Language & Communication 99 (2024) 274–288

Contents lists available at ScienceDirect

Language & Communication

journal homepage: www.elsevier.com/locate/langcom

Name it till you mean it: Intersections between formal and semantic neological procedures in naming emerging pandemic objects in Spanish

Miguel Sánchez Ibáñez [a,*], Paula Pérez Sobrino [b]

[a] University of Valladolid, Department of Spanish Language, Faculty of Philosophy and Letters. Plaza del campus Universitario, s/n, 47011, Valladolid, Spain
[b] University of La Rioja, Department of Modern Philologies, c/San José de Calasanz, 33, 26004, Logroño, Spain

ARTICLE INFO

Article history:
Available online 13 November 2024

Keywords:
Neologisms
COVID-19
Compounds
Metonym
Metaphor

ABSTRACT

The goal of this study is to investigate the relationship between formal and semantic neological procedures in the coinage of COVID-19-related emerging realities. Our study is based on a survey conducted to elicit the spontaneous creation of neologisms in Spanish related to the COVID-19 pandemic. Participants were asked to name a set of pandemic-related objects presented to them in a set of pictures. Naming strategies resulted mostly from the intersection of metonyms with compounding and metaphors with syntagmation. Participants preferred metonymy-based strategies to name objects they have fewer clues to identify. On the other hand, objects resulting from the adaptation of pre-existing items were mostly named using metaphors.

1. Introduction

The pandemic the world was through in 2020–2021 caused the appearance of many novel realities for which there was a significant lack of established, functional denominations in most languages. The phenomenon was sudden, unexpected and global (Zizek, 2020; Agamben, 2020), triggering the denominative possibilities of many languages. Speakers in contact with COVID-19, regardless of their mother tongue, were forced to adjust, recombine and reinterpret their linguistic abilities and resources to categorize efficiently all those new realities. This generated a true outburst of neologisms in languages such as Spanish. Neologisms can be defined as linguistic units which have recently emerged, subjected to different and specific circumstances, with morphological, semantic and pragmatic elements closely related to the time they start being used (Sánchez Ibáñez and Maroto, 2021, p. 359).

The goal of this study is to investigate the relationship between formal and semantic neological procedures in the coinage of COVID-19-related emerging realities, thus bridging the gap between the discursive and cognitive dimensions of neological creations motivated by global, turning point events. We are also interested in *age* as a source of variation in the production of neologisms.

Our study is based on a survey conducted to elicit the spontaneous creation of neologisms related to the COVID-19 pandemic. A set of pictures portraying pandemic-related objects was displayed to a sample of participants, and they were

* Corresponding author.
E-mail addresses: miguelsanchez@uva.es (M.S. Ibáñez), paula.perezs@unirioja.es (P.P. Sobrino).

https://doi.org/10.1016/j.langcom.2024.10.010

asked to name them. Some of the objects have been recently conceived and created, whereas others were adaptations of existing gadgets. However, both of them had similar aims: to help people tackle particular aspects of the pandemic (hand sanitization, social distancing, contactless routines …).

We have formulated four specific research questions and working hypotheses to drive our study:

RQ1. What are the most frequent types of formal and semantic neological procedures adopted by participants to name new and adapted objects?

Among the multiple types of available formal procedures to coin new names (see Section 2.2.), we expect Spanish speakers to be more inclined to prefer descriptive units, which will lead them to the condensation of information by means of the juxtaposition of different linguistic units following the principle of linguistic economy (Guerrero Ramos, 1995; Llopart-Saumell and Freixa, 2014). Likewise, we seek to know whether participants rely more on metaphoric or metonymic connections to coin new names for objects they have not seen before. Overall, we expect participants to prefer metonymy-based neologisms for new objects because of the difficulty of finding other objects to establish analogies. In turn, adapted objects will be perceived as more familiar and therefore they will be more likely to be associated with another object through a metaphoric mapping.

RQ2. Is there any pattern or correlation in the way formal and semantic neological procedures overlap when naming emerging realities?

In other words, could the detection of statistically significant relationships between formal and semantic neological procedures help us delve into word creation from a new perspective beyond traditional classifications (Guilbert, 1975; Rey, 1976; Tournier, 1985; Cabré, 1993; Sablayrolles, 2019)? The lack of previous work done in this regard makes it impossible to formulate any tentative hypothesis, and at this stage, this research question remains purely exploratory.

RQ3. To what extent do the findings vary according to the age of the participants?

We explore the role played by age to predict differences in the production of neologisms, of both formal and semantic type. By some trends already detected in the neological habits of Spanish speakers regarding their ages with respect to COVID-related vocabulary (Zvereva, 2022) we envision younger participants to produce more neologisms than more senior counterparts, as well as a change in the neological procedures' frequencies.

RQ4. Could any cognitive insight regarding the process of denomination be drawn from the strategies adopted by speakers to name emerging realities?

We analyze the way neological procedures and the correlations detected among them can imply some sort of cognitive optimization when naming new realities and how that conditions speakers' creativity. Our hypothesis here is that adapted objects are easier to name by the participants since they have clearer references to resort to understand and assimilate them, and therefore, they can take a chance on their creative skills to name them. In contrast, we venture that the process will be the opposite with new objects: a higher cognitive demand to understand them will result in less creative, but descriptive, pragmatic neological solutions. We expect the neological procedures chosen by the participants will give us cues to prove this hypothesis.

To assess this, we set out a naming task where 148 native Spanish speakers (divided into two age groups: 75 participants were between 20 and 39 years old and 73 participants reported to be between 40 and 59 years old) were asked to provide a name (as well as a motivation for such name) for six objects that were somehow related to any aspect of the management of the pandemic. Three of them were easily recognizable objects with a pandemic-related supplementary feature (e.g. ski-shaped shoes to keep social distance from others) and the other three objects had been created ad hoc for the pandemic and were not traceable to any pre-pandemic well-known object (e.g. a device to open doors without touching the handle directly with the hand).

This paper is structured as follows: In Section 2, a theoretical background is presented to define and frame the concepts used to design the study and define its goals, particularly those of neologicity and neological procedures. After that, Section 3 explains the methodology followed that allowed us to come up with the results shown in Section 4 as well as the discussion and conclusions explained in Section 5.

2. Theoretical background

2.1. Neologicity: a subjective feature

A word is perceived as neological when it holds a set of features related to the fact that it may be recent: classical definitions of neologisms (Guilbert, 1975; Rey, 1976; Cabré, 1999) point out consistently some of those features, such as semantic instability, absence from dictionaries and the perception users have about them as new or uncommon in some

way. Regarding this last element, the facts that it may be unknown to a certain speaker, although it may not be a newly formed word; that it does not follow the rules of word formation or it uses a different code; or that, being a little-used word, even if it may not be recent, it is perceived as such (Llopart-Saumell and Cañete, 2023) are the most prominent ones. Schmid (2008, p. 13) mentions the predictability and transparency of a word as the two linguistic features that influence the perception of neologicity because they facilitate the possibility of understanding it without having seen or used it before (Estopà, 2015). However, despite the vast literature explaining in detail the way these factors exert an influence on the perception of neologisms by the speakers, the way they operate when speakers do not assess, but coin them, still remains pretty much unclear.

