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The scalar focus operator *hasta*: an experimental study on processing costs in Spanish

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María de las Lourdes Torres Santos

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Erstgutachter: Prof. Dr. Óscar Loureda

Zweitgutachterin: Prof. Dr. Christiane von Stutterheim

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Introduction

Communication has an ostensive-inferential nature in which the utterance comprehension takes place through inferential computations (Sperber & Wilson 1995[1986]; Wilson & Sperber 2004, 2012; Wilson 2016). When uttering a sentence, only a small part of the information is linguistically codified. The full understanding is a process in which the linguistic input merges with the addressee's available assumptions that are relevant in a particular communicative situation.

Communication is also geared to search for the maximal relevance, that is, to obtain the maximum cognitive effect in return for the smallest processing effort (Sperber & Wilson 2012: 88). If communication is considered a mainly inferential activity that is guided by the search for an optimal trade-off between minimal effort and maximal effects, then a language must have some linguistic means to constrain the inferential process. Discourse particles are one of those linguistic means. They are expressions with a mainly procedural meaning that guide the addressee towards the intended interpretation without expending a large amount of cognitive effort in processing.

Pragmatic-oriented studies have substantially changed how these functional words have been approached. The Relevance Theory (RT) opened the door to a more suitable research framework to study these elements (Sperber & Wilson 1995[1986]; Wilson & Sperber 2004, 2012; Wilson 2016). The application of this cognitive theory, along with Blakemore's (1987) new line of research, allowed for the study of discourse particles relying on the notion of procedural meaning. The present research lies within the relevantist theory and adheres to the concept of procedural meaning. In this venue, we deal with the scalar focus operator *hasta* ('even'), the function of which in context with pragmatic scales has been experimentally investigated.

Scalar focus operators (FOs) create a specific information structure in discourse. They introduce an element, the focus, as the most informative of the utterance, elicit a search for alternatives to be contrasted with the focus and rank of lexical elements on a scale of likelihood. The use of scalar FOs is generally associated with pragmatic scales, which are orderings of given members based on the world knowledge shared by the speaker and the addressee (Fauconnier 1975; Fuentes 1987; Kay 1990; Iten 2002). *Hasta* ('even') is a scalar FO of an absolute nature in the Spanish language. *Absolute* means that *hasta* encodes an endpoint-marking value, and it imposes an end-of-scale

interpretation to its focus (Schwenter 2000, 2002; Schwenter & Vasishth 2001; Portolés 2007).

(1)
*Lucía y Daniel hablan español, inglés y **hasta** chino.*
'Lucia and Daniel speak Spanish, English, and **even** Chinese.'[1]

The use of *hasta* in (1) automatically establishes a scale among the three given languages (Spanish, English, and Chinese) and arranges them from the most likely language to speak (Spanish) to the least likely (Chinese). The ordering of the elements on the scale imposed by *hasta* is compatible with the assumptions that a native Spanish speaker would have in his long-term memory. As native Spanish speakers, it is to be most expected that the language they speak is Spanish. As regards foreign languages, English is the most studied language and much easier to learn than Chinese. Now consider:

(2)
Lucía y Daniel hablan español, inglés y chino.
'Lucia and Daniel speak Spanish, English, and Chinese.'

The example (2) does not explicitly mention that saying something in Chinese is less likely that saying it in English or Spanish. The implication that telling something in Chinese is the least unlikely event is a conversational implicature that we derive based on our world knowledge. The presence of *hasta* in (1), however, conventionally signals a scalar contrastive implicature. The implicature comprises the identification of the focus (Chinese) as the most informative element, the contrastive relation between the focus and the set of explicit alternatives (Spanish, English), the arrangement of all elements on a scale of likelihood, and the assignment of the focus at the final position of the evoked scale. Even though the implicature triggered by the FO requires more inferential computations to be recovered, the procedural meaning of *hasta* constrains the possible inferences and guides the addressee to the appropriate assumption minimizing the processing effort (Blakemore 1987, 1992; Sperber & Wilson 1995[1986]; Leonetti & Escandell 2004).

The characteristics of *hasta* have been addressed in numerous lexicographic works on the Spanish language (Bello 1847[1988]; Kany 1944; Cano 1982; Cuervo 1993; Pavón Lucero 1999) and other more specific studies (Martínez 1992; Schwenter 2000, 2002; Schwenter & Vasishth 2001; Miyoshi 2009, 2010, 2015). When the expression *hasta* adopts an adverbial value, instead of a prepositional one, its meaning has been oft

[1] English translations of the Spanish sentences are given to reflect word-by-word the Spanish word structure - often resulting with English sentences with incorrect word order.

compared with that of *incluso* ('even'). Even though both FOs are interchangeable in many contexts, Schwenter (2000) argued that they are two different kinds of scalar operators and proposed the distinction between relative and absolute FOs. Under this classification, *hasta* is an absolute FO because it always expresses a scalar evaluation with an endpoint interpretation. This endpoint-marking imposes limitations concerning the interaction of *hasta* with pragmatic scales.

This work wants to contribute to the earlier theoretical and descriptive investigations from a cognitive perspective. Numerous experimental studies on discourse markers in different languages and their procedural meaning have been conducted, especially within the *Diskurspartikel und Kognition* research group (for an overview, see Loureda & Nadal 2011; Nadal et al. 2016; Loureda et al. 2019, 2021). Results support the theoretical argument that discourse particles guide the inferential computations that the addressee must perform based on their morphosyntactic, semantic, and pragmatic properties (Martín Zorraquino & Portolés 1999; Portolés 2001[1998]).

Experimental research on scalar utterances with the Spanish FO *incluso* (Loureda et al. 2015; Nadal et al. 2017; Cruz & Loureda 2019; Cruz 2020) or *también* (Loureda et al. 2013) have shown a specific processing path triggered by the FOs. However, if there is a correlation between the properties of discourse particles and the cognitive activity that their production and processing unleash, the semantic and pragmatic particularities tied to the absolute FO *hasta* may not exert the same effects on the cognitive processing of the utterances in which it is inserted.

The main goal of this dissertation is to describe the cognitive effect of the Spanish FO *hasta* on the processing of pragmatic scales and to examine how its presence determines the cognitive pattern adopted during the processing of the utterances in which it is inserted. To this end, a series of psycholinguistic experiments have been carried out. Two different methods were implemented: an eye-tracking reading experiment and a comprehension test.

On the one hand, the online recording of participant's eye movements while reading the given stimuli allows for the measuring of the processing costs that each condition under study demands. On the other hand, the offline test allows corroborating to what extent the procedural instruction guides comprehension of the intended inferences. The qualitative and quantitative data collected from the online and offline methods will provide a more detailed panorama on the FO *hasta* and the cognitive activity that its production and understanding trigger in native Spanish speakers.

Three independent variables (IV) were examined: a) focus marking, b) size of the alternative set, and c) degree of pragmatic plausibility. The IV - *Focus marking* examines the presence or absence of the FO in a given utterance. It allows corroborating whether the presence of *hasta* leads to differences in the processing path and the cognitive effort that the host utterance generates. The IV - *Degree of pragmatic plausibility* examines what happens when the procedural instruction of the FO conflicts with the contextual assumptions that the readers entertain. According to the theories on the procedural meaning, the procedural meaning of the instruction should prevail over the conceptual meaning because of its rigidity. The IV - *Size of the alternative* evaluates the interaction of the procedural instruction with the semantic properties of the host utterance, and whether a greater or less amount of lexical meaning influences the processing path.

The interaction of these variables gives further insight into the role of the FO as a inferential guide during communication and the rigidity nature of its procedural meaning. The experimental findings of our study will provide, along with theoretical and descriptive studies, a three-dimensional image of this FO: the cognitive activity triggered by its processing, its idiomatic properties, and its specific behaviour in discourse.

This dissertation includes six chapters and conclusions. **Chapter 1** is devoted to the theoretical background of this research. The first section explores the RT, whereas the second includes the notions of the common ground and accommodation in communication. The third section deals with the distinction between procedural and conceptual meaning and their main properties. **Chapter 2** deals with the information structure and the focusing phenomena. It is divided into four sections. The first section discusses the basic notions of the information structure from different approaches and how they are adopted in this dissertation. The second and the third sections cover the kinds of elements and their properties involved in a focusing operation: the focus and the alternatives, respectively. The last section addresses the different types of scales. **Chapter 3** describes the object of study of this dissertation: the FOs. It presents an overview of the general properties and types of FOs, and the last section addresses the properties of the Spanish FO *hasta*. **Chapter 4** reviews the eye-tracking methodology as a research method and the main findings of previous experimental studies on focus phenomena. It also describes the experimental design in detail, as well as the statistical data treatment. The results are presented and discussed in two chapters. **Chapter 5** addresses the processing and understanding of unmarked and marked utterances, and **Chapter 6** focuses on the impact of the endpoint-marking value of *hasta* in utterances

with different degrees of plausibility. Each chapter of the results is structured into four sections. The first section comprises, in turn, four subsections. The first three subsections correspond to a condition of the variable under study. The last subsection includes an overall comparison of all conditions previously analysed. The second section presents the results of the comprehension test, and the final section presents a general discussion of the results for that variable. The **Conclusion** reports the main conclusions of the doctoral thesis, which will respond to the objectives set out and verify the hypotheses formulated. The **References** will be the penultimate section, and the **Appendices** will conclude the doctoral thesis.

Chapter 1: Inferential communication and optimal relevance

Human verbal communication is essentially an inferential process (Sperber 1995; Sperber & Noveck 2004). Understanding an utterance is not just about decoding the linguistic material; the hearer or reader makes inferences about the speaker's intention based on mental states and contextual information (Clark 1996; Noveck & Sperber 2004; Noveck & Reboul 2008).[2] For example:

(3)
[*Sara and Paul are at home*]
Sara: Do you want to go to the cinema?
Paul: I am tired.

(4) [*Sara and Paul are at a party*]
Sara: Do you want to go home?
Paul: I am tired.

In both cases, (3) and (4), Paul replies with the same utterance but what he communicates is different in each situation. While Paul's answer in (3) is a refusal to go to the cinema, in (4) it is an affirmative answer and he prefers to leave the party. These examples show that the same utterance can carry different intentions depending on the context. The mere linguistic decoding of an utterance provides the addressee with the *sentence meaning*, but an utterance has an underlying meaning that is highly context-dependent: the *speaker's meaning*, that is, what the speaker intends to communicate in a particular situation.

Grice (1975) was the first to make the distinction between sentence meaning ('what is said') and speaker's meaning ('what is implicated') and argued that understanding an utterance is a matter of inferring the speaker's intentions.[3] However, as seen in (3) and (4), as the same message may convey different intentions, the addressee is tasked with contextually completing or enriching the linguistic material by means of pragmatic operations to recover what the speaker really communicates. From a Gricean perspective, the speaker and the addressee take part in two different tasks in a communication exchange: the speaker carries out a productive process to express a particular intention and the addressee performs an interpretative process to infer his

[2] I will use the terms *speaker* (he) to indicate the utterer/writer and *addressee* (she) to indicate the hearer/reader/receiver.

[3] Grice's theory explained communication in terms of intentions and inferences and his work led to the development of an inferential-intentional model of human communication as an alternative to the coding-decoding process (Wilson & Sperber 2002, 2004).

intended meaning. Based on Grice's ideas, Sperber and Wilson (1995[1986]) developed their cognitive theory of human communication: RT.[4]

From a relevance-theoretic account, verbal communication is an ostensive-inferential process. Communication is ostensive because the speaker produces an ostensive stimulus to fulfil two intentions: an *informative intention* of making a set of assumptions manifest to the addressee (i.e., the intention to communicate something) and a *communicative intention* of making the informative intention mutually manifest to the addressee (i.e. that the addressee recognises that the speaker wants to communicate something) (see Sperber & Wilson 1995[1986]: §§ 1.11, 1.12). Communication is also inferential because the addressee recognizes and infers the speaker's intention (or the communicated assumption in relevantistic terms) based on the stimulus and the contextual data. Ostension and inference are then two sides of the same process of communication but seen from two different perspectives: whereas communication is an ostensive task from the speaker's side and refers to the production of a message, communication is an inferential task from the addressee's side and refers to the interpretation of that message (Sperber & Wilson 1995[1986]; Pons Bordería 2004; Escandell 2006; Yus 2010; Wilson & Sperber 2012).

The reason why the addressee settles on the interpretation intended by the speaker, out of all possible meanings, lies in the notion of *relevance*. For Sperber & Wilson (1995[1986], 2002), human beings automatically search for maximal relevance, that is, to obtain the most relevant or important information from the inputs we have in a particular situation:

> As a result of constant selection pressure towards increasing efficiency, the human cognitive system has developed in such a way that our perceptual mechanisms tend automatically to pick out potentially relevant stimuli, our memory retrieval mechanisms tend automatically to activate potentially relevant assumptions, and our inferential mechanisms tend spontaneously to process them in the most productive way (Wilson & Sperber 2002: 254).

[4] RT aims at explaining the communication from the sides of the speaker and the addressee and at illustrating the inferential processes that the latter goes through to obtain a successful interpretation of an utterance. Even though Grice's claims were the point of departure for RT, there are some fundamental differences between both models: while RT is based on cognition, Gricean theory is based on human cooperation. For Grice, communication was effective because all interlocutors tacitly respected a general conversational principle, the *cooperative principle*, which determined how language was used correctly and effectively. This principle consisted of four categories called the maxims of conversation: the maxims of quantity (truthfulness), the maxims of quality (informativity), the maxims of relation (relevance), and the maxims of manner (clarity). On the other hand, the RT account reduces all Grice's maxims to a single principle responsible for governing human communication: the *principle of relevance* (Sperber & Wilson 1995[1986]; Montolío 1998; Yus 2003, 2016; Wilson & Sperber 2004, 2012; Ifantidou 2014).

The whole process of communication – from the production of the ostensive stimulus to the recovery of the speaker's meaning – is guided by the *principle of relevance*. This principle leads the inferential processing involved in an utterance interpretation and ensures that the addressee reaches the intended message in a specific context even though the same utterance may convey an array of different meanings depending on the context (Yus 2003; Pons 2004; Wilson & Sperber 2004).

Sperber & Wilson (1995[1986: 260-278]) claimed that relevance is a cognitive and communicative notion and proposed two principles:

a) *Cognitive Principle of Relevance:* Human cognition tends to be geared to the maximization of relevance.

b) *Communicative Principle of Relevance*: Every act of ostensive communication communicates a presumption of its own optimal relevance.

From a communicative perspective, each stimulus implies that the speaker wants to be relevant, and he uses the most appropriate stimulus he can create to guide the addressee towards the correct interpretation (communicative principle of relevance). From a cognitive perspective, the addressee starts an interpretative task which aims at selecting the most relevant assumptions and efficiently interprets them in the current context, that is, with the greatest cognitive effects and the smallest processing effort (cognitive principle of relevance).

The utterance also raises *expectations of relevance* about itself that guide the addressee towards the right interpretation. However, relevance is not an underlying property of utterances; the relevance of an utterance is the result of the trade-off between the cognitive effects the addressee can derive and the processing effort she needs to derive them. The amount of cognitive effects – or the implications that can be drawn – also depends on the *context* wherein the linguistic stimulus is uttered and processed:

> Ser relevante no es una característica intrínseca de los enunciados. Se trata más bien de una propiedad que surge de la relación entre enunciados y contexto, esto es, entre el enunciado, por una parte, y un individuo con su particular conjunto de supuestos en una situación concreta, por la otra. Lo que puede ser relevante para alguien en un momento dado, puede no serlo para otra persona, o puede no serlo para él mismo en otras circunstancias (Escandell 2006: 120).

During the interpretative process, the reader constructs accessible hypotheses about the speaker's meaning that best satisfy her expectations of relevance. The decisions about the most accessible hypothesis are made almost unconsciously in favour of the one that involves the least effort and the only one that respects the presumption of optimal

relevance. The interpretation process will stop when the expectations of relevance are met or abandoned (Wilson & Sperber 2004: 613). When the expectations of relevance are satisfied, the final interpretation should satisfy two conditions (Yus 2009: 756):

a) An assumption is relevant if the cognitive effects produced when it is optimally processed are large.

b) An assumption is relevant if the processing effort needed to produce these cognitive effects is small.

However, that does not mean that an addressee automatically rejects interpretations that are more effort-demanding than other less demanding ones. If the recovery of a particular assumption requires additional processing effort, this increased effort has to be compensated by a greater number of cognitive effects. Considering again the previous conversation between Sara and Paul:

(5)
[*Sara and Paul are at home*]
Sara: Do you want to go to the cinema?
a. Paul: I am tired.
b. Paul: No.

Paul's reply (5a) does not provide a direct answer to the question so that Sara needs to invest more effort to interpret (5a) than for interpreting (5b), which is a more straightforward and less demanding answer. With answer (5a), Sara needs to recover from her long-term memory that when people are tired, they prefer to sit or lie on couches watching TV. Therefore, she concludes that Paul does not want to go to the cinema. Nevertheless, the answer (5a) provides more cognitive effects, namely, the reason for rejecting the invitation, that could not probably be obtained from (5b). This additional effect offsets the increased effort.

Therefore, relevance is considered a matter of balance between the processing effort required to process a stimulus and the amount of cognitive effects that this processing produces (Sperber & Wilson 1995[1986]; Yus 2003, 2010; Wilson & Sperber 2004, 2012).[5] And since human beings tend to compensate effort and cognitive gain, the more cognitive effects produced by a stimulus, and the smaller effort its processing involves, the higher the relevance of the stimulus will be. Conversely, if the input needs a

[5] Positive cognitive effects (or *contextual cognitive effects*) are changes that enhance one's representation of the world (Wilson & Sperber 2004: 608). They occur when the new information interacts with a set of assumptions available in the addressee's cognitive system. They can interact by strengthening, weakening, or eliminating an existing assumption or by introducing a new assumption that combines with context to yield relevant conclusions.

considerable amount of effort and yields few cognitive effects in return, it will be less relevant and there is a high risk of losing the addressee's attention. With this in mind, an input is proportionally relevant to an addressee and consequently worthy of processing, if it yields the maximum cognitive effects for the least processing effort.

