

In Rachida's corpus, 16 instances of PNAs were found, while in Khalid's corpus only 2 instances were found. Khalid's instances were very scarce but this could not be considered anecdotal since this supported a trend shown by Rachida's instances. These PNAs appeared in Rachida's and Khalid's corpora with singular Ns, both masculine and feminine, as in (38) and (39), and with plural nouns, as in (40):

38. Labuelo
    [el abuelo]
    [ART DEF MAS-SIN N MAS-SIN]
    [the grandfather]
    'The grandfather.' (Rachida, 10;9)

39. Lotro
    [el otro]
    [ART DEF MAS-SIN A MAS-SIN]
    [the other]
    'The other.' (Khalid, 7;11)

40. Lárboles
    [los árboles]
    [ART DEF MAS-PL N MAS-PL]
    [the trees]
    'The trees.' (Rachida, 10;11)

These PNAs or confluences in a prosodic unit of a definite article—always phonetically realized as [l]—and an N seem to be of the same nature as MPHs; this is to say, they represent an earlier stage in the overall acquisition of articles (and other Ds) in which children are aware of the position occupied by articles and are sensitive to some parts of the phonetic realization of articles but not to all parts.

On accepting the importance of phonetic imitation in the development of MPHs, we could agree that a relationship can be established between MPHs and PNAs (Question 5, Section 2.3). The data of our corpora showed, as seen in Section 3.1.1, that no significant differences were documented in reference to MPHs in either of the children. Therefore, we could hypothesize that a comparison between the use of PNAs in both children should offer a similar conclusion.

Nevertheless, the average proportion of PNAs was significantly higher in Rachida than in Khalid (participant effect) $F(1.45) = 7.72$, $p = 0.010$, $\eta^2_p = 0.138$. The time effect was not significant: $F(1.45) = 2.72$, $p = 0.106$, $\eta^2_p = 0.057$. However, these effects were moderated by a significant interaction between participant and time: $F(1.45) = 7.53$, $p = 0.009$, $\eta^2_p = 0.143$. The majority of the production of PNAs in Rachida appeared in period 1, while both children showed similar proportions of PNAs during period 2.

A graph of the appearance of PNAs is provided Figure 2.

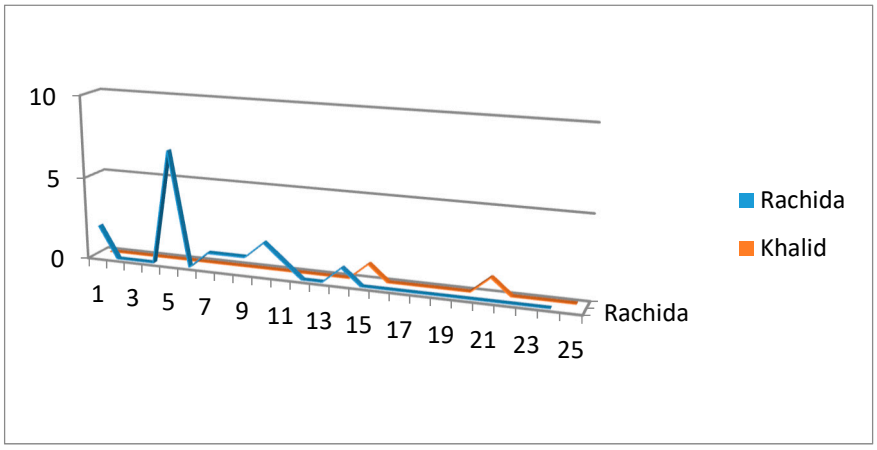

Figure 2. Number of occurrences of prosodic nominal assemblies (PNAs).The horizontal axis represents interview numbers; the vertical axis represents numbers of occurrences.

PNAs were only documented in the initial stages of acquisition in these corpora and not in the most advanced ones. The pattern of appearance of these PNAs coincided with the pattern found in MPHs (see Section 3.1.1). This fact could suggest that during the initial stages of both L1 and L2 acquisition children try to approach the phonetics of the language they are learning. Later on, when phonetic analyses are more appropriate (and perhaps with the assistance of writing and reading skills), morphological instances become more adequate.

4. Conclusions

This article has focused on the use of MPHs in the acquisition of Spanish. MPHs have been analyzed extensively in L1 acquisition of Spanish but their study in L2 acquisition has received much less attention. This study provides evidence for the presence of MPHs in the L2 Spanish of two L1 Moroccan Arabic children living in Spain: Rachida, who was aged 10;9 when the data started to be collected and Khalid, who was aged 6;10 when the research began.

The data documented in our corpora showed that MPHs are used by both children (see Section 3.1.1). The analysis of MPHs in Rachida and Khalid's corpora does not confirm the hypothesis formulated in Questions 1 and 2 (Section 2.3). We stated that the different age of the two children would imply that Khalid would use MPHs in the same way as native children do, and

that Rachida would not. However, and even though the number of occurrences of MPHs is slightly higher in Khalid's corpus (24 instances) than in Rachida's corpus (18 instances), the difference is not significant.

We acknowledge that these data do not provide evidence for the hypothesis that each child represents a different type of language acquisition (adult L2 and child L1), as we initially defended. On the contrary, both children seem to use MPHs as native children do. Our data are also in accordance with the data documented by Rosado (2000) about MPHs found in foreign language acquisition in children. Our work showed that MPHs are found in child L2 acquisition of Spanish, regardless of the child's age. Given the fact that the presence of MPHs has been previously detected in L1 acquisition of Spanish and in child foreign language acquisition of Spanish, the results of our work can support the hypothesis that the use of MPHs may be a strategy available to all child learners of Spanish.

The use of MPHs by Rachida and Khalid shows a pattern in which most MPHs appear in the first period of the corpora and disappear as time goes by. The patterns located in the use of MPHs may suggest that the feature [+word marker/gender] is involved in their appearance, as suggested by Liceras et al. (2000): as MPHs cease to appear, gender mismatches stop being significant (see Section 3.1.3). The analysis of gender disagreements in DPs in our corpora supported this claim: the statistical significance of gender mistakes in Ds coincides with the appearance of MPHs. However, as we mentioned in Section 3.1.3, this conclusion should be taken with caution since the concurrence of two facts does not necessarily imply that they are related.

We also studied the relationship between MPHs and N-drop (see Section 3.2). Four instances of N-drop constructions with MPHs have been documented in our corpora. These instances have been found in both corpora and with two different kinds of N-drop constructions: with APs and PPs. Therefore, we argue that these instances are not anecdotal and that N-drop constructions are not incompatible de facto with MPHs, in contrast to the proposal by Liceras et al. (2000) for L1 Spanish, who use Snyder and Senghas (1997) and the theoretical framework of Snyder et al. (1999).

A relationship between MPHs and PNAs seems to be supported by the data we have analyzed; MPHs and PNAs both seem to be phonetic approaches to the correct morphological realizations of Ds and Ns (see Section 3.3). The pattern of appearance of PNAs coincides with the pattern of appearance of gender mistakes within the DP and the pattern of appearance of MPHs: all of them are left aside by children as acquisition progresses.

More data analyses are needed if we are to determine whether these trends are followed by all children acquiring Spanish as an L2 and to elucidate whether these facts can be applicable to all types of language acquisition by children.

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Abbreviations

A	Adjective
ART	Article
COP	Copulative verb
CP	Complement Phrase
D	Determiner
DEF	Definite
DEM	Demonstrative
FEM	Feminine
L1	First Language
L2	Second Language
MAS	Masculine
NP	Nominal Phrase

MPH	Monosyllabic Place Holder
N	Noun
NEU	Neuter
P	Person
PL	Plural
PNA	Prosodic Nominal Assembly
PP	Prepositional Phrase
SING	Singular
VP	Verbal Phrase

References

Abney, Steven P. 1987. The English Noun Phrase and Its Sentential Aspect. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA, USA.

Aguirre Martínez, María del Carmen. 1995. La Adquisición de las Categorías Gramaticales en Español. Ph.D. thesis, Universidad Autónoma de Madrid, Madrid, Spain.

Bartra, Anna. 1997. The schwa as a functional *joker* in early grammars. Paper presented at the Incontro di Grammatica Generativa, Pisa, Italy February 1997, and the VII Colloquium on Generative Grammar, Oviedo, Spain, April 1997.

Bernstein, Judy. 1993. The syntactic role of word markers in null nominal constructions. *Probus* 5: 5–38. [CrossRef]

Bialystok, Ellen, and Barry Miller. 1999. The problem of age in second-language acquisition: Influences from language, structure and task. *Bilingualism Language and Cognition* 2: 127–45. [CrossRef]

Bley-Vroman, Robert. 1990. The logical problem of foreign language learning. *Linguistic Analysis* 20: 3–49.

Bottari, Piero, Paola Cipriani, and Anna Maria Chilosi. 1993–1994. Prosyntactic devices in the acquisition of Italian free morphology. *Language Acquisition* 3: 327–69. [CrossRef]

DeKeyser, Robert M. 2000. The robustness of critical period effects in second language acquisition. *Studies in Second Language Acquisition* 22: 499–533.

Demonte, Violeta. 1999. El adjetivo: Clases y usos. La posición del adjetivo en el sintagma nominal. In *Gramática Descriptiva de la Lengua Española*. Directed by I. Bosque and V. Demonte; Madrid: Espasa Calpe, pp. 129–215.

ElKadiri, Houmad, (CEOSI), Estrella Nicolás, and (Fundación José Ortega y Gasset-Gregorio Marañón). 2015. Personal communication.

Eguren, Luis. 1989. Algunos datos del español en favor de la hipótesis de la frase determinante. *Revista Argentina de Lingüística* 5: 163–203.

Eguren, Luis. 2006. La capacidad explicativa de la Hipótesis de la Frase Determinante. *Revista Iberoamericana* 17: 215–38.

