

A CROSS-CULTURAL ANALYSIS OF POPULARIZATIONS IN ENGLISH AND SPANISH NEWSPAPER DISCOURSE¹

Izaskun Elorza
Universidad de Salamanca

Abstract

A cross-cultural analysis has been carried out for two news articles from the *Guardian* and *El País* respectively, both reporting the same scientific finding. The aim was to study how the same event is (re)contextualised in two different languages and cultures through written media. After analyzing the contextual, structural, and inter-personal dimensions quantitatively and qualitatively, the results show that, even if the contextual dimension is similar, newsworthiness is achieved by means of different structural and interpersonal strategies (text organization and attribution) which could be linked to cultural differences in readers' expectations. The results also suggest that cross-cultural comparisons can account for features of popularizations which are not

Resumen

Se ha realizado un análisis contrastivo de dos noticias de divulgación científica publicadas en el *Guardian* y en *El País* sobre el mismo hallazgo científico. El objetivo del análisis era estudiar cómo se produce la (re)contextualización de la información científica en los medios de comunicación escritos de diferentes culturas. Tras un análisis cuantitativo y cualitativo, los resultados muestran que, a pesar de que la dimensión contextual es similar, la noticiabilidad se obtiene mediante estrategias de organización textual y atribución diferentes en cada caso, que podrían relacionarse con diferencias de tipo cultural en las expectativas de cada grupo de lectores. Los resultados también indican que las comparaciones transculturales pueden poner de relieve características de los artículos de divulgación científica que no se manifiestan

¹ I am grateful to Dr Christopher Moran and to the two anonymous referees for their suggestions to improve earlier versions of this article. The research carried out has been possible thanks to the support from *Junta de Castilla y León* (Research Project Ref. SA109A08).

revealed when interpreting them as mere translations between scientific genres. It is therefore concluded that cross-cultural analyses of popularizations may help to avoid an oversimplification in the study of popularizations as an integral part of the process of scientific knowledge construction.

Keywords: popularizations, cross-cultural analysis (English-Spanish), newsworthiness, newspaper discourse.

cuando éstos son tratados como meras traducciones entre distintos géneros científicos, por lo que se concluye que los análisis comparativos de este tipo pueden ayudar a evitar la simplificación cuando los artículos de divulgación científica se estudian como parte integral del proceso de construcción del conocimiento científico.

Palabras clave: artículos de divulgación científica, análisis contrastivo (inglés-español), noticiabilidad, discurso periodístico.

Most people become acquainted with scientific findings from texts dealing with science that are not addressed to other scientific specialists (Myers 2003:265) and which are commonly referred to as *popularizations* or *popular science texts*. Nevertheless, there is generally an underlying assumption that “the texts that are addressed to other specialists are something else, something much better: scientific discourse” (Myers 2003:265). In this prevalent view of scientific knowledge, as constructed and spread in two separate levels or dimensions, it is also assumed, as Myers highlights, that “there are two separate discourses, one within scientific institutions and one outside them, and that information is translated from one of these discourses to the other” (Myers 2003:266). This conceptualization of the popularization process of scientific knowledge has been pervasive in most of the analyses and descriptions carried out thus far, leading mostly to studies focusing on the lexicogrammatical features chosen to adapt meaning construction to a lay audience or readership, either as single-case studies or as contrastive analyses between a scientific genre and another (for example, between research articles and reports in newspapers) and also to studies dealing with the coverage of the same topic both by the media and by scientific journals, as in Miller’s study of the reporting of what at the time was called the “gay gene” in the British press and television news, and its comparison with the commentary on the reported linkage between genetics and male homosexuality in scientific journals (Miller 1995), or also the comparative study carried out by Weingart, Engels and Pansegrau (2000) analyzing communication about global warming as it was covered in the fields of science, politics, and the media in Germany between 1975 and 1995.

However, this view is now being questioned in textual studies (Myers 2003:266), giving way to a more integrative perspective which considers

popularizations as “a process which opens up questions about the actors, institutions, and forms of authority involved” (Myers 2003:267), thus focusing on the descriptive features of popularizations as a particular text type or genre. For example, Myers (1990) has compared scientific articles from two scientific journals with popularizations of the same findings published in *New Scientist* and *Scientific American*, concluding that many of the linguistic differences between research articles and popularizations can be described in terms of contrastive underlying narratives, which make use of different lexicogrammatical strategies.

Myers (1994:179) argues that, in popular science, facts are endowed with an authority which is not always present in scientific articles because the narrative style of much of popular science articles emphasizes “the immediate encounter of the scientist with nature,” following what Myers calls a “narrative of nature,” whereas the narrative style of most scientific research reports emphasizes “the concepts and techniques through which the scientist conceives of and delimits nature,” after what he calls a “narrative of science.” One of the conclusions of his analysis is that “popular science texts do not suggest how scientific facts could be questioned or modified,” whereas scientific texts “still convey more of the personal and provisional than popular texts or textbooks” (Myers 1994:190).

The features described by Myers are limited to sequences of events which can be identified in the superficial structure of the texts. By analyzing three variables, *i.e.* organization, syntax and vocabulary, Myers has found that the organizational structure is not similar, as scientific articles tend to situate the claim made within the existing literature and to construct and develop an argument, whereas in popularizations the experiments are presented in a sequence, the story is told in chronological order, the researchers become actors and the claim made is presented as a discovery event. Other features described include that in popularizations there tend to be two main kinds of actors (scientists and organisms) and that the stories narrated are about discoveries involving observation in the field or laboratory.