New information is also relevant for the addressee when it interacts with the assumptions that she has accessible at the moment of interpreting the input. New information can interplay with old information in three different ways. It can reinforce a previous assumption about the world, it can contradict or eliminate an existing assumption, and it can also give rise to a new conclusion (or *contextual implication*)[6] when it combines with the existing assumptions (Sperber & Wilson 1995[1986]; Yus 2003, 2009; Escandell 2005; Wilson & Sperber 2012; Ifantidou 2014). For example:

(6)

New information:
Sara: There is an interesting art exhibition on Saturday. Are you coming?
Paul: I have Andrea this weekend.
Information already accessible:
a. Paul is a divorced father and has a daughter called Andrea.
b. Paul shares custody and gets the child every two weekends.
c. When he has his child, he spends as much time as possible with her.
Conclusion (inferred by combining two sources of information):
Paul will be unable to attend the exhibition on Saturday (because he will spend time with his child).

The conclusion that Paul will not attend the exhibition can only be inferred if Sara knows about Paul's family situation beforehand. In this case, the blend of both kinds of information – the new information and the accessible information – allows Sara to draw the final interpretation which could not be reached by considering these sources of information separately.

On the other hand, expectations of relevance can also be abandoned if the processing of the new information demands a high amount of processing effort and, at the same time, such effort does not raise sufficient cognitive effects. This would be the case, for example, when the communicated assumption involves replacing mental beliefs with others that are contradictory to our world knowledge.

(7)

[*Isabel comes from Madrid and she works at a language school in Berlin.*]
Isabel speaks Chinese and even English.

[6] For Sperber & Wilson (1995[1986]), a contextual implication is not just new information, it is "a synthesis of old and new information, a result of interaction between the two" (p. 108).

According to a European vision of the world, the most popular foreign language to learn is English. Hence when, in example (7), speaking English is presented as a less likely event than speaking Chinese, the new information collides with the mental assumptions of the addressee. Assuming that the speaker is trying to be relevant and attempting to save communication, the addressee searches for possible contexts in which the conflicting assumption could fit. This search is a cognitive operation that triggers a certain amount of processing effort. However, if the expended effort does not yield enough cognitive effects and, thus, there is no optimal balance between effects and effort, the addressee can abandon the expectations of relevance and stop the interpretation process. Therefore, an utterance will also be relevant if the communicated assumption is adaptable to the context and if it is easy for the addressee to process.[7]

In summary, under the RT account, in communication, there is a division of tasks between the speaker and the addressee in a conversational exchange. First, a speaker creates an ostensive stimulus to make sure that the most easily accessible interpretation consistent with the principle of relevance is the one intended. After recognizing the informative intention of the speaker, the addressee assumes the interpretative cognitive task, which consists of identifying the best hypothesis about the speaker's intentions. Along the process, the principle of relevance guides the addressee to evaluate all possible interpretations in terms of relevance and help her to exclude all of them, except for one (Sperber & Wilson 1995[1986]; Yus 2003; Wilson 2004; Wilson & Sperber 2012). The optimal balance between effect and effort will depend on the correlation between selecting the best context in which to process the new information and obtaining the maximum of cognitive effects in exchange for the least amount of effort (Sperber & Wilson 1995[1986]: 144; Yus 2003: 2017). However, if the positive effects do not offset the processing effort to derive them, there is a high risk of abandoning the expectations of relevance and the interpretation process.

1.1 Linguistic underdeterminacy and pragmatic enrichment

An utterance does not linguistically encode all the information necessary to understand the speaker's meaning (Sperber & Wilson 1995[1986]; Carston 2002, 2004; Murillo 2010; Wilson & Sperber 2012); it is instead a template to be enriched by means of different pragmatic processes:

[7] We study the effect on processing and interpretation that causes a pragmatic mismatch between a procedural element as a FO and the contextual assumptions entertained by the readers (see Chapter 6).

> Se puede afirmar, en fin, que todo enunciado está subdeterminado desde el punto de vista de lo exclusivamente codificado en la lengua. La lengua proporciona únicamente un esquema (schemata) o plantilla (template) de una suposición (assumption) que ayuda o dirige el funcionamiento del mecanismo inferencial. Es gracias al enriquecimiento pragmático como se llega a obtener una suposición que se corresponde, al menos, con una proposición (Portolés 2004: 147).

The utterance *Sara's house is gorgeous* is linguistically underdetermined. Without further context, it can mean the house Sara owns, designed, rents, etc. The utterance delivers an incomplete proposition that must be filled in by pragmatic elements that specify the relation between Sara and the house. Because of this **linguistic underdeterminacy,** the complete interpretation of the utterance not only involves the decoding of the explicit meaning but also a pragmatic enrichment of the output of linguistic decoding. The addressee must take contextual factors into account and make a pragmatic contribution to the explicit meaning of the utterance to infer what the speaker communicates but does not say explicitly.

Utterances also present different degrees of linguistic underdeterminacy depending on the level of explicitness of the explicature:

(8)

a. Sara has taken enough help from Paul.
b. She has taken enough from him.

Utterances (8a) and (8b) carry the same explicature,[8] but it presents a higher or lower degree of explicitness that can be analysed in terms of relative proportions between linguistic decoding and pragmatic inference. In (8a) the explicature is more explicit than in (8b), so the contribution of decoding will be greater and the contribution of pragmatic inference smaller. On the contrary, the explicature is less explicit in (8b) so that the linguistic decoding will be smaller and the pragmatic contribution higher (Wilson & Sperber 2012). From a cognitive perspective, the linguistic underdeterminacy of the proposition expressed by an utterance is linked to more processing effort. Disambiguating, assigning reference, or constructing a context are steps necessary for a full identification of the speaker's meaning that takes place with cognitive effort. The processing effort required to enrich the decoded explicit meaning by supplying contextual assumptions is reflected in longer reading times during processing in

[8] Sperber & Wilson (1995[1986]) coined the notion of explicature to identify "an ostensibly communicated assumption which is inferentially developed from one of the incomplete conceptual representations (logical forms) encoded by the utterance" (Carston 2002: 377). The difference between explicatures and implicatures lies in the amount of pragmatic inference needed for each one. While the addressee arrives at the explicature by combining the linguistic decoding and pragmatic inferencing, an implicature is derived exclusively through pragmatic inferences (Carston 2004).

comparison to utterances with less underdeterminacy, where the needed information is more accessible.

The relevance-theoretic comprehension of an utterance involves a sequence of tasks that takes place in parallel and against a background of expectations that the addressee reviews or elaborates as the utterance unfolds. Wilson & Sperber (2004) distinguished two kinds of pragmatic operations: primary operations to derive the *explicature* and secondary operations to activate the intended *contextual assumptions* (implicated premises) and, finally, to arrive at the intended *contextual implication* (implicated conclusion). These processes to reach the interpretation of an utterance are automatically performed in a parallel adjustment between decoded and inferred information:

> Los procesos de codificación en inferencia se suceden en un movimiento de zig-zag de ciclos muy breves, que alterna procesos ascendentes (inducidos por el estímulo) y procesos descendentes (guiados por los conocimientos y las expectativas). De este modo, las expectativas generan desde el principio hipótesis anticipatorias con respecto tanto a la forma lingüística como a las representaciones que se intenta comunicar, con lo que se restringe significativamente el espacio de búsqueda para el procesamiento de los nuevos constituyentes; cada nuevo constituyente proporciona, a su vez, nuevos datos que siguen refinando las hipótesis interpretativas (Escandell 2005: 134-135).

The comprehension starts with the decoding of the explicit linguistic content that gives rise to the logical form of the utterance (Carston 1996; 2002). This logical form represents the conceptual semantic representation that is determined by the grammar and is context-independent. The logical form cannot be evaluated in terms of truth conditions. For that, it must be enriched through pragmatic operations to yield a propositional form that is truth-evaluable: the *lower-level explicature*,[9] which represents the communicated proposition.

The addressee obtains this explicature by combining decoding processes and a series of pragmatic enrichments: disambiguation, pragmatic enrichment, and *ad hoc* concept construction, among others.

The *disambiguation solving* consists in selecting the appropriate meaning of a word or a grammatical construction according to the situation or context in question. For example, the words *rose*, *fair* or *bark* can have different meanings and their disambiguation will require the addressee to fall back on the contextual information to decide the most appropriate meaning in each case. The decision for the correct interpretation in a specific context will be guided by the principle of relevance.

[9] The lower-level explicature is also called *basic explicature* (Wilson & Sperber 2004), *propositional explicature* (*explicatura proposicional*, Escandell 2006), or *first-level explicature* (see Wilson & Sperber 2012).

The process of *pragmatic enrichment* consists of completing the explicit content conveyed by an utterance. The main processes are *saturation* and *free pragmatic enrichment*, and the difference between both lies in the necessity of contextual elements to express a complete proposition. Saturation is mandatory because "a slot has to be contextually filled, leaving the utterance semantically incomplete if it remains unfilled" (Recanati 2012: 70). For example, the utterance *Lisa is ready* does not express a complete proposition if the context does not answer the question *For what*? The word *ready* is a context-sensitive expression because the linguistic meaning depends upon the context: ready for the exam or ready to leave the house. In contrast to saturation, free pragmatic enrichment is optional. *Free* means that the process is context-driven since it is not required by any element within the linguistic form. In the utterance *Leo went to the cinema last Monday, and he ran into Lisa*,[10] it is contextually assumed that where and when Leo and Lisa met is in the *cinema* and *last Monday*, respectively. Here, providing a place and a time for the event in the second member of the utterance (*he ran into Lisa*) is not imperative – they are mentioned in the first part of the coordination – and for that reason, they do not need to be specified in the context to have a complete proposition. According to Recanati (2012), it is possible to talk about free enrichment if three conditions are met: a) the context provides an element for interpreting the utterance, b) that element contributes to the truth conditions of the utterance, and c) if the element is omitted, the proposition is still complete.

The *ad hoc concept construction* occurs when interpreting utterances. The addressee needs to modify the literal meaning of words to satisfy the expectations of relevance that rise in a particular context (Carston 1996, 2002, 2004; Wilson & Carston 2007; Wilson 2016). Such *ad hoc* concept construction can be of two kinds: enrichment (or narrowing) and loosening (or broadening). Lexical enrichment involves the use of a word "to convey a more specific sense than the encoded one with a more restricted denotation" (Wilson & Carston 2007: 232). For example, the concept of the noun *drink* undergoes an enrichment when it is used to mean an *alcoholic drink*. Lexical loosening is the use of a word "to convey a more general sense than the encoded one" (Wilson & Carston 2007: 234). This process leads to the widening of the lexically encoded conceptual meaning under a specific context. The encoded concept of a *tonne* in *My bag weighs a tonne* is intended to be interpreted as *too much* and not literally.

[10] Adapted from Recanati (2012: 71).

The derivation of the explicature is not finished yet with the execution of these pragmatic processes, since further aspects related to the verbal action and the speaker's attitude must be also reconstructed. These representations about the propositional attitude or illocutive intentions of the speaker transform the actual explicature into a *higher-level explicature.*[11] Only when the derived explicature combines inferentially with the contextual knowledge that the addressee has available, do assumptions or implicatures finally arise.

The addressee is guided by the principle of relevance throughout the whole process, from the construction of the logical form of an utterance to the derivation of the implicature (Wilson & Sperber 2004, 2012). The addressee makes decisions about the most accessible interpretation and, assuming that the speaker is being optimally relevant, she settles on the interpretation that yields more effects with the least processing effort, while the other interpretations in conflict with the principle of relevance are abandoned (Sperber & Wilson 1995[1986]; Wilson & Sperber 2004, 2012; Wilson 2016). The addressee is not aware of this selection-discard process, and she will only make a conscious decision when the most accessible option does not make sense within the given context.

1.2 Common ground and accommodation

Communication takes place against a background of a set of assumptions that are assumed to be shared and mutually recognized by the interlocutors in a communication act (Krifka & Musan 2012; Fischer 2016). The presumed knowledge that participants have in common has been named the *common ground* (CG) shared by interlocutors in a communication that constrains the inferential processes and includes information conveyed in the conversation, background knowledge, beliefs, suppositions, and other aspects of the current accessible situation (Clark 1996; Fischer 2016):

> Roughly speaking, the presuppositions of a speaker are the propositions whose truth he takes for granted as part of the background of the conversation … Presuppositions are what is taken by the speaker to be the common ground of the participants in the conversation, what is treated as their common knowledge or mutual knowledge (Stalnaker 1978: 260).

[11] The higher-level explicatures are also called *higher-order explicatures* (Wilson & Sperber 2004, 2012; Wilson 2016) or superior explicatures (*explicaturas superiores*, Escandell 2006). These higher-level explicatures are not made explicit but the speaker may use certain linguistic phenomena or expressions to clearly show the higher-level explicature: prosody, gestures, modality particles, word order in a sentence, and certain features of verbal flexion such as modus. For her part, the addressee needs to combine inferential information from different sources, like the communicative situation itself and her world knowledge (Leonetti & Escandell 2004).

The CG is continuously modified during communication, and how speakers plan their contributions and introduce the information to his addressee is based on that ongoing evolving feature (Clark 1996; Krifka 2007). A speaker makes guesses about the knowledge, ideas, and expectations that the addressee has in mind during communication. Considering what she knows or ignores, the speaker organizes and adapts his discourse in order to transmit the information in the most effective way and ensure a specific interpretation adapted to his communicative intention. On the other hand, the addressee makes use of her CG as a resource to understand messages quickly and effortlessly, make disambiguations, and recover the communicated assumption (Prince 1992; Fischer 2016).

The relevance model is based on the idea that we communicate because we want to improve our knowledge about the world, and that any stimulus we process will somehow modify our cognitive environment. The cognitive environment of an individual is shaped by the facts and assumptions that are manifest to him, in other words, a set of the facts that he can represent mentally and accept as true at a given place and time (Sperber & Wilson 1995[1986]; Yus 2003). The cognitive environment of each person is also different because it is built based on a particular social or cultural background, previous beliefs, or experiences:

> We do not all construct the same representation because of differences in our narrower physical environments on the one hand, and in our cognitive abilities on the other … People speak different languages; they have mastered different concepts; as a result, they can construct different representations and make different inferences. They have different memories, too, different theories they bring to bear on their experience in different ways (Sperber & Wilson 1995[1986]: 38).

Even though the assumptions are different across individuals, successful communication is possible because the interlocutors can have access to similar contextual facts that are manifest to both: the *mutual cognitive environment*, which refers to the set of assumptions that speaker and addressee have in their mental models and consider to be true (Sperber & Wilson 1995[1986]).[12] Therefore, in a particular communicated exchange, the speaker and the addressee have an idea of each other's cognitive environment and search those assumptions that they share to create their mutual cognitive environment. The speaker considers the cognitive environment of his addressee to design his utterance, whereas the addressee makes hypotheses and selects

[12] Even though there are theoretical differences between *common ground* (see Clark 1996) and *mutual cognitive environment* (Sperber & Wilson 1995[1986]), in this work we assume a more inclusive notion of *CG* and we argue that the CG that interlocutors share depends on the immediate context and ideas the speaker and addressee have and build from each other during communication.

the most relevant assumptions to interpret the utterance following the principle of relevance. If the communication is successful, the mutual cognitive environment increases, but communication can also fail if the CG does not meet the presuppositions of the speaker's utterance. During a conversation, the speaker may presuppose events or things as part of the CG, and he expects the addressee to accommodate that information by adding it to her CG. When that happens, the *accommodation* can repair the context.

Accommodation is seen as a repair strategy by which the addressee updates the CG by adding new material to the context in order to satisfy the presuppositional requirements of the utterance and avoid the disruption of comprehension (Thomason 1990; Ahern & Leonetti 2004; Beaver & Zeevat 2007; von Fintel 2008; Escandell et al. 2011; Lucas 2011; Roberts 2012; Müller 2018):

(9)

[Context: when leaving a store, we read the following sign]
Please mind the step

The reader of (9) is not aware of the existence of any step until she reads the sign. Under a relevantist approach, definite articles are procedural items that encode instructions about the availability of mental representations (Escandell & Leonetti 2000; Lucas 2011). The article *the* presupposes the accessibility of the assumption that there is a step, but the current CG of the addressee does not necessarily contain that information. There is then a mismatch between the meaning encoded by the definite article and the accessible contextual assumptions. To meet the requirements of the procedural item and repair the communication, the addressee initiates an accommodation process and explicitly adds the new assumption – that there is a step in the premises – in her current CG. By means of the accommodation, the addressee reviews and readjusts her mental assumptions to build a new *ad hoc* assumption (Escandell et al. 2011).

The readjustment of the context does not always take place with the same ease though. The degree of adaptation of assumptions to the context and the inferential effort expended to adapt and integrate the new information can constrain the accommodation process (Ahern & Leonetti 2004; Beaver & Zeevat 2007; Singh et al. 2016; Müller 2018). For instance, the study of Singh et al. (2016) showed that readers have more difficulty in accommodating the word *bouncer* when it is embedded in the context of (10b) than in the context of (10a):

(10)

a. Bill went to a *club* last night. The *bouncer* argued with him for a while.
b. Bill went to the *circus* last night. The *bouncer* argued with him for a while.

The accommodation of the assumptions triggered by the FO *too* in implausible and plausible conditions was also examined:

(11)

Plausible condition
a. John will go to the pool this morning.
b. Peter will go swimming *too* after he gets back from school.
Implausible condition
a. John will go to the mall this morning.
b. Peter will go swimming *too* after he gets back from school.

The outcomes revealed that the accommodation of implausible assumptions triggered longer reading times in comparison to the plausible ones. These results are in line with those of other studies with the FOs *only*, *even* (Filik et al. 2009) and the German FO *auch* (Tieman et al. 2011) and leads to the conclusion that the accommodation of pragmatic mismatches triggered by the procedural instruction of FOs entails more difficulty – in terms of longer reading times – than the accommodation of pragmatic mismatches caused by other procedural items, such as definite articles.

This variability in cognitive performance reveals that accommodation is a gradual phenomenon (Lucas 2011: 179): while some conflicts can be repaired almost automatically, some others are considered less immediately repairable, leading to a more effortful processing in an attempt to readjust the new information. In this respect, Ahern & Leonetti (2004) argued that the origin of the accommodation seems to lie on the communicative principle of relevance. Since the accommodation is an inferential process that requires cognitive effort, it can be hindered if the relation between the processing effort we implement to carry out the contextual readjustment and the positive cognitive effects we obtain for that effort is unbalanced (see §1.1). In other words, if the pragmatic mismatch leads the addressee to an incoherence in the search for optimal relevance and the addressee does not find a compatible context in which the communicated assumption can fit, the inferential adjustment may not be completed and the communicated assumption can be abandoned.