Moreover, the problem of perception as a neologicity marker lies in the subjectivity that it implies because the neological consideration of a unit depends heavily on the speakers' feelings or intuitions: not every user of a language has the same knowledge about its lexicon, which will cause that some units are conceived as neological by some speakers and not for others, and vice versa (Vega and Llopart, 2017, p. 1419). This subjectivity, so crucial in the construction of the concept of novelty (Freixa, 2010, p. 28-29), finds a significant echo in the procedures employed by speakers to coin new units. The same feelings and intuitions that make a speaker consider a unit more or less neological influence their decisions when naming an emerging reality.

The units coined by the participants of our study can be considered neological since they apply, to some extent, to several factors traditionally taken as neologicity triggers: formal innovation, unprecedented semantic references, low frequency of use and low documentation. Besides, those novel units could be considered neological because the concept associated with each one of them has not yet been agreed upon by the members of the linguistic community (Schmid, 2008). It is risky to consider them full neologisms, though, since they have not been used in real interactions (Sablayrolles, 2019, p. 187), which leaves their discursive and communicative potential untested. Traditionally, neologisms tend to be defined as units that have already gone along a minimal path within the language they belong to (Rey, 1976; Cabré, 1993; Estornell, 2009): that is what allows to make contrasts regarding their presence in dictionaries, the different kinds of variations they have been subjected to, the degree of dissemination among speakers and the time gone by since their first use tracked.

However, we think the units proposed by the participants in our study are neologically relevant because they reflect interesting insights on lexical creativity, understood as the ability to create words that are both novel (i.e. original, unexpected) and appropriate (i.e. adaptive concerning task constraints) (Sternberg and Lubart 1999, p. 47). Concerning the drivers and constraints of creativity, some factors can condition the creation of new words, such as the knowledge of other languages, the age and background of the speakers, the productivity and recurrence of some affixes and roots over others and the motivations behind the naming drive (Bauer, 1983). Likewise, Rainer (1993, 2002) points out some factors behind the level of transgression perceived from a new word that can also be applied to the configuration of the creativity in the moment of its creation, namely the semantic interpretation of its constituents, as well as the restrictions and productivity of its the formal elements. Creativity has a direct impact on the expressive nature of neologisms, which, according to Llopart and Freixa (2017, p. 471), lies on the use of forms that, although possible, draw the attention of the speakers because they are not the expected forms since they transgress the linguistic rules. We consider that the ways in which speakers manage, combine and understand all those triggers and constraints influence their neological strategies, which are at the core of every culture and language vitality (Giraldo Ortiz, 2016) and push forward the ability of a language to name new realities in a constant tension between what is considered as expectable and what crosses that line (Casado Velarde, 2015, p. 15). Also, statistical distribution of linguistic items plays a key role in characterizing their semantic behaviour (Lenci, 2018, p. 152), which conditions the likelihood of a neologism to appear and to endure as a stable word. Distributional semantics holds that neologisms are more likely to come up in sparser areas of semantic space, as well as in 'semantic neighbourhoods of growing populants' (Lenci, *Ibid.*). The outbreak of the COVID-19 pandemic has provided speakers with a sudden setting for both situations to be brought about.

Since lexical creativity is, for us, an important neology trigger, the units coined by the participants in our study could be considered as some kind of *proto-neologisms*, that is to say, lexical solutions in an embrionary phase. Bauer (1983, p. 45) calls them *noncewords*, 'new complex words created by a speaker/writer on the spur of the moment to cover some immediate need', in an approach that connects with the conception of neologisms as a linguistic process, rather than static lexical products (Boulanger, 2010; Renouf, 2013; Freixa, 2022). Boulanger (2010 p. 63) focuses the characterization of neologisms on the fact that they constitute the first stage of the life of a lexical unit. According to this author, neology would be nothing more than the initial stage of the life of words, a useful label to know how to establish the position of lexical units in the chronological axis of their existence.

> 'Le premier stade es celui de la nouveauté (…) Pendant un temps plus ou moins long, le signifiant est senti comme un corps étranger, un greffon; on lui attribue des qualités ou des défauts physiques (beauté, laideur, allure bizarre, critère d'euphonie …).'
>
> Boulanger (2010, p. 63)

	Stage 1: Neology Discourse	Stage 2: Lexicalization Dictionarization	Stage 3: Maturity	Stage 4: Use as a dated unit	Stage 5: Removal from the dictionary
Use	+/-	+ >	>/<	+ <	ø

Fig. 1. Stages of the life of a word (Boulanger 2010, p. 64, adapted). The words proposed by the participants of our study would be at Stage 0, right before the moment of their potential discursive articulation.

2.2. Neological procedures: a key to organize and assess new naming solutions

Neological procedures are among the most relevant and useful ways to categorize neologisms, and, therefore. Sablayrolles (2000) has shown the supremacy of procedures as a criterion for establishing typologies of neologisms: more than two-thirds of almost a hundred typologies that he reviews are based on procedures (67, either singly or combined with another principle). Classifications of neologisms are made according to already operative units at stages 1 or 2 in Boulanger's scale (Fig. 1), that is to say, by observing already coined units with a minimal degree of formal and semantic stability within the language. However, speakers seem to follow particular procedural trends when coining new solutions from scratch: findings from the field of distributional semantics show that speakers tend to have uniformity in their naming habits (Lenci 2018), and nonce-words by similar speakers can also display preferences in the choice of procedures (Bueno and Freixa, 2020, p. 26). That is why we have taken them as the crucial criteria to organize and analyze the data of our study, taking the delimitation between formal and semantic procedures (Bastuji, 1974; Pottier Navarro, 1979) as the main categorizing criterium, and, in the case of formal procedures, basing our categorization on Cabré and Estopà (2015).

Neological feeling is directly related to the process of word formation (Bernal, 2015; Sablayrolles, 2000). In consequence, neological procedures have a major impact on the fluctuations of the perceived neologicity: neologisms created by derivation, compounding, and syntagmation go more unnoticed, whereas loanwords and neologisms formed by blending are easily detectable by participants (Sablayrolles, 2000; Díaz Hormigo, 2007). These authors generally allude to psychological parameters to explain these fluctuations, whereas Llopart-Saumell and Freixa (2014) consider the access of speakers to evidence of the procedures in different sources as decisive. Another determining element described in the literature is the productivity of formal constituents, which is not particularly relevant for us, given the embryonic status of the units of our study, already mentioned.

If, as we have already suggested, the same feelings and intuitions that make a speaker consider a unit more or less neological influence their decisions when naming an emerging reality, it seems sensible to venture that the way they perceive a neological procedure correlates to some extent to how they assimilate it within their naming habits.

2.3. Neological procedures from a cognitive perspective

In the case of the study of Spanish neology, the theories accounting for the lexical processing from a cognitive point of view have focused on the way speakers retrieve information from their mental lexicons to process new words (Varo, 2013; Varo et al., 2009) where a content structure, based on the activation of semantic-conceptual features, and a form structure, based on the combination of phonemes that may or may not interact, interact (Varo, 2019). Cognitive approaches accept the possibility of reconstruction of the lexical system from the cerebral perspective, which assumes that linguistic knowledge is organized in complex interconnected neural constellations. Considering this perspective, words would be, in essence, the projection of a double formal and semantics construct (Varo, *Ibid.*) That is why all the units proposed by the participants of our study have been classified from both approaches, as explained in Section 3.