On the other hand, in their social dimension, popularizations can also be considered routinized social activities that have led to the creation of stable genres, in such a way that “one *Scientific American* article will have a very similar structure and style to another, or one newspaper feature article on, say DNA fingerprinting, will have the same sort of metaphors and rhetoric as others” (Myers 2003:267). Therefore, popularizations such as reports in newspapers can also be compared in terms of their typological patterns and

described as belonging to a genre subclass whose purpose follows “local rules of communication” in that, although the metaphoric and iconic representations of scientific facts employed by lay people may be wrong in scientific terms, “they are able to serve as acceptable and legitimate belief systems in discourses with other lay people” (Wagner 2007).

Several empirical studies have been conducted which typically analyze and describe the features of popularizations dealing with a particular topic (often a controversial one), such as the coverage of the biotechnology debate in “elite” US newspapers (Hornig Priest 2001) and its coverage in both US and UK media (Marks *et al.* 2007), the coverage of cloning in UK news media (Holliman 2004), the coverage of the genetically modified (GM) food debate in the British press (Cook *et al.* 2006), the representation of the climate change in the British “quality press” (Carvalho 2007) as well as the changing perceptions about it over time in Germany (Weingart *et al.* 2000). What is particularly interesting about these studies is that, through both quantitative and qualitative analyses, they tend to focus on questions which are in general related to the *public perception* of scientific facts. Not only is the reporters’ perspective analyzed on how they interpret and frame scientific information for lay readers (Marks *et al.* 2007) and how media coverage might influence the construction of “scientific citizenship” (Holliman 2004), but the readers’ perspective is also the focus of some of them. As found by Cook, Robbins and Pieri (2006), certain readers may reject scientists and companies as unreliable and some arguments as untrustworthy when certain issues are characterized by newspapers and by experts as primarily scientific.

What these studies seem to suggest is that the description of popularizations may be refined if it is not centered exclusively in describing the (re)contextualizations (Verschuere 2007) of scientific knowledge as public knowledge but also includes the study of variables related to public *attitudes* about science (Allum *et al.* 2008) as well as the ideological features involved, which, as Carvalho (2007) posits, entangle strongly the discursive (re)construction of scientific claims in the media.

It is my contention here that, in order to attempt such a description, popularizations are better analyzed not as part of the construction process of scientific knowledge, but rather in their social dimension as samples of media discourse which follow, as Wagner (2007) suggests, “the local rules of communication.” For this reason, most of the features considered relevant for the study presented here have been previously defined for the description of newspaper discourse (Bell 1991).

Within the array of genres and subgenres distinguished in newspaper discourse, popularizations can be taken as a subclass of special-topic news which aims at making scientific findings available to lay audiences. According to Bell (1991:15), special-topic news is distinguished from hard news and features. This subgenre includes a variety of news on different topics, such as sports, racing, business or financial, arts, agriculture or computers, and usually appears in sections of the paper “explicitly flagged for their subject matter” and “generally produced by separate groups of specialist journalists under the control of their own editor” (Bell 1991:15).

The aim of this analysis is to compare both quantitatively and qualitatively how the same event is (re)contextualized as newspaper discourse in two different situations. The rationale is that if, as Verschueren (2007:79) argues, contexts are “objects of decision making” which are “affected by linguistic choices –not in the least by the choice of language– just as the meaning of linguistic forms is affected by specific orientations of elements of context,” then a comparison between popularizations on the same topic but produced in contexts which are different linguistically and culturally will potentially reveal features not only related to how the narration of the finding is constructed in each case, either as a “narrative of nature” or as a “narrative of science,” but also to aspects related to “the actors, institutions, and forms of authority involved,” as Myers (2003:267) suggests.

Therefore, the analysis carried out is twofold. On the one hand, it aims at describing how the narration is constructed in each popularization. Even if the distinction made by Myers of the two types of narration has been considered, a different methodological approach has been followed which is based on the concept of *theme* as the point of departure for what the text producer is going to say (Halliday 1985:36) and also on the macrostructural properties of headlines and leads. My assumption here is that structural changes affecting the higher-level structure in text are marked by a co-occurrence of changes in textual features. For this reason, headlines and leads are scrutinized in order to observe which elements are used and how they are combined to sum up and highlight the information and thematized elements are identified in order to observe the perspective adopted by the journalist. Even so, popular science news is considered a genre of newspaper discourse in which the main journalist function expected by the readership is not to persuade but to inform, so in this kind of (re)contextualization we expect the writer to act as an active *mediator* who explains the news to the readers and, in order to do so, constructs the text in the most efficient way.

On the other hand, an emphasis has also been placed on contextual and interpersonal aspects of the texts. As the range of intervening variables had to be restricted to a manageable size, a selection has been made of variables dealing with the contextual and interpersonal dimensions of the popularizations. The contextual dimension is described by means of the umbrella concept of *newsworthiness*, whereas the interpersonal dimension is analyzed by focusing on the specific features of attribution which have been used.

Textual organization, newsworthiness and attribution will be discussed in the sections below by contrasting the features found in each text. However, it should be stressed that these variables are considered to hold a dialectical relation between them.