From an experimental point of view, these two ways of dealing with a pragmatic conflict of this kind – an accomplished accommodation and a processing breakdown – involve different cognitive effort during online processing and are associated with different processing patterns. On the one hand, a concluded accommodation can cause greater processing effort because the contextual repair entails reconsidering and readjusting the mental assumptions or, even, creating a new *ad hoc* assumption to fulfil the procedural instruction; and all these operations convey more inferential effort than in those cases

where no accommodation must be initiated (see §§ 1.3, 6.1). Besides this, since the accommodation involves revising and readjusting the stored assumptions, it is expected to take place during late stages of processing (see § 4.3.1). Conversely, if the accommodation is not successful and the processing of the utterance is disrupted, a processing breakdown or abandonment of the utterance will be reflected in a lesser effort with respect to an utterance in which the accommodation was completed. Either way, a concluded accommodation does not automatically imply that the new assumption is successfully integrated into the CG, as the addressee may find it unacceptable *posteriori* (see § 6.2).

1.3 Concepts and procedures in the interpretation process

Human communication is driven by maximal relevance, and any stimulus will be relevant if its processing generates the greatest number of cognitive effects with the less processing effort. However, there is also a gap between the linguistic form and the speaker's meaning that is filled by pragmatic inferencing. In turn, drawing inferences is an effort-demanding activity, so in the pursuit of the best effort-effect balance, the speaker may use certain linguistic expressions aimed at constraining the inferential processing and easing the recovery of the intended meaning (Blakemore 1987, 2002; Wilson 2011).

Conceptual and procedural distinction

The linguistic underdeterminacy of utterances, along with the search for optimal relevance in communication, support the idea that languages are expected to provide interlocutors with linguistic elements to signal how to perform the inferences necessary to arrive at the intended interpretation of the utterance without expending unnecessary effort. Therefore, a linguistic form may encode two different kinds of information*:* *conceptual meaning* and *procedural meaning* (Blakemore 1987, 2002; Wilson & Sperber 1993; Iten 2000; Leonetti & Escandell 2004, 2012; Portolés 2004; Escandell, Leonetti & Ahern 2011; Curcó 2016).[13]

[13] The conceptual-procedural opposition has become less evident over time. Now it is argued that "all linguistics items can be envisaged as encoding processing instructions operating at various levels of representations" (Escandell 2017: 74). Leonetti & Escandell (2012) made a brief review of how the idea of procedural meaning has been treated from different approaches and conclude that, although the initial distinction is not as clear as at the beginning, it is important to maintain this distinction. If a word encodes both types of information, the conceptual meaning will be subject to procedural meaning. See Escandell & Leonetti (2011) and Wilson (2011) to consult the main arguments to

> […] there are two distinct processes involved in utterance-interpretation decoding and inference, the first being an input to the second, and, second, that the inferential phase of utterance comprehension involves the construction of conceptual (or propositional) representations which enter into inferential computations. This means that, in principle, linguistic form could encode not only the constituents of the conceptual representations that enter into inferential computations but also information which constrains the computations in which these computations are involved. In other words, it is possible for linguistic form to encode either *conceptual* information or *procedural* information (Blakemore 2002: 78).

The existence of these two different kinds of meaning implies that a linguistic expression can underpin the interpretative process of an utterance in different ways (Blakemore 2002; Leonetti & Escandell 2004):

(12)
Tienen hasta yates.
'They have even yachts.'

The word 'yachts' encodes a conceptual meaning. It maps on to concepts with a denotation, gives access to encyclopaedic knowledge, and has truth-conditional value.[14] From a relevance-theoretic approach, the concepts we store in our mind comprise three different kinds of information (Sperber & Wilson 1986[1995]: 92):[15]

a) The *logical entry* contains a series of deductive rules of the concept that provides essential information about a concept. This information is usually constant amongst speakers at a given time. For example, the concept *dog* is assumed to have a logical relation to the concept ANIMAL, which means that one of the logical properties of *dog* is 'animal of a certain kind'.

b) The *lexical entry* includes the phonological and morphological properties of a word corresponding to a certain concept, as well as the syntactic role of the word and its co-occurrence possibilities.

c) The *encyclopaedic entry* contains information we have associated with the concept and may include assumptions, beliefs, or experiences. Roughly speaking, the encyclopaedic entry would be the world knowledge we have about the concept. It is particular to an individual or community and varies depending on the context. For instance, the encyclopaedic entry of the concept *dog* gives access to various kinds of information about these animals: their appearance,

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maintain a clear distinction between procedural and conceptual meaning. For a more recent restrictive theory about the procedural meaning and procedural expressions, see Escandell (2017).

[14] The conceptual-procedural distinction was initially assumed to have a clear correlation with truth-conditional and non-truth-conditional differentiation. Nevertheless, this original parallelism has found critical voices since it has been proved that conceptual and procedural meaning may or may not be truth-conditional (see Leonetti & Escandell 2004; Wilson 2011).

[15] Not all concepts have the three entries, some of them may lack one. For instance, the word *and* encodes a concept with no encyclopaedic entry (see Sperber & Wilson 1995[1986]: § 4).

their behaviour, and any associated cultural ideas. For most European speakers, a dog is a popular pet, whereas for some Chinese, dogs can be consumed.

On the other hand, words like *even* have a mainly procedural meaning. They encode pure computational procedures and deploy a series of instructions about how to combine the mental representations activated by the conceptual words with each other and with contextual information to recover the communicated assumption (Blakemore 1987, 2002; Carston 2002; Leonetti & Escandell 2004, 2012; Escandell 2017). These procedural words act as constraints on pragmatic inferences that help to derive the correct assumption efficiently. Moreover, they cannot easily be brought to consciousness since they have no encyclopaedic entry (Wilson & Sperber 1993; Blakemore 2002).

The main properties entitled to the procedural meaning are *rigidity* and *asymmetry* with respect to the conceptual meaning (Leonetti & Escandell 2004; Escandell & Leonetti 2011). A single word has the capacity of being easily adapted to the contextual demands to transmit a wide range of concepts. Thus, conceptual information is malleable, flexible, and context-dependent so that it can be adjusted to the contextual assumptions and meet the expectations of relevance (Leonetti & Escandell 2004; Curcó 2011; Escandell & Leonetti 2011).

Procedural meaning does not have that changeability component. The procedural instructions trigger quasi-mandatory inferences and force the conceptual meaning to change, following whatever content they define (Leonetti & Escandell 2004; Curcó 2011).

(13)

a. Piero is from Italy, *therefore,* he is polite.
b. Piero is from Italy, *however,* he is polite.

The interpretation of the utterances changes according to the instructions provided by *therefore* in (13a) and *however* in (13b), since *a priori* being from Italy does not imply a special tendency to be more or less polite. In (13a), the second discourse member (*he is polite*) is understood as a consequence of the first one, while in (13b), the instruction of *however* forces us to interpret the second member as a conclusion contrary to the one that could be inferred from the first member. For their part, the malleability of concepts makes them adapt to the procedures. The procedural meaning establishes rigid conditions on the context and compels the addressee to activate or generate *ad hoc* the necessary assumptions to meet the processing instructions.

The contrast between the rigidity of the procedural meaning and the adaptability of the conceptual meaning establishes an asymmetric interrelation between conceptual and procedural content, in which the procedural one always prevails over the conceptual. The procedural meaning requires that a mental representation must exist to which the rules can apply, while the conceptual words cannot impose their lexical meaning upon the instructions. Hence, the concepts can adapt themselves to the context and to the procedural meaning, but not the other way around (Leonetti & Escandell 2004, 2012; Curcó 2011, 2016; Escandell & Leonetti 2011; Escandell et al. 2011).

This asymmetry also becomes evident in situations in which an incompatibility between contextual assumptions and procedures arises:

(14) a. Peter works a lot, he works *even* on Sundays.
b. #Peter works a lot, he works *even* on Mondays.

The procedural instruction of the FO *even* remains constant in both cases, but while the speaker communicates in (14a) an assumption that is consistent with our world knowledge (Sundays are usually a day of rest in most Western countries), in (14b) the speaker compels the addressee to recover an assumption that clashes with her mental beliefs so that the utterance becomes pragmatically implausible. Procedural instructions cannot be cancelled, even if there is a mismatch between procedures and contextual assumptions. In those cases, when the instruction cannot be fulfilled by the contextual information that is already accessible, the rigidity of the procedural element triggers an accommodation process to activate or create the right assumption to satisfy the instruction in the interpretative process (see §§ 1.2, 6.1).

Discourse particles as procedural expressions

There are procedural expressions that contribute to the interpretation of an utterance by constraining the range of possible meanings and guiding the addressee through the inferential process to optimize relevance (Blakemore 1987, 2002; Portolés 2001[1998]; Wilson & Sperber 2012). During the whole comprehension process, procedural items can operate at different levels of inference.

The procedural expressions operating at lower-level explicatures contain instructions for referent assignment, disambiguation, and enrichment. Pronouns, definite determiners, anaphoric and deictic expressions, or verb tense are procedural items working at this level (Escandell & Leonetti 2000; Escandell 2006). The procedural words contributing to higher-level explicatures signal the speaker's attitude and activate rules to retrieve

information about the speech-act or the propositional attitude (Escandell & Leonetti 2000, 2011; Leonetti & Escandell 2004; Wilson 2011; Wilson & Sperber 2012). They are mood indicators (declarative, imperative, and interrogative), word order, attitudinal adverbs (e.g. *unfortunately*), illocutionary adverbs (e.g. *seriously*), hearsay adverbs (e.g. *reportedly*), evidential adverbs (e.g. *obviously*), interjections, intonation, or some parenthetical expressions (e.g. *they say*). Finally, at the implicature level, *discourse particles* are procedural elements that fulfil the particular function of ensuring the appropriate context selection at minimal processing effort.

Discourse particles were one of the first expressions considered to be procedural based on the work of Diane Blakemore (1987, 2002).[16] Words like *however* or *therefore* are seen as procedures that constrain the possible contexts and make accessible those contextual assumptions which are relevant for interpreting the utterance in which they occur (Blakemore 1987, 2002; Wilson & Sperber 1993; Escandell et al. 2011; Ifantidou 2014). In the last number of decades, discourse particles have been largely studied under different theoretical frameworks, with different purposes, and with applications to very different languages (Martín Zorraquino & Portolés 1999). Depending on the approach, the spectrum of elements included within this class also varies. In this line, FOs tend to be excluded from classifications because they do not share the prototypical characteristics assigned to discourse particles: FOs do not have a cohesion function in discourse, nor do they have a syntactic function at the sentence level.

A relevantist account, however, envisages discourse particles as linguistic items with a mainly procedural meaning that constrain the range of possible interpretations and guide the inferential computations the addressee must perform based on their morphosyntactic, semantic, and pragmatic properties (Martín Zorraquino & Portolés 1999; Portolés 2001[1998]; Blakemore 2002; Wilson & Sperber 2012). Accepting this function of inferential guides, discourse particles are:

[16] As for the terminological aspect, *discourse particle* and *discourse marker* are currently the two most popular terms. *Discourse marker* usually refers to a restricted class of elements with the prototypical properties of a discourse marker. Given that some other expressions share only some of those canonical characteristics, *discourse particle* is suggested as a more general term as a general category under which items with the same specific properties can be grouped. For example, it would encompass words with a syntactic function in the utterance, like FOs. In the present thesis, we opted for the English term *discourse particle* since this term comprises a broad array of expressions that act or operate at the level of the implicature.

> […] unidades lingüísticas invariables, no ejercen una función sintáctica en el marco de la predicación oracional —son, pues, elementos marginales— y poseen un cometido coincidente en el discurso: el de guiar, de acuerdo con sus distintas propiedades morfosintácticas, semánticas y pragmáticas, las inferencias que se realizan en la comunicación (Portolés 2001[1998]: 48; Martín Zorraquino & Portolés 1999: 4057).

This definition underlines distinctive features of a different nature for classifying a linguistic expression as a discourse particle (Portolés 2015). On a morphological basis, discourse particles tend to be invariable expressions as the result of a lexicalization and grammaticalization process;[17] from a syntactic point of view, discourse particles usually have a clause-marginal position – that is, they are not integrated into the syntactic structure of the sentence in which they occur (Pons Bordería 2006; Llamas 2010; Portolés 2015); and from a semantic perspective, they are *inferential guides* in the utterance interpretation because of their fundamentally procedural meaning.

Applying this characterization to the object of study of this work, FOs are considered a subclass of discourse particles because they present some of the most commonly recognized features for a discourse particle: they show invariability in their formal constitution and have a mainly procedural meaning that allow them to play a guiding role in the inferential process (Blakemore 1987, 2002; Martín Zorraquino & Portolés 1999; Portolés 2001[1998], 2010, 2015).

(15)

a. *Cuentan que fue malvendiendo todo lo que había de valor; cuadros, porcelanas, alfombras, cubiertas,* ***hasta*** *las joyas de su santa madre.*
'They say that he sold everything of value: paintings, porcelain, carpets, cutlery, **even** the jewels of his holy mother.'

(María Dueñas. 2015. *La Templanza*. Barcelona. Planeta)

Unlike other discourse particles, the FO *hasta* in (15) does not hold a clause-marginal position, since it modifies a constituent integrated into the host utterance: *las joyas de su santa madre*. Because of this particularity, FOs are not normally regarded as discourse

[17] The internal constitution of a DM mirrors a double process: a combination of a lexicalization process and a grammaticalization process (Martín Zorraquino 2010; Murillo 2010). The DMs derive from lexical items or groups of lexical items that progressively lose their flexion and combination capacities (*bueno* ('well') and *claro* ('of course') derive from adjectives, *hombre* ('man') from a noun, *entonces* ('then') or *bien* ('good') from adverbs, etc.). They tend to be formally fixed because of the lexicalization they undergo. Through this gradual process, several grammatical words group and become a single expression. In the grammaticalization process, there is an evolution from linguistic items with more lexical meaning to linguistic items with more abstract and relational value (Pons Rodríguez 2010). However, grammaticalization does not imply that the initial lexical component on DMs is entirely non-existent. Some of them, even having mostly procedural meaning, still retain traces from the original conceptual content and their procedural meaning is somehow intimately connected (Portolés 2001[1998]). For example, *en suma* ('overall') has evolved from the noun *suma* ('sum') and the original meaning of addition has been retained: the DM *en suma* presents its member as the final result of a series of previous elements that have happened and, in some way, been added (Briz et al. 2008).

particles. However, *hasta* – as other linguistic cues belonging to the same paradigm such as *incluso* or *también* – encodes procedural instructions that signal the addressee on how to interpret the conceptual words. Firstly, *hasta* highlights the upcoming linguistic expression (*las joyas de su santa madre*) as the least likely object to sell in the given context (§ 3.1); it also evokes a pragmatic scale among the focused expression and the other mentioned alternatives (*cuadros, porcelanas, alfombras, cuberterías*) (§ 2.4.2), and imposes an end-of-scale interpretation upon the focused element (*las joyas de su santa madre* focus) (§ 3.3.2). The presence of an FO as a procedural expression constrains the range of possible interpretations optimizing the relevance of the host utterance (Blakemore 1987, 2002; Martín Zorraquino & Portolés 1999; Portolés 2001[1998], 2010, 2015).

If the FO *hasta* is not present, the reader might arrive at the same interpretation conversationally. A deceased mother's jewellery often has sentimental value for the family. Therefore, some families pass it down one generation to the next and sell it only in case of need. This idea is stored in our long-term memory, and we would activate it when reading the utterance embedded in the context at hand. These inferential operations require a certain amount of cognitive effort and there is no guarantee that the reader reaches the conversational implicature. The presence of *hasta*, however, guides the inferential phase conventionally and helps the addressee to obtain the most relevant interpretation with the least possible effort (Blakemore 1987, 2002).

Chapter 2: Information structure and focusing

Neither the content nor the purpose of an utterance is randomly determined. When we communicate, we continually make decisions about the shape of our message, considering our informative intention, the mental state of our interlocutor, and the resources that she must use to recover the appropriate interpretation (Lambrecht 1994; Krifka 2007; Portolés 2010). Aspects such as what we, as speakers, want our addressee to know and pay attention to, what we assume she already knows, what her expectations are, what information we treat as primary, assumed, or trivial, all constrain why we say things in different ways (Leonetti 2014: 2).

A message must be fully adapted to its specific context and be delivered in the most effective way to meet the communicative needs of the addressee and to optimize the use of her cognitive resources in processing and comprehension (Escandell 2006; Gutiérrez Ordóñez 2008; Sperber & Wilson 2012; Leonetti 2014).

> Los seres humanos organizamos el discurso de forma que se acomode a los conocimientos contextuales de nuestros interlocutores en el momento de la enunciación [...] Dicho con otras palabras, los hablantes al organizar un discurso no sólo tenemos en cuenta aquello que queremos comunicar, sino también los estados mentales que prevemos en nuestros interlocutores, si desconocen –pongamos por caso– lo que les vamos a contar, si tienen una noticia previa o si se han hecho una idea equivocada de lo que, en realidad, ha sucedido (Portolés 2010: 283–284).

We cope with discourse organization using mechanisms available in languages to obtain a coherent and cohesive discourse that facilitates communication. In Spanish, some of these resources are informative partitions in the sentence (topic/comment, theme/rheme, focus/background) or morphosyntactic procedures in the structuring and presentation of information such as dislocation, topicalization, or focalization.

2.1 The basic notions of information structure

The notion of *information structure* (IS) refers to how the information is formally distributed within an utterance.[18] Furthermore, as any sentence is always embedded in a linguistic and extralinguistic context, some formal features must also be analysed considering the situation in which the sentence is uttered (Lambrecht 1994: 2). Broadly

[18] The phenomenon of information structure has also received different denominations: *information structure* (Halliday 1967), *information packaging* (Chafe 1976) or *informatics* (Vallduví 1992), for example. IS has been studied in many and different perspectives. This has given rise to plentiful theoretical models, proposals for its description, and a terminology that is not applied homogeneously to the same events.

speaking, IS tries to account for how the information contained in an utterance is distributed and how such information fits into a context:

> [La estructura informativa es una] pieza esencial de los mecanismos lingüísticos de "adaptación al contexto", en el sentido de que contiene instrucciones sobre cómo integrar la información lingüística en el conjunto de informaciones accesibles para los interlocutores –el contexto–, con el fin de optimizar el uso de los recursos cognitivos en el procesamiento y en la comprensión (Leonetti 2014: 5).

As Leonetti (2014) declared, the IS must not be identified either with the syntactic structure of a sentence or with its semantic content. All utterances in (16) describe the same state of affairs and are grammatically correct in Spanish, but they present the information in different ways and cannot be uttered in the same situation:

(16)

a. *La empresa despedirá a muchos empleados.*
'The company will lay off many employees.'
b. *Va a despedir la empresa a muchos empleados.*
'Will lay off the company many employees.'
c. *A muchos empleados la empresa va a despedir.*
'Many employees the company will lay off.'