Herrero Muñoz-Cobo, Bárbara. 1999. *Gramática de Árabe Marroquí Para Hispano-Hablantes*. Almería: Servicio de Publicaciones de la Universidad de Almería.

Hulk, Aafke, and Leonie Cornips. 2005. Differences and similarities between Child L2 and (2)L1: *DO*-support in Child Dutch. In *Proceedings of the 7th Generative Approaches to Second Language Acquisition Conference (GASLA 2004)*. Edited by Laurent Dekkydtspotter, Rex A. Sprouse and Audrey Lijestrand. Somerville: Cascadilla Proceedings Project, pp. 163–77.

Johnson, Jaqueline S., and Elisse Newport. 1989. Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology* 21: 60–99. [CrossRef]

Johnson, Jaqueline, and Elisse Newport. 1991. Critical period effects on universal properties of language: The status of subjacency in the acquisition of a second language. *Cognition* 39: 215–58. [CrossRef]

Karmiloff-Smith, Annette. 1979. *A Functional Approach to Child Language. A Study of Determiners and Reference*. Cambridge: Cambridge University Press.

Krashen, Stephen D. 1973. Lateralization, language learning and the critical period: Some new evidence. *Language Learning* 23: 63–74. [CrossRef]

Laca, Brenda. 1999. Presencia y ausencia de determinante. In *Gramática Descriptiva de la Lengua Española*. Directed by Ignacio Bosque and Violeta Demonte; Madrid: Espasa Calpe, pp. 891–928.

Lenneberg, Eric H. 1960. Language, evolution, and purposive behaviour. In *Culture in History: Essays in Honor of Paul Radin*. Edited by Stanley Diamond. New York: Columbia University Press.

Lenneberg, Eric H. 1967. *Biological Foundations of Language*. New York: Wiley and Sons.

Leonetti, M. 1999. El artículo. In *Gramática Descriptiva de la Lengua Española*. Directed by Ignacio Bosque and Violeta Demonte; Madrid: Espasa Calpe, pp. 787–890.

Liceras, Juana M. 2002. The L1/L2 'Fundamental Difference Hypothesis' revisited: More on the interpretation of acquisition data. Paper presented at the 6th Hispanic Linguistic Symposium, Iowa City, IA, USA, October 18–20.

Liceras, Juana M., Elisa Rosado, and Lourdes Díaz. 1998a. On the differences and similarities between primary and non primary language acquisition: Evidence from Spanish null noun. Paper presented at EUROSLA'98, Paris, France, September 10–12.

Liceras, J. M., Elena Valenzuela, Elisa Rosado, and Lourdes Díaz. 1998b. The role of morphological paradigms in the acquisition of syntactic knowledge: N-drop and null subjects in L1 and L2 Spanish. Paper presented at 28 Kabgyage Symposium in Romance Linguistics (LSRL), University Park, PA, USA, April 16–19.

Liceras, Juana M., Lourdes Díaz, and Caroline Mongeon. 2000. N-Drop and determiners in native and non-native Spanish: More on the role of morphology in the acquisition of syntactic knowledge. In *Current Research on the Acquisition of Spanish*. Edited by Ronald P. Leow and Cristina Sanz. Somerville: Cascadilla Press.

Lleó, Conxita. 1997. Filler syllables, proto-articles and early prosodic constraints in Spanish and German. In *Proceedings of the GALA'97 Conference on Language Acquisition*. Edited by Antonella Sorace, Caroline Heycock and Richard Shillcock. Edinburg: The University of Edinburgh, pp. 251–56.

Lleó, Conxita. 2001a. The interface of phonology and syntax: The emergence of the article in the early acquisition of Spanish and German. In *Approaches to Bootstrapping: Phonological, Lexical, Syntactic and Morphophysiological Aspects of Early Language Acquisition*. Edited by Jürgen Weissenborn and Barbara Höhle. Amsterdam/Philadelphia: Benjamins, vol. 2, pp. 23–44.

Lleó, Conxita. 2001b. The transition from prenominal fillers to articles in Spanish and German. In *Research on Child Language Acquisition:Proceedings of the 8th International Congress of the IASCL*. Edited by Margareta Almgren, Andoni Barreña, María-José Ezeizabarrena, Itziar Idiazabal and Brian MacWhinney. Somerville: Cascadilla Press, vol. 2, pp. 713–37.

Lleó, Conxita. 2003. Hacia la gramática minimista, maximizando lo prosódico. *Cognitiva* 15: 169–75. [CrossRef]

Lleó, Conxita, and Katherine Demuth. 1999. Prosodic constraints on the emergence of grammatical morphemes: Crosslinguistic evidence from Germanic and Romance Languages. In *Proceedings of the 23rd Annual Boston Conference on Language Development*. Edited by Annabel Greenhill, Heather Littlefield and Cheryl Tano. Somerville: Cascadilla Press, vol. 3, pp. 407–18.

Long, Michael H. 1990. Maturational constraints on language development. *Studies in Second Language Acquisition* 12: 251–85. [CrossRef]

López Ornat, Susana. 1997. What lies in between a pre-grammatical and a grammatical representation? Evidence on nominal and verbal form-function mappings in Spanish from 1;7 to 2;1. In *Contemporary Perspectives on the Acquisition of Spanish, Volume I: Developing Grammars*. Edited by Ana Teresa Pérez-Leroux and William R. Glas. Somerville: Cascadilla Press, pp. 3–20.

López Ornat, Susana, Almudena Fernández, Pilar Gallo, and Sonia Mariscal. 1994. *La Adquisición de la Lengua Española*. Madrid: Siglo XXI.

MacWhinney, Brian. 2000. *The CHILDES Project: Tools for Analyzing Talk*, 3rd ed. Mahwah: Lawrence Erlbaum Associates.

MacWhinney, Brian. 2007. The TalkBank Project. In *Creating and Digitizing Language Corpora: Synchronic Databases*. Edited by Joan C. Beal, Karen P. Corrigan and Hermann L. Moisl. Houndmills: Palgrave-Macmillan, pp. 163–80.

Mariscal, Sonia. 1997. El proceso de Gramaticalización de las Categorías Nominales en Español. Ph.D. thesis, Universidad Autónoma de Madrid, Madrid, Spain.

Mariscal, Sonia. 2001. ¿Es "a pé" equivalente a Det + N? Sobre el conocimiento temprano de las categorías gramaticales. *Cognitiva* 13: 35–59. [CrossRef]

Meisel, Jurgen M. 2008. Child second language acquisition or successive first language acquisition. In *Current Trends in Child Second Language Acquisition.A Generative Perspective*. Edited by Belma Haznedar and Elena Gavruseva. Amsterdam and Philadelphia: John Benjamins, pp. 55–80.

Nicolás, Estrella. 2016. La Adquisición del Sintagma Determinante en Español por Niños de Lengua Materna Árabe Marroquí. Ph.D. thesis, Universidad Complutense de Madrid, Madrid, Spain. Available online: http://eprints.ucm.es/39529/1/T37867.pdf (accessed on 18 March 2018).

Penfield, Wilder, and Lamar Roberts. 1959. *Speech and Brain Mechanisms*. Princeton: Princeton University Press.

Peters, Ann M. 1983. *The Units of Language Acquisition*. Cambridge: Cambridge University Press.

Peters, Ann M. 1985. Language segmentation: Operating principles for the analysis and perception of language. In *The Crosslinguistic Study of Language Acquisition*. Edited by Dan Slobin. Hillsdale: Lawrence Erlbaum, vol. 2, pp. 1029–68.

Peters, Ann M., and Lise Menn. 1993. False starts and filler syllables: Ways to learn grammatical morphemes. *Language* 69: 742–77. [CrossRef]

Real Academia Española. 2009. El artículo (I). Clases de artículos. Usos del artículo determinado. In *Nueva Gramática de la Lengua Española*. Madrid: Espasa Libros, pp. 1023–86.

Rosado, Elisa. 1998. La Adquisición de la Categoría Funcional Determinante y los Sustantivos Nulos del Español Infantil. Master's thesis, University of Ottawa, Ottawa, ON, Canada.

Rosado, Elisa. 2000. *La Adquisición Infantil del Español. Una Aproximación Gramatical*. Málaga: ASELE.

Rosado, Elisa. 2007. La Adquisición del Sintagma Determinante en Español Como Lengua Segunda y Lengua Extranjera. Ph.D. thesis, Universitat de Barcelona, Barcelona, Spain.

Schwartz, Bonnie D. 2004. Why child L2 acquisition? In *Proceedings of Generative Approaches to Language Acquisiton 2003*. Edited by Jaqueline van Kampen and Sergio Baauw. Utrecht: LOT Occasional Series, pp. 47–66.

Serra, Miquel, and Mònica Sanz. 2003. Acotando la sobreextensión de 'gramática' y de otros términos lingüísticos. Comentarios a 'Caminando hacia la gramática: una perspectiva teórica' de Mireia Llinàs. *Cognitiva* 15: 221–33. [CrossRef]

Snyder, William, and Ann Senghas. 1997. Agreement morphology and the acquisition of noun-drop in Spanish. In *Proceedings of the 21th Annual Boston University Conference of Language and Development*. Edited by Elizabeth Hughes, Mary Hughes and Annabel Greenhill. Somerville: Cascadilla Press, vol. 2, pp. 584–91.

Snyder, William, Ann Senghas, and Kelly Inman. 1999. *Agreement Morphology and the Acquisition on Noun Drop in Spanish*. Manuscript: University of Connecticut-Columbia University.

Tolchinsky, Liliana, Melina Aparici, and Elisa Rosado. 2003. Caminando con la gramática. *Cognitiva* 15: 235–42. [CrossRef]

Torrens, Vincent, and Kenneeth Wexler. 2001. Specific Language Impairment in Spanish and Catalan. *Aloma* 9: 131–48.