Regarding form, that is to say, considering procedures such as compounding, affixation or abbreviation, among others, there are three potential explanations of the way people retrieve such information: (1) a *partial* one, which says that we store words as such; (2) an *exhaustive* one, which considers that the mental lexicon is organized into affixes and roots we combine each time we need to utter a new word, and (3) a *mixed* one, which states that we storage different kinds of elements segmented according to their productivity, their proximity or their recurrence. This is reinforced by the fact that the access to

these elements does not have to coincide with structures previously stored. In fact, this is one of the most relevant incentives for lexical creativity in Spanish, with examples originating during the pandemic such as *zoompleaños*[1] or *cuarenpena*.[2]

Any creation of a new word begins with the selection of the meaning it is intended to convey (Varo, 2020, p. 15) If we pay attention to the resulting *semantic* structure (Varo, 2013), we must take into account the way sensory and contextual data are translated into lexical information, as well as the strategies followed to combine and integrate all the semantic inputs in order to create a new meaning. Within this study, we will focus on two main semantic categories to classify the units proposed by the participants:

- Metaphor: semantic neological procedure consisting of naming an unfamiliar element through a reference to another, more familiar concept. Metaphorical creations are a reflection of the vital interests and practices of those who produce, welcome and disseminate them (Casado Velarde 2015, p. 91), something particularly relevant in our study, focused on lexical creation around a global event such as the COVID-19 pandemic.
- Metonymy: semantic neological procedure consisting of referring to an unfamiliar element through one of its constituent parts. Whereas the analogy established in metaphorical creations usually needs additional information to be fully understood, in the case of metonymies, the relation is external, explicit and occurs in reality.

To sum up, our study is framed within cognitive premises that, on the one hand, take the units proposed by the participants as embryonic neologisms at the first stages of their life cycle, and, on the other hand, consider formal and semantic procedures as pertinent categories to classify them to unravel significant patterns in their naming processes.

3. Methodology

The stimuli, survey, dataset, and statistical script are available in a public repository to ensure the transparency, reproducibility and replicability of our study: https://osf.io/rnfgd/.

3.1. Participants

148 Spanish speakers were recruited via Prolific (www.prolific.co). By age, 75 participants were between 20 and 39 years old (who, for the sake of practicality, were labelled in this study as the 'junior' group) and 73 participants were reported to be between 40 and 59 years old (the 'senior' group). Besides recording their ages, we also asked them about their proficiency in other languages and health-related professional or personal environments. Participants could withdraw at any time throughout the study and were compensated for their participation in the study respecting the minimum wage, in line with the standards set up by the platform.

3.2. Materials and design

For this study, we selected six pictures of new, unusual, pandemic-related objects that we found online with simple searches such as '*objetos raros de la pandemia*' ('weird pandemic objects') or '*inventos pandémicos*' ('pandemic inventions'). Three of them were clear adaptations of easily recognizable existing items, but that had an added feature: (1) a stationary bicycle with a supplementary table to work on the laptop; (2) a diving-suit like individual protector over a table to protect those eating inside; and (3) a pair of ski-shaped shoes to keep a 2-m distance with others). The other three objects did not have such an obvious connection with previous objects as they had been created ad hoc for the pandemic: (4) a device to hold face masks, (5) a device to open doors without touching the handle, and (6) a bracelet to carry hand sanitizer.

All participants were shown the six pictures in a randomized way to avoid any learning effects. There were no time constraints pre-established for this study: participants could look at the pictures as long as they wished. Below each picture, they were asked the same two tasks: to provide a name for the object and an explanation motivating the reasons for such choice. The reason why we asked for such an explanation was to assist us in the coding of the type of neologism at work, especially whether they had a metaphoric or metonymic basis (as this is sometimes a highly subjective task for the analyst).

3.3. Coding

The neologisms suggested by the participants were annotated according to the most salient formal and semantic procedures adopted to coin them. *Formal procedures* coded included (1) affixation (mostly suffixation), (2) compounding (with and without classical roots), (3) abbreviation (including shortening, acronyms and blending), and (4) other procedures such as syntagmatic and syntactic neology and loan-wording.

[1] *Zoompleaños* is a neologism made up of the word *zoom*, name of one of the most common videochat platforms used in Spain during the pandemic and *cumpleaños* (birthday), and it referred to the virtual birthday parties held during the shutdown (March–June 2020).

[2] *Cuarenpena* is a neologism made up of *cuarentena* (quarantine) and *pena* (sorrow), used during the pandemia to describe the sad and grieving feelings the shutdown originated in the Spanish population.

For the coding of semantic neologisms, as mentioned above we relied on the explanations provided by participants to code whether the motivation given for the name had a metaphoric or metonymic basis.

3.4. Statistical analyses

For all statistical analyses, we used the R statistical programming environment version 4.0.2. (2020-06-22). For all our four research questions we provide both descriptive (frequency counts) and inferential statistical tests (chi-square tests of independence, as our variables of interest are categorical in all cases). For the latter, if we found any significant relationship, we complemented the result with an analysis of Pearson standardized residuals to have more specific information about the combinations that are statistically over and under-represented.

4. Results

RQ1. What are the most frequent types of formal and semantic neological procedures adopted by participants to name new and adapted objects?

Headline finding: Participants are significantly more likely to attach additional words to existing ones to name adapted objects (syntagmatic neologism); and coin new, hybrid names for new objects (compounding). Also, Participants prefer metonymy-based names for new objects and metaphor-based names for adapted objects

In our first research question, we investigated whether there was a visible relationship between the type of object to be named and the type of formal and semantic neological procedures at work. Fig. 2 shows the distribution of such formal procedures according to the novelty of the object to be named:

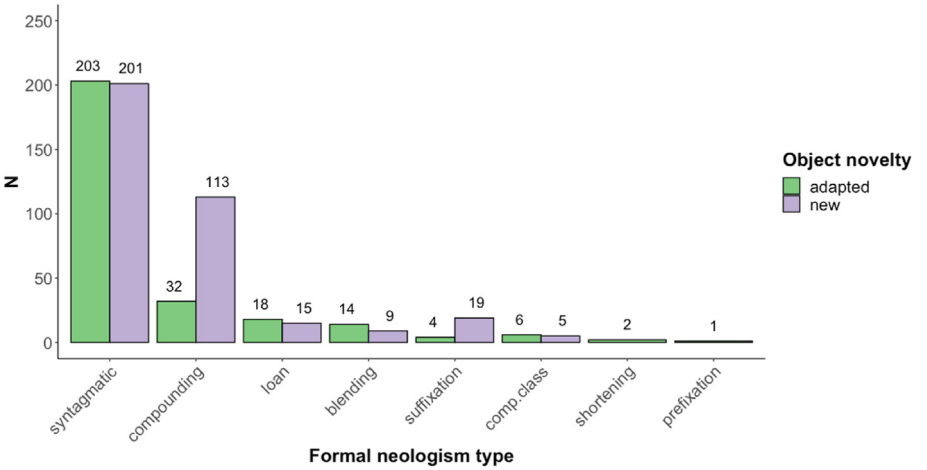

Fig. 2. Types of neologisms according to the novelty of the product.

