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Informational structural markers in Spanish and their cognitive reflection during reading

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Abstract: Speakers use resources to facilitate information processing. Structural markers are information regulators that signal the start and end of information blocks, place them in an order within a sequence, and make it possible to anticipate processing. Their role is especially important in expository textual discourse and in specialized texts where there is a special need to prioritize information to non-specialist audiences. We propose an eye-tracking study of the Spanish structural markers *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally') to verify if their semantic and pragmatic features influence how native speakers process the structures on which they operate. Our starting hypothesis was that their presence may lead to a reduction of the cognitive effort during reading compared to an equivalent text where they are absent. Data analysis from a reading eye-tracking experiment with Spanish native speakers confirmed that the presence of structural markers in enumerative fragments has an accelerating effect on processing during the first reading. However, during the rereading phase this facilitative effect was not found. From this it follows that marking the information structure in an enumeration in specialized texts hardly represents a quantitative advantage for the native reader.

Keywords: structural marker, information structure, discourse processing, eye-tracking, experimental pragmatics

Article note: Laura Nadal is responsible for writing sections 1 and 4, Cristina Procentese has written section 3 on the description of results, and Iria Bello is responsible for section 2.

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Zusammenfassung: Sprecher nutzen Ressourcen, um die Informationsverarbeitung zu erleichtern. Strukturmarker sind Informationsregulatoren, die den Beginn und das Ende von Informationsblöcken signalisieren, diese innerhalb einer Sequenz ordnen und die Antizipation der Verarbeitung ermöglichen. Ihre Rolle ist besonders wichtig in erklärenden Texten und in Fachtexten, in denen die Priorisierung von Informationen für ein nicht-spezialisiertes Publikum erforderlich ist. Wir schlagen eine eye-tracking Studie der spanischen Strukturmarker „en primer lugar“ (De. „zuerst“), „en segundo lugar“ (De. „zweitens“) und „por último“ (De. „schließlich“) vor, um zu überprüfen, ob deren semantische und pragmatische Merkmale die Verarbeitung der Strukturen durch Muttersprachler beeinflussen. Unsere Ausgangshypothese war, dass deren Vorhandensein im Vergleich zu einem gleichwertigen Text ohne diese Marker zu einer Reduzierung des kognitiven Aufwands beim Lesen führen kann. Die Datenanalyse eines Blickbewegungs-Experiments mit spanischen Muttersprachlern bestätigte, dass das Vorhandensein von Strukturmarkern in Aufzählungsfragmenten die Verarbeitung beim ersten Lesen beschleunigt. Dieser Effekt war jedoch beim wiederholten Lesen nicht mehr feststellbar. Daraus lässt sich schließen, dass die Kennzeichnung der Informationsstruktur in Aufzählungen in Fachtexten für Muttersprachler kaum einen quantitativen Vorteil darstellt.

Schlüsselwörter: Strukturmarker, Informationsstruktur, Diskursverarbeitung, Blickbewegungs-Tracking, experimentelle Pragmatik

Resumen: Los hablantes utilizan recursos para facilitar el procesamiento de la información. Los estructuradores funcionan como reguladores de la información que señalan el inicio y el final de los distintos bloques de información, los ordenan dentro de una secuencia y permiten anticipar su procesamiento. Su papel es especialmente importante en los textos expositivos y especializados donde existe una necesidad especial de priorizar la información para públicos no especializados. El objetivo de este estudio es analizar con datos de seguimiento ocular si las Características semánticas y pragmáticas de los estructuradores *en primer lugar*, *en segundo lugar* y *por último* influyen en cómo los hablantes nativos procesan las estructuras sobre las que operan. Nuestra hipótesis de partida es que su presencia puede conducir a una reducción del esfuerzo cognitivo durante la lectura en comparación con un texto que carezca de ellos. El análisis de datos confirmó que la presencia de marcadores estructurales en fragmentos enumerativos tiene un efecto acelerador del procesamiento durante la primera lectura. Sin embargo, durante la fase de relectura no se observó este efecto facilitador. De ello se desprende que marcar la estructura de la información en una enumeración en textos especializados difícilmente representa una ventaja cuantitativa para el lector nativo.

Palabras clave: estructurador, estructura de la información, procesamiento del discurso, seguimiento ocular, pragmática experimental

1 Introduction

Some adverbial expressions such as Spanish *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally'), can either act as time or place adjuncts or play the role of structural markers (Fuentes Rodríguez, 2017), as the example presented in (1).

(1) Para poner *en primer lugar* a la naturaleza, debe dejarse de pensar que se comporta como la economía, donde el valor monetario es el mismo independientemente del lugar donde se encuentre (Real Academia Española, n.d.-a).
'To place nature *first*, you must stop thinking that it behaves like the economy, where the monetary value is the same regardless of where you are.'

In (1), *en primer lugar* (Eng. 'firstly') acts within the limits of the sentence, hence it can be denied, focused, or put to question, as shown in (1a), (1b), and (1c), respectively.

(1a) La naturaleza no debe ponerse *en primer lugar*, sino en segundo;
'Nature should not be put *in first place*, but in second.'
(1b) Es precisamente *en primer lugar* donde se debe poner a la naturaleza;
'It is precisely *in the first place* where nature should be put.'
(1c) ¿Es *en primer o en segundo lugar* donde se quiere poner a la naturaleza?
'Is it *first or second* where you want to put nature?'

This suggests a connection between *en primer lugar* (Eng. 'firstly') and the predicative nucleus. In this case, the phrase functions as an attached adverbial phrase (Martín Zorraquino, 2010).

However, in (2), the same expression is delimited between pauses and becomes a conjunctive adverbial phrase (Martín Zorraquino, 2010, p.127; Mederos, 1988)[1].

1 We believe that this type of structural markers, like reformulators, fulfill many of the properties that characterize disjoint adverbial phrases, as, for instance *sinceramente* (Eng. 'sincerely'), because they can function autonomously in a conversational turn accompanied only by the adverbs *sí* (Eng. 'yes') or *no* (Eng. 'no') and do not necessarily link parts of the discourse (Martín Zorraquino, 2010, p.127).
Prepositional phrases like *en primer lugar* (Eng. 'firstly', literally 'in the first place'), which are usually adjuncts, often constitute "the germ" responsible for the development of grammaticalized adverbial

(2) Cuando me llegó mi turno, sin embargo, fue exactamente eso lo que sucedió. Me quedé de piedra. *En primer lugar*, por haberme muerto, algo que siempre resulta inesperado, excepto, supongo, en el caso de algunos suicidas, y después por estar interpretando involuntariamente una de las peores escenas de *Ghost* (Real Academia Española, n.d.-a).
'When it was my turn, however, that's exactly what happened. I was shocked. *Firstly*, for having died, something that is always unexpected, except, I suppose, in the case of some suicides, and then for unintentionally acting out one of the worst scenes in *Ghost*.'