The internal disposition of the constituents across (16a-c) is not arbitrary. The speaker has an intention to inform, and he decides to emphasize different elements according to what the addressee needs to know. These formal alterations affect the compatibility of the utterances with the context in which they might appear since each sentence has a different information structure and makes a different contribution to the discourse (Contreras 1978: § 3.3; Leonetti 2014: 6). We can prove this contextual incompatibility if we think of what kind of question an utterance could reply to: if every utterance is an answer to an explicit or implicit initial question, then the linguistic items are organized depending on such a question.

The question-answer paradigm, better known as *out-of-the-blue questions* or *wh-questions*, is widely used to determine the unmarked order in free order languages like Spanish, since it allows the identification of new information in a sentence (Zubizarreta 1998: 1; Gutiérrez Bravo 2008: 6; Gutiérrez Ordóñez 2008: § 1.3). A question like *What is hapenning?* corresponds to a context in which the questioner ignores the current communicative situation. For that reason, a pragmatically acceptable answer will be one in which all items convey new information (Gutiérrez Bravo 2008: 370).

If we apply this test to all examples of (16), we can imagine a situation in which an employee arrives late at the office and sees that people are nervous, so he asks *What is happening*? From all possible answers given in (16), only (16a) could be pragmatically

acceptable in the context determined by the question. Utterance (16a) presents an unmarked order (Subject-Verb-Object, SVO),[19] and all elements are new information. The alterations of this SVO-distribution are the result of the information structure and signal that a constituent of the utterance has a special informative status and, thus, a relation with a specific kind of context. Therefore, the marked order in (16b) and (16c) determines a strong dependence on a particular context so that these utterances are perceived as pragmatically infelicitous in the context in which the *What is happening?* question arises.

Under this perspective, it is generally assumed that information is presented following a *given-before-new principle*. This principle states that speakers tend to place the known or given information before the new one in their messages. The cognitive processing effort that each kind of content triggers could also be an explanation for such distribution. A great deal of eye-tracking studies has consistently shown that the integration of new information is more effortful than the given information (see Irwin et al. 1982; Rayner 1998; Liversedge et al. 2003). If new information is assumed to be the target of the addressee's attention and where she invests her efforts, it is reasonable to believe that given information is mentioned beforehand to pave the way and make the comprehension of the most informative information effortless.

The IS serves for the optimization of the transmitted message, and its description in the literature has been mainly done based on categories or units of information in utterances. A central idea is the distinction of two levels of information in an utterance: *given information* and *new information*.

The term *given* generally refers to the knowledge already known –to some degree – in the CG between the speaker and the addressee, while the *new information* is the knowledge that the speaker believes his addressee does not yet have. The contrast between these two parts carrying different degrees of informativity can be formally marked in different ways (see Zubizarreta 1998, 1999; Gutiérrez Bravo 2008). For example, the given information is generally assumed to be mentioned before the new

[19] The SVO in Spanish is the most neutral order in declarative sentences (Gutiérrez Ordóñez 2008: 366). It does not depend on particular contextual conditions and that is why it is so compatible with many possible contexts of use (Contreras 1978: 46; Gutiérrez Ordóñez 2008: 442; Leonetti 2014: 3). The SVO order has also been named the *basic, canonical, or neutral* order. Traditionally, the position of the subject (S), verb (V), and object (O) determines the neutral order in Spanish. Casielles (1999: 4) claimed that subjects can have two different positions in sentences and the position is related to the informative status: the topical subject is preverbal and the focal subject - new in discourse and focused - is postverbal. So, given that the informative status is expressed syntactically, there are two kinds of word orders: an unmarked order and a marked order.

constituents, or the most informative part of an utterance correlates with the pitch accent. Likewise, the recoverability of the given information makes it easier to leave it out, while the new information always has informative relevance and cannot be omitted.

The division between a more and a less informative part is often referred to as *theme-rheme*, *topic-comment*, or *background-focus* partitions. Each dichotomy identifies two kinds of information within a sentence: a) information that the speaker considers to be already known or assumed by the addressee at the time of producing the utterance, and b) information that the speaker considers not to be known or assumed by the addressee at the time of producing the utterance (Contreras 1978; Lambrecht 1994; Zubizarreta 1998, 1999; Casielles 2004; Erteschik-Shir 2007; Krifka 2007; Leonetti 2014).

These concepts have also been defined in vastly different ways depending on the approach in question. The major competing definitions are those based on the notions of *givenness* and *aboutness* (see Matíc 2015). Based on aboutness, some approaches distinguish between what the utterance is about (*topic, theme*) and what the speaker has to say about it (*comment, rheme*). Based on the notion of givenness, some other approaches make an informative partition between what is new information in discourse (*focus, new information*) and what is known (*background, given information*). These three pairs of informational partitions are the most important basic concepts addressed in the study of information structure (Lambrecht 1994: 6; Leonetti 2014: 7).

Padilla (2006: 2) argued that 'the information structure' is an umbrella term that subsumes two kinds of structures related to two different aspects of a communicative act: the *topic-comment structure* and the *theme-rheme structure*. The topic-comment structure is oriented to the speaker and to the moment of enunciation. From this perspective, it is possible to describe how information is or will be organized since the speaker controls what is about to be said. The theme-rheme structure is oriented to the addressee and to the previous context; and from this point of view, it is possible to decide if the information is known or new.

The topic-comment structure

We follow authors such as van Kuppevelt (1995) and Portolés (2010) to give an account of the topic-comment structure. For them, the topic-comment structure is a sequence of question-answer pairs to explain the progression of a discourse. They described the discourse as a conversation between a speaker and addressee. In this dialogue, each utterance constitutes the answer to an explicit or implicit question. In turn, each question

introduces in discourse a topic that corresponds to what is being talked about. The answer to that question is the *comment* and constitutes what is said about the *topic*. We illustrate the concept of topic and comment with the example (17), where what A says is the comment and Q is an implicit topic-forming question:

(17)

Students are no longer allowed to take more than six years over their first degree.
Q: Whose decision has this been?
A: This has been the decision of the Minister of Education and Science.
Q: What is the reason for this decision?
A: It has been decided to cut the education budget drastically.
Q: When will the measure become operative?
A: The measure will become operative at the beginning of the new academic year.
Q: What is expected to be the effect of this measure?
A: One expects that in the years to come, student numbers will go down substantially
(van Kuppevelt 1995: 122).

The structural coherence of the discourse is the result of implicit topic-forming questions that determine how the discourse unfolds (van Kuppevelt 1995; Portolés 2010). The implicit questions are understood as those that "the speaker anticipates will arise in the listener's mind on interpreting preceding utterances" (van Kuppevelt 1995: 117) and contribute to a better interpretation of the ongoing discourse. The speaker builds his discourse by adding the answers to those questions. In the answer, the topic can be mentioned or unmentioned.[20]

The theme-rheme structure

This second structure considers the information from the addressee's perspective and concerning the previous discourse (Padilla 2006). An utterance can be divided into two units according to the degree of informativity as regards the actual discourse: information that is assumed to be mutually shared by the speaker and the addressee, and information that is new for the addressee. Depending on the theoretical approach, this informative partition has been referred to as the dichotomies of background/focus, given/new information, or theme/rheme. The terminology theme and rheme is widely considered to be equivalent to given and new information, respectively (Chafe 1976;

[20] For van Kuppevelt, the process includes three elements indeed: a) the feeder - a linguistic or non-linguistic event - that induces the explicit or implicit questions, b) the topic-forming question, and c) the comment. If the given answer is unsatisfactory, a subquestion will be formulated. This subquestion, in turn, generates a subcomment: "When a topic-constituting question has been answered unsatisfactorily, it will give rise to a subquestion which, if also answered unsatisfactorily, gives rise to a further subquestion, and so on recursively, until the original, topic-constituting question has been answered satisfactorily" (van Kuppevelt 1995: 123).

Prince 1981; Padilla 2006; Portolés 2010).[21] We will also assume this correspondence between theme-rheme and given-new information, so we move the discussion to the distinction between given and known information.

In the distinction between *givenness* and *newness*, the notion of givenness has been identified with the interpretations of recoverability or retrievability (Halliday 1967, 1976), shared knowledge (Haviland & Clark 1974; Clark & Haviland 1977), consciousness (Chafe 1976), and assumed familiarity (Prince 1981). We hold the idea that given information – or theme – is the knowledge that the speaker believes that his addressee knows, assumes, or can easily infer. Both interlocutors know the information because it belongs to the CG (Krifka & Musan 2012: 1; see § 1.2). Conversely, new information – or rheme – is the knowledge that the speaker believes that his addressee does not know or assume.

The distinction between given and new information in Spanish is linked to the syntactic order of the elements in a sentence, and its identification can be done by formulating an initial question (Portolés 2010: 298).

(18)

a. *¿Quién sabe cocinar?*
'Who can cook?'
b. *Sabe cocinar Leo*.
'Leo can cook.'

In (18b), *Sabe cocinar* is given information because it has been already mentioned in the question, while *Leo* corresponds to new information for the addressee. Nevertheless, a more realistic response to an explicit question such as (18a) would be just *Leo*. The possibility of omitting in the answer the shared information (*sabe cocinar*) provided in the question proves that given information can be left out because it is easily recoverable from the CG, whereas new information must necessarily be present.

The background-focus structure

The description of the background-focus pair has been generally related to given and new information (Jackendoff 1972; Zubizarreta 1998; Sudhoff 2010). This comparison makes this dichotomy seem to correspond mainly to the theme-rheme structure. Nevertheless, while some scholars adopt this equivalence, some others advocate there is

[21] The distinction between *givenness* and *newness* have been deeply addressed from a wide variety of approaches which has contributed to a heterogeneous terminology to refer to the same concepts: theme-rheme (Mathesius 1929); topic-comment (Reinhart 1982); presupposition-focus (Jackendoff 1972); background-focus (Jacobs 1983); old/given-new (Halliday 1967; Chafe 1976), open proposition-focus (Prince 1981).

a distinction between them. Hetland & Molnár (2013: 90), for instance, explained that theme and rheme are equivalents of given and new information from the addressee's perspective, but background and focus are concepts that determine what the speaker considers relevant or not. Therefore, it seems that the term *focus* has been used to refer to two different phenomena: a) new information introduced in the discourse, and b) an element within an utterance that the speaker wants to emphasize.

The idea of focus as new information is oriented to the speaker and his intentions, since he decides what information must be part of the addressee's CG and how he will deliver the message. The identification of this kind of focus is traditionally made with the out-of-the-blue questions, the answers to which allow us to distinguish between given and new information. If a focus conveys new information, and in line with the given-before-new principle, a focus that introduces new information usually has a sentence-final position in declarative sentences (Casielles 2004: 131). On the other hand, the background has a complementary function and is assumed to be "given or derivable from the linguistic or situational context and therefore belongs to the CG of speaker and hearer" (Sudhoff 2010: 13).

The notion of focus finds another explanation in Rooth's *Alternative Semantics Theory* (1985, 1992, 1996). For Rooth, the focus is a highlighted constituent within an utterance that evokes the presence of alternatives relevant for the interpretation of the utterance. This focus is generally marked by prosodic prominence, syntactic structures, or other specific focus-sensitive mechanisms*:*

(19)

a. *LISA votó por él.*
'*LISA* voted for him.'
b. *La que votó por él fue Lisa.*
'It was Lisa who voted for him.'
c. *Hasta Lisa votó por él.*
'Even Lisa voted for him.'
(Adapted from Gutiérrez Bravo 2008: 377)

The element *Lisa* constitutes the focus of each example in (19). Nevertheless, the formal realization of the focus is done in different ways. In (19a), the focusing operation involves prosodic prominence; in (19b) the focus is expressed by a cleft-structure, and in (19c), the focus is signalled by the presence of the FO *hasta.*

The two notions of focus outlined above correspond to the distinction made in literature between *information focus* and *contrastive focus*. The information focus identifies new information in discourse and broadens the CG between interlocutors (Gundel &

Fretheim 2004; Kenesei 2006; Portolés 2010). It has primarily an identificational value. On the other hand, the contrastive focus introduces new information, but also activates a contrastive relation between the focused element and a set of alternatives relevant for the interpretation of the utterance (Rooth 1985, 1992, 1996; Kiss 1998; Kenesei 2006). This explicit contrast between contrastive focus and alternatives is a conventional implicature. The informative focus may also evoke the existence of alternatives, in this case, the contrastive relation will be processed as a conversational implicature (Portolés 2010, 2011; Loureda et al. 2015; Cruz & Loureda 2019). The information focus and contrastive focus will be further discussed in the present work under the denomination of unmarked focus and marked focus, respectively (§ 2.2). We conclude by outlining the relevant terminology used in this investigation and how it will be applied. In the scope of our work, we sustain two fundamental dimensions of IS to account for the distribution of the information in discourse (topic/comment structure) and the informativity contribution of each element to discourse (given/new information).

We endorse the proposal of van Kuppevelt (1995) and Portolés (2010) to explain the notions of topic and comment. We interpret discourse as a succession of question/answer pairs. The context preceding each stimulus establishes the topic with an implicit topic-forming question. Each experimental utterance constitutes a comment on that topic.

Context	*Alba y Lucas dirigen una empresa de alquiler de vehículos en Ibiza. Actualmente tienen una flota muy moderna de vehículos; entre ellos, coches y motos.* 'Alba and Lucas run a vehicle hire company. They currently have a very modern fleet of vehicles, including cars and motorcycles.'
Topic-forming question	*¿Qué vehículos tienen Alba y Lucas?* 'What vehicles do Alba and Lucas have?'
Topic	*Tipos de vehículos que tienen Alba y Lucas* 'Types of vehicles that Alba and Lucas have'
Comment	*Alba y Lucas tienen coches, motos y hasta yates.* 'Alba and Lucas have cars, motorbikes, and even yachts.'

We will mainly use the term given information and known information as an alternative. To clarify the preference of given instead of known, we echo the words of Brown & Miller (1991):

> The terms 'given' and 'new' can only be understood in terms of text. In their most straightforward sense, these terms can be understood as information that has literally been 'given' in the preceding text and information that is 'new' to the sentence under consideration (p. 344).

Given the experimental utterance *Alba y Lucas tienen coches, motos y hasta yates*, the constituents already mentioned in the contextualization will be given information. These elements are the subject (*Alba y Lucas*), the verb (*tienen*), and the alternatives (*coches, motos*) when they are syntactically mentioned. The constituents mentioned for the first time in the utterance will be new information or focus (*yates,* for instance).

2.2 The focus: definition and kinds

The notion of focus has been characterized and classified in many ways based on semantic, pragmatic, and syntactic distinctions. Generally, it has been defined as new information in discourse: the knowledge that does not belong to the CG of the speaker and addressee in a given context, and neither is it recoverable from the discourse (Jackendoff 1972; Vallduví 1992; Lambrecht 1994; Zubizarreta 1999). Given that the focus introduces new material, it is the constituent of the discourse with the highest informative value (Halliday 1967; Vallduví 1992; Portolés 2004, 2010; Gutiérrez Ordoñez 2008). Our notion of focus falls under the description set out above, and we also distinguish two kinds of focus: *unmarked focus* and a *marked focus*.

The unmarked focus

The unmarked focus is the constituent within a sentence that conveys new information for the addressee in a neutral way,[22] that is, without using focusing procedures such as prosody or syntactic and lexical means (Casielles 2004: 136; Escandell & Leonetti 2009: 15; Leonetti 2014: 8). As it is new information, this kind of focus increases the CG between interlocutors, and the out-of-the-blue questions are the traditional strategy to identify it (Zubizarreta 1999: 4224; Kenesei 2006: 144; Olarrea 2012: 605):

(20)

Context: Alba and Lucas run a vehicle hire company. They currently have a very modern fleet of vehicles, including cars and motorcycles.

Alba and Lucas tienen coches, motos y yates.
('Alba and Lucas have cars, motorcycles, and yachts.')

Regarding the topic-forming-question *What vehicles do Alba and Lucas have?* the constituent *yates* in (20) constitutes the unmarked focus. The marked focus identifies the new information and has a primarily *identificational value* that triggers a relation between the new information (*yates*) and the background information (*coches, motos*)

[22] This kind of focus has been labelled as *information focus* (Kiss 1998; Gundel & Fretheim 2004; Kenesei 2006), *presentational focus* (Selkirk 2008), *foco neutro* (Zubizarreta 1999), *foco no marcado* (Pinuer 2009).

(Jackendoff 1972; König 1991; Vallduví 1992; Lambrecht 1994; Zubizarreta 1999; Kenesei 2006; Cruz & Loureda 2019). All elements in the relation established in this focus structure are part of a same set that must consist of at least one element (Kenesei 2006: 144). If another element becomes the focus, the set changes accordingly, along with the elements that belong semantically to the set.

The size of the expression in focus may vary in the same utterance according to the initial topic-forming question. In particular, an SVO utterance is potentially ambiguous as to the scope of the focus (Zubizarreta 1999: 4225). Given that an utterance with an SVO order can be a pragmatically felicitous response to different possible questions, the focus will correspond to the interrogative pronoun of each question:

(21)
Alba y Lucas tienen yates.
'Alba and Lucas have yachts.'

Given context	**Focus structure**
a. *¿Qué ocurre?* 'What is happening?'	[*Alba y Lucas tienen yates*]$_{F.}$
b. *¿Qué hacen Alba y Lucas*? 'What do Alba and Lucas do?'	*Alba y Lucas* [*tienen yates*]$_{F}$
c. *¿Qué vehículos tienen Alba y Lucas*? 'What vehicles do Alba and Lucas have?'	*Alba y Lucas tienen* [*yates*]$_{F}$

If we formulate the question (a), the entire utterance is interpreted as new information and becomes a *sentence focus* or *wide focus* (Leonetti 2014: 9). If the same utterance is the response to the question (b), we can identify *Alba y Lucas hacen x* ('Alba and Lucas do x') as given information and the verbal predicate *tienen yates* receives focus. If the same sentence answers question (c), the focus structure includes only the direct object *yates*, giving rise to a *narrow focus* (Leonetti 2014: 9).[23] The question-answer test shows that the assignment of focus depends mostly on the context and focus structures must be inferred from the discourse context. As seen from the above examples, a focused expression can be a single word, lexical phrases of any kind, and also larger units as a whole sentence.

[23] The distinction between wide and narrow focus depends on the focused phrase (Casielles 2004: 162). A narrow focus encompasses only a phrase, and a wide focus includes several words. So, utterances that are interpreted in their entirety as new information, with no specific background, are usually called a wide focus. On the other hand, a narrow focus requires the addressee to split the utterance into given and new information. For that reason, a narrow focus is unambiguous concerning which element constitutes the focus of the utterance.