As can be seen, syntagmatic neologism (i.e. new names arising from the combination of several words) is the preferred option chosen by participants to name both adapted (N = 203) and new objects (N = 201). Examples of this can be seen in '*zapato de pato*' ('duck shoe') for one of the adapted objects that showed an extra-long shoe meant to keep the recommended 2-m distance with others, and the rather descriptive '*pulsera dispensadora de gel hidroalcohólico*' ('hydro alcoholic gel dispenser bracelet') for the new object that resembled a crystal bell for people to isolate within.

A plausible explanation for the great availability of syntagmatic neological procedures is that they rely on adding extra words related to the novel feature to the existing, well-known object, rather than creating a new composite made up of two words. This strategy seems to be easier, as it allows to keep intact the structure of both words to be combined; and it also matches the structure of Spanish as a language, less prone than other languages (such as Germanic or Anglosaxon languages) to compounding. Whereas this would initially seem the most straightforward option to name adapted objects, it is interestingly paralleled with the number of neologisms gathered for new objects. *Compounding* (i.e. merging two words into a new composite name) emerges as the second most productive neological procedure for both types of objects, although it is much more representative in the case of new objects (N = 113) than adapted ones (N = 32), as it is the case of '*abrepuertas*' ('door opener') for a new device to avoid touching directly door handles when opening doors.

A chi-square test for independence yielded a significant relationship between the novelty of the object named and the type of formal neologism more likely to be used (X^2 (1) = 44.75, $p < 0.001$). In other words, this finding confirms that there are strong associations between specific types of formal neologisms that are more likely to be associated with either new or adapted objects. In order to find out more about these specific associations, we conducted an additional analysis of Pearson standardized residuals, which can be visualized in Fig. 3. This mosaic plot shows the relationship between the type of object in the horizontal axis (divided into new and adapted) and the type of formal neologism in the vertical axis. The size of each square (or mosaic tiles) is proportional to the number of units in the dataset for each pair of categories (also shown within each tile); and the colour represents Pearson standardised residuals (in blue, those categories that are significantly over-represented in the dataset beyond what could be expected, and therefore constitute a relevant trend; and in red those cells that significantly under-represented below what could be expected, and therefore show a very unlikely relationship).

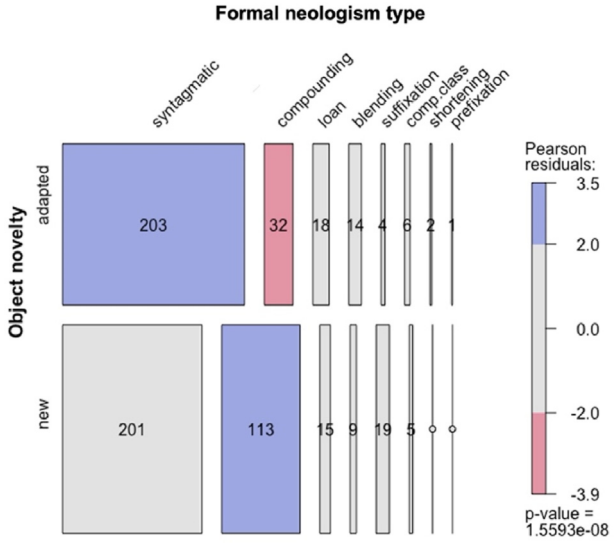

Fig. 3. Pearson residuals showing the significant relationships between the novelty of the objects and formal neological procedures.

In line with the analysis provided above, Pearson residuals confirm that (1) participants preferred compounding to name new objects, a neological procedure very unlikely to be chosen for adapted objects); and (2) syntagmatic neologisms for adapted objects, but not for new objects, at least in a statistically significant way. Note that this finding contradicts our initial hypothesis that participants would prefer shorter neologisms since they seem to favor long names for both new and adapted objects (merged in one word or in combination with several words). Additionally, this finding nicely reflects the (unconscious) perception that the more novel objects would consequently require more creative naming strategies (at least if compared with syntagmatic neologisms). The remaining types of formal neological procedures we relied on to a rather tangential extent and were merely anecdotal.

Moving on to the semantic procedures we also wanted to measure in order to answer RQ1, we sought to know the conceptual motivation behind the generation of new names: would participants draw associations between an existing, easily recognizable object and another idea (metaphor), or would they just refer to a salient property of the shown object (metonymy)? And to what extent do these two strategies relate to new or adapted objects, if there is such a relationship?

Fig. 4 shows opposite naming trends depending on the novelty of the object in question: metonymy-based neologisms are much more frequently found in the names provided for new objects (N = 262) than metaphoric ones (N = 100). An example of this is '*protegeorejas*' ('ear-protector') to name the device that helps to hold face masks by alluding to its most salient property, i.e. that it prevents hurting the back of the ear. In turn, we observe a reverse pattern when we look at the semantic strategies to name adapted objects: participants favoured metaphor-based names (N = 157), thus evoking in their neologisms another object that was perceived similar (although the difference with metonymy-based neologisms was much narrower, N = 123). For instance, the bell-shaped screen over a table to protect those eating inside was labelled as '*lámpara*' ('lamp') by several participants, because of the physical resemblance between the two objects.

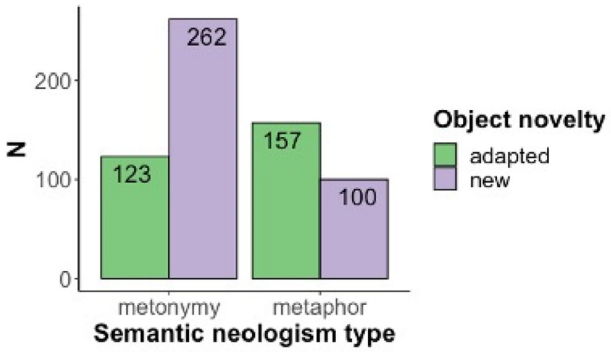

Fig. 4. Metaphor and metonymy-based neologisms according to the novelty of the product.

A chi-square test of independence showed that there was a significant association between the type of semantic neologism and the novelty of an object (X^2 (1) = 53.221, $p < 0.001$). Interestingly, a closer look at the Pearson residuals (Fig. 5) confirmed the statistical significance of the observed pattern for metaphor and metonymy-based neologisms. Note that the different shades of blue reflect a much stronger association between metaphor-based neologisms and adapted objects than for metonymy-based names and new objects, although they were both equally statistically significant.

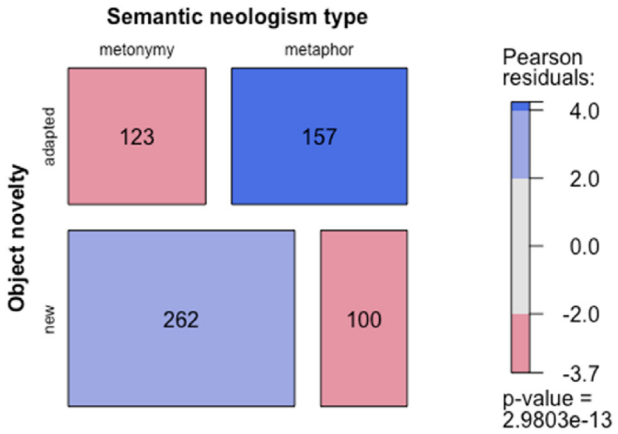

Fig. 5. Pearson residuals showing the significant relationships between the novelty of the objects and semantic neological procedures.