1. DESCRIPTION

The case presented deals with two popularizations of the scientific finding that bees from different species can communicate. This finding was reported in a research article appearing in the open-access electronic scientific journal *PLoS One* (<http://www.plosone.org>) on June 4, 2008, and also covered the same day by two popular science texts, one published in the *Guardian* (BCTG onwards) and the other in *El País* (BCEP onwards). The analysis has been conducted using the electronic versions of the newspapers (at <http://www.guardian.co.uk> and <http://www.elpais.com> respectively).

	HEADLINE	LEAD	SIGNING AUTHOR (type)	LENGTH: running words (sentences) (paragraphs)	AVERAGE: words/paragraph (words/sentence) (sentences/par.)	SECTION (Section → subsection)
BCTG	Bees translate dances of foreign species	–Mixed hives learn to interpret signals –Movements point out distance of source food	Ian Sample (science correspondent)	629 (28) (13)	48 (22.46) (2.15)	Science (News → Science → Animal behaviour)
BCEP	El lenguaje universal de las abejas [“Bee universal language”]	Investigadores descubren que los insectos asiáticos pueden entender a los europeos [“Researchers find that the Asian insects can understand the European”]	ELPAÍS.com (news agency?)	513 (22) (8)	64 (23.31) (2.75)	Sociedad [“Society”]
Off-the-corpus related triggering text						
PLoS One	East learns from West: Asiatic honeybees can understand dance language of European honeybees		Su <i>et al.</i> (2008)	7,874		

Table 1 Popularizations and related triggering text

2. STRUCTURAL ORGANIZATION OF TEXTS: HEADLINES, LEADS AND THEME

The structural dimension is analyzed to see how the linguistic elements are organized and combined to construct meaning in the texts in order to compare how the narrative of the scientific finding is constructed in each case.

2.1. HEADLINES AND LEADS

Headlines and leads operate on the macrostructural dimension within news articles but their function, as well as their structure, differs. Reah points out that headline words are not chosen just as devices to use space economically (Reah 2002:16) but that they also have “a persuasive function when they are designed to attract the attention of the reader and interest him/her in reading the story” (Reah 2002:28). In order to achieve this kind of effect on readers, strategic use of the linguistic potential is made.

On the other hand, leads have the same function in news as the abstracts in personal narrative, summarizing the central action and establishing the point of the story (Bell 1991:149). When it is integrated in the body as the initial paragraph, a lead is structurally a one-paragraph story where the most newsworthy information is put at the beginning and not at the end (Bell 1991:176). The lead can also be placed between the headline and the byline, organized either as a finite sentence (without punctuation), as in BCEP, or also as an outline summing up the most relevant information, as in the bulleted list of BCTG. The particular kind of strategy employed has to do with the text type within the newspaper as well as with the general style of the newspaper, so we can expect variation here when comparing different newspapers even if dealing with the same text type.

The lead is, textually speaking, more important than its preceding headline, not only because it is at the same time “packed with information and news appeal, but as short as possible and clearly understood” (Bell 1991:176), but also because it sets the tone of the article by informing the reader of its purpose (Zappaterra 2007). In this sense, the lead acts as a bridge or link between the headline and the body of the text, both textually and visually. When the headlines and their corresponding leads are compared, two different approaches are revealed.

The headline in BCTG (“Bees translate dances of foreign species”) has been constructed as a finite sentence which is a statement summing up the scientific finding, whereas in BCEP the headline (“*El lenguaje universal de las abejas*” [“Bee universal language”]) has been constructed as a nominal phrase/group which is a non-challengeable evaluative assumption (that language is universal). In addition to this, the BCTG lead outlines the experimental results and also a description of dances as communicative signals, while BCEP constructs the lead as a finite sentence which is a summary of the scientific finding. There is a structural similarity between the headline in BCTG

and the lead in BCEP but in the BCTG formulation “bees” is the element thematized, whereas in BCEP thematization lies on “scientists.” This different approach to reporting the finding can also be observed in both leads. In this respect, as Zappaterra (2007) posits that the lead sets the tone of the story, a question which arises here is whether the element which is thematized in the lead will also tend to occupy this position throughout the text.

In the analysis, four groups of participants in thematized positions have been identified: honeybees, participants related to honeybees (*e.g.*, “dances” or “moves”), researchers, and participants related to researchers or their research (*e.g.*, “conclusions” or “findings”). In Table 2 below, a summary is presented which shows that thematization in the lead constitutes a tendency in the body of the text in both cases, both when considering only the kind of thematized participant (“honeybees” and “researchers”) and when considering also their related participants.

	HONEYBEES (H)	RELATED TO HONEYBEES (RH)	RESEARCHERS (R)	RELATED TO RESEARCH/ERS (RR)	TOTAL
BCTG	10	6	7	5	28
BCEP	5	4	9	4	22

Table 2. Thematized participants in the Bee Corpus

2.2. TEXTUAL STRUCTURE

As we have seen in Table 1, BCTG is longer than BCEP in words (629 *vs.* 513), sentences (28 *vs.* 22) and paragraphs (13 *vs.* 8). However, BCTG has fewer words per paragraph (48 *vs.* 64), words per sentence (22.46 *vs.* 23.31) and sentences per paragraph (2.15 *vs.* 2.75). What these figures seem to suggest is that the semantic density of paragraphs in BCTG is higher than in BCEP, as fewer words are used to say “the same.” Although this seems to be a general tendency when comparing texts in English and Spanish, and hence its potential for explaining significant differences is low, a closer scrutiny of the texts on other textual features reveals more delicate structural patterns. These features are related to how the information is structured in texts, specifically how

paragraphs are organized, what elements are thematized and where changes in the narration, as marked by changes in verb tense, are produced.