The extrapredicative nature of *en primer lugar* (Eng. 'firstly') in (2) precludes the rejection or focusing of the unit shown in (2a) and (2b):

(2a) *no *en primer lugar*, por haberme muerto;
'not *firstly*, for having died'.
(2b) *es *en primer lugar* que por haberme muerto me quedé de piedra.
'It is *firstly* because I died that I was shocked.'

Unlike adjuncts, conjunctive adverbials have suprasegmental independence and constitute their own intonational environment. As such, they appear between punctuation marks (Martín Zorraquino & Portolés, 1999). Furthermore, even if they are not argumentative connectives, these units relate two segments of discourse (Fuentes, 2009). In (2), the statement introduced in by *en primer lugar* (Eng. 'firstly') is only understood in relation to the preceding discourse segment. The segments that relate these types of adverbial phrases to each other can represent different types of sentences modalities, as in (2c).

(2c) Me quedé de piedra. *En primer lugar*, ¿por haberme muerto?
'I was shocked. *Firstly*, because I died?'

Finally, these adverbials semantically interrelate segments of discourse but are not part of the propositional content of any of them (Martín Zorraquino, 2010, p. 122). In fact, they are adverbial phrases that can be omitted without altering the ostensibly communicated assumption, as in (3).

(3) Me quedé de piedra. Por haberme muerto y por estar interpretando un papel.
'I was shocked. For having died and for playing a role.'

Regarding grammaticalization, units like *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally'), are fixed phrases that do not admit new elements, nor the modification of their components without producing a change from a macrosynthetic unit (conjunctive adverbial phrase) to a unit of mi-

phrases that come to occupy a place at the macrosyntactic level, that is, they become "discursive prepositional phrases" (Company, 2022).

crosyntax (adjunct): **en este primer lugar* (Eng. 'in this first place), **en los primeros lugares* (Eng. 'in the first places'). However, unlike what happens with other units that are included under the same adverbial category (*no obstante, sin embargo* Eng. 'however'), their meaning is totally transparent, since they still retain part of their compositional meaning. In other words, the presence of ordinal numerals indicates an ordered succession of enumerated elements (Garcés, 2008, p. 44). Their macrosyntactic function is that of presenting "the members of the discourse that they link as a series of ordered elements that express different aspects of the same theme" (Garcés, 2008 own translation). Semantically, they are, therefore, adverbial phrases that present each segment of discourse as a part that complements an entire information set and that occupies a specific order within that set (Martín Zorraquino & Portolés, 1999).

The presence of these units is likely to have consequences for information processing during reading. They signal the start and end of each information block, place it in an order within a sequence, and make it possible to anticipate the presence of subsequent information blocks that are subsumed under the same thematic set. Thus, it can be expected that their presence may lead to a reduction of the cognitive effort during reading compared to an equivalent text in which they are not present. This hypothesis, which has been verified experimentally for other types of discourse markers (cfr. Loureda et al., 2021), is proposed in this article for the case of enumerations marked by the adverbials *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally'). This article is structured in four sections. After this introduction, which contains a brief account of the theoretical framework concerning information structure and enumerations, Section 2 contains information about the methodology used, including the independent and dependent variables, the starting hypothesis, the experiment design and procedure and the analysis carried out. The remaining two sections offer a detailed analysis and discussion of data that signal an accelerating effect in some processing stages. The limitations of this study and possible lines of future research are offered in the concluding remarks.

1.1 Information structuring and structural markers

Discourse markers provide instructions for information processing by limiting the potential ambiguity of expressions and guiding inferential processes in communication, often reducing the cognitive effort required in the processing of the statements in which they appear (Blakemore, 1987; Levinson, 2000; Sperber & Wilson, 1995, 2002; Wilson & Sperber, 2002). To produce a coherent and cohesive discourse that facilitates communication, speakers use informational structures that establish re-

lationships between the information communicated in the statements and their context. The series of utterances that make up discourse reflects the explicit or implicit questions that the recipient of the text poses while reading (Kuppevelt, 1995).

(4) Pujol concentró en el Partido Popular las primeras críticas de la precampaña y señaló que "la reconversión del PP es un homenaje al catalanismo", aunque se preguntó si sería cierta. Ofreció con nitidez las dos coordenadas en las que va a moverse su mensaje de estas primeras semanas: el peligro viene fundamentalmente del PP, al que presenta abiertamente como una formación que durante dos años se ha dedicado a sembrar la animadversión contra Cataluña en el resto de España, y *en segundo lugar*, no hay que girar la cara y esconderse ante las críticas que reciban por su apoyo al Gobierno socialista.
'Pujol focused the first criticism of the pre-campaign on the Popular Party and pointed out that "the reconversion of the PP is a tribute to Catalanism", although he wondered if it would be true. He clearly offered the two coordinates in which his message of these first weeks will move: the danger comes fundamentally from the PP, which he openly presents as a formation that for two years has dedicated itself to sowing animosity against Catalonia in the rest of Spain, and *secondly*, there is no need to turn away and hide from the criticism they receive for their support for the socialist Government.'

The first sentence in (4) may trigger a question such as in what way did Pujol continue to concentrate his criticism on the Popular Party? The second sentence answers this question. In turn, this new sentence contains a numeral (*dos* Eng. 'two') that poses a new question: what are the two coordinates of this message? Then, the question is answered as to which are the two central questions in the politician's speech. The questions that the reader asks or that arise when reading a statement contain the topics of the discourse, while the answers constitute the comments on the topic (Portolés, 2010). The sentence prior to the colon introduces the topic "the two points of the message" and the clauses that follow the colon contain the two comments subsumed under the same topic "the PP shows animosity against Catalonia" and "we must not hide from "the criticism for supporting the socialist government", as shown in Figure 1.

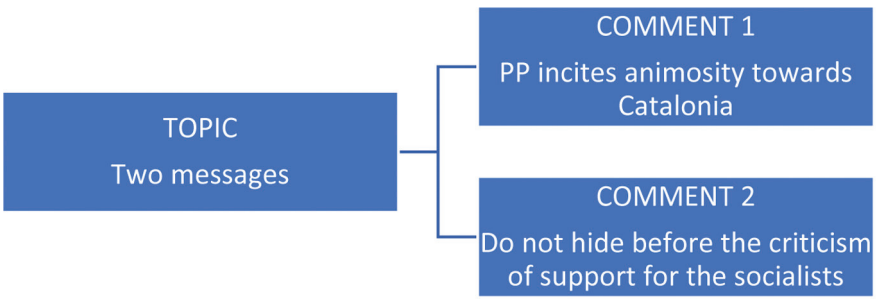


Figure 1: Topic and subcomments

In this context, structural markers help to signal when an information sequence is subordinated under the same thematic block. In other words, the presence of structural marker provides clarity about which discursive segments function as comments on the same topic (Portolés, 1999, p. 166). In (4), *en segundo lugar* (Eng. 'secondly') provides two processing instructions to the reader: 1) that a topic change has not yet occurred; and 2) that this is already the second and last of the two announced units. In (4), the author decided to mark with structural markers only the second comment to the topic, even if the first comment could also have been introduced by *en primer lugar* (Eng. 'firstly') as in (4b).