Curiously, this finding also contradicts our initial expectations that people would prefer metaphor-based names for new objects. Metaphor is traditionally perceived as a much more creative thought pattern than metonymy, which sometimes is hard to spot as it has been said to border the literal (Littlemore and Tagg, 2018). However, our data seems to indicate that it is only when people have identified the well-known 'host' object they draw connections with another reality to refer to the adaptations; and when they encounter an ad hoc, completely new object, they feel more confident by simply referring to one of its salient properties (for example, its function).

RQ2. Is there any pattern or correlation in the way formal and semantic neological procedures overlap when naming emerging realities?

Headline finding: Compounding is more likely to have a metonymic basic whereas syntagmatic neologism is more likely to rely on metaphoric mappings.

Once investigated the production of neological strategies chosen by participants in naming objects of varying degrees of novelty, we aimed in our third question to explore whether there were any stable and predictable links between formal and semantic neologisms. Bridging the gap between the formal structure of neologisms and its conceptual motivation has been scarcely investigated in the literature, as it has been mostly tackled independently from each other, thus providing a partial view of the process of neological generation. Fig. 6 shows the distribution of formal neologisms according to their metaphoric or metonymic motivation.

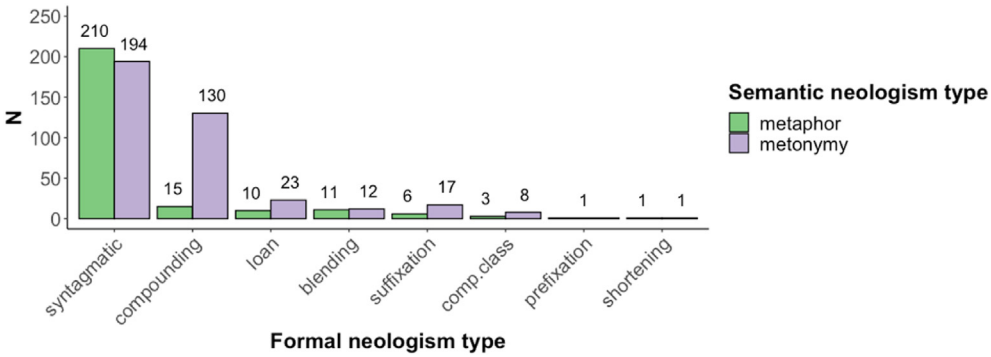

Fig. 6. Formal neologism procedures according to their metaphoric or metonymic motivation.

Following up on the findings for RQ1, we will exclusively focus on the two most frequent types of formal neologism, namely syntagmatic and compounding, given that the rest of the strategies are rather residual. Whereas syntagmatic neologisms seem to have a metaphoric basis (N = 210) rather than metonymic (N = 194), such difference is more striking for the case of compounding, which by and large appear to be based on part-whole metonymic mappings (N = 130) and only very tangentially on metaphoric mappings (N = 130).

Such a reverse pattern was confirmed by a chi-square test of independence, which yielded a significant relationship between the formal and semantic makeup of the neologisms collected in the naming task (X^2 (1) = 83.331, $p < 0.001$). In particular, the analysis of Pearson residuals (see Fig. 7) confirmed the reverse pattern shown in the bar chart in Fig. 5: the strongest relationship was found for neologisms based on compounding with a metonymic basis, as in '*biciblog*' ('blogbike'; here 'blog' refers to the table were to work on a laptop to post a blog) followed by syntagmatic neologisms based on metaphor, as in '*campana anticontagio*' ('anti-contagion bell', were bell helps to refer to a protecting screen that has a similar shape). Interestingly, the alternative patterns were very unlikely to appear in our dataset: as indicated by the cells in red, metonymy-based syntagmatic neologisms and metaphor-based compounds were very rarely produced by the participants in our study. Examples such as '*bicicleta de apuntes*' ('note-taking bike', i.e. a syntagmatic neologism that highlights a salient function of the main object), and '*skizapatos*' ('skishoes', a compound that draws on the analogy between shows and skis) were rather the exception than the norm (at least from a statistical point of view).

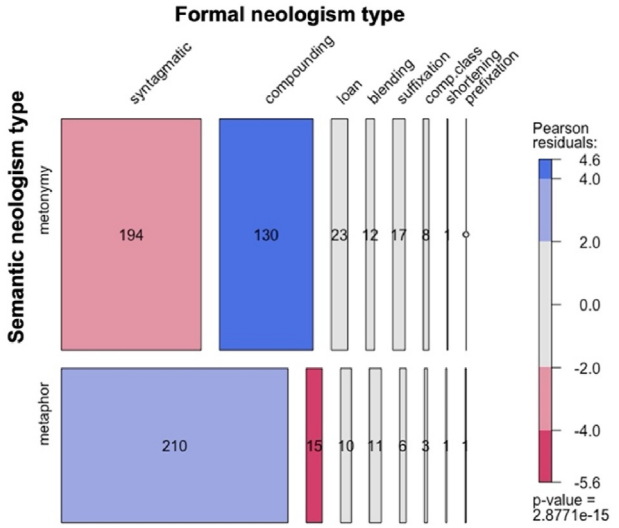

Fig. 7. Pearson residuals showing the significant relationships between formal and semantic neological procedures.

RQ3. To what extent do the findings vary according to the age of the participants?

Headline finding: Both junior and senior participants produce a similar number of types of formal and semantic neologisms; age cannot be established as a source of variation in the coinage of new names

In this case, we draw our attention to the role played by age as a potential source of variation in the generation of neologisms. Traditionally, it has been argued that age is indirectly related to the production of new names, that is, the younger the people are, the more neologisms they come up with. However, there are no indications that make us expect a very different use of formal and semantic strategies across age groups, and therefore we expect them to replicate to some extent the findings for RQ3.

Surprisingly, we found that both the junior and the senior groups had come up with the same number of neologisms in the naming task: 321 neologisms in total, which amounts to an average of 4,3 neologisms per junior participant and 4,4 neologisms per senior participant. The narrow difference between both groups prevents us from establishing that age plays a role in determining productivity in terms of coining new names.

If we take a look at the breakdown by type of formal neologisms shown in Fig. 8, we do not observe many differences between the strategies chosen by each age group. Indeed, they both replicate the main findings reported for RQ1, where we concluded that syntagmatic neologisms were by far the most frequent formal strategy in the coinage of new names, followed by compounding (although it does not even make it to half of the number of syntagmatic neologisms produced in either group). The rest of the formal neologisms are not frequent and scarcely produced by either junior or senior participants.

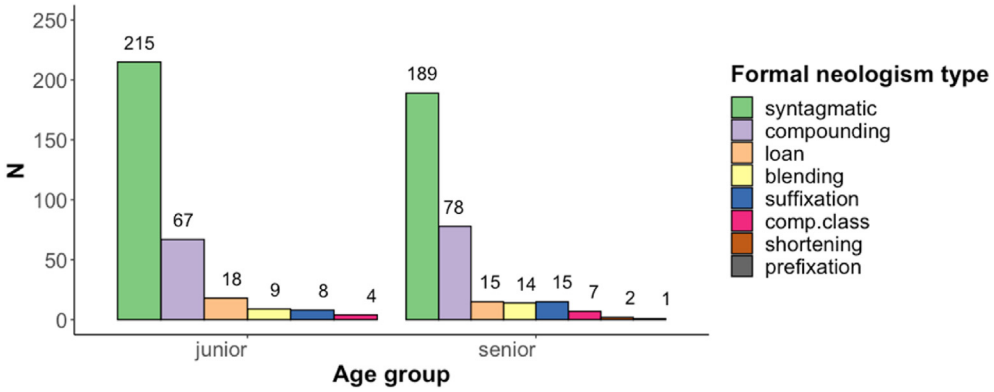

Fig. 8. Breakdown of formal neologisms produced by age group.