In Table 3 below, a contrastive summary is presented of the features analyzed for the description of textual structure in each text, namely the length of paragraphs (in number of sentences per paragraph) together with the thematized participant in the sentence and the tense in which the action related to it is reported. As the length of both texts is different, alignments of paragraphs have somewhat been forced in the table in order to match similar patterns visually and the abbreviations for theme used in Table 2 have also been followed here for the sake of brevity.

BCTG				BCEP			
Paragraph	Sentence	Theme	Tense	Paragraph	Sentence	Theme	Tense
1	1	H	PRESENT	1	1	RR	PAST
2	2	H	PAST		2	R	PRESENT PERFECT
3	3	RH	PRESENT	2	3	H	PRESENT
	4	H	PRESENT		4	R	PRESENT PERFECT
4	5	H	PRESENT	3	5	R	PRESENT PERFECT
5	6	R	PAST		6	R	PAST
	7	R	PAST	4	7	R	PAST
6	8	R	PAST		8	R	PAST
	9	RH	PAST		9	H	PAST
	10	RH	PAST			10	RH
	11	RH	PAST		5	11	RH
12	H	PAST	12	RH		PRESENT	
7	13	H	PAST	13		RH	PRESENT
8	14	RH	PAST	5	11	RH	PAST
	15	RH	PAST		12	RH	PRESENT
	16	R	PAST		13	RH	PRESENT
8	17	RR	PAST	5	11	RH	PAST
	18	H	PAST		12	RH	PRESENT

9	19	RR	PAST	6	14	R	PAST
	20	H	PAST		15	R	PAST
	21	RR	PRESENT		16	RR	PRESENT
10	22	R	PAST	7	17	H	PAST
	23	H	PAST		18	H	PAST
	24	H	PAST		19	H	PAST
11	25	RR	PRESENT	8	20	RR	PRESENT
12	26	R	PRESENT		21	RR	PRESENT
13	27	R	PRESENT		22	R	PRESENT
	28	RR	PAST				
Total	28			Total	22		

Table 3 Structural patterns in the Bee Corpus

My assumption for analyzing the structural level was that structural changes affecting the higher-level structure in text are marked by a co-occurrence of changes in textual features. In this sense, the co-occurrence of the features analyzed here are taken as indicators of textual structure change and the analysis of the number of sentences per paragraph, the thematized element and the tense used has allowed me to identify a structure of three parts in each text, which is marked in the table by a triple line between cells in the paragraph column (lower-level or local changes are marked by a dotted line).

In this case, a change in the number of sentences per paragraph is also accompanied by other changes, although not all the structural patterns are so clearly divided. For example, paragraph 5 of BCTG is interpreted as a transition paragraph between Part 1 and Part 2 because its number of sentences is similar to the four previous paragraphs but there is a change in the participant which is thematized and the report also changes from present to past tense, which is the tense used until the end of paragraph 10. In BCEP, Part 2 starts with paragraph 4 but the change of thematization is not introduced until the third sentence of the paragraph, while the change of tense has already been introduced in the last sentence of the previous paragraph.

In any case, the similarity of structural patterns detected in the analysis is not maintained within the three parts. A noteworthy example is the point at

which Karl von Frisch is introduced in each text as the first person who noticed the importance of bee dances. In BCTG, von Frisch is introduced at the end of the text, whereas in BCEP it is used to start the story. A greater similarity holds between Part 2 of both texts than between Parts 1 and 3, which seem to be more prone to variation. Von Frisch is not a participant in the experiment so his role in the story is indirect and seems to respond to the purpose of explaining to the layman the importance of the study of bee dances. But this does not explain the fact that in BCTG this item is placed in the least informative position of the text (the final sentence), whereas it takes the most informative position (absolute thematic position) in BCEP. In order to give a plausible explanation for this, we have to analyze the story's sources and how they are treated in each case, which will be done in Section 4.

3. CONTEXTUAL VARIABLES AFFECTING NEWSWORTHINESS

Newsworthiness is an evaluative term used to account for the fact that in newspaper discourse not all the pieces of information receive the same attention by editors but that there is a systematic selection of what is considered more important and of the kind of newspaper coverage it is going to receive. This umbrella term agglutinates a range of contextual factors dealing both with the context of situation of the discovery event narrated and also with the valuation of the event itself and the intervening actors, and which may help us ascertain and assess the function of some of the textual features found in the news articles.

The starting point for the description of this aspect is the length and location of the news in the newspaper. The basic assumption here is that the greater the newsworthiness of an event or information, the bigger the space devoted to it and the better its position in the newspaper. The highest value of this range would be a single piece of news covering the front page of the newspaper and the lowest value, the absolute lack of coverage of the information or, in other words, the event not becoming news.

Newsworthiness is considered a metadiscursive feature which can help us establish the relative prominence given to the same event or piece of information in different newspapers, so it can help us identify intercultural differences within newspaper discourse dealing with values and stereotypes of a certain culture. In the case of the texts analyzed here, my hypothesis is that,

even if the texts selected have been triggered by the same event, popularizations also depend on the kind of cultural expectations which editors and readers have about scientific findings and so it might be possible to find some textual differences which could be reasonably explained in terms of cultural imbalance.