Unsworth, Sharon. 2005. *Child L2, Adult L2, Child L1: Differences and Similarities. A Study of the Acquisition of Direct Object Scrambling in Dutch*. Utrecht: LOT.

Veneziano, Edy, and Hermine Sinclair. 2000. The changing status of filler syllables on the way to grammatical morphemes. *Journal of Child Language* 27: 461–500. [CrossRef] [PubMed]

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Article

On Recursive Modification in Child L1 French

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Abstract: This paper investigates nominal recursive modification (RM) in the L1 acquisition of French. Although recursion is considered the fundamental property of human languages, recursive self-embedding is found to be difficult for children in a variety of languages and constructions. Despite these challenges, the acquisition of RM proves to be resilient; acquirable even under severely degraded input conditions. From a minimalist perspective on the operations of narrow syntax, recursive embedding is essentially the application of a sequence of Merge operations (Chomsky 1995; Trotzke and Zwart 2014); therefore, given the universality of Merge, we do not expect to find cross-linguistic differences in how difficult recursion is. But if the challenging nature of recursion stems from factors which might differ from language to language, we expect different outcomes cross-linguistically. We compare new data from French to existing English data (Pérez-Leroux et al. 2012) in order to examine to what extent language-specific properties of RM structures determine the acquisition path. While children's production differs significantly from their adult's counterparts, we find no differences between French-speaking and English-speaking children. Our findings suggest that the challenging nature of recursion does not stem from the grammar itself and that what shapes the acquisition path is the interaction between universal properties of language and considerations not specific to language, namely computational efficiency.

Keywords: recursion; complexity; Determiner Phrases; Noun Phrase modification; L1 acquisition; French syntax; minimalism

1. Introduction

Although recursion as an abstract property is considered a fundamental feature of human languages, recursive self-embedding, as in (1), has been shown to be difficult for children in a variety of languages and constructions.

1. Mary's mother's friend's dog ran away.

In child English, recursive possessive and Prepositional Phrase (PP) structures are rare in production, and difficult to understand (Limbach and Adone 2010; Roeper 2011; Pérez-Leroux et al. 2012). Despite these challenges, the acquisition of recursive modification (RM) proves to be resilient, and acquirable even under severely degraded input conditions, such as in deaf home signers (Goldin-Meadow 1982) and bilinguals (Pérez-Leroux et al. 2017). The structures that can function recursively vary across different languages, fueling the controversy regarding the universality of recursion (Evans and Levinson 2009).

From a minimalist perspective on the operations of narrow syntax, recursive embedding is essentially the application of a sequence of Merge operations (Chomsky 1995; Trotzke and Zwart 2014) thereby raising the general research question: Why is RM challenging in L1 acquisition? In other words, why do children need time to apply Merge in a recursive manner?

To address this question, we compare new data from French to existing English data (Pérez-Leroux et al. 2012) in order to examine to what extent the acquisition path is determined by language-specific properties of RM structures. Our specific research questions are:

I. What are the main patterns of production of complex Noun Phrases (NPs) in French-speaking children compared to French-speaking adults?
II. Do French-speaking children have a general advantage over English-speaking children in terms of their production of recursive NPs?
III. Do French-speaking children have an initial advantage?
IV. Do French-speaking children have an advantage with recursive possessives, given that in English, a generally right-branching language, possession is primarily expressed via a left-branching strategy, the Saxon genitive '-'s'?

Section 2 provides the larger context, on recursion, French NPs, and their acquisition as well as our hypotheses, for the study reported on in the subsequent sections.

2. Background

2.1. Recursivity and Complexity in Language Acquisition

When addressing the question of how children's utterances increase in complexity with age, the issue of determining what is complex naturally arises. Although researchers do not all agree on its nature (McWhorter 2011; Culicover 2013; Newmeyer and Preston 2014; Roeper and Speas 2014; Trotzke and Bayer 2015), they mostly agree that embedding, including self-embedding, increases complexity (Culicover and Jackendoff 2006; Givón 2009). Watumull et al. (2014) state that "the grammars of all natural languages are recursive" (p. 1) and that syntactic constituents are built recursively "in a stepwise strongly generative process creating increasing complexity" (p. 6). Recursive structures are the result of repeated applications of Merge operations and it follows that structures built through similar derivational steps should all be similarly complex. In other words, given the architectural and universal nature of recursion, any cap on recursion that might be observed in output structures whether in children or adults must be attributable to arbitrary external factors. We follow the general approach outlined in Bejar et al. (forthcoming) according to which "because recursive iterations of Merge can result in different varieties of recursively embedded output structures, some structural elaborations [may] turn out to be more complex than others."

If the challenge of recursion lies in the narrow syntax operations involved in the derivation of phrases and sentences, i.e., with applications of Merge, then we expect recursive structures to be equally complex across languages with comparable constructions. Stated differently, given the universality of Merge, we do not expect to find cross-linguistic differences in how difficult recursion is for children. This is our Null Hypothesis, which predicts that there should be no relevant differences between languages in the L1 acquisition process.

If, on the other hand, the challenging nature of recursion stems from factors which might differ from language to language (e.g., properties of specific lexical items or differences in constructions), then we expect different developmental outcomes across languages. This Alternative Hypothesis makes the prediction that the observed difficulties will differ between languages. In the present study, this Alternative Hypothesis is explored in the context of two properties where English and French NPs differ: uniformity of branching directionality in nominal modification, and the kinds of strategies allowed to embed nominal modifiers (relativization, prepositional modification are present in both, but only English relies on case morphology for possession). We will return to this in our presentation of hypotheses.

2.2. French Determiner Phrases

Turning now to our empirical domain, there is essentially no published work dealing in any relevant detail with modification of N by PPs in French. Previous research is mainly concerned with the semantics of French prepositions ((Vandeloise 1991) for instance) and complements in *à* 'to' and *de* 'of' ((Godard 1988; Abeillé et al. 2003) for instance). For this reason, we provide a basic description of the structures at stake.

Simple Determiner Phrases (DP) in French are structured as follows:

2. [$_{DP}$ D [$_{NP}$ N]]

For our present purpose, the fine-grained functional architecture within and above NP does not matter; what is of interest is the potential expansion of the structure through embedding, typically used to restrict the description of the set denoted by the head Noun. Two possibilities arise: complementation as in (3), where the complement is semantically selected by N, or adjunction as in (4), where the added constituent simply modifies the head Noun.

3.

L'	auteur	de	ce roman
the	author	of	this novel
[$_{DP}$ [$_{D}$ l']	[$_{NP}$ [$_{N}$ auteur	[$_{PP}$ [$_{P}$ de]	[$_{DP}$ ce roman]]]]

'The author of this novel.'

4. a.

L'	auteur	dont	j'	ai	lu	tous	les	romans
the	author	of-whom	I	have	read	all	the	novels
[$_{DP}$ [$_{D}$ l']	[$_{NP}$ [$_{N}$ auteur]	[$_{CP}$ dont	j'	ai	lu	tous	les	romans]]]

'The author of-whom I have read all the novels.'

b.

L'	auteur	avec	plusieurs	titres	sur	la	1ère
the	author	with	several	titles	on	the	1st
[$_{DP}$ [$_{D}$ l']	[$_{NP}$ [$_{N}$ auteur]	[$_{PP}$ [$_{P}$ avec]	[$_{DP}$ plusieurs	titres	[$_{PP}$ [$_{P}$ sur]	[$_{DP}$ la	1ère

guerre mondiale
world war
guerre mondiale]]]]]]
'The author with several titles on the 1st world war.'

Crucially, the number of modifiers is potentially unlimited:

5. Un auteur avec plusieurs titres sur les soldats qui ont combattu dans les tranchées près de Passendale vers la fin de la 1ère guerre mondiale . . .
An author with several titles on the soldiers who have fought in the trench near Passchendaele towards the end of the 1st world war . . .

Our study is restricted to DPs that include PP modifiers (not complements). In terms of the internal structure of the expanded DP, we must distinguish between recursive multiple modification and sequential multiple modification. In the first case, each nominal added to the DP modifies the noun immediately dominating it (6), while in the other they all modify the head Noun (7).

6.

La	personne	avec	un	bébé	dans	une	poussette
the	person	with	a	baby	in	a	stroller
[$_{DP}$ [$_{D}$ la]	[$_{NP}$ [$_{N}$ personne]	[$_{PP}$ [$_{P}$ avec]	[$_{DP}$ un	bébé	[$_{PP}$ [$_{P}$ dans]	[$_{DP}$ une	poussette]]]]]]

'The person with a baby in a stroller'

7. Le vase avec des fleurs sur le coin de la
   the vase with some flowers on the corner of the
   [$_{DP}$ [$_{D}$ le] [$_{NP}$ [$_{N}$ vase] [$_{PP}$ [$_{P}$ avec] [$_{DP}$ des fleurs]] [$_{PP}$ [$_{P}$ sur] [$_{DP}$ le coin de la
   cheminée
   fireplace
   cheminée]]]]
   'The vase with some flowers on the corner of the fireplace.'

Note that (6) and (7) are ambiguous when taken in isolation but a context would serve to disambiguate them. A variety of prepositions are allowed to embed DP internal modifiers (*avec* 'with', *sur* 'on', etc.), but the polysemous prepositions *de* 'of' and *à* 'to' are very common and srve to establish different semantic relations, including purpose (*table à manger* 'dining table'), theme (*peinture de fleurs* 'painting of flowers'), kinship (*soeur d'Elmo* 'sister of Elmo'), ownership (*le sac de la fille* 'the bag of the girl'), etc. Since the focus of this paper is on doubly modified DPs, we will use the terms sequential double modification (SDM) and recursive double modification (RDM).