We observe a similar picture in Fig. 9, which shows a breakdown by age in the production of semantic neologisms. Both junior and senior participants generated more neologisms based on metonymy than on metaphor, and largely to the same extent in both age groups (193 and 192 metonymies respectively, v. 128 and 129 metaphors). Once again, this finding reflects the findings obtained for RQ2, which showed a higher incidence of metonymy-based neologisms in our dataset.

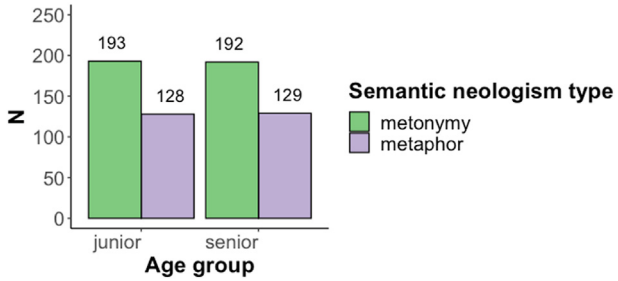

Fig. 9. Breakdown of semantic neologisms produced by age group.

Naturally, no significant differences were found between the junior and the senior age groups in their choice of formal neological strategies ($X^2(1) = 9.82$, $p = 0.17$), neither in the semantic ones ($X^2(1) = 0.006$, $p = 1$). Overall, all the participants in our study were more likely to syntagmatic neologisms over compounds (and very exceptionally, rely on any of the other

formal strategies), and they were equally likely to motivate their neologisms on part-whole metonymic mappings rather than on cross-domain metaphoric connections.

Last, but not least, we also wanted to explore whether there were any differences attributable to age for our findings in RQ3, i.e. the associations between both formal and semantic neologisms. Just by way of reminder, we found that syntagmatic neologisms were more likely to be motivated by metaphor, whereas compounding was more likely to be based on metonymy. Fig. 10 shows the analysis of Pearson residuals that triangulates the statistically significant associations between both formal and semantic types of neological procedures and age groups:

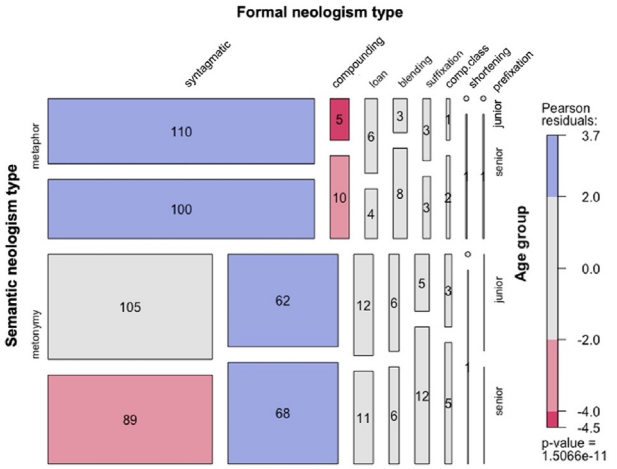

Fig. 10. Pearson residuals show the significant relationships between the production of formal and semantic neologisms by age group.

It should be noted that this plot is very similar to our findings for RQ3 in Fig. 6. Including age in the equation further confirms such results and also provides us with a more nuanced picture of the way in which participants coined new names. Matching blue cells in both age groups informs us that both junior and senior participants converged in their preferred choices: they were both equally likely to rely on metaphor for their syntagmatic neologisms and on metonymy to motivate their compounds. However, a closer look at the red cells tells us that they differed slightly in their least preferred choices: junior participants were very unlikely to draw on metaphors in their compounds (to a larger extent than senior participants, who also drew on metaphor very exceptionally), and senior participants were also unlikely to draw on metonymy in their syntagmatic neologisms. That was not the case for junior participants, who made use of a larger number of metonymies (although not to a significant extent).

RQ4. Could any cognitive insight regarding the process of denomination be drawn from the strategies adopted by speakers to name emerging realities?

Headline finding: metonyms tend to be used to close wider cognitive gaps, whereas metaphors are preferred to frame and contextualize familiar concepts.

As we have seen in Fig. 4, new objects tend to be named following metonymic strategies. Metonymy's cognitive leaps are always based on premises of explicit contiguity (physical, space or time-related, linked by means of cause and effect …). That may imply that participants attempt to save cognitive costs when they are not familiar with the realities, in order to compensate for the cognitive effort that assimilating a new reality entails. Table 1 shows some of the metonymic solutions suggested by participants to name new objects:

Table 1
Examples of metonymies suggested by participants to name new objects (types of metonymies as formulated in Radden and Kövecses, 1999).

Object	Neologism	Type of metonymy
Bracelet to carry hand sanitizer	*dispensador de gel de muñeca* ('wrist gel dispenser')	ACTION FOR INSTRUMENT
	gelfacil ('easygel')	SALIENT PROPERTY FOR OBJECT
	gelmóvil ('mobile-gel')	CONTENT FOR CONTAINER
Device to open doors without touching the handle	*abrepuertas* ('door opener')	ACTION FOR INSTRUMENT
	evitapomo ('knob avoider')	RESULT FOR ACTION
	manos fuera ('hands off')	MANNER OF ACTION FOR OBJECT
Device to hold face masks	*sujetamascarillas* ('mask holder')	ACTION FOR INSTRUMENT
	protegeorejas ('ear protector')	RESULT FOR ACTION
	orejaslibres ('ear-less')	STATE FOR OBJECT (CAUSING IT)

On the other side, metaphors are also based on analogies by participants, but not necessarily explicit. Moreover, implicit references with a nuance of perceptive subjectivity are usually at the core of metaphorizing. That, together with the fact that participants coin those solutions relying on the shared knowledge with their potential interlocutors to ensure new denominations' operational success, make metaphors a much riskier naming strategy. The fact that they have been the preferred method to name adapted objects makes us think that participants feel they can afford more intuitive, imaginative strategies when naming objects they feel more familiar with. Also, that preference derives more easily on ludic, idiosyncratic solutions much more culture-bound. Table 2 shows some of the metaphorical solutions suggested by participants to name adapted objects.

Table 2
Sample of metaphors suggested by participants to name adapted objects.