3.1. LENGTH, LOCATION (AND A METHODOLOGICAL PROBLEM)

As Table 1 above shows, although the length of BCTG and BCEP is quite similar, BCTG is longer than BCEP, containing 116 words, 5 sentences and 5 paragraphs more. On the other hand, BCEP has an average distribution of 22 words per paragraph more than BCTG, the number of words per sentence being also slightly great, as well as the number of sentences per paragraph. These dissimilarities in distribution give a profile of different textual organization in each case, as we will see later. As I have no data of this kind from other studies on popularizations, it is not possible to associate these dissimilarities with cultural differences affecting register or genre, as they may also be due to differences in the writing style of the text producers. However, the greater number of words per sentence in the Spanish text is consistent with findings in other text types within newspaper discourse. Comparing editorials from *El País* (May 2000) with those from *The Times* (March 1999), Hyde has found that the average length of the orthographic sentence in words was 30.2 and 20.7 respectively (Hyde 2002:37). This longer length in the Spanish text is typically explained in terms of systemic differences between Spanish and English languages when comparing texts written in English and in Spanish but it is equally dependant on the pragmatic decisions of writers when imposing sentence and paragraph divisions in their texts.

On the other hand, as popularizations are a kind of special-topic news which do not receive daily coverage (unlike sports, business/financial or arts), their comparability is problematic both for methodological reasons and for the potential of the results obtained. There is no standard classification of news in fixed sections; each newspaper decides on the kind of structure and coverage they want to have and, for this reason, the name and number of the sections varies largely from one newspaper to another. This is a serious problem for the design of the equivalent parallel corpora necessary for contrastive analysis (Moreno 2008).

The *Guardian* includes, within the News section, a stable section of Science with topic subsections, where BCTG was published (in the subsection Animal Behaviour), but *El País* did not in 2008, so BCEP was published in the section of

Society. In the *Guardian* website it is possible not only to access the news articles but also the statistics related to the sections and subsections. For example in 2007 there were 1,653 texts published in the Science section, 20 of which appeared in the subsection Animal Behaviour; of these, 11 were published in the paper version and another 7 only in the electronic version of the newspaper. We cannot access this type of information in *El País* website so the compilation of popularizations, even if the search is only carried out in the section of Society, is extremely slow and difficult if an efficient search is required. Therefore, in the case of newspapers the variability of the sections where popularizations are published cannot be controlled and, for this reason, some of the results obtained in the analysis cannot be interpreted unequivocally. This problem is common to all kinds of news which do not have a stable section in the newspapers analyzed. In this respect, my analysis is methodologically limited because, although the texts analyzed are samples of popularizations and, at the same time, of special-topic news articles, the imbalance and instability of their location adds complexity to the generalization of the results to a higher-rank unity, such as text type (be it popularization or special-topic news article) or to the universe of discourse (newspaper discourse in this case), as it would be desirable.

In any case, a comparison of the length and position of BCTG and BCEP does not allow us to conclude that newsworthiness is not the same in both cases. So, in order to analyze this dimension in greater detail, my next step will be to consider a further set of features.

Due to the number, type and elusiveness of some of the factors involved in the production of special-topic news articles, and in order to gain a deeper insight of the textual features which could be related to the contextual dimension, I will consider a selected range of features which represent the value of the events and actors in the news, as described by Bell (1991:156-158). This range will allow us to judge if one of the news stories has been considered more newsworthy than the other. The relevant features considered for the analysis of the special-topic news articles are, according to Bell's nomenclature, recency, proximity, consonance, novelty, relevance, eliteness of the news actors, attribution and facticity.

3.2. RECENCY

According to Bell (1991:156-157), "recency" refers to the idea that the best news is something that has only just happened, so newsworthiness is associated

with how well news conforms to the news work cycles. In newspapers, the basic news cycle is the 24-hour span of the day.

3.3. PROXIMITY

“Proximity” is a broad term covering more than the physical description of distance. Geographical closeness can enhance news value but closeness can also be interpreted as “the familiarity and similarity of one country with another, not just the physical distance between them” (Bell 1991:157). This factor then includes abstract concepts such as affinity and alignment.

3.4. CONSONANCE

This factor refers to the compatibility of a story with “the preconceptions about the social group or nation from which the news actors come” (Bell 1991:157), so the main aspect involved is the newswriters’ and readers’ expectations about what the event is typically like. Cognitive theories posit that people use mental scripts, frames or plans for interpreting the world efficiently. In this sense, consonance refers to newswriters’ and readers’ expectations about how events, people and things proceed conventionally. As conventions are bound to social and cultural common practices and values, consonance is constructed in each culture and each social group in a different way, so we may expect differences in this factor when dealing with cross-cultural contrastive analyses.

3.5. NOVELTY

This factor refers to the selection of news according to its novelty. In the press, science is “a low-priority area, but gains coverage when there is a ‘breakthrough’ to report” (Bell 1991:157). Therefore, we can expect popularizations appearing in newspapers to be mainly reports of scientific breakthroughs which, unlike other news areas (*e.g.* sports), are reported now

and then and not systematically within the 24-hour cycle in a specially-dedicated section.

3.6. RELEVANCE

This factor refers to how relevant a story is, in terms of the effect of the story on the lives of the readers or its closeness to their experience. According to Bell (1991:158), “a common angle on economic announcements, political decisions or scientific breakthroughs is to lead with what they supposedly mean for the ordinary reader: more money in the pocket or a better paint for houses.”