2.3. The Acquisition of Determiner Phrase Structure in Child French

The acquisition of the DP in child French has been described as a gradual process (Pannemann 2007; Bassano et al. 2008). According to Pannemann (2007), DP-internal elements emerge in the following order: bare nouns > determiner with nouns > pre-nominal adjectives > post-nominal adjectives. At the initial stage thus, nominal structures consist primarily of bare nouns; and article use is optional (Prévost 2009). By two and a half years, determiners are systematically present. In the work presented in Demuth and Tremblay (2008), young French-speaking children employed determiners at one year and a half, and they produced more than 82% of determiners between the ages of 2;3 to 2;5. Errors in DP production are common and include determiner omission, gender and number agreement, and overuse of definite articles (Clark 1986; Frechette and Labelle 2007; Pannemann 2007; Bassano et al. 2008; Demuth and Tremblay 2008; Prévost 2009). These errors persist longer with more complex structures, according to Royle and Valois (2010).

By age three, children already employ a range of determiners regularly. In data from the spontaneous speech of 60 children aged from one year and six months (1;6) to 3;4, Bassano et al. (2008) identified many types of determiners, including indefinite (*un gâteau* 'a cake') and definite articles (*le chat* 'the cat'), possessive (*mon, ma* 'my', *leur* 'their'), demonstrative adjectives (*ce, cette* 'this'; *ces* 'these') and other types of determiners, such as numeral (*deux* 'two', *trois* 'three'), interrogative (*quelle* 'which'), and indefinite (*plusieurs* 'many, several', *autre* 'other', *même* 'same', *tout/toute/tous* 'whole, all'). However, possessives, demonstrative adjectives, and other determiners remained rare (approximately 10% for possessives, and less than one percent for other types). In addition, Bassano et al. (2008) reported an increase in contrastive uses of a given noun without determiner or with different determiners between ages 1;8 and 3;3.

The production of modified DP increases between ages three and five, but remains low in relation to the production of simple DPs. Royle and Stine (2012) compared SLI children to typically developing MLU-matched children (mean age 3;9; range 3;2–4;8) and age-matched children (mean age 5;6; range 4;10–5;11). They classified DPs as simple if they consisted of common noun and determiner (*un chien* 'a dog') or proper nouns (*grandpapa Gilles* 'grandpa Gilles'), or N plus P (*d'place* 'of room'). Complex DPs included a noun with a determiner and an adjective (*un bouchon vert* 'a green plug'), a noun with a determiner and a prepositional phrase (*les arbres (dans les arbres) dans les branches* 'the trees (in the trees) in the branches'), and an adjective with an omitted noun (*la rouge* 'the red (one)'). Royle and Stine (2012) found that even within this age range, most production consisted of simple DPs (78% for the younger group, and 70% for the older children). Older children were fully productive with the various types of complex DPs, mostly with adjectives. PP modification made up 3% and 5% of the production of younger and older children, respectively.

According to Pannemann (2007), children start to use pre-nominal adjectives at 1;8 (mean age of first use = 23 months) but post-nominal adjectives emerge a few months later (mean age of first use = 25 months). Valois and Royle (2009) reported that DPs overtly containing a determiner, a noun, and an adjective appear in spontaneous production between ages 2;1–2;4 but are rare (less than 1% of all occurrences of DPs). Royle and Valois (2010) examined the acquisition of colour and size adjectives by francophone children from 3;1 to 4;11 years in a puzzle-based elicited production study. Even the youngest children used adjective-modified DPs, and they observed an increasing ability with age to produce appropriate adjectives. One of the elicitation conditions targeted combinations of size and colour adjectives (i.e., *la grosse maison blanche* 'the big white house'). By 3;5 such doubly modified adjectival structures were used at 80%, and the rate increased to 90% at 3;6.

The first possessive constructions are attested around age two. Interestingly, these primarily take the form of non-target analytic structures that include a preposition (*à* or *de*) and a pronoun instead of the target possessive determiners, which appear at a later age (Clark 1986; Aimard 1996), as in (8):

8. la cuiller de moi
   the spoon of me (instead of *ma cuiller* 'my spoon')
   'my spoon' (1;11) (Clark 1986, p. 730)

Children also produce target-like instance of DPs with possession, such as (9) below, where the object of the preposition is lexical.

9. c' est la maman du lapin
   it is the mother of+the rabbit
   'this is rabbit's mom' (Age not provided) (Bassano et al. 2008, p. 420)

Relativization appears early in the spontaneous speech of two-year-old francophone children, initially in the form of cleft constructions:

10. c' est ça qui va là
    it is that that goes there
    'It's that that goes there.' (2;0) (Labelle 1990, p. 113)

After three-and-a-half, relative clauses (RC) are regularly used; however, the acquisition of RCs is a long process. Developmental patterns include incorrect choices of relative pronouns (11) and frequent use of resumptive elements (12), all of which continue to be attested after 6 years (Clark 1986; Labelle 1990; Fragman 1998; Belzil 2004):

11. la voiture que le monsieur met une roue
    the car that the man puts a wheel
    'The car that the man is putting a wheel.' (5;06; Bouvier and Platone 1976; cited in Clark 1986)

12. sur la balle qu' il lance la balle
    on the ball that he throws the ball
    'On the ball that he throws the ball.' (5;0) (Labelle 1990, p. 100)

Furthermore, even the RCs of school-aged French children show less diversity of forms and uses (Jisa and Kern 1998).

In sum, the various analyses show a consistent picture in French. DP structures develop in the following sequence:

13. Developmental sequence for French DPs
    bare nouns > det+nouns > Adj+N > N+Adj > N+PPs > N+RC modifiers

DPs containing one level modification (both PPs and RCs) emerge in two-year-olds, and are already established in three-year-olds. However, as observed in other languages (Eisenberg et al. 2008; Pérez-Leroux et al. forthcoming), nominal modification is less productive and structurally more limited in children compared to adults, even across the school years. One noteworthy characteristic of French acquisition is that children start out with the more structurally elaborated expression of possession (as PPs) rather than the simple determiner option. Although we have seen that, by the age of four, children can productively modify a noun with two adjectives, to the best of our knowledge, no previous work has examined RM in DPs in the acquisition of French.

2.4. Hypotheses

French and English DPs share many characteristics. The French structures above would work equally well to describe English DPs, with one exception: the existence of the left-branching possessor construction in English, the Saxon genitive '-'s' as in (1)—*Mary's mother's friend's dog ran away*. In French, only a right-branching structure serves to embed possessor DPs, as shown in (14).

14. Le chien de l' ami de la mère de Marie s' est sauvé
the dog of the friend of the mother of Mary REFL is saved
'Mary's mother's friend's dog ran away.'

If we consider then that the French DP appears to be uniformly right-branching, whereas English includes a productive, and very common, left branching structure, it is clear the input in French is more consistent. As pointed out by a reviewer though, the presence of prenominal adjectives in the French input introduces the possibility of left-branching modification. However, recursivity is what is at stake in our study and although single adjectives can appear preverbally, descriptively speaking recursion is mostly found in postnominal adjectives in French (Roeper and Snyder 2004). In addition, according to Laenzlinger (2005, p. 686) "all adjectives are postnominal at some step of the derivation. Prenominalization of adjectives is obtained through subsequent AdjP movement to a specific functional projection within the determiner domain." Consequently, we maintain that French is uniformly right-branching in the nominal domain. Returning to our research questions and hypotheses, given the centrality of input in the language acquisition process, it could be assumed that the uniformity of the input might translate as an advantage for French children and that this would come up in our results as either: (i) an initial advantage; (ii) faster development, which can be attested globally (for all forms of recursive modification); or (iii) locally (i.e., limited to possession conditions). According to Culicover (2013, p. 328), "complexity of processing is correlated with memory load, and uniformity of branching reduces memory load [. . .] uniformity is computationally less complex". From the English perspective therefore, mixed directionality might introduce an early cost that becomes apparent only in the performance of younger children.

Another potentially relevant difference between English and French involves a contrast in the choice of linking strategies for modifiers within DPs. Again, although no systematic study has examined this in detail, previous works point to a preference in French for modification via relative clauses in contexts where English opts for PPs. Vercollier et al. (2004, p. 241) observe that, contrary to English, French generally requires different strategies to express various modification relations; so, for instance, 'The animals in the zoo are sick' would be said with a relative clause ('that are in the zoo'), an adjective or participle ('kept in the zoo'), or the preposition *de* ('of the zoo'). Jisa and Kern (1998) note that RCs in French are commonly used to introduce new referents. We return to this in Section 4.2.3.

3. Materials and Methods

The method in this study was the same referential elicitation task used in Pérez-Leroux et al. (forthcoming), which was approved by the University of Toronto Office of Research Ethics (protocol reference #: 27755; approval date: May 2012) and was conducted with

permission from the school administrators and teachers. Parents were asked to sign a consent letter and to complete a short questionnaire on their children's language history. Children whose parents gave permission were asked if they were willing to participate. At the beginning of the session, they were informed they could take breaks or discontinue the test at any time. Adult participants were recruited among school employees. Recordings were conducted individually in a quiet classroom and lasted between 25 and 40 min. All participants received a small gift. Interviews with participants were recorded by using a digital recorder (ZOOM H4n, Hauppauge, NY, USA) and transcribed for coding. Personal data is kept confidential and is identified by a code rather than a name.