The predefined distribution of given-new information makes the unmarked focus usually hold the last position in the utterance (Contreras 1978: 46; Kiss 1998: 248; Rodríguez Ramalles 2005: 554; Gutiérrez Bravo 2008: 382; Leonetti 2014: 4). In this way, by default, in Spanish the right side of an utterance turns into the most informative area (Trager & Smith 1951). Furthermore, if a focus is associated with the introduction of new information and all declarative sentences convey new information, there will always be an unmarked focus in an utterance (Kiss 1998: 246; Casielles 2004: 159; Gundel & Fretheim 2004: 182; Gutiérrez Ordoñez 2008: 448; Leonetti 2014: 7).

In our investigation, the unmarked focus presents particular features to avoid any ambiguity about the identification of given and new information and the scope of the focus structure. In an utterance such as …

(22)
Alba y Lucas tienen coches, motos y yates.
'Alba and Lucas have cars, motorbikes, and yachts.'

… the unmarked focus will correspond to the last word of the utterance (here, *yates*) and introduce new information into the CG in a neutral way. The rest of the information (*Alba y Lucas tienen coches, motos*) belongs to the CG because it was already mentioned in the contextualization. In the experimental utterance, the order of the elements also follows the give-before-new principle in terms of informativity.

The marked focus

In pursuing a particular informative intention, a speaker can use a series of focus-sensitive procedures to place the focus on any constituent within the utterance. We call this focused element *marked focus*.[24] The marked focus is optional, has a much more flexible distribution within the utterance than an unmarked focus, and must be marked by syntactic, lexical, or prosodic mechanisms (Kiss 1998: 246; Gutiérrez Ordoñez 2008: 448). In Spanish, focus marking usually involves the use of the following mechanisms to signal which information the speaker considers relevant to the addressee (see Portolés 2010: 294-298):

a) *Prosody.* The relation between focus and intonation often indicates that an element to which attention is drawn is marked orally by a higher emphatic

[24] This kind of focus has received many names in the literature based on slightly different features: *unmarked focus* (Trager & Smith 1951), *broad focus* (Selkirk 1984), *contrastive focus* (Kenesei 2006), *information focus* (Jackendoff 1972; Kiss 1998; Gundel & Fretheim 2004), *neutral focus* (Zubizarreta 1999), *presentational focus* (Rochemont 1986), *retrieve-add focus* (Vallduví 1992).

intonation (see Gutiérrez Bravo 2008: § 3.3). Prosodic realizations on certain elements to signal the focused expression are more often in English than in Spanish. In written language, prosodic prominence is commonly indicated in capital letters: *Alba y Lucas tienen YATES* ('Alba and Lucas have YACHTS').

b) *Word order*. Assuming the claim that given information precedes the new or less accessible knowledge, an alteration in the order in which constituents are supposed to appear in a sentence signals the special informative status of the focused element: *Yates tienen Alba y Lucas* ('Yachts have Alba and Lucas').

c) *Syntactic structures*. Relative periphrasis, also called cleft-structures in English, set the focused constituent apart from the rest of the sentence (Gutiérrez Bravo 2008: 377) as in *Son yates lo que tienen Alba y Lucas* ('It is yachts that Alba and Lucas have'). The focus marked by a relative periphrasis indicates an assumption contrary to that expected by the addressee (Givón 1990: 702).

d) *Focus operators*. Expressions like *también* ('also'), *incluso, hasta* ('even'), or *solo* ('only') foreground a member in the discourse. Depending on the semantic component that each FO encodes, they can trigger a search for alternatives, they can activate a scalarity relation among all elements, or they can exclude or include the possible alternatives from the discourse.

As well as unmarked focus, a marked focus has not only an identificational value but also a *contrastive value* (Kiss 1998; Gundel & Fretheim 2004; Kenesei 2006). The presence of a marked focus conventionally evokes a set of alternatives with which to establish a conventional relation of contrast between elements with two different informative values: the focused element and the contextually given set of alternatives (König 1991; Kiss 1998; Zubizarreta 1998; Gundel & Fretheim 2004; Kenesei 2006; Gutiérrez Ordoñez 2008; Portolés 2009, 2010).

(23)

*Alba y Lucas tienen **hasta** yates*.
'Alba and Lucas have **even** yachts.'

In (23), the set of alternatives (cars, motorbikes, bicycles, for example) is implicit and the contrast against the focus is a conventional implicature triggered by the procedural meaning of the FO *hasta*. Therefore, the implicature cannot be cancelled, as (24) shows:

(24)

*#Alba y Lucas tiene **hasta** yates, pero no tienen otros vehículos*.
#'Alba and Lucas have **even** yachts, but they do not have other vehicles.'

Furthermore, the marked focus is always a subset of the set of alternatives so that the set needs to contain an item different from the focused element, in short, the set must include more than one element (Kenesei 2006; Portolés 2010; Gotzner 2017). That is the reason why the answer in example (25) is infelicitous:

(25)

¿Cuál es la capital de Noruega?
'What is the capital of Norway?'
*#La capital de Noruega es **hasta** Oslo.*
#'The capital of Norway is **even** Oslo.'
(Adapted from Portolés 2010: 300)

The FO *hasta* in (25) conventionally triggers the existence of a set of alternatives to the marked focus *Oslo*. This set should encompass the focus and another constituent. However, Norway has only one capital, and we only expect one element in the set so that the answer becomes infelicitous. An unmarked focus in the answer would be felicitous:

(26)

¿Cuál es la capital de Noruega?
'What is the capital of Norway?'
La capital de Noruega es Oslo.
'The capital of Norway is Oslo.'
(Adapted from Portolés 2010: 300)

Unlike the marked focus, the unmarked focus may evoke the existence of alternatives if the contextual enrichment provides sufficient information to process a conversational contrast between focus and alternative. In (26), as the activation of alternatives is neither conventionally nor contextually required, then no conversational contrast is processed. Since the contrast between the unmarked focus and a set of alternatives can only be processed as a conversational implicature, the contrast can be contextually cancellable:

(27)

Alba y Lucas conocen Oslo, pero no conocen otras ciudades.
'Alba and Lucas know Oslo, but they do not know other cities.'

Another difference between the marked and unmarked focus is the straightforward relation between focus and new information. Indeed, the correspondence of marked focus and new information is not universally accepted:

(28)

A: *¿Sabe multiplicar Sara?*
'Can Sara multiply?'
B: S*ara sabe **incluso*** [*dividir*]$_{F}$.
'Sara can **even** [divide]$_{F.}$'
C: *ALICIA sabe incluso* [*dividir*]$_{F.}$
'[*ALICIA*]$_{F}$ can **even** [divide]$_{F.}$'
(Adapted from Portolés 2010: 301)

In (28), the utterance produced by speaker C contains two foci: *Alicia* and *dividir*. The prosody marks the first focus (*Alicia*), while the FO *incluso* marks the second one (*dividir*), which is not new information since speaker B already mentioned it in the previous utterance.

In the light of the previous discussion, we synthesize the notion of focus in this investigation and how an unmarked focus and marked focus are interpreted. In our experimental items, the focus is the element of the utterance that introduces new information so that it carries the highest informative value and generates the most positive cognitive effects. We also distinguish two kinds of focus: an unmarked focus (29a) and a marked focus (29b).

(29)

a. *Alba y Lucas tienen coches y* [*yates*]$_{F.}$
'Alba and Lucas have cars and [yachts]$_{F.}$'
b. *Alba y Lucas tienen coches y* ***hasta*** [*yates*]$_{F.}$
'Alba and Lucas have cars and **even** [yachts]$_{F.}$'

The unmarked focus and the marked focus (*yates*) share the common feature of introducing new information in discourse and holding the last position in the utterance. However, they are formally differentiated. The unmarked focus introduces new information neutrally, that is, without using any focus-sensitive devices, while the presence of a marked focus is always signalled by the Spanish FO *hasta.*

The kind of relation established with the set of alternatives is another distinction between unmarked and marked focus. While the unmarked focus identifies new information in discourse and has primarily an identificational value, a marked focus also has a contrastive value. The marked focus necessarily evokes a set of alternatives to be contrasted with the focused element so that the contrastive relation between focus and alternative is a conventional implicature. The unmarked focus may also evoke the existence of alternatives if there is sufficient contextual enrichment to process such contrast between unmarked focus and an alternative as a conversational implicature (Portolés 2010, 2011; Loureda et al. 2015; Cruz & Loureda 2019). In conclusion, the contrastive relation between focus and alternative is triggered conventionally in the marked utterance; while in the unmarked utterance, there is an additive relation between both informative values, and any contrastive relation between them will be processed as a conversational implicature.

Since the two kinds of focus present two different kinds of information, they are also expected to be associated with different levels of processing effort. The unmarked focus

structure, as is (29a), triggers a less complex representation than the marked focus structure in (29b), but it is also potentially more ambiguous. The high linguistic underdeterminacy of an unmarked utterance allows for a broad array of interpretations. Since the addressee must identify and process an additive relation relying on the accessible context, the integration of the new information into the CG can be performed following different cognitive patterns. The high underdeterminacy of this kind of focusing structure will be reflected in major processing effort at a local and global level in comparison to the marked structures.

On the other hand, the mental representation of the utterance (29b) is more complex because of the identificational and contrastive values of the marked focus. The comparison of two elements with a different informativity translates into more cognitive effort for this kind of information structure, but the marked utterance is also more semantically determined than the unmarked one – and thus less ambiguous. The FO *hasta* activates the contrast between the conceptual elements by imposing specific procedural instructions that restrain the need to access a context to recover the communicated assumption. As a result, the inferential interpretation is a more guided process and any additional effort demanded during the information retrieval will be finally offset. Therefore, the global processing of a marked focus structure will not require major effort, even though this kind of structure conveys a higher semantic load of information.

2.3 Alternatives

The presence of a marked or unmarked focus may evoke a set of alternatives with which the focus establishes a contrast. This contrastive relation is a conventional implicature when the focus is marked by the FO *hasta*, while such a contrast between focus and alternative is processed as a conversational implicature in the case of an unmarked focus.

(30)

Context: Elena and Ana work as volunteers in an animal shelter. They take in animals, such as dogs and cats, to find them a new owner.

a. *Elena y Ana tienen* [*loros*]$_{F}$.
‘Elena and Ana have [parrots]$_{F}$.’
b. *Elena y Ana tienen* ***hasta*** [*loros*]$_{F}$.
‘Elena and Ana have **even** [parrots]$_{F}$.

According to the topic ANIMALS WHICH ELENA AND ANA HAVE IN THEIR HOME, the unmarked focus *loros* in (30a) introduces new information that broadens the CG. The reader then relates new and background information in a simple additive relation. The

unmarked focus *loros* represents a subset of the set of contextually or situationally given alternatives that may either consist of a single element or contain a large group of elements (Kenesei 2006; Portolés 2010).

The presence of the FO *hasta* in (30b) conventionally evokes the existence of a set of alternatives that must be contrasted to the marked focus *loros*. This scalar contrastive implicature is conventional and cannot be cancelled out. The marked focus is a subset of the set of alternatives that necessarily consists of more than one element, that is, the set must have at least one element besides the focus. For that reason, examples like (31) are pragmatically strange:

(31)
*#La capital de Noruega es **hasta** Oslo.*
#'The capital of Norway is **even** Oslo.'

The alternatives can also be syntactically mentioned or unmentioned in the discourse but accessible in context (König 1991; Kenesei 2006; Portolés 2011; Krifka & Musan 2012). When the alternative is mentioned or explicit, as in (32), there is a syntagmatic relation between both informative values.

(32)
*Cuentan que fue malvendiendo todo lo que había de valor: cuadros, porcelanas, alfombras, cuberterías, **hasta** las joyas de su santa madre*.
'They say that he sold everything of value: paintings, porcelain, carpets, cutlery, **even** the jewels of his holy mother.'
(María Dueñas. 2015. *La Templanza*. Barcelona. Planeta)

When the set of alternatives remains implicit, as in (33), the contrastive relation becomes paradigmatic, and the addressee must recover the possible alternatives based on contextual and pragmatic factors.

(33)
***Hasta** para tabaco tenía que pedirle guita.*
'**Even** for tobacco I had to ask her for cash.'
(Alicia Giménez. 2015. *Hombres desnudos*. Barcelona. Planeta)

The FO takes scope over *para tabaco* in (33) and conventionally triggers a set of alternatives. The addressee must interpret that the speaker had to ask money for at least one other thing besides the *tabaco*. Since these alternatives are not expressed, the list of elements we can think of might be extensive. The context limits down this list:

(34)
*Porque yo he estado sin curro, tío, y era horroroso. Vivía entonces con una chorba que hacía de cajera en un supermercado y lo pasaba de puta pena. ¡**Hasta** para tabaco tenía que pedirle guita*!
'Because I have been with no job, man, and it was awful. At that time I lived

with a chick who was a cashier in a supermarket, and I had no motherfucking fun. **Even** for tobacco, I had to ask her for bucks!'
(Alicia Giménez. 2015. *Hombres desnudos*. Barcelona. Planeta)

The set of alternatives has been contextually narrowed down, and as alternatives we recall such things which are necessary for life's basic needs and more expensive than a cigarette pack: rent, invoices, food, or clothing. Utterances with an implicit alternative are assumed to trigger more processing effort than utterances with an explicit alternative. For the utterance interpretation, the addressee needs to infer the implicit information by relying on the background information and world knowledge. When the alternative is explicit, however, the degree of linguistic underdeterminacy of the utterance is reduced, along with the pragmatic contribution that the addressee must make.

The relation between focus and alternative has other particularities. Alternatives and focus can belong to a scale with different kinds of structures that have an impact on the size of the set of alternatives:

(35)

a. *Leo ha visitado **hasta** Nepal*.
'Leo has visited **even** Nepal.'
b. *Mi sobrina puede **hasta** dividir*.
'My niece can **even** divide.'

The size of alternatives in (35a) can be extended to a large group of items. The elements are part of a scale with an open structure so that the alternatives can be all the countries in Asia, for instance. In (35b), the set of alternatives is limited to the four basic arithmetic operations: addition, subtraction, multiplication, and division. The focus and the alternatives in (35b) build up a scale with a close structure. Further examples of a close set of alternatives are the suits of poker playing cards (diamonds, clubs, hearts, and spades) or competition medals (bronze, silver, gold). Another singularity about the set of alternatives is the internal order within the set. In this respect, Portolés (2009: 57) called attention to the fact that the alternatives are not arranged by their informative value within the set and the scale consists of only two values: alternative and focus.

From a cognitive perspective, an open or closed set of alternatives affect the inferential effort that an addressee expends when processing the utterance. Experimental studies have proved that an addressee initially considers a large number of alternatives based on semantic activation spreading, and then pragmatic and contextual factors restrict this first set to a smaller one (see Gotzner & Spalek 2016; Gotzner 2017). Hence, if the scale has a close structure, there are fewer lexical elements to consider and contrast. That limited quantity of potential alternatives would imply a restriction on the inferential

computations during the utterance interpretation, which would be reflected in a lower processing effort of the utterance (see Loureda et al. 2014).[25]

The relation between focus and alternatives can also be of two kinds depending on the semantic meaning that the FO encodes (see also § 3.2):

(36)

a. *Alba y Lucas tienen **solo** yates*.
'Alba and Lucas have only yachts.'
b. *Alba y Lucas tienen **también/hasta** yates.*
'Alba and Lucas have also/even yachts.'

The exclusive FO *solo* in (36a) establishes an *exhaustive* relation since the proposition expressed by the utterance does not hold for any alternatives. In this case, the focus is affirmed and the alternatives values are discarded. In Spanish, an exhaustive relation can also be created by relative clauses or prosodic marked structures. In utterance (36b), the relation between focus and alternative is *additive*. The FOs *también* and *hasta* express that the proposition holds for the element in focus and presupposes an alternative proposition so that the focus and the alternatives are maintained and added.

2.4 Scales

According to a topic, alternatives and focus can be arranged in a scale based on their degree of informativity (Leonetti 1993; van Kuppevelt 1996; Portolés 2007; Fuentes 2016).[26] As regards the scales with which scalar operators interact, the ordering has been analysed mainly in terms of argumentative scales or informative scales (Yates 2006: 20). From an argumentative approach, the scales are studied to interpret the influence of the linguistic elements on the argumentative function of the utterance and how they lead towards a particular conclusion. The study of the scales from the information structure gives an account of the paradigmatic relations and the generalized conversational implicatures (Portolés 2007: 147).[27]

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[25] The study from Loureda et al. (2014) analysed the behaviour of the Spanish FO *incluso* with open and closed scales. Results showed discrepancies in the processing effort generated by the FO in each condition. The differences between scales can reflect the difficulty in reordering elements in each kind of scale. The reordering of a close scale (such as the basic mathematics operations) is a procedure that requires less inferential computations than the reordering of an open scale. Consequently, utterances with close scale generated less reading values than the utterances with an open scale like a list of countries or languages.

[26] According to Fuentes (2016: 108), the concept of scale has been defined in terms of informativity and semantic strength (Levinson 1983; Horn 1984), in terms of argumentative strength (Ducrot 1980; Anscombre & Ducrot 1983), and based on pragmatic entailments (Fauconnier 1975).

[27] Portolés (2007) set forth that both kinds of scales (argumentative and informative) are complementary since their application has different purposes. He went on to say that when examining

2.4.1 Argumentative scales and informative scales

Anscombre & Ducrot (1983: 48) asserted that language is primarily argumentative. In their proposal of the Argumentation Theory,[28] the presence of certain words provides the utterance with an argumentation orientation that supports some particular conclusions rather than others.

(37)

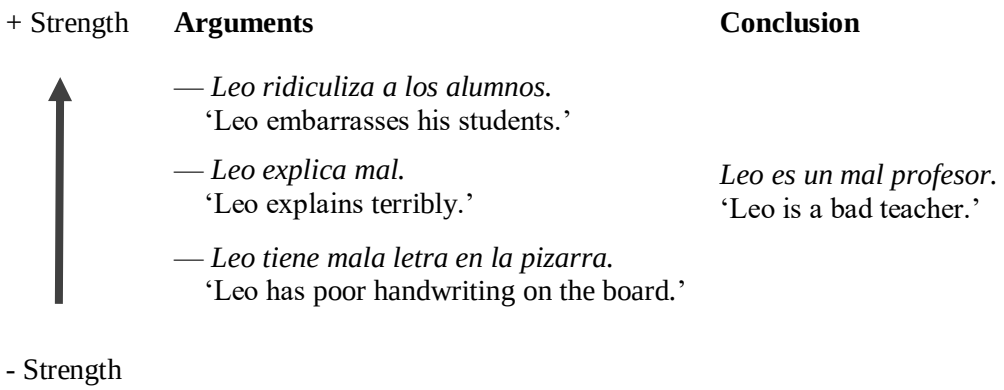
a. *Lisa es una cocinera estupenda. La comida está deliciosa*.
'Lisa is a great cook. The food is delicious. I will eat a little more.'
b. #L*isa es una cocinera estupenda. La comida está sosa.*
#'Lisa is a great cook. The food is tasteless.'