(4b) Ofreció con nitidez las dos coordenadas en las que va a moverse su mensaje de estas primeras semanas: *en primer lugar*, el peligro viene fundamentalmente del PP, al que presenta abiertamente como una formación que durante dos años se ha dedicado a sembrar la animadversión contra Cataluña en el resto de España, y *en segundo lugar*, no hay que girar la cara y esconderse ante las críticas que reciban por su apoyo al Gobierno socialista.
'He clearly offered the two coordinates in which his message in these first weeks will move: *firstly*, the danger comes fundamentally from the PP, which he openly presents as a formation that for two years has dedicated itself to sowing animosity against Catalonia in the rest of Spain, and *secondly*, there is no need to turn away and hide from the criticism they receive for their support for the socialist Government.'

From the pragmatic point of view these grammaticalized adverbial units primarily have procedural meaning, as the marking of discourse through structural markers contributes to the identification of the beginning (*en primer lugar*), the continuation (*en segundo lugar*) and the end (*por último*) of a discursive sequence. This can determine more clearly when one is faced with a single information block (Portolés, 2010).

1.2 Enumeration and the predictive value of structural markers

Structural markers that structure and prioritize information are especially present in expository textual discourse or in specialized (legal, technical, economic, etc.) texts. Communication among experts requires a special focus on clarity and, in this sense, structural markers are a way to ease text comprehension when it comes to enumerations (López Samaniego, 2006; Montolío, 2006). In an enumeration, an author mainly aims to "parcel and group" information (Montolío, 2006, p. 5; own translation), to differentiate between a sequence of elements and, at the same time place all under the same category. In this parallel process of segmentation and regrouping, authors use markers to provide clues that can guide readers by marking the limits of each element listed (Montolío, 2006, p. 16).

Marking can be carried out using three different procedures: 1) graphic resources, for example, lists in which each element is marked with a hyphen at the beginning and is presented by an item on the left; 2) alphanumeric resources, where each item listed is preceded by a letter or number; and 3) discourse markers specialized in information structuring, as is the case of markers *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally') (Domínguez García, 2010). Any of these procedures are held to be very positive for cognitive processing during the reading of enumerative sequences (López Samaniego, 2006; Montolío, 2006).

Structural markers keep a spatio-temporal meaning and thanks to this they sequentially distribute information and prioritize it (Portolés, 1999). They present an additive nuance in their procedural meaning, for when the first segment of the speech is introduced, the continuation of other segments that are included under the same information block are announced at the same time (Garcés, 1997). For this same reason, the marker that opens the enumeration in the first place has a cataphoric value, since its presence ensures the enumerative continuation (Montolío, 2006, p. 20). In turn, the rest of the markers that complete the sequence have an anaphoric value, as they refer to the presence of previous segments that are part of the same information structure (Domínguez García, 2010). In (5), an enumeration containing four structural devices informs readers about the reading path they should follow.

(5) El perfil del oficial del siglo pasado ha estado decididamente determinado por *tres* factores relevantes. *En primer lugar*, la pertenencia a una fuerza militar que nace paralela al Estado, con un singular sentido de nacionalidad y que por imperativo de las circunstancias ha tenido que asumir roles que exceden el ámbito propio de la defensa. *En segundo lugar*, un modelo de instrumento castrense preparado para resolver un eventual conflicto en un escenario muy amplio, por lo que su organización es eminentemente cuantitativa y, *en tercer lugar*, la influencia innegable de la filosofía militar y estratégica del notable pensador prusiano Karl Clausewitz, que se constituye en la fuente primaria del pensamiento militar chileno (Real Academia Española, n.d.-a).
'The profile of the officer of the last century has been decisively determined by *three* relevant factors. *Firstly*, belonging to a military force that was born parallel to the State, with a singular sense of nationality and that, due to the imperative of circumstances, has had to assume roles that exceed the scope of defense. *Secondly*, a model of military instrument prepared to resolve an eventual conflict in a very broad scenario, so its organization is eminently quantitative and, *thirdly*, the undeniable influence of the military and strategic philosophy of the notable Prussian thinker Karl Clausewitz, which constitutes the primary source of Chilean military thought.'

The first element that provides hints about the structure of the texts is the numeral *tres* (Eng. 'three') in the first sentence. This has a strong cataphoric effect that

allows the reader to make anticipatory hypotheses in the processing of the fragment (Tadros, 1994). After reading it, readers will not consider closed the information block that is subsumed under the topic "three factors that determine the profile" until the third element appears. The three information markers that follow delimit the beginning and the end of each element and, each time readers encounter them, they help readers confirm that their processing hypothesis is still valid.

As a result of this, it is very likely that the presence of structural markers has positive effects on the reader's working or operational memory. This is so because, on the one hand, what has been anticipated is processed more quickly and, on the other hand, each marker represents a procedural rest point for the reader to avoid cognitive overload (cf. Montolío, 2006, p. 23). Furthermore, the information presented after each marker is largely focused when compared to the effect that the absence of those devices would have (Montolío, 2006, p. 25).

The facilitating effect on understanding that the appropriate use of markers entails has been raised as a hypothesis obtained from intuition in López Samaniego (2006) and Montolío (2006). Experimentally, Loureda et al. (2021) showed that the presence of *primero* (Eng. 'firstly') and *segundo* (Eng. 'secondly') in minimal informative sequences entails a moderate acceleration of processing costs compared to sequences that do not explicitly mark the informative structure of the discourse. (Nadal & Sainz 2024) provided evidence of this facilitative effect of *en primer lugar* (Eng. 'firstly'), (Eng. 'secondly') and (Eng. 'finally') in L1 Italian, L2 Spanish speakers. The present research replicates the study by (Nadal & Sainz 2024) to check if the facilitating effect continues to occur in the reading of expository fragments when they are read by native speakers or if, on the contrary, the presence of these units can be considered a case of "overmarking": the superfluous presence of discourse markers in a sequence.

2 Methodology

2.1 Independent variable and hypothesis

This experiment measured the processing costs invested in reading two fragments in Spanish that contained a definition. The only difference between both texts was in the presence or absence of structural markers in the sequence, as presented in (6a) and (6b), respectively:

(6a) La depresión presenta tres características: *en primer lugar*, implica un estado de ánimo irascible tras una dificultad severa; *en segundo lugar*, provoca un cambio notable en el apetito; *por último*, la falta de energía conlleva dificultad para concentrarse.
'Depression has three characteristics: *first*, it involves an irascible mood after a severe difficulty; *secondly*, it causes a noticeable change in appetite; *Finally*, lack of energy leads to difficulty concentrating.'