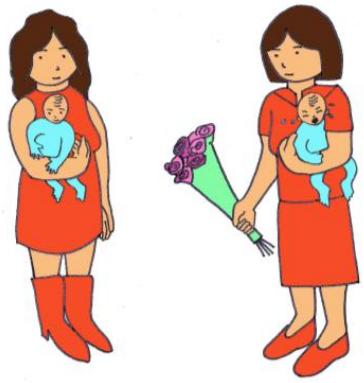
3.1. Participants

Our French data were collected in three elementary schools and four daycare centres in Quebec City in May and June 2016 by two researchers. A sample of 78 monolingual French-speaking children aged 4;0 to 6;7 and 12 adult controls participated in the study. Based on information provided by teachers and parents, the participants were monolingual and typically developing children. French-speaking participants were divided into three age groups: four-year-olds (n = 26, range 3;11–4;11 years, Mean age = 4;4, Median = 4;4, SD = 2.8 months), five-year-olds (n = 26, range 5;1–5;11 years, Mean age = 5;8, Median = 5;9, SD = 7 months), and six-year-olds (n = 26, range 6;0–6;7 years, Mean age = 6;3, Median = 6;4, SD = 0.7 months). These speakers were compared to data from the initial English study, where data were collected from 71 English-speaking children and 13 adult controls. In Pérez-Leroux et al. (forthcoming), monolingual typically developing English-speaking children were grouped as four-year-olds (n = 25, Mean age = 4;6, Median 4;6, SD = 2.4 months), five-year-olds (n = 25, Mean age = 5;4, Median = 5;4, SD = 3.3 months), and six-year-olds (n = 21, Mean age = 6;5, Median = 6;4, SD = 3.2 months).

3.2. Stimuli and Procedures

The original task was developed for English, and subsequently adapted to French by the authors of the present study. The materials targeted production of doubly modified nouns (DPs) with two embedded modifiers. Stimuli included four recursive (RDM) and one non-recursive (SDM) conditions; each condition had between five and seven items. One item was eliminated from the French materials, for a total of 30 test items and 12 distractors. Participants listened to an illustrated story about familiar objects and characters performing simple activities. Each situation had several referents represented on a picture. To properly disambiguate the target referent in answer to the prompt question (*which x . . . ?*), the response required multiple modifications. The procedure is illustrated with the recursive comitative condition in (15). Other conditions included recursive locatives (16), recursive possessives (18), and recursive relational nouns (19). As a test of the effect of recursive embedding itself, we included a condition with double non-recursive PPs (Pérez-Leroux et al. forthcoming). As shown in (17), this contained two PPs, which in principle could be structurally ambiguous in the surface, but the visual context determined that the second PP could be attached as modifier to the highest NP. It contained either two locatives (three items) or a mix of locative and comitative PPs (three items).

15. Recursive comitative condition (RDM)
Prompt question: Lequel des bébés pleure? ('Which baby is crying?')



Le	bébé	avec	la	femme	avec	des	fleurs.
the	baby	with	the	woman	with	some	flowers

'The baby with the woman with the flowers.'

16. Recursive locative condition (RDM)

La	brosse	dans	le	pot	sur	la	tablette.
the	toothbrush	in	the	cup	on	the	shelf

'The toothbrush in the cup on the shelf.'

17. Non-recursive condition (locative or a combination of locative and comitative) (SDM)

Les	livres	dans	la	boite	sous	la	chaise
The	books	inside	the	box	under	the	chair

'The books in the box (and) under the chair.'

18. Recursive possessive condition (RDM)

Le	ballon	de	la	sœur	d'	Elmo.
the	ball	of	the	sister	of	Elmo

'Elmo's sister's ball.'

19. Recursive relational noun condition (RDM)

Sur	la	pile	de	peintures	de	fleurs.
on	the	pile	of	paintings	of	flowers

'On the pile of paintings of flowers.'

Items were presented as an illustrated booklet with semi-randomized orders. Participants were randomly assigned to two versions with different orderings. The first three items were training distractors.

As was the case in the original English experiment, if during the test a participant did not give a complete answer after the first attempt, the experimenter was instructed to repeat the prompt two additional times. If a child was pointing a response, he or she would be invited to describe the picture with words. For incomplete answer (e.g., "The books" instead of "The books in the box under the chair"), the experimenter would invite clarification (e.g., "Yes, you are right, but which one?").

3.3. Coding

To analyze French results, we adapted the English coding system developed in Pérez-Leroux et al. (2012) and Pérez-Leroux et al. (2015), which includes syntactic and semantic

classifications. The syntactic coding characterizes the response based on level of embedding and syntactic devices used to link embedded phrases. The level of embedding was analyzed as Single (a single NP; 20a), Level 1 (a noun modified by a single embedded phrase; 20b), or Level 2 (a noun modified by two embedded phrases; 20c):

20. Syntactic Coding
    a. Single:
       [$_{DP}$ le ballon]
       the ball
       'The ball.'

    b. Level 1:
       [$_{DP}$ le ballon [$_{PP}$ de la soeur]]
       the ball of the sister
       'The sister's ball.'

    c. Level 2:
       [$_{DP}$ le ballon [$_{PP}$ de la soeur [$_{PP}$ d'Elmo]]]
       the ball of the sister of Elmo
       'Elmo's sister's ball'

Recursive phrases containing two embedded phrases were classified as Level 2 (cf. 20c). Non-recursive doubly modified structures, such as (17) with the relevant part of the structure given in (21), were classified as 2 Level 1 since both PPs modify the higher N.

21. [$_{DP}$ Les livres [$_{PP}$ dans la boite] [$_{PP}$ sous la chaise]]
    'The books in the box under the chair.'

We also coded the syntactic mechanisms employed to integrate the modifiers. Embedding linking strategies included PPs (22a), RCs (22b) or a combination of both (Mixed, 22c).

22. Syntactic linking strategies
    a. Prepositional phrases:
       [$_{DP}$ Le ballon [$_{PP}$ de la soeur [$_{PP}$ à Elmo]]]
       the ball of the sister of Elmo
       'Elmo's sister's ball.' (6;6) (PP-PP)

    b. Relative clauses:
       [$_{DP}$ Celui [$_{RC}$ qui est dans les bras de la femme [$_{RC}$ qui a un bouquet de fleurs]]]
       the one who is in the arms of the woman who has a bouquet of flowers
       'The one who is in the arms of the woman who has a bouquet of flowers.' (6;5) (RC-RC)

    c. Mixed:
       [$_{DP}$ La brosse à dents [$_{RC}$ qui est située dans un verre [$_{PP}$ sur la tablette orange]]]
       the toothbrush that is situated in the cup on the shelf orange.
       'The toothbrush that is in the cup on the orange shelf.'
       (Adult) (RC-PP)

Participants also employed other linking strategies, which do not result in phrasal embedding, such as clausal or predicative relation (23a), coordination (23b), apposition (23c), compounds (23d). Utterances containing such linking strategies were not analyzed as targets.

23. Other linking strategies (without embedding)

a. Clausal relation:

Le chien il est là	pis il va	manger ce	hot-dog-là.
the dog he is there	and he is going	to eat	this hot-dog there

'The dog he's there, and he is going to eat this hot dog.' (4;9)

b. Coordination:

Le ballon d'Elmo et de sa sœur.
the ball of Elmo and of his sister
'Elmo's and his sister's ball.' (6;0)

c. Apposition:

Lui [le ballon], la soeur de Nemo [Elmo]
it [the ball] the sister of Elmo
'It, Elmo's sister.' (4;10)

d. Compound:

La sœur grenouille
the sister frog
'The sister frog.' (4;3)

A second step in coding integrated the syntactic coding with an assessment of whether the participant's response succeeded in identifying the target referent. The semantic coding takes into consideration whether the target head noun and modifiers were included in the response, and how they were integrated. The various types of responses identified included incomplete responses (24a), which did not provide sufficient modifiers to disambiguate the target referent, and sequential responses, such as (24b), which identified the referent but across multiple utterances. Alternative responses (24c) were also structurally simpler, and relied in other property of the visual scenario to describe the target, primarily using spatial terms. Finally, responses that included all three descriptors (the head noun, and the two target modifiers) in a single utterance, were classified as non-embedded (24d), or target (15)–(19) responses, depending on the types of linking strategies employed.

24. Semantic Coding

a. Incomplete responses: single nominal or Level 1 NPs

Le	ballon
the	ball

'The ball.' (6;2)

b. Sequential responses: a sequence of single nominals or Level 1 responses that identified all the relevant referential relations, but not in a single utterance

le	ballon	de la soeur. La soeur d'Elmo.
the	ball	of the sister the sister of Elmo.

'Sister's ball. Elmo's sister.' (6;4)

c. Alternative responses: referentially correct, but without the target modifiers
Celui [le ballon] à droite.
the one [the ball] to right
'The one to the right.' (5;9)

d. Non-embedded responses: referentially complete, but without recursively embedded modification
Le ballon d'Elmo et de sa soeur.
The ball of Elmo and of his sister
'Elmo's and his sister's ball.' (6;4)

Only responses which involved both recursive modification of an NP and correct identification of the appropriate referent (i.e., responses that were referentially successful) were considered target in the recursive conditions. The results were coded by one investigator and then independently verified by a second investigator.

4. Results

Our results provide the following answers to our research questions. We return to our hypothesis in Section 5.

4.1. General Characteristics of the French Recursive Noun Phrases: French-Speaking Children vs. Adults

What are the main patterns of production in French-speaking children compared to adults? As shown in Figure 1, adults produced between half and two-thirds of the target responses across conditions. Their highest rates of targets are in the possessive and the non-recursive conditions, followed by the comitatives. The condition that elicited the least targets was the relational noun condition. As for the French speaking children, rates of target responses (averaged across all conditions, RDM and SDM) centered around 16, 24, and 28% for four-, five-, and six-year-olds, respectively. The general distribution of targets across conditions was similar, with older children performing better with comitatives than the other conditions. Since the goal of this paper is to focus on the onset of recursive modification, we do not discuss the non-recursive condition further but see Pérez-Leroux et al. (forthcoming), for extensive discussion.