The first member of the utterance (37a), *Lisa es una cocinera estupenda*, prompts a particular continuation and can be used as an argument in favour of the conclusion *La comida está deliciosa*. Hence, both members in (37a) are argumentatively co-oriented. Example (37b) is odd because the second member, *La comida está deliciosa sosa*, does not maintain the same argumentative orientation as the first utterance, and the resulting conclusion is unusual: when someone says that a person is a good cook, we expect that he prepares delicious food. In (37b), both utterances are argumentatively anti-oriented.

Besides having the same orientation, arguments can convey greater or lesser argumentative strength in the same given context to guide the interlocutor to a particular continuation (see Ducrot 1980; Portolés 2004: 257, 2007: 146). When several arguments with the same orientation can be arranged based on the greater or lesser argumentative strength to support a conclusion, they build an *argumentative scale*. For instance, in the following example, we provide arguments that guide towards the conclusion *Leo es un mal professor* ('Leo is a bad teacher') but with different argumentative strengths:

FOs, the key would be to determine which kind of instruction (informative or argumentative) is predominant in the procedural meaning of the FO under study.

[28] The Argumentation Theory (Anscombre & Ducrot 1983, 1994) posits that language has a primarily argumentative value. Utterances are oriented argumentatively. This means that with their meaning, they lead to a particular conclusion, favouring or excluding other possible ones (Portolés 2004: 235). Arguments also establish *argumentative orientations.* This argumentation is determined mainly by the linguistic forms (Portolés 1998: 89). An utterance such as (a) *Lisa is a good athlete* pragmatically implies a conclusion of (i) *She trains many hours a day* because both members follow the same argumentative orientation. They are co-oriented. Conversely, members can hold opposite orientations so that they are anti-oriented, as happens if we link the utterance (a) *Lisa is a good athlete* with (ii) *She loses all competitions*. Here, both members are argumentatively anti-orientated since (ii) is not a conclusion that could be inferred from the argument in the first utterance. This relation of argument-conclusion is supported by the inference rule that typically good athletes train many hours.
These general ideas are called *topoi* and are related to the thoughts, beliefs, or cultural stereotypes shared by the linguistic community of which the speaker and addressee are part.



The arguments are ranked on the scale based on how strongly they lead to the conclusion. The arguments at the base (closer to the symbol '-') have less argumentative strength to support the continuation. As the arguments get closer to the top (closer to the symbol '+'), they have greater strength. The argumentative scales are a useful notion to explain the meaning of some discourse particles.

(38)

Y los gorditos son rechazados por sus compañeros, profesores, e ***incluso*** *pediatras.*
'And overweight children are rejected by their classmates, teachers, and **even** pediatricians.'
(Portolés 2007: 46-147)

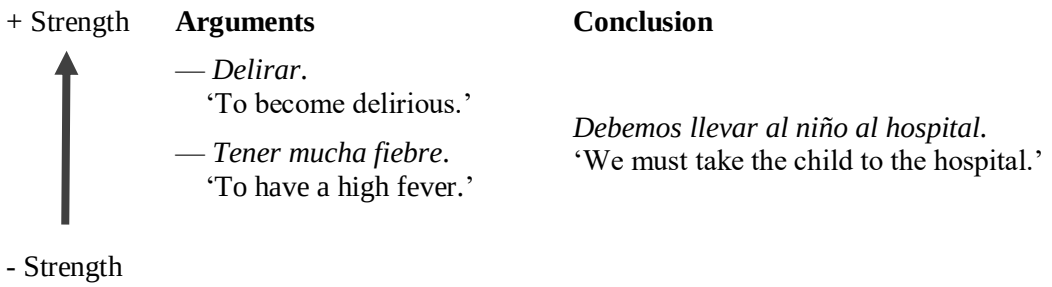
Utterance (38) leads to the conclusion that overweight children suffer discrimination. The values of the scale (*compañeros, profesores, pediatras*) orientate towards the same conclusion, and they are presented according to their argumentative strength. The first argument (*compañeros*) is the argument with lesser strength, since the reader may not find it surprising that obese children are teased at school by other children. The FO *incluso* introduces what the speaker considers the strongest argument (*pediatras*), as the reader would not expect doctors to be accomplices in such rejection.

To fully explain the use of some discourse particles in some cases, Portolés (1998, 2004) affirms that the notion of argumentative orientation must be completed with the notion of *suficiencia argumentativa* ('argumentative sufficiency'). From the perspective of argumentative orientation, *incluso* is used as a connector in (39) to introduce a stronger argument when the first argument is considered insufficient for drawing a conclusion:

(39)

Debemos llevar al niño al hospital. Tiene mucha fiebre e, ***incluso****, ha comenzado a delirar.*
'We must take the child to the hospital. He has a high fever and has **even** started to become delirious.'
(Portolés 1998: 210)

Both arguments in (39), *Tiene mucha fiebre* and *ha empezado a delirar*, point to the conclusion *Debemos llevar al niño al hospital*. The procedural meaning of *incluso* indicates that the second argument has more argumentative strength. The argumentative scale on which the two arguments would be placed is as follows:



Despite having an appropriate orientation, the speaker of (39) considers the first argument to not have sufficient argumentative potential to lead to the conclusion. Therefore, he introduces the second argument with *incluso* to provide it with greater strength. The argumentative sufficiency proposed by Portolés gives an account of why a second argument is added to another one that is already oriented to the same conclusion. Nevertheless, Portolés (2007: 148) acknowledged that adopting a mainly argumentative explanation to interpret all scales with discourse particles presents some limitations:

(40)

Se puede meter un gol, dos o ***incluso*** *ninguno, y ser de gran ayuda al equipo combinando bien con los pilotes o jugando con el extremo.*
(Portolés 2007: 149)
'You can score a goal, two or **even** none, and still be of great help to the team by assisting the forward players or playing with the defenders.'

The elements *un gol* and *dos goles* guide towards the conclusion of being helpful to the team. The element *ninguno* is presented by *incluso* as the most potent argument to arrive at the intended conclusion, but it seems to have an opposite orientation. Following Portolés, this argumentative scale should be interpreted differently from those explained so far.[29] *Incluso* does not introduce a superior value; the greater argumentative strength is attained if all members of the scale are added. In this case, the sum of the two anti-orientated members is more informative than the first members (*un gol, dos goles*). Since *incluso* does not necessarily link arguments that are co-orientated to the same conclusion, the informative scales could be a more comprehensive concept to deal with

[29] Portolés (2007: § 5) clarified that Ducrot considered all argumentative scales as culminative, but some of them could be non-culminative. In the latter kind of scale (see § 2.4.5), the upper value has no greater argumentative strength than the lower ones, the argument with the highest argumentative potential is the sum of all the values: the upper and the lower values.

the scales with which an FO in Spanish interacts (Portolés 2007: 148). From a relevance-theoretic perspective, the linguistic items have a different degree of informativity due to the cognitive effects that they generate in the addressee's cognitive environment. With this in mind, the elements can be ordered along a scale based on the degree of informativity they have in a particular context, the most informative item being the one that modifies to a more considerable extent the existing assumptions in the addressee's mind (see Sperber & Wilson 1995; Portolés 2007, 2009, 2010).

The degree of informativity may occur within a lexical paradigm (for instance, the word *happy* has a lesser degree of informativity within its paradigm than *euphoric*), or it can be constrained by the world knowledge or mental assumptions that are most easily accessible to interlocutors at the moment of processing an utterance.

(41)

Alicia sabe dividir.
'Alicia can divide.'
(Portolés 2007: 135)

The focus *dividir* in (41) is more informative than other alternatives – like add, subtract or multiply as possible answers to the question *What can Alicia do*? – because we know that every person who can divide can also multiply, add, and subtract.

van Kuppevelt (1996: § 3.3.2) understood a scale as a set of values that are possible answers or comments to the same topic-forming question (see § 2.1). Therefore, a scale is formed by items that share the same topic and the values are arranged on the scale in terms of answer informativeness; that is, depending on whether they are satisfactory (more specific) or unsatisfactory (less specific) answers to the question. According to this ordering principle, "higher scale values are more informative than lower values in the sense that they exclude more possible answers as satisfactory answers to the question" (van Kuppevelt 1996: 429). With such a perspective, the informative scales can be of three kinds: semantic scales, pragmatic scales, and scales evoked by the procedural meaning of a discourse particle (see Portolés 2007). Furthermore, the scales can be substitutive or additive, on the one hand, and also culminative and non-culminative on the other.

2.4.2 Semantic scales and pragmatic scales

Semantic scales give an account of the generalized Cis (Horn 1989; Levinson 1983). They are also known as quantitative scales or Horn scales.[30] The scale information follows a semantic (or logical) entailment, in which an expression unilaterally entails (|) the lower or weaker terms (S|W; entailment relationship) and conversationally implicates (+>) the negation of the higher or stronger scale members (W+>S; the implicature relationship) (Schwenter 1999: 185; Portolés 2007: 136-137; Rodríguez Rosique 2008: 52). By way of illustration, note the semantic scale <*algunos**TODOS*>[31] in the following examples and the scalar implicatures obtained from each utterance:

(42)

a. *Todos los alumnos vinieron a clase.* | *Algunos alumnos vinieron a clase*.
'All the students came to class.' 'Some of the students came to class.'

b. *Algunos alumnos vinieron a clase.* +> *No todos los alumnos vinieron a clase.*
'Some of the students came to class.' 'Not all the students came to class.'

In the semantic scale <*algunos**TODOS*>, the stronger term (*todos*) is more informative than the weaker one (*algunos*) because the latter is unilaterally entailed (|) by the former. Likewise, the weaker member implicates (+>) the negation of the stronger member.

Semantic scales can be composed of quantifiers <*algunos**TODOS*> ('<some, ALL>'), adverbs <*a veces**SIEMPRE*> ('<sometimes, ALWAYS>'), adjectives <*grande**ENORME*> ('<big, HUGE>'), verbs <*apreciar**ADORAR*> ('<appreciate, ADORE>'), or verbal modes <*subjuntivo**INDICATIVO*> ('<subjunctive, INDICATIVE>') (see Levinson 1983: 134; Portolés 2004: 260). The semantic nature of scales can be verified by affirming the strong element and denying the weakest element, as suggested by Schwenter (1999: 187). When the scale is semantic, it is not possible to assert the strongest member and negate the weakest one (Schwenter 1999: 187; Portolés 2004: 261):

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[30] This implicature is a generalized conversational implicature based on the Quantity principle. This Q-principle states that a speaker should not say less than he can. So, if the speaker does not use a stronger term, it implicates that he is not able to employ any stronger term. Obeying the Q-principle, the speaker's utterance should be as informative, and the addressee should assume that the speaker did so. Given a scale of adjectives such as <warm, hot>, if a speaker says *It is warm today*, he implicates that it is not hot. If he had been able to use the stronger term *hot*, which entails the weaker term *warm*, it is assumed that he would have done so.

[31] The convention introduced by Horn was to represent the scale in angular brackets and with items ordered from strongest to weakest (<S, W> from left to right). Nevertheless, we adopt the representation of the elements as Portolés (2007) does, in which the weaker value is located at the right side and the stronger item on the left (<W, S> from right to left). Given that semantic scales are typically substitutive, items are separated by (\), and the stronger value is written in small caps.

(43)

a. #***Todos*** *los alumnos vinieron a clase, pero no algunos*.
#'**All** the students came to class, but not some of them.'
b. #*El rascacielos es* ***enorme****, pero no grande*.
#'The skyscraper is **huge**, but not big.'
c. #*La comida está* ***excelente****, pero no buena.*
#'The food is **excellent**, but not good.'

Examples in (43) are not plausible because it is complicated to find a context in which the stronger element of each semantic scale (*todos, enorme, excelente*) does not entail the weaker element (*algunos, grande, buena*).

The lesser or greater informative value of linguistic expressions on a scale can also be assigned based on our world knowledge. In this case, the scale is pragmatic. For example, if we read in a newspaper that the Duchess of Sussex *Meghan Markle speaks English, French, and Tagalog*, our world knowledge will be the factor responsible for ordering the informative values from less to the most informative. Based on mental assumptions and expectations interlocutors have about the world, we conclude that speaking Tagalog is more informative than the other mentioned languages. This is because if we know that Meghan Markle was born in the United States, it is more likely that English is her first language, so French becomes more informative than English. Similarly, Tagalog is the most informative idiom in the scale because of the typological, social, and geographical distance between the Duchess' mother tongue and the language of the Philippines.

Unlike the semantic scales, in pragmatic scales, it would be plausible to affirm the most informative value and to negate the less informative (Portolés 2007: 137). For that, it is necessary to find an appropriate context to accommodate the emerged pragmatic scale. Finding an appropriate context to make the pragmatic scale plausible also demonstrates that pragmatic scales are reliant on the context in a particular communicative situation (Portolés 2007: 141; Borreguero 2014: 7).

(44)

Lisa tiene dinero para alquilar un apartamento de dos dormitorios, pero no tiene dinero para alquilar un apartamento de un dormitorio.
'Lisa has money to rent a one-bedroom apartment, but she has no money to rent a two-bedroom apartment.'

Since we know that, at least in western cultures, the more rooms an apartment has, the more expensive the rent will be, at first blush the informative strength of these two values would be as follows: <*tener dinero para alquilar un apartamento de un dormitorio*\TENER DINERO PARA ALQUILAR UN APARTAMENTO DE DOS DORMITORIOS>.

However, the utterance would be plausible in a context in which Lisa is a student. Then, she could rent a two-bedroom apartment because the apartment can be shared with another student, and we all know that flat-sharing is usually cheaper than living alone.

2.4.3 Scales evoked by FOs

FOs like *incluso* and *hasta* create a scale on which the focused element carries the highest value of informativity. The scale can have a semantic or a pragmatic ordering or be induced by the procedural meaning of the FO (Portolés 2007: 138).

(45) a. *Hay muchas cosas que me gustan, que **incluso** adoro de Amelia.*
'There are many things I like, that I **even** adore, about Amelia.'
(Chairlane Harris. 2010. *De muerto en peor*. España. Ediciones Santillana)
b. *Para no verse desprotegido, en cueros frente a una lamentable realidad que podría llegar a ser por todos conocida. Y comentada. Y chismeada. Y **hasta** celebrada por más de uno, como solía ocurrir en todas las derrotas ajenas.*
'In order not to be unprotected in the face of an unfortunate reality that could become known by all. And commented on. And gossiped about. And **even** celebrated by more than one, as used to happen with all other people's defeats.'
(María Dueñas. 2015. *La Templanza*. Barcelona. Planeta)
c. *Todos la [vida] hubiéramos dado por él, aunque al final tengo la sensación de que **hasta** yo le he fallado.*
'All of us would have given it [the life] for him, although in the end, I have the feeling that **even** I have failed him.'
(Alicia Giménez. 2015. *Hombres desnudos*. Barcelona. Planeta)

Utterance (45a) contains a semantic scale <gustar\ADORAR> that is reinforced by the use of *incluso*. This FO marks the stronger element of the scale (*adorar*) as the most informative value: the focus. The lower value of the scale (*gustar*) is explicit in this case and constitutes the alternative. In (45b), the scale is pragmatic. In the face of someone's misfortune, to feel sympathy or sorrow is socially acceptable, while to show joyful feelings is a sign of evil. The delight in other people's disgrace is introduced with *hasta* by the speaker to stress what he considers the least expected and the most unacceptable behaviour to be when people suffer misfortune. In (45c), the procedural meaning of *hasta* makes us interpret the fact that the speaker has failed is more informative than if another person had done it. It is important to note that when a scalar FO interacts with pragmatic scales, the rigidity of the procedural instruction is such that the readers are compelled to process a scale even if this is contrary to what we know according to our mental assumptions, as happens in (46):

(46)
*# Madonna ha sido galardonada con discos de oro y **hasta** de plata.*
#'Madonna has been awarded gold and **even** silver records.'

Silver, gold, and platinum awards are given to singers and musical groups for achieving high record sales. Even if we do not precisely know the number of record sales required for each award, we are aware that a gold award will require more units sold than the silver award. Hence a gold prize has more prestige than a silver one. The plausible ordering of the award scale would be silver, gold. Nevertheless, the presence of *hasta* in (46) reverses the order of the items and forces an interpretation that does not fit our mental assumptions about the world (see §§ 1.2, 1.3).

The scales described so far, and following the proposal of Portolés (2007), have been interpreted as argumentative or informative. The informative scales have been classified into three kinds. They can be semantic, pragmatic, and can be summoned by FOs. The latter kind, in turn, can have semantic or pragmatic grounds or have an ordering imposed only by the procedural meaning of the FO. As regards semantic and pragmatic scales, Portolés (2007) outlines that they can be of two kinds: substitutive and additive scales. Besides, the additive scales may be culminative or non-culminative.

2.4.4 Substitutive and additive scales

Semantic and pragmatic scales can be substitutive and additive (Portolés 2007: 41). A semantic scale is usually interpreted as substitutive, but it can have two different interpretations: as a substitutive scale and as an additive scale.[32] The context conditions the interpretations.

(47)

Beatriz lleva a una fiesta de fin de año ***solo*** *dos botellas de cava*.
'Beatriz takes to a New Year's Eve party **only** two bottles of cava.'
(Portolés 2007: 138)

Utterance (47) can be interpreted as a substitutive scale and an additive scale. In a substitutive scale such as <*dos botellas de cava*\TRES BOTELLAS DE CAVA>, the element *dos botellas* is a lower value because it is introduced by the exclusive FO *solo*. The scale is semantic because the elements are ranked following the cardinal numbers. The scale is also substitutive since the higher value (*tres botellas*) replaces the lower value (*dos botellas*). However, the scale of the same utterance can be understood as an additive. In this case, it could be interpreted that Beatriz should have brought two bottles and a box of marzipan to the party.

[32] van der Auwera (1997: 178) proposed the additive scale as the basic type of scale, arguing that some scales considered substitutive can also be additive according to the context. In such cases, the higher value (n) does not replace the lower value because the higher value includes the lower. The result is a broader set that is more informative (n+1) (Portolés 2007: 139).