(6b) La depresión presenta tres características: implica un estado de ánimo irascible tras una dificultad severa; provoca un cambio notable en el apetito; la falta de energía conlleva dificultad para concentrarse.
'Depression has three characteristics: it involves an irascible mood after a severe difficulty; causes a noticeable change in appetite; Lack of energy leads to difficulty concentrating.'

In this study, we aimed at delimiting the effect of the presence of the structural markers *en primer lugar* (Eng. 'firstly'), (Eng. 'secondly') and (Eng. 'finally') in expository texts. We formulated the following hypotheses: the reading times will increase in case of absence of the markers (Condition B) compared to their presence (Condition A), since the presence of structural markers provides readers with an anticipatory effect in the construction of the discourse (Garcés, 2008a; Montolío, 2006, p. 6; Tadros, p. 38, 1994).

2.2 Experimental utterances

Eighteen experimental items following the same syntactic structure as the items presented in 4.1 were created for the experiment (https://doi.org/10.17605/OSF.IO/GE8HF). The critical utterances were distributed in two experimental lists according to a Latin square design (Conklin et al., 2018, p. 43). In this way, all participants could read all experimental conditions and nine replicas of each condition with different topics, according to the guidelines provided by Jegerski (2014). This meant that participants who read Condition A about the illness of depression, never read Condition B with the same topic, but were rather presented with other critical utterances lacking structural markers that dealt with different diseases.

Fillers were interspersed between the experimental utterances in a 1:2 ratio to prevent participants from learning about the object of study (Keating & Jegerski, 2015, p. 15). These dealt with different topics and presented another type of syntactic structure, as shown in Table 1. Participants were told that they would read short textual fragments from different topics and registers.

Table 1: Fillers and critical utterances

Type of utterance	Example
Filler	La ministra aseguró que es necesario aumentar la presencia de tropas en los países aliados. Ello supone un aumento de los impuestos. 'The minister assured that it is necessary to increase the presence of troops in allied countries. This means an increase in taxes.'
Critical utterance	La depresión presenta tres características: implica un estado de ánimo irascible tras una dificultad severa; provoca un cambio notable en el apetito; la falta de energía conlleva dificultad para concentrarse. Los afectados deben estar bajo tratamiento psicológico. 'Depression has three characteristics: it involves an irascible mood following severe difficulty. It causes a noticeable change in appetite. Lack of energy leads to difficulty concentrating. Those affected must be under psychological treatment.'
Filler	La policía localiza los cuerpos después de que uno de los dos hermanos detenidos por el crimen del periodista y el indigenista los llevará hasta el lugar. 'The police locate the bodies after one of the two brothers arrested for the crime of the journalist and the Native-American Activist took them to the place.'

All experimental items adjusted to the same syntactic structure presented in Table 2.

Table 2: Structure of experimental utterances

Utterance	Structure	Example
U1	[Det. + N] + [[V] + [Num. + N]]:	*La depresión presenta tres características:* 'Depression has three characteristics.'
U2	[*en primer lugar*,] [[V] + [Det. + N + prep. + N + Adj] + [prep. + Det. + N + Adj.];	*en primer lugar, implica un estado de ánimo irascible tras una dificultad severa;* 'Firstly, it involves an irascible mood following severe difficulty.'
U3	[*en segundo lugar*,] [V] + [[Det. + N + Adj. + prep + Det. + N]];	*en segundo lugar, provoca un cambio notable en el apetito;* 'Secondly, it causes a noticeable change in appetite.'
U4	[*por último*], [[Det. + N + prep + N] + V [N + prep. + V]].	*por último, la falta de energía conlleva dificultad para concentrarse.* 'Finally, lack of energy leads to difficulty concentrating.'

At word level, frequency and lexical ambiguity were controlled (Clifton et al., 2007; Rayner, 2009, p. 1472) to create texts in standard, colloquial Spanish. Except for the name of the disease at the beginning of the enumeration, technical words were also avoided.

2.3 Dependent variables and Areas of Interest

Eyetracking allows the exploration of the direct connection between gaze and cognition. This technique is based on the Eye-Mind hypothesis (Just & Carpenter, 1980), according to which there is a direct link between what is fixated with our foveal gaze and what is processed by our mind. When reading, our eyes combine two types of movements: saccades, which are rapid leaps in which the eye moves from one point to another (e.g., from one word to the next), and fixations, when the eye remains relatively still (except for a mild tremor) on parts of the stimulus that is being processed to extract information (Rayner, 1998, pp. 373–375). It is only during fixations that processing takes place. Thus, fixation time may serve as a parameter for measuring the cognitive effort applied while reading a text: the longer the fixation duration, the greater the processing effort (Loureda et al., 2020).

In this experiment, we measured the fixation times of reading six different Areas of Interest (AOI) into which the experimental items were divided for analysis (Arunachalam, 2013). Fixation times were analyzed by differentiating the six AOIs considering the functional areas that come into play in the structuring discourse. They include the structural markers that introduce the items of the enumeration (in the fragments of the Condition A) and the three utterances that are introduced by them, as shown in Figure 2.

En primer lugar,	**implica un estado de ánimo irascible tras una dificultad severa;**
M1	**U1**
En segundo lugar,	**provoca un cambio notable en el apetito;**
M2	**U2**
Por último,	**la falta de energía conlleva dificultad para concentrarse.**
M3	**U3**

Figure 2: Areas of Interest

Fixation times were recorded for two additional AOIs, namely the total mean and the lexical mean. The total mean includes the fixations of the whole utterance [M1 + M2 + M3 + U1 + U2 +U3] whereas the lexical mean computes only the reading times recorded for units with conceptual meaning [U1 + U2 + U3]. In the case of Condition B, the total mean and the lexical mean are the same. For all AOIs, average processing times were calculated per word (Loureda et al. 2020). On the one hand, inter-statement comparisons were established between the different AOIs (e.g., U1_Condition A vs. U1_Condition B) to compare processing costs between experimental conditions. On the other hand, intra-statement statistical differences were also calculated (e.g., U1_Condition A vs. lexical mean_Condition A) to verify if there is a different cognitive weight between the procedural and lexical units.

The comparison of intra- and inter-utterance reading times was carried out considering three dependent variables that considered the reading time per number of words. The first of them is called *first reading* or *first pass dwell time* (Holmqvist et al., 2011, p. 390) and it consists of those fixations in an AOI before the gaze abandons the region for the first time. This is an early processing stage in which readers carry out a graphic decoding of the stimulus, recognize the lexical units and assign them a meaning. During this phase, the syntactic structure is established, and pragmatic enrichment processes are carried out (Pons Bordería, 2004; van Dijk, 2003). These are all automatic processes from which a mental representation of the utterance is obtained. Figure 3 provides a graphic representation of the process according to which the first reading of the AOI M1 [*en primer lugar*] would be obtained by the sum in milliseconds of fixations 1 and 2.