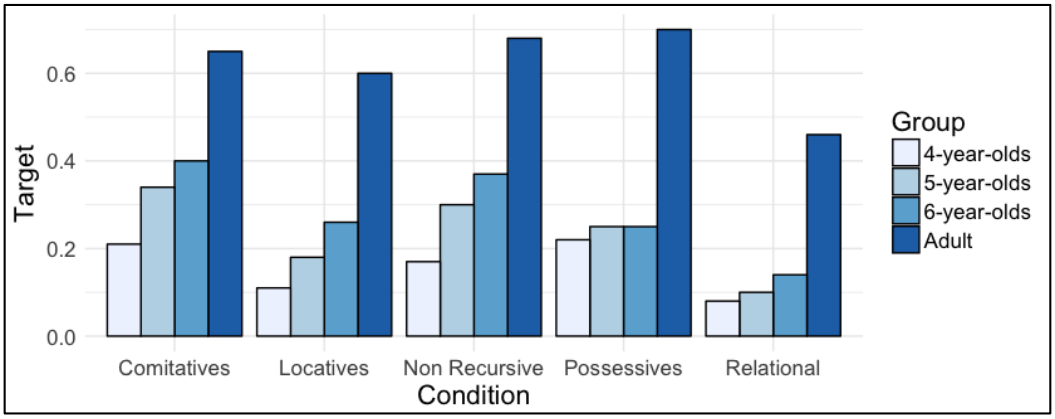


Figure 1. Proportion of target responses across conditions in French-speaking children and adults.

Individually, while some younger children produced no recursive responses, only 8 out of 26 children in the four-year-old group and 3 out of the 26 children in five-year-old group did not produce any recursive targets. In contrast, all of the French six-year-olds produced recursive responses.

The kinds of errors produced by children and adults can be seen in Table 1, which reports the distribution of response types for the four recursive conditions, according to the semantic coding.

Table 1. Composition of response type to recursive conditions, represented as number of tokens (% in parenthesis).

Group	Incomplete		Sequential		Alternative		Non-Embedded		Target	
Four-year-olds	353	(61%)	36	(6%)	63	(11%)	38	(7%)	93	(16%)
Five-year-olds	188	(31%)	139	(23%)	78	(13%)	60	(10%)	132	(22%)
Six-year-olds	199	(32%)	138	(22%)	61	(10%)	55	(9%)	162	(26%)
Adults	21	(7%)	12	(4%)	30	(10%)	50	(17%)	175	(61%)

For adults, the primary non-target pattern corresponds to complete responses that involved the use of non-embedding strategies such as turning a PP modifier into an adjective, apposition, and clausal relations (e.g., (25)), followed by alternative responses (e.g., (26)).

25. Target: Le sac à dos de l' ami de Dora.
the backpack of the friend of Dora
'Dora's friend's backpack.'

Clausal relations: Le sac à dos bleu est porté par l' ami de Dora.
the backpack blue is carried by the friend of Dora
'The blue backpack is carried by Dora's friend.'
(Adult)

26. Target: Le chien sous la table près de la fenêtre.
the dog under thetable near of the window
'The dog under the table near the window.'

Alternative: C'est le chien sous la table brune.
it is the dog under the table brown.
'It is the dog under the brown table.' (Adult)

For children, in contrast, incomplete responses are the primary error pattern overall; they prefer to produce structures with only one level of embedding. For the four-year-olds, these represent more than half of the responses. We observe a developmental shift whereby the older children tend to produce less incomplete responses, and increase the numbers of targets and sequential responses produced, in comparison to their younger counterparts.

4.2. Comparing the Frequency of Recursive Responses in French and English

4.2.1. Overall Rates of Recursive Responses in Children and Adults

As shown in Figure 2, there are no great differences between the languages. We analyzed the data using the glmer function in the statistical package lme4 in R. We entered the data into a generalized linear mixed model fit by maximum likelihood method (Laplace Approximation), using the binomial distribution. The dependent variable was whether the responses were target (i.e., recursive or not), with group (adult vs. children) and language (French vs. English) as fixed effects, and participant as a random effect. Neither language nor the interaction between language and group was significant. The effect of the group was highly significant ($\beta = -1.903$, SE = 0.318, $p < 0.001$).

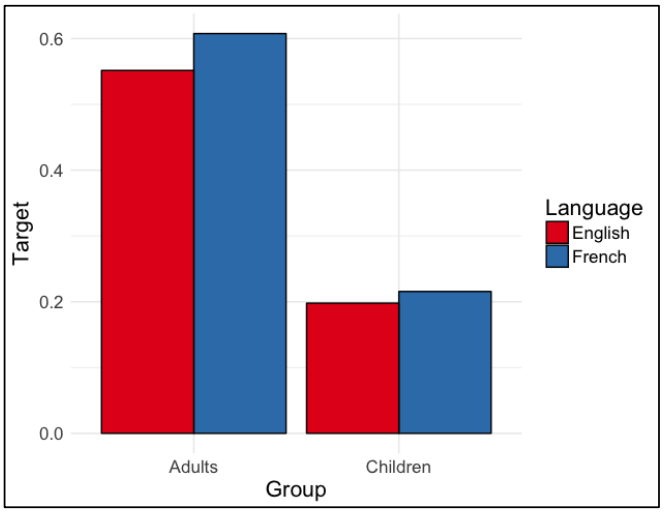


Figure 2. Average proportion of overall target responses across recursive conditions comparing English and French-speaking children and adults.

4.2.2. An Initial French Advantage?

To test the possibility of an early language difference, we then considered only the children's data. The scatterplot in Figure 3 represents individual participants distributed by age and proportion of target responses produced, separated by language. Figure 3 shows the general developmental trend, and a great degree of overlap in the two languages. We entered a second model for analysis, using the same parameters as in the first model, with the only difference that the group factor was replaced with the three age groups in children (four-, five- and six-year-olds).

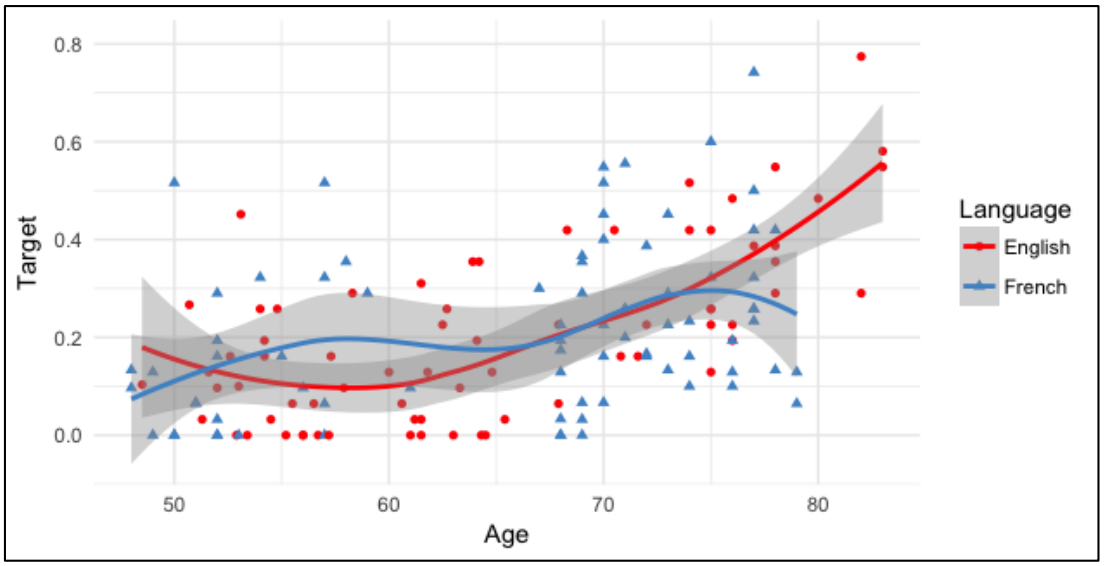


Figure 3. Individual children plotted as a function of age (in months) and proportion of target recursive responses produced, separated by language. A locally weighted smoothed line (lowess) is fitted for each language. Associated shaded areas indicate 95% confidence interval.

Again, this second model indicates no significant effect of language nor language by age group interaction. The effect of age was significant for six-year-olds. As shown in Figure 3, no child after 70 months failed to produce RDM responses, so that the rates of target responses in the older children is overall higher.

Finally, we focused the contrasts for the effect of language for each age group. This was important since the trends vary for each period. A Wilcoxon test of differences on the effect of language for four-year-olds is not significant (W = 305, $p = 0.715$). This is similarly true for the five-year-old group (W = 245, $p = 0.135$).

4.2.3. A French Possessive Advantage?

Our last question concerned the possibility of identifying a local French advantage for possessives. As we have seen, French possessives follow the regular right branching pattern, whereas possession in English is primarily expressed via a left-branching strategy, the Saxon genitive '-'s', in contrast to the right-branching patterns that dominate English clausal and nominal structures. Table 2 shows that the patterns of development for the possessive contexts are similar to the overall results described in Section 4.2.1, in that there is a small initial advantage for French children (4%–5%), but by age six, the comparison group of English-speaking children actually become more productive than the French children.

Table 2. Mean proportion of target responses to the possessive condition across groups, by language.

Group	English	French
Four-year-olds	0.18	0.22
Five-year-olds	0.20	0.25
Six-year-olds	0.44	0.25
Adults	0.72	0.70

As before, we tested the language contrast by mean of a Wilcoxon test of differences. The results indicate that the effect of language is not significant, neither for the four-year-olds (W = 305, $p = 0.715$), nor for the five-year-olds (W = 291, $p = 0.531$).