+ Strength

— *dos botellas + una caja de mazapanes*
'two bottles + a box of marzipan.'

— *dos botellas de cava.*
'two bottles of cava.'

- Strength

The scale now has a pragmatic nature since the ordering of items is not imposed by our world knowledge. Moreover, since elements are added instead of being replaced, the scale is additive instead of substitutive. In additive scales, the most informative expression is indeed the sum of the lower value and the higher value. In the examples offered by Portolés, the semantic scales are substitutive. If these scales are additive, they become pragmatic. The same author also proves that semantic scales can be additive. For that, he analyses the different values of *incluso* and *hasta* in a reformulation process.

(48)

a. *Los datos del paro son malos, **incluso** muy malos.*
b. *#Los datos del paro son malos, **hasta** muy malos.*
'Unemployment data is bad, **even** very bad.'
(Portolés 2007: 142)

In (48a), the speaker considers the first argument (*malos*) as insufficient for arriving at the provided conclusion, and he decides to mark the most informative argument with *incluso*. Here, the FO *incluso* introduces the most informative value and replaces the lower value. The substitutive semantic scale is the following: <*los datos son malos*\LOS DATOS SON MUY MALOS>. The use of the FO *hasta* in a reformulation process in which the upper value replaces the lower value of the same scale is difficult because of its endpoint-marking meaning (see § 3.3.2).[33] Nevertheless, it is possible to use *hasta* in semantic scales as long as the interpretation is additive.

(49)

*Estos últimos años ha habido datos del paro malos y **hasta** muy malos algunas veces.*
'In the last few years, there has been bad unemployment data, and **even** very bad data sometimes.'
(Portolés 2007: 143)

In (49), the *hasta* interacts with a semantic scale (<*malos*\MUY MALOS>). The FO introduces the most informative value, but this upper value does not replace the lower value. Both are summed on a scale with an additive interpretation. As Portolés (2007:

[33] In this regard, Portolés (2007: 144) remarked that *incluso* can occur in semantic scales with substitutive and additive interpretations. The occurrence of *hasta* in substitutive semantic scales is more difficult to find.

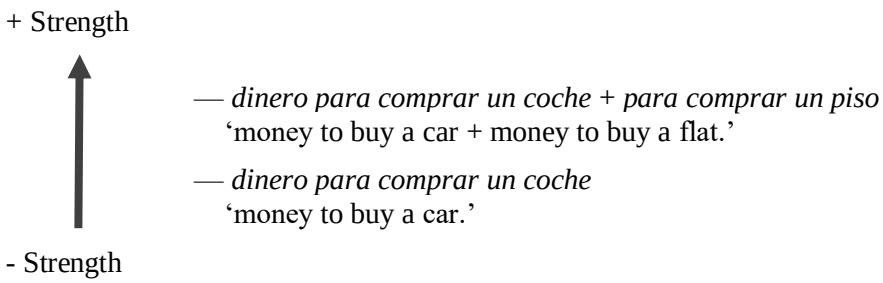
143) made clear, the fact that unemployment data has been very bad sometimes does not replace the fact that the data has been only bad in recent years. The examples prove that semantic scales can be additive in combination with a scalar FO.

So far, we have outlined that semantic scales can be substitutive – the most common cases – and additive. However, pragmatic scales can also have a substitutive and an additive interpretation (Portolés 2007: § 3). In § 2.4.2, the pragmatic scales we proposed were all additive.

(50)

Solo tiene dinero para comprarse un coche.
'He only has money to buy a car.'
(Portolés 2007: 141)

If utterance (50) is the answer to the question *¿Tiene mucho dinero?* ('Does he have much money?'), then there are two possible interpretations. On the one hand, we can interpret the utterance following a substitutive scale <*tiene dinero para comprarse un coche**TIENE DINERO PARA COMPRARSE UN PISO*> ('<He has money to buy a car\HE HAS MONEY TO BUY A FLAT>'). This scale is pragmatic because we know that the sale price of flats is higher than the sale price of cars, and (50) implies that he has no money for a flat. On the other hand, the interpretation can also be as an additive scale:



Following an additive scale, the interpretation of (50) *Solo tiene dinero para comprarse un coche* would imply that he does not have money to buy anything else besides a car. In this case, the scale is pragmatic and additive.

2.4.5 Culminative and non-culminative scales

Depending on the semantics of the FO, the additive scales can be understood as culminative or non-culminative (see Portolés 2007: § 4, 2009: 64; Fuentes 2016). The additive scales we have presented with the FOs *incluso* and *hasta* are always culminative. In culminative scales, the focus is more informative than the alternatives. On a culminative scale, there are two different scalar orderings. Firstly, there is an additive ordering (n+1) in which the values of the alternative and focus all together are

more informative than only the set of alternatives. Secondly, there is a scalar ordering in which the focus is more informative than the set of alternatives. These two orderings are the consequence of the additive and scalar meaning components of the semantics of the scalar FOs *incluso* and *hasta*.

(51)

Alba y Lucas tienen coches, motos e ***incluso/hasta*** *yates*.
'Alba and Lucas have cars, motorbikes, and **even** yachts.'

In (51), the FOs *incluso* and *hasta* introduce the highest value on the culminative scale. The focus (*yates*) is more informative than the alternatives (*coches, motos*). The presence of the FO establishes two relations: a) the addition of the alternatives, and the focus is more informative than only the set of alternatives, and b) the focus is the element with the highest informativity because it is less expected than the set of alternatives.

In a non-culminative scale, the new element is added to the lower value. Someway, the ordering of the items within the scale follows a similar entailment as in semantic scales: the lower value (n) implicates the negation of the higher value, and the higher value (n+1) entails the lower value. The FO *también* and the connective *además* evoke non-culminative scales (Portolés 2007: 145).

(52)

a. *Alba y Lucas tienen coches, motos y* ***también*** *yates.*
b. *Alba y Lucas tienen coches, motos y* ***además*** *yates*.
'Alba and Lucas have cars, motorbikes, and **also** yachts.'

También and *además* do not signal that the member they introduce is informatively stronger than the alternative. They rank the items on the scale in such a way that it is the combination of both values (alternative + focus), the option that conveys enough informative strength. For that reason, the ordering of items can be changed within the sentence without affecting the grammaticality or plausibility of the utterance.

The FO *hasta* always interacts with pragmatic scales in this investigation. In the experimental utterance *Alba y Lucas tienen coches, motos y hasta yates*, the FO *hasta* evokes a culminative scale among the items. The FO unambiguously introduces the focus *yates* as the most informative value. Besides this, the focus will be interpreted as the extreme element of the scale because of the endpoint-marking value of *hasta*. The rest of the items constitutes the set of alternatives. The alternatives are less informative than the focus since they are background information. The pragmatic scale evoked by the FO is in line with our world knowledge. In the given context, it is more likely for us that rental companies lease cars than yachts.

Chapter 3: Focus operators in Spanish

From a relevantist approach, FOs are considered a subclass of discourse particles (see § 1.3). They do not accomplish all the criteria attributed to the group of discourse particles, since they are integrated at sentence level and can modify the truth condition of utterances. However, they share other prototypical features for which they are considered discourse particles in this study.

FOs are invariable linguistic units with a mainly procedural meaning that guide the inferences made in communication according to their morphosyntactic, semantic, and pragmatic properties (see Martín Zorraquino & Portolés 1999: 4057; Portolés 2001[1998]: 25-26). Due to their fundamental procedural meaning, they activate an inferential route that leads to the communicated assumption following the path of least effort in computing cognitive effect (Sperber & Wilson 1995[1986]; Blakemore 2002). Assuming a role of inferential guides, FOs can be considered as subtypes of discourse particles (Portolés 2001[1998]; Martín Zorraquino & Portolés 1999; Portolés 2010).

Expressions like *incluso* and *hasta*, ('even'), *también* ('also, too'), *solo* ('only') are FOs in Spanish.[34] Their presence in an utterance induces a focus structure that gives rise to an informative partition in the host sentence of two units according to their informativity: a highlighted part and a backgrounded part (König 1991: 11). Their associated focus is the most informative element, and the rest of the constituents are the uninformative part, that is, the given information or background (see §§ 2.1, 2.2).

[34] The term *focus operator* has many alternatives in the research tradition: focus adverb, focus-sensitive particle, or scalar particle are the most common (Sudhoff 2010: 9). The units we describe in this section are traditionally categorized as adverbs for sharing syntactic and semantic similarities with adverbs. In that regard, Fuentes (2003: 68) assigned the name *operador* ('operator') only to those elements with a syntactic scope that does not exceed the limits of their own utterance. Also, Martín Zorraquino & Portolés (1999: 4072) used the label *operador* to refer to those units whose processing meaning affects only one discourse member. Gast & van der Auwera (2011) chose the term *operator* in their investigation on these units across European languages. For them, *operator* is a more general term under which all the expressions they study can be encompassed. The authors avoided the term *particle* because it is quite concrete, and it would imply that the words are uninflected. They also refused to use *adverb* because many scalar operators in their study do not share the typical properties of adverbs. We likewise settle on the notion *operator* because the word object of our study, *hasta*, does not have an external role at the predicative level, since it modifies an element within the sentence. Secondly, we will use the term *scalar operator* when we refer exclusively to those expressions that, by their procedural meaning, conventionally evoke a scale. The term *focus operator* will be a more general term that includes scalar and non-scalar FOs.

3.1 General properties

The expressions integrating the group of FOs have many syntactic and semantic properties in common. The properties described hereunder are in general common features of FOs across different languages (see König 1991; Gast & van der Auwera 2011).

FOs do not hold a clause-marginal position. They modify a constituent integrated into the utterance to which they are closely related. Within the utterance, they show wide positional variability so that they may appear in several positions (Helbig 1988: 23; König 1991: 10; Sudhoff 2010: 6).

(53)

a. ***Incluso*** *algunos habrán pensado que no me gustaban las mujeres, cuando sucede todo lo contrario*.
'**Even** some have thought I did not like women, when it is quite the opposite.'
(*La Nueva Provincia*, Argentina, 04/02/1997, CREA)

b. *Soy una persona normalísima. Mi familia, e* ***incluso*** *yo, tenemos títulos. Pero a mí no me importa*.
'I am a very normal person. My family, and **even** I myself, have titles. But I do not mind.'
(*Tiempo*, España, 26/02/1990, CREA)

c. *Lo cierto es que todos tratamos de comportarnos normalmente con Roxana, como antes de que se fuera,* ***incluso*** *mamá*.
'The truth is that we all tried to behave normally with Roxana, like before she left, **even** Mum.'
(Enrique Jaramillo. 2002. *Luminoso tiempo gris*. Panamá. CREA)

FOs usually occur immediately before the element they introduce (54a), but they can also be postponed (54b).[35] This positional flexibility is not generally applied to every single FO since *hasta* can only appear before its focus (54c).

(54)

a. *Intervinieron los agentes, les metieron gases e* ***incluso*** *apresaron a algunas*.
'The agents intervened, gassed them, and **even** imprisoned some of them.'
(Moema Viezzer. 1980. *Si me permiten hablar*. México. CREA)

b. *Yo* ***incluso****, algunas veces acepté algunas cosas, cigarrillos, por ejemplo*.
'I **even** sometimes accepted some things, cigarettes, for example.'
(Moema Viezzer. 1980. *Si me permiten hablar*. México. CREA)

c. **Alba y Lucas tienen yates* ***hasta***.
*'Alba and Lucas have yachts **even**.'

[35] FOs do not occur with the same frequency in the prefocal as in the postfocal position. They tend to occur before their focus (see Briz et al. 2008). In the case of *incluso*, the most usual place of which is before the focus, the postfocal position of the FO involves a more cognitive processing effort of the host utterance (see Cruz 2020).

FOs are considered cross-categorial because they can modify noun phrases (NP), prepositional phrases (PP), verb phrases (VP), adjective phrases (AdjP) and adverbial phrases (AdvP) (Krifka & Musan 2012; Borreguero 2014).

(55)

a. *Miguel es muy peligroso para niños, jóvenes e* ***incluso*** *adultos*. (NP)
'Miguel is very dangerous for children, young people, and **even** adults.
(*Los Tiempos*, Bolivia, 06/11/2000, CREA)

b. *La decisión del jurado fue blanco de las críticas que un puñado de pintores lanzaron ayer sobre su obra,* ***incluso*** *sobre su persona*. (PP)
'The jury's decision was the target of criticisms that a handful of painters launched yesterday about his work, **even** about his person.
(*La Razón*, España, 17/06/2003, CREA)

c. *En los niveles más profundos* ***incluso*** *se trabaja sin ropa* (VP).
'At the deepest levels, one works **even** without clothes.
(*La Razón Digital*, Bolivia, 25/04/2004, CREA)

d. *Tormentas por la tarde, con granizo, pudiendo ser fuertes, e* ***incluso*** *muy fuertes, en puntos de Galicia y Asturias*. (AdjP)
'Storms in the afternoon, with hail, possibly strong, and ***even*** very strong, in parts of Galicia and Asturias.
(*El País*, España, 02/06/1989, CREA).

FOs add a specific interpretation to the utterance, triggering conventional implicatures (Karttunen & Peters 1979: 14; Helbig 1998: 24). The meaning contribution that each FO makes to the sentence depends on the semantics of the FO (König 1991; Sudhoff 2010).

(56)

Incluso/Hasta *Lisa votó por él.*
'**Even** Lisa voted for him.'
Proposition: Lisa voted for him.
Implicature: Besides Lisa, there are more individuals (at least one more) that voted for him, and Lisa was the least likely person to do it from all of them.

(57)

También *Lisa votó por él.*
'**Also** Lisa voted for him.'
Proposition: Lisa voted for him.
Implicature: Besides Lisa, there are more individuals (at least one more) that voted for him.

(58)

Solo *Lisa votó por él.*
'**Only** Lisa voted for him.'
Proposition: Lisa voted for him.
Implicature: Besides Lisa, no other person voted for him.

Incluso/hasta in (56) are scalar FOs and assign its focus "an extreme position on a scale formed of its contextually relevant alternatives" (Sudhoff 2010: 34). *También* is a simple additive FO, and its presence in (57) makes the utterance express that there is a least one other person besides Lisa who voted for him. The FO *solo* in (58) is an exclusive FO with a semantics that contributes with an exhaustive interpretation. *Solo* expresses that

the proposition does hold for the alternatives so that the utterance (58) means that the alternatives are excluded from the set of people that voted for him.

The contribution made by an FO to the meaning of the host sentence also depends on two further components: the *focus* and the *scope* (König 1991: 29). The notions of scope and focus are not synonymous, although they may coincide in some cases (Dimroth & Klein 1996). In this respect, Borreguero (2014: 25) explained that the scope encompasses all the items falling under the influence of the FO, while the focus is usually a single element that receives the action of the FO more directly, resulting in the most informatively relevant constituent. Stated in another way: FOs modify a syntagm that constitutes their scope, and within this syntagm, they highlight a focus that evokes alternatives (Portolés 2009: 51):

(59)

a. *Este año Lisa **hasta*** [*se ha ido de viaje a Rusia*]$_{F.}$
'This year Lisa **even** [went on a trip to Russia]$_{F.}$'
*b. Este año Lisa **hasta** se ha ido de viaje este año a* [*Rusia*]$_{F.}$
'This year Lisa **even** went on a trip this year to [Russia]$_{F.}$'

The scope of the FO in both examples is the syntagm following the FO *hasta* (*se ha ido de viaje a Rusia).* However, the focus is different in each structure and evokes different alternatives in each case: in (59a) the things that Lisa did this year and in (59b) the places where Lisa has travelled to. In oral language, focus usually receives a higher intonation, being easier to distinguish between focus and scope. In writing, both elements are more complicated to differentiate. In those cases, the information provided by the context is essential to identify the focus and the scope (Borreguero 2014). It is crucial for focus-sensitive operators to be in a position in which they can have scope over their focus. In our research, to avoid interferences in the processing costs that might have arisen if the focus and scope were not the same, these two components are identical in the experimental utterances. More precisely, in all marked utterances, the focus is the last word of the utterance and immediately follows the FO (see § 4.4.1).

3.2 Types of FOs

Incluso, hasta, también, or *solo* are FOs. They associate with a focus and evoke a set of alternatives, but they do not trigger the same conventional implicatures, as seen previously. According to their specific meaning, FOs can either include or exclude the alternatives as possible values for the proposition in their scope (König 1991, 1993; Portolés 2009). Based on that, FOs can be divided into two main groups: *exclusive*

operators and *additive operators* (see Jacobs 1983; König 1991; Dimroth 2004; Sudhoff 2010; Borreguero 2014).[36]

Exclusive FOs

Exclusive FOs like *solo* encode an interpretation of *exclusiveness*. They have an exclusive meaning component by which all other contextually relevant alternatives are denied (see König 1991: § 5.1; Dimroth 2004: § 3.1.3). This means that the information conveyed by the utterance affects only the focused element. The focus associated with those operators is exclusive or exhaustive,[37] since when the speaker confirms the focus, he automatically discards the alternatives:

(60)

*Alba y Lucas tienen **solo** yates*.
'Alba and Lucas have **only** yachts.'

Exclusive FOs are said to modify the truth conditions of the utterance, depending on which elements are affected by their scope (König 1991: 94, 1993: 980).[38] Following Horn (1969), the English FO *only* presupposes that the proposition holds for the focus – the focus is the only element that leads to a true assertion – and asserts that all other relevant alternatives are false. Rooth (1985) accounted for the difference in the truth condition with the following examples:

(61)

a. John **only** introduced $[\text{Bill}]_F$ to Sue.
b. John **only** introduced Bill to $[\text{Sue}]_F$.
(Rooth 1985: 29)

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[36] FOs have also been labelled *restrictive* and *inclusive* (König 1991, 1993; Dimroth 2004).