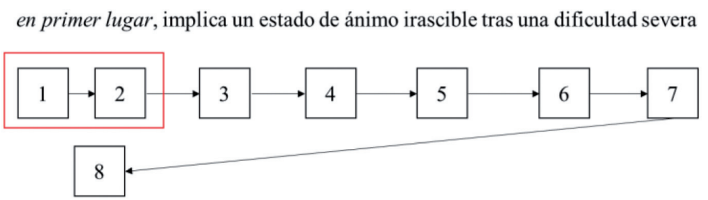


Figure 3: First reading

After readers have completed the rereading of the whole utterance (AOIs M1+U1), they may decide to go back and reprocess a specific word or AOI. This is shown in Figure 4, where the reader made a regressive saccadic movement and repositions a fixation on the marker (position number 8). This fixation, which is carried out once the AOI has already been left, represents the rereading time (Conklin et al., 2018, p. 36). Refixations are an indication of cognitive difficulty during processing. Readers may

need to go back over what was processed and check the hypotheses established during the first reading (Holmqvist et al., 2011, pp. 389–390). Rereading is, ultimately, a late measure of verification and, if necessary, rectification of an assumption.

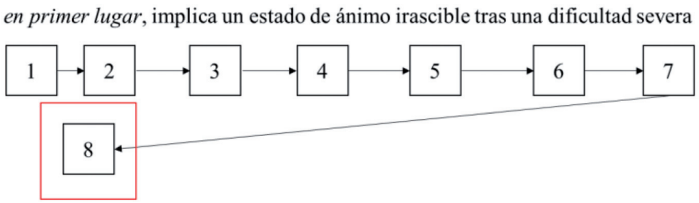


Figure 4: Rereading

Finally, the next late measurement is the accumulated parameter represented by the *total reading* or *total dwell time*, which is offered in Figure 5. This dependent variable does not allow the distinction of different processing phases and provides information about the cognitive effort used overall for the processing of all the AOIs analyzed (Holmqvist et al., 2011, pp. 389–390).

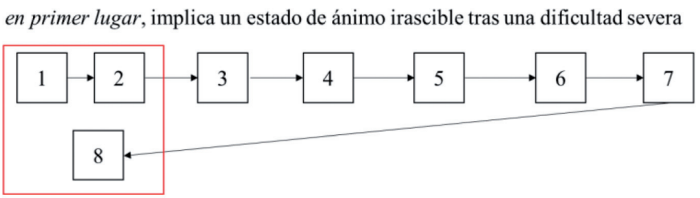


Figure 5: Total reading

2.4 Participants and procedure

Data were recorded from a total of 88 participants, who were students at the National University of Colombia and were native speakers of Spanish. Their age range was between 18 and 25 years of age, and 63 declared to be women. The experiment has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. Participation in the experiment was voluntary. Before starting, participants were asked to sign a consent form in which they agreed to participate in the study and permitted data use for scientific purposes. They were explicitly told that they could withdraw at any time.

The self-sequenced reading experiment was carried out with an *Eyelink 1000* eye tracker system with a recording frequency of 1000 Hz. Participants were positioned at approximately 65–70 cm from the screen on which the stimuli were displayed. The eye tracker was located below the screen and an infrared light camera detected the movement of the pupil of each participant after having completed a calibration exercise. The system can record data from the movement of both eyes and calculates average values. At the beginning of the self-sequenced reading, participants read the instructions and performed a mock experiment that allowed them to become familiar with the procedure. This way, questions concerning the procedure were avoided once the experiment began. Before reading each stimulus, participants had to fix a cross on the screen, which was positioned exactly at the same coordinates in which the textual stimulus began. The total duration of the test was approximately 20 minutes.

2.5 Statistical analysis

The analysis of reading times was carried out using R software in R Studio 4.1.2 (R Studio 2021). First, we calculated some descriptive statistics, such as mean reading times per word for all the dependent measurements and for each AOI and condition. Moreover, we calculated the percentage of regressions for each AOI and condition. Then, we constructed generalized linear mixed models (GLMM) based on Gamma distribution. In Model 1, AOIs U1, U2, U3 and, in Condition A, M1, M2, and M3 were treated as fixed effects, along with the number of characters per word. The random effects were the participants (individual differences in reading times,) and the topics (diseases) of the experimental stimuli. In Model 2, the total mean and the lexical mean, as well as AOIs U1, U2, U3 and, in Condition A, M1, M2, and M3 constitute the model's fixed effects, along with the number of characters per word. The random effects were the same as in Model 1. In both Model 1 and 2, we took the reading time per number of words as dependent variable.

The two models were calculated for each of the dependent variables (First Reading/words, Rereading/words, Total Reading/words), which made a total of six models. These were assembled in the *glmmTMB* package (Brooks et al. 2017). Estimated marginal means (EMMs) of the dependent variables and their pairwise comparisons were obtained with emmeans and contrast functions of the package *emmeans* (Lenth 2022). For rereading time, we implemented a zero-inflated Gamma model (ziGamma), which allowed us to overcome the restriction of a classical gamma distribution to positive observations. In fact, our data included a wide amount of zero values, which signaled the absence of rereading. In this paper, since we are not

interested in the probability of having (or not having) a regression out of each AOI, we are presenting only the results of the count model.

For the best model selection, we adopted a Type I ANOVA comparing the nested models through the likelihood ratio test. For the fixed effects, we also verified that all the candidates for predictors (i.e AOI) satisfied the collinearity condition through the Generalized Variance Inflation Factor (GVIF) proposed by Fox and Monette (1992). Finally, the goodness of fit was checked through *Pseudo-R2* (Nakagawa et al. 2017) and C (Hosner & Standley 2000).

Extreme values in the data set were eliminated if they met at least one of the following criteria (Keating & Jegerski, 2015; Loureda et al. 2021):

1) The first reading recorded a value of 0 for AOIs U1 or U2 or U3, total average or lexical average (*any skip*).
2) Both the first reading and the second reading had an average per word of less than 80 ms for the AOI U1 or U2 or U3, total average or lexical average (*fast reader*).
3) The total reading had an average per word greater than 800 ms for the total average (*slow reader*).
4) After fitting the models, we eliminated the points whose standardized residuals were more than 2.5 standard deviations distant from the zero (Baayen 2008, 257).

The differences between processing times per word were interpreted as a percentage (Loureda et al., 2020), but they were only considered if the tested hypotheses yielded statistically significant differences where the *p* value was less than 0.05 (Arunachalam, 2013). The *p* values were corrected using the adjustment method by Holm (1979).

3 Results

3.1 Descriptive statistics.

Before presenting the mixed models' results, let us report the mean reading times per word for each AOI and for each dependent variable (Table 3).

Table 3: Mean reading times per word in milliseconds, and percent regressions for each AOI and condition (namely A with discourse markers (DMs) vs B without DMs). Standard error of the mean is in parenthesis.