4.2.4. A Difference in Types of Strategies Employed?

We next compared another potential source of differences between the two languages: the relative number of pure PP responses vs. mix of RCs and PPs. Associated work on the English data (Pérez-Leroux et al. forthcoming) noted the use of RC and mixed responses. These patterns were deemed surprising since the materials were designed to elicit simpler PP structures. Even more surprising was the fact that English-speaking children produced as many RCs as adults, given a broad literature suggesting that RCs are complex and delayed in acquisition. Furthermore, English-speaking children specifically produced more RC responses in the recursive condition. In French, where PPs are required in possessive contexts, we expected the PP responses to dominate in general. The examples in (27) and (28) illustrate the responses discussed here for both languages:

27. French
    a. Prepositional phrases:
    [$_{DP}$ Le ballon [$_{PP}$ de la soeur [$_{PP}$ à Elmo]]]
    the ball of the sister of Elmo
    'Elmo's sister's ball'

    (6;6) (PP-PP)

    b. Mixed structures:
    [$_{DP}$ La brosse à dents [$_{RC}$ qui est située dans un verre [$_{PP}$ sur la tablette orange]]]
    the toothbrush that is situated in a cup on the shelf orange
    'The toothbrush that is in the cup on the orange shelf.'

    (Adult) (RC-PP)

c. Relative clauses:
[$_{DP}$ Celui [$_{RC}$ qui est dans les bras de la femme [$_{RC}$ qui a un bouquet de fleurs]]]
the one that is in the arms of the woman who has a bouquet of flowers
'The one who is in the arms of the woman who has a bouquet of flowers.'
(6;5) (RC-RC)

28. English
a. Prepositional phrases:
The girl with the hat . . . the one with the dog with the hat (4;6.2) (PP-PP)

b. Mixed structures:
The one with the dog that has a hat. (4;3.6) (PP-RC)

c. Relative clauses:
The chick that's on the croc'dile that's on in the water. (5;11.6) (RC-RC)

For the current analysis, we considered only the conditions which had recursive PPs as targets, that is the comitative, locative, and relational noun condition, to the exclusion of the possessive condition. We further excluded 11 English tokens where a possessive was used in the relational noun condition. Most of these were produced by adults and six-year-olds.

The percentage of responses classified as PP/Mixed/RCs per age group is shown in Figures 4 and 5. In both language groups the most common alternative to PPs is mixing PPs and RCs. Figure 4 shows how English-speaking children use as many RC and combined RC and PP as adults. This contrasts with French-speaking children, who rely primarily on PPs. At age six, we observe a trend towards the adult pattern, so the relative proportion of PP responses decreases and RC and Mixed responses increase.

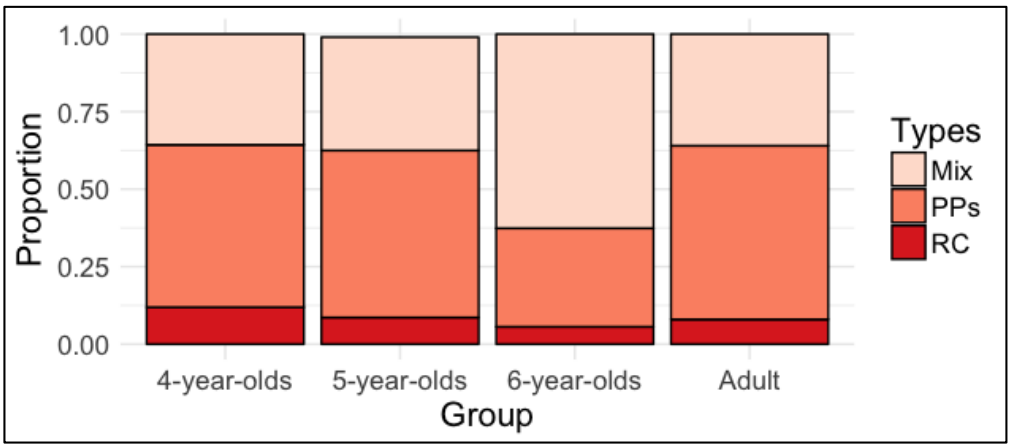


Figure 4. Composition of types of target responses across age groups in English. PP: Prepositional Phrase; RC: relative clauses; Mix: combination of PP and RC.

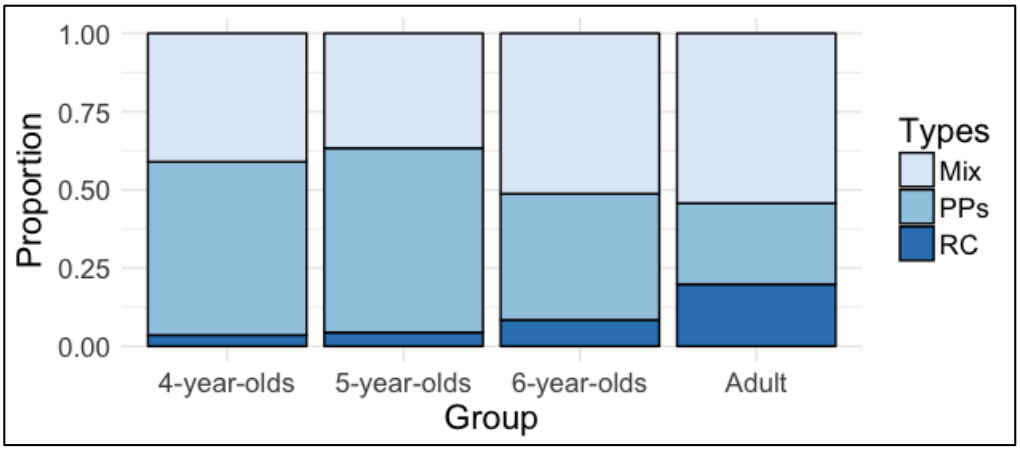


Figure 5. Composition of types of target responses across age groups in French.

Contrary to our expectations, PPs do not generally dominate in the adult data. Somehow, PP use in French adults and older children appears more restricted than in English.

The data on response type was entered into a generalized linear mixed model fit by maximum likelihood method (Laplace Approximation), using the binomial distribution. The dependent variable was whether the recursive responses consisted solely of PPs or not, with group (adult vs. children) and language (French vs. English) as fixed effects, and participant as a random effect. There is an effect of language ($\beta = -1.658$, SE = 0.541, $p = 0.002$), but no effect of group ($\beta = -0.689$, SE = 0.441, $p = 0.117$). The French-speaking children produced more PP responses than other groups, giving rise to a significant interaction between language and group ($\beta = 1.975$, SE = 0.618, $p = 0.001$).

5. Discussion

We started from a series of simple questions. Focusing on the age where it has been shown that recursive modification is acquired in other languages, question I was primarily developmental: How do preschool children differ from French-speaking adults in their production of complex, recursively modified DPs? As we summarized in Section 2.3, existing characterizations of development in this domain speaks mostly about the emergence and productivity of simple modification. Other than data on double adjective use, and on types of relative clauses children use, the continued growth of complexity in the French DP is mostly undocumented. Our data show that between the ages of four and six, French-speaking children start by primarily producing structurally simpler responses (the incomplete and sequential patterns). The number of target responses produced gradually increases, without yet reaching adult levels. In terms of types of embedded responses, adults differ from children in showing a preference for RCs, and Mixed modifiers (RCs and PPs). In contrast, two thirds of the target responses of the younger groups of French-speaking children were PP-only.

The remaining questions in Section 1 address our main hypothesis: Can specific characteristics of a language set limits on children's ability to develop recursive modification? In this case, our data showed no general advantage for French during the preschool-early school age periods, which is when recursive modification emerges and becomes productive (Questions II and III). Nor was there a specific advantage for possession (Question IV). We observed slightly increased production in the four-year-old range, but this was not significant.

Given that we found no difference in the general developmental patterns of complex NPs in French and English-speaking children, we can maintain the Null Hypothesis and conclude that recursion is equally difficult across languages. Admittedly, a comparison of only two languages, which are also very close typologically, is not sufficient to conclude without a doubt that this will be true for any and all pairs of languages. Nevertheless, for the present, we find no evidence in support of the Alternative Hypothesis.

This does not exclude the possibility that typological differences can have an effect on development and this is where the strategies discussed in Section 4.2.4 become relevant. First, the differences we report between French and English participants demonstrate that our method not only elicits the targeted structures but is also robust enough to be sensitive to potential typological differences between the two languages. Although we cannot answer this question for the moment, we can ask why PPs are significantly more disfavored in French than in English-speaking adults. Our results thus point to important differences between the behavior of French and English-speaking adults but, given the dearth of studies on RDM and SDM constructions in the two languages, we are not in a position to elaborate on this at this stage.

Returning to the general patterns, we find that RDM is challenging for all groups but more so for children compared to adults, in both languages. If RDM corresponds to Merge and Merge is strongly anchored in Universal Grammar then what is challenging about it? The narrow syntax component of the derivation of RDM constructions cannot be the locus of the difficulty, so we must turn to the interface components and processing considerations to account for the results. Further research is required to identify the specific challenges that children must overcome as part of their development. One potential source is suggested by recent work on working memory and its interaction with the development of recursion in the thought domain. The research question examined in Arslan et al. (2017) is strikingly similar to ours, although it targets a different domain: "Why do children need some years to pass second-order false belief tasks once they are able to pass first-order false belief?" (p. 2). They also consider a complexity account according to which the number of beliefs involved and the recursive organization of second-order theory of mind stories adds further demands on working memory. For them, working memory acts as a "bottleneck" on the serialization task needed to process the nested structures involved. Could a similar "serial processing bottleneck" (Verbrugge 2009) be invoked in our domain to account for both the difficulty with and the development of multiple recursive embedding, specifically in the cases involving multiple PPs? Could it be the case that the RC and Mixed RC + PP strategies are used by our participants to facilitate the serialization of the recursive structure? While we cannot address these questions here, our results are in line with "the attempt to account for properties of language in terms of general considerations of computational efficiency, eliminating some of the technology postulated as specific to language and providing more principled explanation of linguistic phenomena" (Chomsky 2005, p. 1). Chomsky refers to these considerations not specific to language as one of the factors (the third factor) contributing to the growth of language in humans. In our particular study, this perspective allows us to maintain a simple and universal Merge operation and to impute the difficulties observed in its applications to processing demands that apply in other domains of human cognition. In other words, there is no need to include additional mechanisms in the phrase structure building rules to account for our results. Our findings may thus contribute to a better understanding of how universal properties of language interact with third factor considerations in shaping the acquisition path.