Object	Neologism	Implicit analogy
Ski-shaped shoes to keep a 2-m distance from others	*zapayaso* (*zapato*, 'shoe' and *payaso*, 'clown')	The shape of the object is similar to that of the shoes used by prototypical clowns
	zapatorrincos (*zapato*, 'shoe' and *ornitorrinco*, 'platypus')	The shape of object is similar to that of a platypus' beak
	zapatos de pinocho ('Pinocchio's shoes')	The shape and size of the object reminds the Pinocchio's nose when he would lie.
Diving-suit like individual protector over a table to protect those eating inside	*mampara social* ('social shower screen')	The function of the object is similar to that of a shower screen: to divide a space and isolate one of the sides from the other. It is also a thin, translucid membrane.
	campana anticontagio ('anti-contagion church bell')	The shape of the object is similar to that of a church bell
	lámpara aislante ('insulating lamp')	The shape of the object is similar to that of a desk lampshade
	cubículo sanitario ('sanitary cubicle')	The room delimited by the object is cramped, it can contain barely a person with very limited chances of movement and action, just as it happens within a cubicle.
Stationary bicycle with a supplementary table to work on the laptop;	*portafolios a pedales* ('briefcase on pedals')	
	Cicloescritorio ('cycledesk')	

5. Discussion and conclusions

The study has been undertaken under in-vitro conditions that may have conditioned and decontextualized some of the results gathered, despite the general context all the participants were immersed in (the post-pandemic global situation). Likewise, some elements may have biased the research, such as the terms of the queries made to collect the prompting images, as well as the pictures offered by the search engine. Also, the classificatory criterium followed to categorize the protoneologisms suggested by the participants could have conditioned the results and trends detected, even if, as literature on the matter states, it is the most operative criterium (Sablayrolles, 2000).

Nevertheless, and despite all those factors potentially constraining the generalizability of the study, the results collected have allowed us to gather a relevant sample of neological solutions to name COVID-related realities, coined by a significant, diverse number of speakers. Those new denominations have helped us prove that, as we foresaw, participants prefer metonymy-based strategies to name objects they have fewer clues to identify and, therefore, establish analogies with. On the other hand, objects resulting from the adaptation of pre-existing items are mostly named using metaphors, since participants seem to have clearer references to resort to understand and assimilate them, and therefore, they can take a chance on their creative skills and implicit resemblances to name them.

Regarding the strongest trends in naming strategies adopted by participants (which, as shown in Fig. 7, result mostly from the intersection of metonyms with compounding and metaphors with syntagmation), some remarks can be made. If we pay attention to the syntagmatic units suggested by participants, a significant proportion is on the verge of the phraseological level, given their prepositional structure (Vega, 2022, p. 145). The main characteristics of syntagmatic neologisms are their semantic and referential unicity, as well as their syntactical unitary behaviour (Vega, 2022, p. 136). Even if the first feature appears in the solutions suggested by the participants, the second one is impossible to verify in such a preliminary stage of the naming process. This, coupled with the limited idiomatic nature of extensive solutions, (Aguilar Ruiz, 2012, p. 49) which can be easily noticed in the ones compiled in our study (see a sample in Table 3), leads us to consider the syntagmatic solutions suggested by the participants in our study as proto-neologisms that could hardly progress beyond their embryonic stage and become established in the language as functional lexical units. Instead, we are mostly dealing with metaphors (and to a lesser extent, metonymies) that transcend the lexical domain and enter the realm of the textual one: they could be taken as explanatory micro-texts interlacing concepts that, first and foremost, the participants fully understand, and secondly, assume that the potential receivers of their denominative solution also do. It is not unreasonable to consider that solutions such as those presented in Table 3 are on the threshold of the neological process itself and hover over concepts for which, as speakers, the participants do not feel the urge to find an operational name.

Rather, they consider it more pertinent to create a whole frame (eminently metaphorical) where they mostly contextualize novel concepts that are partially familiar to them.

Table 3
Sample of metaphorical syntagms suggested by participants.

Object	Neologism
Bracelet to carry hand sanitizer	*Dispensador de gel hidro-alcohólico de muñeca* ('wrist hand sanitizer dispenser')
	Gel hidro-alcohólico para llevar en la muñeca ('hand sanitizer to be carried around the wrist')
Device to open doors without touching the handle	*Cosito para abrir la puerta o bajar el picaporte* ('little device used to push doors or to turn handles')
	Abridor de puertas sin contacto ('contactless door opener')
Device to hold face masks	*Protector de orejas para las mascarillas* ('ear protector for masks')
	Gorro con enganche para mascarillas ('cap with hangers for masks')

The second significant correlation between formal and semantic neological procedures is the one resulting from the overlapping of metonymies and compounding. This pattern, followed by units that combine two different lexemes and hold one new, single meaning and syntactical behaviour, can be due to the high productivity of some compounding structures in Spanish, such as verb+noun, noun+noun and noun+adjective (Varela Ortega, 2005, p. 79; Vega Moreno, 2022, p. 126). The first case is especially likely to have a metonymic basis since the resulting units tend to refer to the function of the entity they name. In other words: they favor the expression of contiguous features that occur in reality. Moreover, and as we saw in 2.1., neologisms created compounding go more unnoticed, (Bernal, 2015; Sablayrolles, 2000), so they would be more easily integrated by speakers in their vocabulary. Table 4 shows some examples:

Table 4
Sample of metonymic compounds suggested by participants.

Object	Neologism suggested by participants	Compounding structure
Bracelet to carry hand sanitizer	*pulsagel*	Verb+noun
	gelmovil	Noun+adjective
	mangagel	Noun+noun
Device to open doors without touching the handle	*enganchapomos*	Verb+noun
	abrepuertas	Verb+noun
	ayudamano	Noun+noun
Device to hold face masks	*sujetamascarillas*	Verb+noun
	protegeorejas	Verb+noun
	salvaorejas	Verb+noun

Unexpectedly, these findings partially refute our initial hypothesis that the participants would attempt to mitigate the unfamiliarity with objects that are less familiar to them through strategies that prioritize description over communicative efficiency and idiomaticity; they do not choose syntagmation as a descriptive procedure to close the cognitive gap new objects may imply but to recreate a figurative context for partially familiar concepts. Conversely, they synthesize unfamiliar notions in compounds that prime concision in the expression of contiguous features over extended explanations and descriptions.

Another unexpected finding resulting from our study concerns the age of the participants as a neological variable. Our hypothesis was that age might mark a shift in the naming strategies adopted by the participants in the study. However, as can be seen in Figs. 8 and 9, it does not seem to be a determining factor. Traditionally, older speakers have been considered to be more conservative in judging (and, therefore, assimilating) new vocabulary (Sánchez Ibáñez and Maroto, 2021), although that may not hold when it comes to coining it, according to the data collected in this study.

Neology is a way of linguistic representation and interpretation of reality, as a result of which not only the worlds reflected in a specific way but also a special reality is constructed: a way of seeing the world inherent in a particular society is created, a way of ordering the reality and also, a way of overcoming cognitive challenges by means not only of language optimization but also figurative recreation.

Funding

Funding for this study has been granted by the Spanish Ministry of Science, Innovation and Universities/FEDER (PID2020-118349GB-I00, PID2021-123302NB-I00).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Miguel Sánchez Ibáñez: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Paula Pérez Sobrino:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Acknowledgements

This research has been conducted in the frame of a research project (REF.: PID2021-125906NB-I00/MICIN/AEI/10.13039/501100011033/FEDER, UE) granted by the Spanish Ministry of Science and Innovation, the Spanish National Agency of Research and the European Funds for the Regional Development.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.langcom.2024.10.010.