Measure	U1	U2	U3	M1	M2	M3	Lexical mean	Total mean
First reading								
-A with DM	19.78 (1.05)	164.85 (4.24)	159.24 (4.31)	131.87 (3.29)	139.58 (3.48)	143.44 (3.77)	97.57 (1.94)	107.09 (1.77)
-B without DM	121.19 (5.14)	177.11 (4.31)	171,86 (4,12)					149.00 (3.36)
Second reading								
-A with DM	205.34 (4.33)	120.39 (17.77)	151.25 (17.11)	92.42 (8.85)	112.21 (8.91)	122.76 (6.07)	111,25 (3,35)	89.52 (2.69)
-B without DM	185.48 (8.66)	103.27 (9.65)	105.47 (9.54)					86.56 (3.82)
% regressions								
-A with DM	99.2 (0.44)	27.3 (2.24)	25.5 (2.19)	7.58 (1.33)	22.2 (2.09)	26.3 (2.21)	99.7 (0.25)	99.7 (0.25)
-B without DM	52.0 (2.51)	18.9 (1.97)	21.7 (2.07)					63.6 (2.42)
Total reading								
-A with DM	223.57 (4.41)	197.69 (5.64)	197.82 (5.31)	138.87 (3.70)	164.51 (3.80)	175.69 (4.06)	208.54 (3.77)	196.38 (3.30)
-B without DM	217.67 (4.61)	196.67 (3.97)	194.76 (3.83)					204.09 (3.44)

The following observations can be drawn from the descriptive statistics. During the first reading, the utterances without a discourse marker have the highest processing costs, whereas during rereading the behavior is reversed. In fact, in the latter case when discursive segments are introduced by a marker, they require higher rereading costs than analogous utterances without a marker. This trend is confirmed by the regression rates, which are notably higher for utterances marked by a procedural unit. However, in total reading the reading times between conditions A and B are not considerably different. Preliminarily, it can be concluded that native speakers of Spanish apply different information extraction strategies depending on whether the enumeration is procedurally marked or not.

3.2 First reading: model 1 and model 2 results.

In Table 4 we report the EMMs of First reading for each predictor of interest, namely AOIs per condition (here called AOIC)[2]. Looking at mixed model estimates, the trend is clear: the absence of marker leads to a general increase in processing costs of the discourse segments during the first reading. Let us now focus on Model 1 for First reading. First, we report the results of the model validation. Overall, we identified and removed 154 outliers (4.32 %). As for goodness of fit, the values of Conditional R^2 = 0.61 and C = 1 demonstrate a good predictive ability of the model.

Table 4: Model 1: EMMs of First reading for each AOI per condition (AOIC predictor).

AOIC	response	SE	df	Lower.CL	Upper.CL
U1_a	17.9	0.86	Inf	16.3	19.7
U1_b	107.7	5.20	Inf	98.0	118.4
U2_a	159.8	7.65	Inf	145.5	175.5
U2_b	165.5	7.88	Inf	150.7	181.6
U3_a	150.3	7.37	Inf	136.5	165.4
U3_b	160.2	7.76	Inf	145.6	176.1

The most prominent effect occurs in U1, which has significantly higher reading times per word in case of absence of the procedural unit. Not marking the beginning of an enumerative series implies extra costs, especially in the utterance that starts the series. Readers take greater effort to assign a discursive label to the first member, as they need to make use of their inferential capacity. Processing a word in U1 when the discourse marker is absent costs 501,68 % more than processing a word in the presence of marking. The increase of first reading times that is produced in U2 is of 3.57 %. Therefore, the presence of a discourse marker produces a small effect. Finally, we observe that mean processing per word in U3 increases of 6.59 % in absence of the discourse marker compared to the same utterance introduced by the same procedural unit. Pairwise comparisons of EMMs (Table 5) show that the only significant difference between condition A and B is attested in U1.

2 EMMs are estimated based on the following model setup in R: glmmTMB(FPRT/Words ~ AOIC + Char_Word + (1|Theme) + (1|Participant), family = Gamma(link = "log"), data). AOIC stands for the area of interest plus condition (A or B). Char_Word is the number of characters per words.

Table 5: Model 1 First reading: pairwise comparisons of EMMs for each AOI per condition (AOIC predictor).

contrast	estimate	SE	df	t-ratio	*p-value*
U1_a-U1_b	-1.79	0.04	3397	-44.51	0.000***
U2_a-U2_b	-0.04	0.04	3397	-0.87	0.3810
U3_a-U3_b	-0.06	0.04	3397	-1.56	0.2340

Let us now focus on Model 2. First, we report the results of the model validation. Overall, we identified and removed 186 outliers (7.65 %). As for goodness of fit, the values of Conditional R^2 = 0.30 and C = 1 demonstrate a sufficiently good predictive ability of the model.

In Table 6 we report the EMMs of First reading time per word for each predictor of interest (AOIC)[3]. As we can see, the extra cost produced by the absence of a procedural mark that delimits the terms of the enumeration is also reflected globally on the reading times per word of the entire utterance.

Table 6: Model 2: EMMs of First reading for each AOI per condition (AOIC predictor).

AOIC	response	SE	df	Lower.CL	Upper.CL
Total mean_a	105.5	3.81	2185	16.3	113
Total mean_b	143.7	5.47	2185	133.3	155
Lexical mean_a	95.6	3.71	2185	88.6	103
M1_a	129.3	5.01	2185	119.9	140
M2_a	136.2	4.80	2185	127.1	146
M3_a	136.8	5.05	2185	127.3	147

During the construction of the first assumption, the presence of structural markers accelerates reading since the construction of the informative structure of the fragment is procedurally guided. In absence of a discourse marker, we registered an increase of first reading time per word of 36.21 %. Similarly, if the lexical average is

3 EMMs are estimated based on the following model setup in R: glmmTMB(FPRT/Words ~ AOIC + Char_Word + (1|Theme) + (1|Participant), family = Gamma(link = "log"), data). AOIC stands for the area of interest plus condition (A or B). Char_Word is the number of characters per words

compared, a significant difference and a very large effect are observed, since an increase in processing costs of 50.31 % in the absence of marking.

On the other hand, each of the procedural units of discursive organization presents considerably higher processing costs compared to the lexical average of the utterance. Processing a structural marker entails between 35 % and 43 % more than processing a word with lexical content. From this it follows that procedural guides constitute a focus of attention for the reader that does not slow down reading. These units concentrate a large part of the processing costs during reading, but which, in exchange, contain the global processing times of the discursive structure in which they are inserted.

As for pairwise comparisons of EMMs, we note that all relevant comparisons result in statistically significant differences, as shown in Table 7.