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References

Abeillé, Anne, Bonami Olivier, Godar Danièle, and Jesse Tseng. 2003. The syntax of French *à* and *de*: An HPSG analysis. In *Computational Linguistics Dimensions of the Syntax and Semantics Prepositions*. Edited by Patrick Saint-Dizier. Dordrecht: Springer, pp. 147–62.

Aimard, Paule. 1996. *Les débuts du langage chez l'enfant*. Paris: DUNOD, ISBN 2100028901.

Arslan, Burcu, Hohenberger Annette, and Rineke Verbugge. 2017. Syntactic cecursion facilitates and working memory predicts recursive theory of mind. *PLoS ONE* 12: e0169510. [CrossRef] [PubMed]

Bassano, Dominique, Maillochon Isabelle, and Sylvain Mottet. 2008. Noun grammaticalization and determiner use in French children's speech: A gradual development with prosodic and lexical influences. *Journal of Child Language* 35: 403–38. [CrossRef] [PubMed]

Bejar, Susana, Massam Diane, Pérez-Leroux Ana-Teresa, and Yves Roberge. Forthcoming. Rethinking complexity. Unpublished manuscript. Toronto, ON, Canada: University of Toronto.

Belzil, Isabelle. 2004. L'absence de Relatives Obliques Standard Chez les Enfants Francophones: Variation et Théorie Syntaxique. Manuscript. Kingston, ON, Canada: Queen's University. Available online: http://cognitio.uqam.ca/2004/belzil.pdf (accessed on 19 December 2017).

Bouvier, Nadine, and Françoise Platone. 1976. *Étude génétique de la construction d'une détermination linguistique complexe: L'expression d'un même contenu par des enfants d'âges différents. Cahiers du CRESAS* 16A. Paris: Institut Pédagogique National.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge: The MIT Press. ISBN 0262032295.

Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36: 1–22. [CrossRef]

Clark, Eve. 1986. Acquisition of romance, with special reference to French. In *The Crosslinguistic Study of Language Acquisition: The Data*. Edited by Dan Isaac Slobin. Erlbaum: Hillsdale, vol. 1, pp. 687–782. ISBN 0898593670.

Culicover, Peter W. 2013. *Grammar and Complexity: Language at the Intersection of Competence and Performance*. Oxford: Oxford University Press: ISBN 0199654603.

Culicover, Peter W., and Ray Jackendoff. 2006. The simpler syntax hypothesis. *Trends in Cognitive Sciences* 10: 413–18. [CrossRef] [PubMed]

Demuth, Katherine, and Annie Tremblay. 2008. Prosodically-conditioned variability in children's production of French determiners. *Journal of Child Language* 35: 99–127. [CrossRef] [PubMed]

Eisenberg, Sarita, Ukrainetz Teresa, Hsu Jennifer, Kaderavek Joan, Justice Laura, and Ronald Gillam. 2008. Noun phrase elaboration in children's spoken stories. *Language, Speech, and Hearing Services in Schools* 39: 145–57. [CrossRef]

Evans, Nicholas, and Stephen C. Levinson. 2009. The myth of language universals. *Behavioral and Brain Sciences* 32: 429–92. [CrossRef] [PubMed]

Fragman, Cathy. 1998. Les propriétés distinctives de la syntaxe enfantine et le développement des relatives en français. Ph.D. dissertation, Université de Montréal, Montreal, QC, Canada.

Frechette, Roseline, and Marie Labelle. 2007. Influence of prosody on the production of determiners and adjectives in two-year-old children's sentences. In *BUCLD 32*. Edited by Harvey Chan, Heather Jacob and Enkeleida Kapia. Somerville: Cascadilla Press, pp. 132–42. ISBN 978-1-57473-084-5.

Givón, Thomas. 2009. *The Genesis of Syntactic Complexity*. Amsterdam: John Benjamins. [CrossRef]

Godard, Danièle. 1988. *La Syntaxe des relatives en français*. Paris: CNRS, ISBN 222204166X.

Goldin-Meadow, Susan. 1982. The resilience of recursion: A study of a communication system developed without a conventional language model. In *Language Acquisition: The State of the Art*. Edited by Eric Wanner and Lila R. Gleitman. New York: Cambridge University Press, pp. 51–77. ISBN 0521282381.

Jisa, Harriet, and Sophie Kern. 1998. Relative clauses in French children's narrative texts. *Journal of Child Language* 25: 623–52. [CrossRef] [PubMed]

Labelle, Marie. 1990. WH-movement, and the development of relative clauses. *Language Acquisition* 1: 95–119. [CrossRef]

Laenzlinger, Christopher. 2005. French adjective ordering: perspectives on DP-internal movement types. *Lingua* 115: 645–89. [CrossRef]

Limbach, Maxi, and Dani Adone. 2010. Language acquisition of recursive possessives in English. In *BUCLD 34*. Edited by Katie Franich, Kate M. Iserman and Lauren L. Keil. Somerville: Cascadilla Press, pp. 281–90. ISBN 9781574731552.

McWhorter, John H. 2011. *Linguistic Simplicity and Complexity: Why Do Languages Undress?* Berlin: Walter de Gruyter, ISBN 1934078379.

Newmeyer, Frederick J., and Laurel B. Preston. 2014. *Measuring Grammatical Complexity*. Oxford: Oxford University Press, ISBN 0199685304.

Pannemann, Maren. 2007. DP Acquisition as Structure Unravelling. Ph.D. dissertation, University of Amsterdam, Amsterdam, The Netherlands. Available online: https://www.lotpublications.nl/Documents/167_fulltext.pdf (accessed on 16 December 2017).

Pérez-Leroux, Ana Teresa, Castilla-Earls Anny, Bejar Susana, and Diane Massam. 2012. Elmo's sister's ball: The problem of acquiring nominal recursion. *Language Acquisition* 19: 301–11. [CrossRef]

Pérez-Leroux, Ana Teresa, Castilla-Earls Anny, Bejar Susana, Massam Diane, and Tyler Peterson. 2015. Strong continuity and children's development of DP recursion. In *Recursion in Brazilian Languages and beyond*. Edited by Maia Marcus, Andrew Nevins and Luiz Amaral. Cambridge: Cambridge University Press, pp. 182–200.

Pérez-Leroux, Ana Teresa, Pettibone Erin, and Anny Castilla-Earls. 2017. Down two steps: Are bilinguals delayed in the acquisition of recursively embedded PPs? *Matraga* 24: 393–416. [CrossRef]

Pérez-Leroux, Ana Teresa, Peterson Tyler, Castilla-Earls Anny, Bejar Susana, Massam Diane, and Yves Roberge. Forthcoming. Recursion and the acquisition of complex NPs. *Language*.

Prévost, Philippe. 2009. *The Acquisition of French: The Development of Inflectional Morphology and Syntax in L1 Acquisition, Bilingualism, and L2 Acquisition*. Amsterdam and Philadelphia: John Benjamins, ISBN 9027253129.

Roeper, Thomas. 2011. The acquisition of recursion: How formalism articulates the child's path. *Biolinguistics* 5: 57–86.

Roeper, Thomas, and William Snyder. 2004. Recursion as an analytic device in acquisition. In *Proceedings of GALA 2003 (Generative Approaches to Language Acquisition)*. Edited by Jacqueline van Kampen and Sergio Baauw. Utrecht: LOT Publications, pp. 401–8.

Roeper, Thomas, and Margaret Speas. 2014. *Recursion: Complexity in Cognition*. Dordrecht: Springer, ISBN 9783319050850.

Royle, Phaedra, and Isabelle Stine. 2012. The French noun phrase in preschool children with SLI: morphosyntactic and error analyses. *Journal of Child Language* 40: 945–70. [CrossRef] [PubMed]

Royle, Phaedra, and Daniel Valois. 2010. Acquisition of adjectives in Quebec French as revealed by elicitation data. *French Language Studies* 20: 313–38. [CrossRef]

Trotzke, Andreas, and Josef Bayer. 2015. *Syntactic Complexity across Interfaces*. Berlin: Walter de Gruyter, ISBN 978-1-61451-790-0.

Trotzke, Andreas, and Jan-Wouter Zwart. 2014. The complexity of narrow syntax: Minimalism, representational economy, and simplest Merge. In *Measuring Grammatical Complexity*. Edited by Frederick J. Newmeyer and Laurel B. Preston. Oxford: Oxford University Press, pp. 128–47. ISBN 0199685304.

Valois, Daniel, and Phaedre Royle. 2009. Partitivity, atomization, and noun-drop: A longitudinal study of French child language. *Language Acquisition* 16: 82–105. [CrossRef]

Vandeloise, Claude. 1991. *Spatial Prepositions: A Case Study from French*. Chicago: University of Chicago Press, ISBN 0226847276.

Verbrugge, Rineke. 2009. Logic and social cognition: The facts matter, and so do computational models. *Journal of Philosophical Logic* 38: 649–80. [CrossRef]

Vercollier, Alain, Vercollier Claudine, and Kay Bourlier. 2004. *Difficultés expliquées du français . . . for English Speakers*. Tours: CLE International, ISBN 978 209-033701-3.

Watumull, Jeffrey, Hauser Marc D., Roberts Ian G., and Norbert Hornstein. 2014. On recursion. *Frontiers in Psychology* 4: 1–7. [CrossRef] [PubMed]