3.7. ELITENESS OF THE NEWS ACTORS

The assumption underlying this factor is that events referring to elite persons may be more newsworthy than the same events referring to ordinary people. In popularizations, scientists are the actors expected to be present so, even if they cannot be considered “ordinary people” in broad terms, nor can they be taken as members of an elite group unless some sort of evaluative qualification is also present (“an outstanding scientist” or “a Nobel Prize,” for instance).

3.8. ELITENESS OF THE STORY’S SOURCES

According to Bell, “highly valued news sources need to be elite in some dimension, particularly socially validated authority” because “the unaffiliated individual is not well regarded as a source” (Bell 1991:158). This factor is called by Bell “attribution” in reference to the fact that in newspaper discourse the question of who responds for the information given is of great importance. The information is often explicitly attributed to some external source different from the journalist. With this factor, Bell highlights the importance of the attributees in order to decide the newsworthiness of a story, so the emphasis is placed on the eliteness of the source used. By contrast, attribution is used in

discourse analysis as a broader term referring to language which is “presented as deriving from someone other than the writer” (Hunston 1999:178). This concept is often applied to the study of evaluation because, as Hunston explains, attribution can be used by text producers “to position the reader to attach more or less credence to the various pieces of information” (Hunston 1999:178). In order not to use this term confusingly, I will not follow Bell’s nomenclature in this case, calling this contextual factor “eliteness of the story’s sources” instead and applying “attribution” to the textual factor of authorial source, especially in reference to reader positioning, as will be discussed later (cf. Section 1.3).

3.9. FACTICITY

Bell defines this factor as “the degree to which a story contains the kinds of facts and figures on which hard news thrives: locations, names, sums of money, numbers of all kinds” (Bell 1991:158). Factual information is crucial for helping the reader construct a clear and precise interpretation of the news and, at the same time, it is expected to be present in the narrative of science popularizations.

Facticity has been analyzed by identifying the expressions used for naming people, locations (e.g., the place where the experiment was carried out), objects (such as “sugary liquid”), and numbers expressing quantities, distance, velocity and time. In Table 4 below a contrastive list can be found of factual information (with literal translations of the expressions used in Spanish in B CEP), where contrastive differences have been underlined. The criterion to assess which version is more factual has been the degree of accuracy of the information, so that the misspelling of the Nobel Prize’s name in B CEP has also been taken as a lack of similarity on this factor. B CTG uses more accurate expressions in five out of the thirteen factual pieces of information contrasted. B CEP is more precise in only one occasion (“*melaza*” [“molasses”] vs. “sugary liquid”), so we can conclude that B CTG shows a higher degree of facticity.

BCTG	FACTICITY BIAS		BCEP
Austrian zoologist Karl von Frisch, Nobel prize for medicine 1973	+	-	“Austrian zoologist Karl von <u>Frisch</u> [<i>sic.</i>], Nobel prize for medicine 1973”
9 species of honeybees	=	=	“9 species of bees”
30 m years ago	=	=	“30 million years ago”
waggle dance	=	=	“waggle dance”
researchers from Australia, Germany and China	=	=	“scientists from Australia, Germany and China”
a 1.5 second dance	=	=	“a 1.5 second dance”
600 metres away	=	=	“600 metres away”
400 metres away	=	=	“400 metres away”
<u>the banks of the Da-Mei canal in Fujian province, China</u>	+	-	“ <u>the region of Da-Mei, China</u> ”
six feeding stations with <u>sugary liquid</u> at 400, 500 and 600 metres <u>in front of and behind the hive</u>	- + +	+ - -	“six feeding stations with <u>molasses</u> at 400, 500 and 600 metres from <u>the hives</u> ”
Jürgen Tautz, <u>a co-worker on the study and head of the bee group at the University of Würzburg in Germany</u>	+	-	“Jürgen Tautz, <u>member of the research team</u> from the University of Würzburg, Germany”

Table 4 Facticity in the Bee Corpus

In order to get a general overview of the set of features analysed in relation to newsworthiness, a summary is provided in Table 5 below.

	BCTG	BCEP
Recency	June 4, 2008	June 4, 2008
Proximity	No direct proximity, no British scientists or previous findings involved	No direct proximity, no Spanish scientists or previous findings involved
Consonance	<u>Linguistic learning capacity found</u> (bees can learn to interpret other bees)	<u>Linguistic universality assumed</u> (bee universal language)
Novelty	Scientific finding	Scientific finding
Relevance	General interest, no direct relevance to readers	General interest, no direct relevance to readers
Eliteness of the news actors	Scientists	Scientists
Eliteness of the story's sources	<ul style="list-style-type: none"> • Journal <i>PLoS One</i> • Nobel prize 	<ul style="list-style-type: none"> • Nobel prize • <u>The Guardian</u> • Journal <i>PLoS One</i>
Facticity	<u>Higher accuracy</u>	<u>Lower accuracy</u>

Table 5 Newsworthiness in the Bee Corpus

Dissimilarities in newsworthiness are located only in three of the eight factors analyzed. Apart from facticity, which has already been discussed, the other two factors also affect the structural dimension of the analysis (consonance) and the interpersonal dimension (the story's sources). For this reason, they will be discussed in more detail in the following section.