References

Agamben, G., 2020. La In:vención de una pandemia. In: Agamben, G., Zizek, S., Nancy, J.L., Berardi, F., López Petit, S., Butler, J., Badiou, A., Harvey, D., Han, B.C., Zibechi, R., Galindo, M., Gabriel, M., Yáñez González, G., Manrique, P., Preciado, P.B. (Eds.), Sopa de Wuhan. Pensamiento contemporáneo en tiempos de pandemias. ASPO, Buenos Aires, pp. 17–19.
Aguilar Ruiz, M.J., 2012. 'Neologismos fraseológicos' como palabras diacríticas en las locuciones en español. Paremia 21, 47–57.
Bastuji, J., 1974. Aspects de la néologie sémantique. Langages 36, 6–19.
Bauer, L., 1983. English Word-Formation. Cambridge University Press, Cambridge.
Bernal, E., 2015. Ser o no ser: els neologismes i la percepció dels parlants, entre la normalitat i la raresa. In: Dinner, K., Wieland, K. (Eds.), Norma, ús i actituds lingüístiques. El paper del català en la vida quotidiana. Leipziger Universitätsverlag, Leipzig, pp. 61–73.
Boulanger, J.C., 2010. Sur l'existence des concepts de 'néologie' et de 'néologisme' Propos sur un paradoxe lexical et historique. In: Actes del I congrès Internacional de neologia de les llengües romàniques. Institut Universitari de Lingüística Aplicada, Universitat Pompeu Fabra, Barcelona, pp. 31–74.
Bueno, P., Freixa Aymerich, J., 2020. Son neologismos los ocasionalismos? In: Guerrero Ramos, G., Pérez Lagos, M.F. (Eds.), Terminología, neología y traducción. Comares, Granada.
Cabré, M.T., 1993. La Terminología. Teoría, metodología, aplicaciones. Barcelona: Antartica/Ampurias.
Casado Velarde, M., 2015. La Innovación léxica en el español actual. Síntesis, Madrid.
Díaz Hormigo, M.T., 2007. Aproximación lingüística a la neología léxica. In: Martín Camacho, J.C., Rodríguez Ponce, M.S. (Eds.), Morfología: Investigación, docencia, aplicaciones: Actas del II Encuentro de Morfología: Investigación y docencia. Universidad de Extremadura, Mérida, pp. 33–54.
Estornell Pons, M., 2009. Neologismos en la prensa. Criterios para reconocer y caracterizar las unidades neológicas. Universitat de València, València.
Freixa Aymerich, J., 2010. La neologicidad en las unidades formadas por prefijación. Puente (Revista de Traducción, Interpretación y Terminología) 12, 28–29.
Freixa, J., 2022. El proceso neológico. In: Bernal, E., Freixa, J., Torner, S. (Eds.), La neología del español. Del uso al diccionario. Iberoamerican Vervuert, Madrid, pp. 51–71.
Giraldo Ortiz, J., 2016. La neología: Indicador de la vitalidad de una lengua y su cultura. Rev. Interam. Bibl. 39 (1), 39–46.
Guerrero Ramos, G., 1995. Neologismos en el español actual. Arco, Madrid.
Guilbert, L., 1975. La Créativité Lexicale. Larousse, Paris.
Lenci, A., 2018. Distributional models of word meaning. Annual Review of Linguistics 4, 151–171.
Littlemore, J., Tagg, C., 2018. Metonymy and text messaging: a framework for understanding creative uses of metonymy. Appl. Ling. 39 (4), 481–507.
Llopart-Saumell, E., Freixa, J., 2014. La función de los neologismos: revisión de la dicotomía neología denominativa y neología estilística. Neologica 8, 135–156.
Pottier-Navarro, H., 1979. La néologie en espanol contemporain. Langues Néo-Latines Boulogne 73 (2–3), 148–172.
Radden, G., Kövecses, Z., 1999. Towards a theory of metonymy. Language and Thought 4, 17–59.
Rainer, F., 1993. Setenta años. 1921-1990 de Investigación en la formación de palabras del español moderno: bibliografía crítica selectiva. In: La formación de palabras. Taurus, Madrid.
Rainer, F., 2002. Convergencia y divergencia en la formación de palabras de las lenguas románicas. In: García-Medall, J. (Ed.), Aspectos de morfología derivativa del español. Tris Tram, Lugo, pp. 103–133.
Renouf, A., 2013. A finer definition of neology in: English. The life-cycle of a word. In: Hasselgard, H., Jarle Ebelling, J., Ebelling, S.O. (Eds.), Corpus Perspectives on Patterns of Lexis. John Benjamins, Amsterdam, pp. 177–208.
Rey, A., 1976. Néologisme: un pseudo-concept? Cahiers de Lexicologie. Revue Internationale de Lexicologie et Lexicographie 28, 3–17.
Sablayrolles, J.F., 2000. La Néologie en Français Contemporain. Examen du Concept et Analyse de Productions Néologiques Récentes. Honoré Champion, Paris.
Sablayrolles, J.F., 2019. Comprendre la néologie. Conceptions, analyses, emplois. Lambert Lucas, Limoges.
Sánchez Ibáñez, M., Maroto, N., 2021. Beyond timelines: the challenges of combining theoretical premises and speakers' Insights about the assessment, validation and Inclusion of Spanish neologisms in dictionaries. Int. J. Lexicogr. 34 (3), 358–381.
Schmid, H.J., 2008. New words in the mind: concept-formation and entrenchment of neologisms. Anglia 126 (1), 1–36.
Sternberg, R., Lubart, T., 1999. The concept of creativity: prospects and paradigms. Handbook of Creativity 1, 3–15.
Tournier, J., 1985. Introduction descriptive à la lexicogénique de l'anglais contemporain. Champion Slaktine, Paris/Geneva.
Varela Ortega, S., 2005. Morfología léxica: la formación de palabras. Gredos, Madrid.
Varo Varo, C., 2013. Aproximación teórico-práctica al procesamiento lingüístico de neologismos léxicos. Revista Signos: Estud. Ling. 81, 132–152.

Varo Varo, C., 2019. Análisis comparativo temporal de los procesos de reconocimiento de usos neológicos formales y semánticos. ELUA: Estudios de Lingüística. Universidad de Alicante 33, 195–209.
Varo Varo, C., 2020. Claves para descifrar la naturaleza neurocognitiva de la neología. In: Lavale-Ortiz, R. (Ed.), Cognitivismo y neología: estudios teóricos y aplicados. Iberoamerican Vervuert, Madrid, pp. 13–34.
Varo Varo, C., Díaz Hormigo, M.T., Paredes Duarte, M.J., 2009. Modelos comunicativos y producción e Interpretación neológicas. Rev. Investig. Lingüíst. 12, 185–216.
Vega, É., Saumell-Llopart, E., 2017. Delimitación de los conceptos de novedad y neologicidad. RILCE. Revista de filología hispánica 33 (3), 1416–1451.
Vega, É., 2022. Caracterización lingüística de los procedimientos de creación léxica. Iberoamerican Vervuert, Madrid.
Zizek, S., 2020. Pandemia. La Covid-19 Estremece Al Mundo. Anagrama, Barcelona.
Zvereva, E., 2022. Neology process in the era of the COVID-19 pandemic: Spanish and French media and social networks discourse. RUDN Journal of Language Studies, Semiotics and Semantics 13 (2), 364–381.