Table 7: Model 2: pairwise comparisons of EMMs for each AOI per condition (AOIC predictor). TM stands for Total mean, whereas LM stands for Lexical mean.

contrast	estimate	SE	df	t-ratio	*p-value*
TM_a-TM_b	-0.31	0.03	2185	-11.13	< .0001***
LM_a-LM_b	-0.41	0.03	2185	-14.91	< .0001***
TM_a-M1_a	-0.30	0.04	2185	-6.91	< .0001***
TM_a-M2_a	-0.35	0.04	2185	-9.73	< .0001***
LM_a-E3_a	-0.36	0.04	2185	-8.93	< .0001***

3.3 Rereading: model 1 and model 2 results.

During rereading phase readers can decide if the assumption they have built up agrees with the rest of the assumptions previously stored in their long-term memory and, therefore, decide to complement, modify or, eventually, even reject it (Kintsch & Rawson, 2005, p. 214). These are, therefore, conscious processes that may or may not take place after having carried out a first reading.

All this considered, let us now present the results of Model 1 for Rereading. First, we report the results of the model validation. Overall, we identified and removed 137 outliers (3.84 %). As for goodness of fit, the values of Conditional R^2 = 0.25 and C = 0.85 demonstrate a sufficiently good predictive ability of the model.

In Table 8 we report the EMMs of Rereading for each AOIC predictor[4]. As we can see, in the rereading phase the processing path observed in the previous parameter is reversed. The presence of a structural marker preceding each of the discursive segments slows down reading in the reprocessing phase.

Table 8: Model 1: EMMs of Rereading for each AOI per condition (AOIC predictor).

AOIC	response	SE	df	Lower.CL	Upper.CL
U1_a	193.5	8.49	3405	171.3	218.5
U1_b	153.3	8.46	3405	131.6	178.7
U2_a	79.4	5.69	3405	65.1	96.9
U2_b	89.3	7.19	3405	71.4	111.6
U3_a	103.9	8.03	3405	83.9	128.8
U3_b	77.9	6.33	3405	62.1	97.6

Let us now report some pairwise comparisons of EMMs. As you can see in Table 9, when the instructional mark is present, the rereading times per word increase significantly in U1 and U3. In U2 this trend is not observed, but the difference is not statistically significant. These results are in line with experimental tests previously carried out with the *primero* (Eng. 'first') and *segundo* (Eng. 'second') (Loureda et al. 2021, p.161). In this case, the presence of a marker generates a greater need for reanalysis in the reader.

Table 9: Model 1 Rereading: pairwise comparisons of EMMs for each AOI per condition (AOIC predictor).

contrast	estimate	SE	df	t-ratio	p-value
U1_a-U1_b	0.23	0.05	3405	4.21	0.000***
U2_a-U2_b	-0.12	0.09	3405	-1.19	0.2352
U3_a-U3_b	0.29	0.09	3405	2.89	0.0077

These data are confirmed by comparing the lexical mean of both utterances. To do so, let us now report the results of Model 2 for Rereading. First, we report the results of the model validation. Overall, we identified and removed 123 outliers (3.45 %). As

4 EMMs are estimated based on the following model setup in R: glmmTMB(RRT/Words ~ AOIC + Char_Word + (1|Theme) + (1|Participant), family = Gamma(link = "log"), data). AOIC stands for the area of interest plus condition (A or B). Char_Word is the number of characters per words.

for goodness of fit, the values of Conditional R2 = 0.23 and C = 0.58 demonstrate a sufficiently good predictive ability of the model.

In Table 10 we report the EMMs for each AOIC predictor[5]. On the one hand, if the marker is not present, the reanalysis decreases by 48.22 % compared to the analogous utterance in which the discursive segments are delimited by the marker. On the other hand, when the unit is present, readers may consider it possible to continue obtaining cognitive assumptions from the given stimulus in a second reading phase.

Table 10: Model 2: EMMs of Rereading for each AOI per condition (AOIC predictor).

AOIC	Response	SE	df	Lower.CL	Upper.CL
Total mean_a	83.8	4.13	2158	73.5	95.4
Total mean_b	69.6	4.32	2158	59.1	82.0
Lexical mean_a	101.2	5.87	2158	86.8	117.9
M1_a	81.4	9.17	2158	60.5	109.6
M2_a	75.3	5.47	2158	62.2	91.2
M3_a	104.1	7.41	2158	86.3	125.7

Let us now look at some relevant pairwise comparisons of EMMs. As we can see from Table 11, in this reprocessing phase the procedural units do not absorb the greatest costs within the utterance. Rather, each of the markers registered average reading times per word that were lower than or very similar to those obtained for the lexical mean of the entire utterance. The rereading of the fragment containing explicit markers was carried out above all from the lexical units.

Table 11: Model 2 Rereading: pairwise comparisons of EMMs for each AOI per condition (AOIC predictor).

contrast	Estimate	SE	df	t-ratio	*p-value*
TM_a-TM_b	0.18	0.05	2158	4.05	0.0002***
LM_a-LM_b	0.37	0.04	2158	0.70	0.0000***
TM_a-M1_a	0.21	0.13	2158	1.70	0.1770
TM_a-M2_a	0.29	0.08	2158	3.48	0.0014***
LM_a-E3_a	-0.03	0.09	2158	-0.32	0.7429

5 EMMs are estimated based on the following model setup in R: glmmTMB(RRT/Words ~ AOIC + Char_Word + (1|Theme) + (1|Participant), family = Gamma(link = "log"), data). AOIC stands for the area of interest plus condition (A or B). Char_Word is the number of characters per words.

3.4 Total reading: model 1 and model 2 results.

Let us report the results of Model 1 for Total Reading, which is an indicator of global processing, without distinguishing between phases for the construction or verification of the assumption (Holmqvist et al., 2011, pp. 389–390). First, we report the results of the model validation. Overall, we identified and removed 152 outliers (4.26 %). As for goodness of fit, the values of Conditional R^2 = 0.50 and C = 1 demonstrate a good predictive ability of the model. In Tables 12 and 13 we report the EMMs for each AOIC predictor and some relevant pairwise comparisons respectively[6].

Table 12: Model 1: EMMs of Total Reading for each AOI per condition (AOIC predictor).

AOIC	Response	SE	df	Lower.CL	Upper.CL
U1_a	205	7.85	3430	190	221
U1_b	200	7.66	3430	186	216
U2_a	183	7.06	3430	170	197
U2_b	185	6.97	3430	172	199
U3_a	177	6.82	3430	164	191
U3_b	177	6.80	3430	164	191

Table 13: Model 1 Total reading: pairwise comparisons of EMMs for each AOI per condition (AOIC predictor).