4. ATTRIBUTION SOURCES

As already explained, the scientific finding reported in the Bee Corpus was made public in the open-access electronic scientific journal *PLoS One* in an article by Su *et al.* (2008). The explicit attribution and the quotations in both texts allow us to establish an intertextual coreferential sequence. In BCTG, Ian Sample cites the article from *PLoS One* as his information source. In contrast, in BCEP the anonymous journalist (probably from an international wire or news service) refers to both the scientific report in *PLoS One* and the article by Ian Sample as explicit information sources. When compared, it is clear that the intertextual relationship of the two texts is not one of multitextual production from a triggering event, but rather of BCEP being an adaptation of BCTG, which is recognized explicitly as the information source on three occasions. In Table 6, a contrastive list is presented where the attributed sources (underlined) appearing in both texts are aligned, underlined and described in reference to their position in the text according to the paragraph, the sentence in the paragraph and the percentage of text calculated by WordSmith Tools 4.0 (Scott 2004), and also to whether attribution is constructed through citation or through quotation.

BCTG	BCEP
	<p><u>“El zoólogo austriaco Karl von Frish [sic.], Premio Nobel de Medicina 1973, descubrió la importancia de los bailes de las abejas.”</u> [“<u>The Austrian zoologist Karl von Frisch, Nobel prize of medicine 1973, revealed the importance of bee dances</u>”]</p> <p>(Paragraph 1/8, Sentence 1/2; 4 % of text; indirect attribution)</p>
<p>“..., <u>scientists</u> have found.”</p> <p>(Paragraph 1/13, Sentence 1/1; 6% of text; direct attribution, citation)</p>	<p>“..., <u>según ha publicado hoy el diario inglés The Guardian.</u>” [“..., as it was published today in <u>The Guardian English newspaper.</u>”]</p> <p>(Paragraph 1/8, Sentence 2/2; 13% of text; direct attribution, citation)</p>

	<p>“... <i>según el periódico</i>,...” [“... according to <u>the newspaper</u>,...”]</p> <p>(Paragraph 2/8, Sentence 1/2; 14 % of text; direct attribution, citation)</p>
	<p>“<i>Según los científicos</i>,...” [“According to <u>the scientists</u>,...”]</p> <p>(Paragraph 5/8, Sentence 2/3; 55 % of text; direct attribution, citation)</p>
	<p>“... <i>explica el Guardian</i>,...” [“... explains <u>the Guardian</u>,...”]</p> <p>(Paragraph 6/8, Sentence 1/3; 67 % of text; direct attribution, citation)</p>
<p>“... said <u>Jürgen Tautz</u>, a co-worker on the study and head of the bee Group at the University of Würzburg in Germany.”</p> <p>(Paragraph 9/13, Sentence 2/3; 70 % of text; direct attribution, quotation)</p>	<p>“... <i>asegura Jürgen Tautz</i>, miembro del equipo de investigación de la Universidad de Würzburg, en Alemania.” [“... says <u>Jürgen Tautz</u>, a member of the research team from the University of Würzburg in Germany.”]</p> <p>(Paragraph 7/8, Sentence 1/4; 81 % of text; direct attribution, quotation)</p>
<p>“The research is published in <u>the journal PLoS One</u>.”</p> <p>(Paragraph 9/13, Sentence 3/3; 74 % of text; indirect attribution)</p>	<p>“<i>Los resultados del estudio pueden encontrarse en el semanario científico PLoS One</i>.” [“The results of the study can be found in <u>the scientific journal PLoS One</u>.”]</p> <p>(Paragraph 7/8, Sentence 4/4; 92 % of text; indirect attribution)</p>
<p>“... <u>the team</u> wrote.”</p> <p>(Paragraph 12/13, Sentence 1/1; 92 % of text; direct attribution, citation)</p>	
	<p>“<i>La conclusión del grupo es que...</i>” [“The conclusion of the team is that...”]</p> <p>(Paragraph 8/8, Sentence 1/2; 93 % of text; indirect attribution)</p>
<p>“The importance of bee dances was first noted by <u>the Austrian zoologist Karl von Frisch</u>, who was awarded the Nobel prize of medicine in 1973.”</p> <p>(Paragraph 13/13, Sentence 2/2; 98 % of text; indirect attribution)</p>	

Table 6 Attributed sources in the Bee Corpus

The difference in the order of appearance of Karl von Frisch in the texts is relevant from a textual perspective. As explained, this entity appears in the last paragraph in BCTG, whereas in BCEP it appears in thematic position at the beginning of the first paragraph, *i.e.* occupying the most informative position in

text. The most likely explanation for this difference is the function that it fulfils in relation to the length and purpose of the text.

BCEP starts with an economical summary of the background in which the importance of bee dances is stated. The appreciation of bee dances as important relies solely here on the eliteness of the attributed source, *i.e.* a Nobel Prize winner. Even if the readers had never heard of Karl von Frisch, the explicit mentioning of his award would be enough to warrant that his appreciation has enough credence. After this, a summary of the scientific finding is presented in the following sentence, both sentences constituting the first paragraph. In BCTG, the function attributed to Karl von Frisch is also to give the appropriate credence to the appreciation that bee dances are important, but this time the first paragraph is occupied by the summary of the scientific finding, which is explained again in a single sentence. Here, the Nobel Prize is introduced in the text in the last sentence of the last paragraph, just after the description of what the scientists are researching next. This final position seems to indicate that, although this element is also used to add credence in BCTG, the appreciation of the importance of the research on bee dances and of the finding reported does not rely crucially on the credibility given by attributing it to the Nobel Prize winner. It is BCEP which uses profusely mediated attribution along the text as a strategy to add credence, whereas BCTG makes scarce use of attribution. This difference is noteworthy not only because the *Guardian* is mentioned explicitly in BCEP as the main information source of the story but mainly because the information in BCEP has been organized in the same way and adapted from BCTG.

5. DISCUSSION OF FINDINGS AND CONCLUSIONS

Even if newsworthiness seems to be similar in both cases, different strategies have been used in each newspaper to achieve a similar goal, the contrast relying mainly in the factors of consonance and the degree of facticity, which is higher in BCTG than in BCEP. When analyzing the headings of the articles, consonance seems to comply with a different preconception in each case, focusing in BCTG on the capacity of bees for language learning while BCEP focuses on language universality, which could be due to different cultural preconceptions of the significance of the finding or also to the degree of popularization with respect to the triggering text, which has not been analyzed

here. Although facticity is similar in the quantity of factual data presented, the quality of the factual information given in BCTG is much higher because it is more accurate and precise than in BCEP.

Consonance is affected by two different preconceptions about the reported finding. In BCTG both headline and lead focus on a capacity of bees to learn how to communicate with other bee species; a capacity also emphasized by the researchers in their scientific report when they suggest that their study “hints at the possibility of social learning between the two honeybee species, and at the existence of a learning component in the honeybee dance language” (Su *et al.* 2008).

In contrast, in BCEP the emphasis is placed on a hypothetical universality of bee language which can be assumed from the antecedents of the scientific study (BCTG Paragraph 2: “The world’s nine species of honeybee separated about 30m years ago and have since developed their own diverse dances, which are used like languages.”) and from the use of the term “dialects” to refer to different bee dances used for the same purpose by different species. But the universality of bee language is not a topic of any of the texts. The choice of this headline in BCEP probably relies more on the editor’s preconception of what is more appealing to readers than on the aim of summing up what the finding is about and what it represents and, in this sense, it seems that consonance is fulfilled in both cases, in BCTG because the headline is consonant with a popularization in the Science section of the *Guardian* and in BCEP because the headline is probably consonant with what we expect to find in the Society section of *El País*.

On the other hand, the main contrast found between the texts analyzed is in how attribution is used to give credence to the news reported. Apart from the presence of Karl von Frisch to give credence to the importance of bee dances, BCEP relies on attributed sources more often than BCTG, so credibility based on attribution relies more often on external sources in BCEP than in BCTG, also including the *Guardian* as a source of credence.

Although most cases of attribution refer to the actors of the scientific finding (the team of scientists in question), information is also attributed to other actors. The comparison carried out has revealed that, even if the narration corresponds to Myers’ description of a “narrative of nature” (Myers 1994) in both texts, the results of the analysis of the structural aspects suggest that the construction of the narration has not been carried out in the same way. The most outstanding contrast detected which could be ascribed to this aspect lies in using either a narrative focused on the people doing or saying things (Karl von Frisch,

the researchers, the *Guardian*), as is the case of the popularization from *El País*, or a narrative centered on the animal researched (honeybees), as is the case of the *Guardian*. In addition, the different distribution and prominence in each text of *Karl von Frisch* (absolute thematic position in BCEP vs final position in BCTG) seems to suggest that the textual function of this attribution source is related to a different degree of the importance given to the credibility of the source in each case, which is interpreted as indicating a difference in the expectations of the readership of each newspaper.

Apart from the description of the (re)contextualizations of the scientific finding analyzed, some methodological problems have been revealed which are worth mentioning for future research. The lack of equivalence of the newspaper sections where the popularizations appear has limited the possibility of ascertaining whether this contrastive feature is due to an imbalance in the kind of narrative used in popularizations in each culture, or to the kind of narrative that newswriters and readers expect to find in the Science and the Society sections of the newspaper in each case. This lack of symmetry will have to be dealt with in further cross-cultural research. The good news is that, as the number of newspapers which have specialized science sections and the number of science articles in the press increases (Hyland 2010:118), the visibility of popularizations in *ad-hoc* stable sections is also more frequent (as is the case of *El País* now), which suggests that methodological problems of this kind may be minimized in the future for the analysis of this genre.

On the other hand, we have been able to identify differences on facticity, consonance, thematization and attribution, as well as the use of different strategies in headline construction to achieve newsworthiness, so that contrastive features affect all the dimensions studied (structural, contextual, and interpersonal). In my view, these results suggest that the variables analyzed can yield to more in-depth descriptions than studies of variables only dealing with one single dimension. In addition, the fact that the differences detected have manifested mainly because of the cross-cultural perspective adopted shows that this type of contrastive analyses may help to gain a deeper insight of popularizations and, consequently, may also help to avoid an oversimplification in the study of the process of popularizations as (re)contextualizations of scientific knowledge.

Finally, as the analysis carried out does not focus on the process of popularization itself but rather on the contrastive aspects which may reveal and which could be attributed to cross-cultural (re)contextualizations rather than to the popularizing process of scientific knowledge, the results obtained can be

compared not only to descriptions of other scientific genres (here to the description of the scientific article by Su *et al.*) but also to descriptions of other genres within newspaper discourse. In this sense, the results obtained may have a variety of applications and have special relevance for a general description of newspaper discourse in English and Spanish as it is realized in the *Guardian* and *El País* newspapers.

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How to cite this article:

Elorza, Izaskun. "A Cross-Cultural Analysis Of Popularizations In English And Spanish Newspaper Discourse." *ES. Revista de Filología Inglesa* 31 (2010): 85-109.

Author's contact: iea@usal.es