Contrast	Estimate	SE	df	t-ratio	*p-value*
U1_a-U1_b	0.02	0.02	3430	1.14	0.7570
U2_a-U2_b	-0.01	0.02	3430	-0.61	1.0000
U3_a-U3_b	-0.00	0.02	3430	-0.08	1.0000

As we can see from Table 13, none of the comparisons showed a statistically significant difference. Moreover, these differences are minimal and reach just 2 %. Therefore, our data show that for native Spanish speakers processing an enumeration that is not procedurally ordered does not seem to generate extra costs in global

6 EMMs are estimated based on the following model setup in R: glmmTMB(TRT/Words ~ AOIC + Char_Word + (1|Theme) + (1|Participant), family = Gamma(link = "log"), data). AOIC stands for the area of interest plus condition (A or B). Char_Word is the number of characters per words.

terms, although the presence of a marker does not have negative effects on reading either. These data agree with the idea that the presence of discourse markers in an utterance never entails extra costs compared to the parallel utterance that does not contain procedural marking (Loureda et al. 2021: 84). Globally and in quantitative terms, for native speakers the presence of information organizers does not imply an acceleration of processing.

Finally, let us now present the results of Model 2 for Total reading. First, we report the results of the model validation. Overall, we identified and removed 193 outliers (7.91 %). As for goodness of fit, the values of Conditional R2 = 0.50 and C = 1 demonstrate a good predictive ability of the model.

In Tables 14 and 15 we report the EMMs for each AOIC predictor and some relevant pairwise comparisons, respectively[7].

Table 14: Model 2: EMMs of Total reading for each AOI per condition (AOIC predictor).

AOIC	Response	SE	df	Lower.CL	Upper.CL
Total mean_a	185	6.99	2178	168	205
Total mean_b	187	7.36	2178	169	208
Lexical mean_a	193	7.67	2178	174	214
M1_a	140	5.57	2178	126	155
M2_a	161	5.96	2178	146	177
M3_a	173	6.64	2178	157	192

Table 15: Model 2 Total reading: pairwise comparisons of EMMs for each AOI per condition (AOIC predictor).

contrast	estimate	SE	df	t-ratio	p-value
TM_a-TM_b	-0,009	0.05	2158	4.05	0.6706
LM_a-LM_b	0,03	0.04	2158	0.70	0.2414
TM_a-M1_a	0,32	0.13	2158	1.70	0.0000***
TM_a-M2_a	0,28	0.08	2158	3.48	0.0000***
LM_a-E3_a	0,11	0.09	2158	-0.32	0.0033***

7 EMMs are estimated based on the following model setup in R: glmmTMB(TRT/Words ~ AOIC + Char_Word + (1|Theme) + (1|Participant), family = Gamma(link = "log"), data). AOIC stands for the area of interest plus condition (A or B). Char_Word is the number of characters per words.

The data shown in Tables 14 and 15 can be used to acknowledge that in total reading, the procedural units introduced by the discursive segments do not constitute a focus of attention compared to the rest of the lexical units that make up the utterance, but instead record reading times below the average. In other words, these are not units that overload processing during reading.

4 Discussion and conclusions

The structural markers *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally') are adverbial phrases that remain outside the sentence predication and delimit the elements of an enumeration (Martín Zorraquino, 2010; Montolío, 2006). These grammaticalized units are responsible for the structuring of information, since they indicate the beginning of each comment that is subsumed by the same discursive topic and allow the identification and orderly sequencing of all those elements that are part of the same information block (Portolés, 1999, 2010). More specifically, these are common procedural units in expository sequences of specialized texts whose aim is that of guiding readers' inferential computations (Domínguez García, 2010). In expository texts, enumeration can widely take advantage of the positive effects that the labeling of the elements listed through linguistic procedures has on cognition (López Samaniego, 2006; Montolío, 2006). The presence of specific markers that guide this operation allows processing hypotheses faster and more easily thanks to the predictive effect and helps to avoid overloading of working memory (Tadros, 1994). The aim of this article was to verify whether the presence of the structural markers *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally') in enumerations contained in expository texts facilitates reading.

The data obtained with native Spanish speakers in this eyetracking reading experiment confirmed that the presence of structural markers in enumerative fragments has an accelerating effect on processing during the first reading. In this processing phase, the fragments containing markers registered lower reading times in local (the different AOIs) and global terms (total mean and lexical mean) compared to the parallel fragments that lacked them. Marking the beginning of each of the three symptoms that define the illness speeded up the reading of the entire fragment. Given the discursive labeling of informational organization, readers should not infer how the information in the fragment is "parceled and grouped," but rather rely on the explicit guide (Montolío, 2006:5; own translation).

During the first reading, this anticipatory effect of "discursive labeling" is also reflected in the decrease in local processing costs in each of the listed members of the discourse. Faced with texts containing adequate procedural marks, readers in-

vest less time determining the limits of each of the listed elements and reconstructing the informative structure intended by the author (Portolés, 1999). This anticipatory effect is only noticed during the first reading, as during rereading the processing pattern is reversed, and the longest reanalysis times were recorded in texts containing markers. The presence of the markers implied a greater need for rereading. This situation implied a compensation in the total reading time. This parameter demonstrates that the presence of markers does not represent a slowdown in processing, which agrees with the results reported by Loureda et al. (2021) with different discourse markers. However, it does not contribute to an acceleration either. The reason for this may be an "overmarking" effect, since it is a short fragment in which the numeral *tres* (Eng. 'three') in the first sentence already establishes a clear reading route (Nadal & Sainz, 2024).

These results contradict those of a parallel study carried out with L1 Italian, L2 Spanish speakers in which the facilitating effect of the presence of *en primer lugar* (Eng. 'firstly'), *en segundo lugar* (Eng. 'secondly') and *por último* (Eng. 'finally') (Nadal & Sainz 2024) could be attested in all three dependent variables. Even if more experimental data is needed, this could be a promising indication of the differences between native and non-native speakers in the processing of pragmatically marked units, as suggested by other experimental studies (Nadal & Sainz, 2024).

Overmarking can be considered a methodological problem due to the restrictions that prevail in the creation of fully controlled experimental items in which only the analyzed condition varies (cf. Section 4; Keating & Jegerski, 2015). It can be hypothesized that in the case of larger fragments, the anticipatory effect of marking would also imply an acceleration of rereading, which would be reflected globally in the total reading. However, to the best of our knowledge, this is the first time that the cognitive reflection on reading for these conjunctive adverbial phrases in Spanish has been experimentally tested[8], since this cognitive effect, until now, had only been hypothesized based on intuition (Domínguez García, 2010; López Samaniego, 2006; Montolío, 2006). It also remains to be confirmed whether the speaker's intention also has effects on processing in this and other types of text, as demonstrated by Kamalski, Lentz, Sanders & Zwaan (2008)'s study on persuasive discourse.

In short, in this article it has been shown that marking the information structure in a enumeration in specialized texts hardly represents a quantitative advantage for the native reader. The study should be complemented with experiments that demonstrate whether the presence of these units improves the effective understanding of textual fragments, despite not implying an acceleration of processing.

8 See Loureda et al. (2021) for experimental results with other types of information structurers in other types of discursive sequences.

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