[37] Molnár (2006: 220) distinguished between *exhaustive focus* and *exclusive focus* based on the number of alternatives that are denied. While an exhaustive focus denies the totality of alternatives - as in the case of *only* - an exclusive focus excludes some of the relevant alternatives. For example:

a. *LISA llegó tarde a la reunión, no Leo.* → Exclusive focus
'LISA was late for the meeting, not Leo.'
b. *Lisa odia solo las espinacas, ninguna verdura más.*
'Lisa hates only spinach, no other vegetables.' → Exhaustive focus

[38] Lacking referential denotative content, the discourse particles are said not to contribute to the truth conditions of the host utterance (Sperber & Wilson 1993; Schourup 1999; Portolés 2001[1998]; Fraser 2006; Murillo 2010). The truth-conditionality does not hold universally for all words considered discourse particles since illocutionary adverbials like *francamente* ('frankly') are conceptual and non-truth-conditional. The expression *frankly* in *Frankly, it is a good movie* is non-truth conditional because it conveys a conceptual meaning so that it can be denied as in *You do not say it frankly, you say it because you know that I like it* (Schourup 1999: 246; Portolés 2001[1998]: 65-66). Following Schourup (1999), the truth-conditionality criterion to determine the status of discourse particles would lead to include quite different expressions in the same class. In this regard, Murillo (2010: 252) argues that the RT has moved away from the clear distinction between truth and non-truth condition as a benchmark to study this functional class of words since there is no value in claiming a group of expressions with non-truth-conditional value that would include such different elements.

(61a) und (61b) have different truth conditions. The focus value for (61a) is the set of propositions of the form "John introduced Bill to x", where x is some individual. The focus value for (61b) is the set of propositions of the form "John introduced x to Sue", where x is some individual. The meaning of (61a) is that "John introduced Bill and no one else to Sue" and any other proposition in the set of alternatives is false. In (61b), *only* takes a different set of alternatives, and the interpretation is that "John introduced Bill to Sue and to no one else". Therefore, if at a party, John introduced Bill to Sue and Mary and no other introductions took place, (61a) is true and (61b) is false. For Rooth (1985), the contrast of these examples illustrates the truth-conditional effect of the alternatives activated by an exclusive FO.

In contrast, Karttunen & Peters (1979) defended the idea that exclusive FOs do contribute to the true conditions of the sentence. Utterances with an exclusive FO also convey the same proposition as utterances without it:

(62) a. *Lisa estudia **solo*** [*por la noche*]$_F$.'
'Lisa studies **only** [at night]$_F$.'
b. Lisa *solo* [estudia]$_F$ *por la noche*.'
'Lisa **only** [studies]$_F$ at night.'

The FO *solo* in (62a) takes as focus *por las noches* and expresses that Lisa does not study at any other time than at night. When the placement of focus changes and the FO focuses the verb *estudiar*, like in (62b), a different meaning is implied: Lisa studies at night instead of going out, for example. However, for Karttunen & Peters (1979) the utterance with and without the exclusive FO convey the same proposition: Lisa studies at night. Some further authors claim that not all kinds of FO affect the truth conditions of the utterance (see König 1991, 1993; Rooth 1992; Iten 2000), and they use this property to make a difference between exclusives and additives FOs: "There is, however, an interesting asymmetry between the group of additive particles and that of restrictive ones. The former does not seem to contribute to the truth conditions of a sentence, whereas the latter do" (König 1993: 980).

(63)
a. ***Incluso*** [*Leo*]$_F$ *escribe poesía.*
'**Even** [Leo]$_F$ writes poetry.'
b. ***Solo*** [*Leo*]$_F$ *escribe poesía.*
'**Only** [Leo]$_F$ writes poetry.'
(Adapted from König 1993: 978)

The contribution made by *even* in (63a) is the implicature that other people besides Leo write poetry and the fact that Leo writes it is surprising. The additive FOs "highlight certain aspects of the utterance and 'comment' on these aspects" (Iten 2000: 29), but

their contribution does not have an impact on the true conditions of the utterance. On the other hand, the exclusive focus in (63b) has a truth-conditional effect in the context of *only* since it expresses that no one other than Leo writes poetry.

Additive FOs

Additive FOs in Spanish are *también*, *incluso,* and *hasta*. They place an element within a sentence in focus and, at the same time, evoke a set of alternatives that can be mentioned in the prior discourse or, at least, be somehow accessible (Rooth 1985, 1992, 1996; König 1991, 1993; Portolés 2009, 2011; Gotzner 2017). The inclusion of the alternatives is part of their conventional meaning so that the information of the utterance holds for the focus as well as for the possible alternatives. As a result, the focus and alternatives are added to an additive relation (König 1991: 61; Dimroth 2004: 25; Borreguero 2014: 19). Nevertheless, additive FOs can contribute to the meaning of the utterance triggering different conventional implicatures.

(64)

a. *Alba y Lucas tienen **también** yates*.
'Alba and Lucas **also** have yachts.'
b. *Alba y Lucas tienen **incluso**/**hasta** yates.*
'Alba and Lucas have **even** yachts.'

The differences in meaning between (64a) and (64b) arise from the semantics that each FO encodes. *También* is a simple additive FO (see König 1991: § 4.1). This kind of FO has an underlying procedural meaning of additivity: it activates an addition of elements that can be linguistically present, as in (65a), or be recovered contextually, as in (65b):

(65)

a. *Alba y Lucas tienen coches y **también** yates*.
'Alba and Lucas have cars and **also** yachts.'
b. *Alba y Lucas tienen **también*** yates.
'Alba and Lucas **also** have yachts.'

Simple FOs operate over a set of alternatives and set up an additive relation between focus and alternatives, but these operators do not induce any ordering among the values (König 1991: 60; Briz et al. 2008).[39] In (65b), the additive meaning of *también* entails that Alba and Lucas have yachts and presupposes that they have other kinds of vehicles. The FO *también* establishes an additive relation on which all values (focus and alternatives) are arranged in such a way that the upper value carries the higher informative degree because it is the sum of all lower items plus a further one (Portolés

[39] Some works (Dimroth 2004; Portolés 2007) maintain that FOs like *only* and *also* can induce a scale in a particular context.

2009: 63, 2010: 242, 2011: 61). Since the focus (n+1) does not replace the set of alternatives (n), it is possible to commute the order of the elements:

(66)

a. *Alba y Lucas tienen coches y* **también** *yates*.
'Alba and Lucas have cars and **also** yachts.'
b. *Alba y Lucas tienen yates y* **también** *coches*.
'Alba and Lucas have yachts and **also** cars.'

Utterance (66a) does not express that having yachts is more informative than having cars, but that yachts and cars all together are more informative than just cars. The same goes for the utterance (66b). The fact of having cars or yachts is not presented as an unexpected event, and herein lies the difference between additive and scalar FOs.

Scalar FOs

Scalar FOs such as *incluso* and *hasta* have an additive and scalar meaning component (see König 1991: § 4.2; Schwenter 2000, 2002; Portolés 2007). This kind of FO does not only evoke a set of alternatives, but it also establishes a scalar ordering for focus and alternatives, whereby the speaker assigns the highest degree of informativity to the focus (Kay 1990; König 1991, 1993; Dimroth 2004; Portolés 2007; Gast & van de Auwera 2011). This scalar arrangement is generally described in terms of *likelihood*, in which the speaker presents the focus as the least likely element to happen in comparison to the alternatives (Karttunen & Peters 1979; König 1991; Dimroth 2004; Gast & van der Auwera 2011).[40]

The meaning of a scalar FO can be atomized into a series of processing instructions (Portolés 2011: 57). The FO *incluso/hasta* provides different instructions: a) it highlights a focus as the most informative element, b) it triggers a set of alternatives to be contrasted to the focus, and c) it evokes a pragmatic scale on which the focus is presented as a less unlikely event to happen than the alternatives. Considering the instructions described above, from the utterance …

(67)

a. *Alba y Lucas tienen* ***incluso/hasta*** *yate*s.
'Alba and Lucas have ***even*** yachts.'

… the addressee can draw the following implicatures:

[40] Karttunen & Peters (1979) proposed that the sentences containing *even* express surprising or unexpected events (state of affairs). In this perspective, alternatives and focus are ordered according to the least or greatest possibility of happening. This likelihood is informativity degree and cognitive/contextual effects in terms of RT.

a) Alba and Lucas have yachts (propositional content).

b) Alba and Lucas have other vehicles apart from yachts (conventional implicature triggered by the additive meaning component).

c) Having yachts is the least likely event from a set of possible alternatives (conventional implicature triggered by the scalar meaning component).

Scalar operators are usually associated with pragmatic scales (see § 2.4.2). In this kind of scale, the elements are ordered according to the world knowledge that interlocutors share in a given communicative situation. Thus, contrary to what happened with the ordering established by simple additive operators like *también*, the scalar meaning of *incluso/hasta* does not allow for reversing the disposition of the values on the scale without making an utterance pragmatically infelicitous in a particular context.

(68)

*Alba y Lucas dirigen una empresa de alquiler de vehículos en Ibiza. Actualmente tienen una flota muy moderna de vehículos; entre ellos, coches y motos. #**Alba y Lucas tienen yates e incluso/hasta coches***.
'Alba and Lucas run a vehicle hire company. They currently have a very modern fleet of vehicles, including cars and motorcycles. #**Alba and Lucas have yachts and even cars**.'

Communication can succeed as long as the context of the interlocutors is identical, and the beliefs and assumptions are highly idiosyncratic (Blakemore 1992: 18). Given a context in which interlocutors share certain beliefs about the vehicles that a rental company should offer to customers, they build a pragmatic scale where the possibility of renting yachts is less expected than renting cars. Therefore, reversing the order of the elements of a pragmatic scale associated with the provided context, and whose elements are ranked according to the topic WHAT VEHICLES DO ALBA AND LUCAS HAVE? results in a pragmatically infelicitous utterance, as happens in *#Alba y Lucas tienen yates e incluso/hasta coches*.

3.3 The FO *hasta*

The FO *hasta* belongs to the paradigm of scalar additive operators, thus, it comprises an additive meaning and scalar meaning simultaneously.

(69)

*a. Alba y Lucas tienen coches y **hasta** yates.*
'Alba and Lucas have cars and even yachts.'
*b. Alba y Lucas tienen **hasta** yates.*
'Alba and Lucas have **even** yachts.'

The FO *hasta* introduces an element of discourse – the focus (*yates*) – as the most informative and sets it up against a set of alternatives. These alternatives are elements with less informativity value than the focus, and they can be syntagmatically present as in (69a) or implied as in (69b).

Hasta also has a scalar meaning component, whereby it evokes a culminative additive scale (see § 2.4.5). In the first place, the scale is additive because the alternatives are not excluded, and all lexical items are added to the scale. Secondly, the scale is culminative because the focus is most informative than the other values. Furthermore, the absolute nature of *hasta* places the expression in focus at an extreme point on the evoked scale.

The absolute nature of *hasta* is the most characteristic feature that distinguishes it from the other Spanish scalar FO *incluso*. These FOs can be occasionally "interchangeable" because their meanings are similar in some aspects: both are scalar and additive.[41] However, the absolute meaning of *hasta* leads its focused expression always being associated with the extreme or final point of a gradation and this endpoint-marking capacity restricts the possibilities and contexts of use in which this FO can occur (Schwenter 2000, 2002).

3.3.1 General properties

Apart from the instructional function, *hasta* presents the following syntactical, grammatical, and semantic features:

a) The FO *hasta* has an unstressed character; that is the reason why it is not autonomous enough to constitute a turn of speech by itself. Instead, the FO is integrated into the member of the discourse on which it operates (Briz et al. 2008).[42]

b) *Hasta* has a broad range of mobility within the utterance. Its position within the utterance determines which element is focused and with that, the utterance has a different interpretation. In (70a), the addressee understands that Alba and Lucas do not only have yachts and, in (70b), that there are other people who also have yachts.

[41] Most of the early descriptive research about the *hasta* consider that this FO has a meaning similar to that of *incluso* but different as far as syntax or sociolinguistics are concerned (see Cano 1982; Gutiérrez Ordóñez 1984; Pavón Lucero 1999).
[42] This feature sets *hasta* apart from other discourse particles, which are entitled with such autonomy to stand alone in a turn of speech (Martín Zorraquino & Portolés 1999: 4068).

(70)

a. *Alba y Lucas tienen **hasta** [yates]*$_{F}$.
b. ***Hasta** [Alba y Lucas]*$_{F}$ *tiene yates.*

c) Because of its prepositional origin, *hasta* must always precede the discourse member that presents (Cano 1982; Portolés 2001[1998]). This feature differentiates it from other FOs like *incluso* and *solo*, which can also be postponed to their focus.

(71)

a. *No vamos a hablar de Tailandia donde creo que llegan [las condenas] a estar **hasta** en cadena perpetua*.
'We will not talk about Thailand where I think [the sentences] are **even** death sentences.'
(*Oral*, España, 18/10/83, CREA)
b. **No vamos a hablar de Tailandia donde creo que llegan a estar en cadena perpetua **hasta**.*
*'We will not talk about Thailand where I think [the sentences] are death sentences **even**.'

d) According to Cano (1982: 244), *hasta* seems to have a higher frequency of use in colloquial registers, probably because it has a more "emphatic" value than *incluso*. However, this idea is based on the author's appreciation of informal Andalusian speech. In a more recent study, Herrero (2014: 215) held that the use of the FO *hasta* is regular in colloquial and written formal registers.

e) The FO *hasta* cannot be denied (72a) nor cancelled (72b) since its meaning contribution is conventional.

(72)

a.**Alba y Lucas no tienen **hasta** yates*.
*'Alba and Lucas do not have **even** yachts.'
b. **Alba y Lucas tienen **hasta** yates, pero no tienen otros vehículos*.
*'Alba and Lucas have **even** yachts, but they do not have more vehicles.'

f) *Hasta* can be suppressed from the utterance without making it ungrammatical; however, its omission affects the interpretation of the utterance (Portolés 2006).

(73)

a. Alba y Lucas tienen yates.
'Alba and Lucas have yachts.'
b. *Alba y Lucas tienen **hasta** yates.*
'Alba and Lucas have **even** yachts.

g) The FO *hasta* admits a series of structures, namely pronouns (74a), noun phrases (74b), adjective phrases (74c), prepositional phrases (74d), adverbial phrases (74e), independent clauses and subordinate clauses (74f).

(74)

a. *Que era un cobarde lo sabes **hasta** tú.*
'That he was a coward, **even** you know.'
(José Luis Alegre. 1982. *Minotauro a la cazuela*. España. CREA)

b. «Masterchef» tendrá ya ***hasta** su propio restaurante.*
'«*Masterchef*» will have now **even** its own restaurant.'
(*La razón*, España, 13/03/2018)

c. *Una serie de expertos invitados al programa intentaron dar explicación a la contradicción que plantean unos secuestradores que llevaban una "vida normal" y eran **hasta** buenos vecinos, pero al mismo tiempo ocultaban un crimen atroz.*
'A number of experts invited to the program tried to explain the contradiction posed by kidnappers who led a "normal life" and who were **even** good neighbors, but at the same time were hiding an appalling crime.'
(*El Mundo*, España, 30/09/1995, CREA)

d. *Y así hemos aprendido a pactar **hasta** con el diablo*.
'And so we have learned to deal **even** with the devil.'
(*La Vanguardia*, España 21/04/1994, CREA)

e. *Si además sus opiniones eran oídas y **hasta** ferozmente criticadas, su satisfacción era completa.*
'If, in addition, their opinions were heard and **even** fiercely criticized, their satisfaction was complete.'
(Alberto Ruy. 1991. *Tristeza de la verdad.* España. De Bolsillo)

f. *Miren, de él dicen que es torero **hasta** cuando camina.*
'Look, he is said to be a bullfighter **even** when he walks.'
(*Oral*, España, 10/10/91, CREA)

h) *Hasta* can also be combined with *incluso* – either before (*hasta incluso*) or after (*incluso hasta*) – to increase the value of the unexpected member (Briz et al. 2008).

(75)

a. *La muchacha tenía una curiosidad enorme, **incluso hasta** un poco de preocupación.*
'The girl had an enormous curiosity, **even** a little concern.'
(Camilo José Cela. *La Colmena*. Madrid. La Cátedra)

b. *Quiero decir, puedes **hasta incluso** odiar, ¿no?*
'I mean, you can **even** hate, can't you?'
(*Oral*, España, 05/08/92, CREA)

i) The FO *hasta* demands personal pronouns in the nominative case (76a); while the prepositional *hasta* needs pronouns in the accusative case (76b) (Alarcos Llorach 1996; Pavón Lucero 1999; Schwenter 2000).

(76)

a. *Que era un cobarde lo sabes **hasta** tú.*
'That he was a coward, **even** you know.'
(José Luis Alegre. 1982. *Minotauro a la cazuela*. España. CREA)

b. *Aun en el piso setenta de un rascacielos, las sirenas de los coches de la policía y las ambulancias llegan **hasta** ti.*
'Even on the 70th floor of a skyscraper, the sirens of police cars and ambulances reach you.'
(Jordi Sierra i Fabra. 1995. *El regreso de Johnny Pickup*. España. CREA)

j) *Hasta* as an FO can co-occur with prepositional phrases (Schwenter 2002: 174).

(77)

Hasta *los ancianos llegaron* ***hasta*** *mi casa.*
'**Even** the elderly came **to** my house.'

k) The FO *hasta* can be replaced in the sentence by other FOs such as *también* or *incluso*. The substitution is possible at a syntactic level but not at the semantic or pragmatic level (Schwenter 2002).

(78)

a. Alba y Lucas tienen ***incluso/también*** *yates.*
'Alba and Lucas have **even/also** yachts.'
b. *Los ancianos llegaron incluso/también mi casa.*
'The elderly came **even/also** to my house.'

3.3.2 The endpoint-marking value

Hasta is an absolute FO because its focus always constitutes the *endpoint value* of the scale. In the words of Schwenter (2002: 127), *hasta* is "inherently endpoint-marking". Kay's scalar model (SM) for *even* presents a practical framework with which to outline the endpoint value carried by this FO. Kay (1990) argues that an *even*-utterance expresses a proposition that is more informative than another contextually accessible proposition. The proposition will be more informative if it pragmatically entails the less informative within the same scale. The most informative one is called *text proposition* (tp), and the less informative is the *context proposition* (cp):[43]

(79)

A: Can John jump six feet?
B: Yes, he can **even** jump seven feet.
(Kay 1990: 67)

In (79), A's question activates the cp *John can jump six feet*. The pragmatic implication of *even* expresses that the proposition *John can jump seven feet* is more informative and pragmatically entails other propositions of less informative value within the same SM (or pragmatic scale).

[43] Kay's proposal is based on contextual and text propositions which are the equivalent to focus and alternatives. The tp is the member in which the FO appears, and the context propositions are the alternatives that are accessible in the context. An accessible cp does not mean that it has to appear explicitly in the previous discourse, but that the proposition can be available through conversational inferences, for example (Kay 1990; Schwenter 2000; Portolés 2001[1998]). In Kay's work, the pragmatic scale would correspond to an SM, understood as the set of assumptions that the conversational participants share at the time of the utterance.

+ Strength

John can jump 7 feet (tp)
John can jump 6 feet (cp)
John can jump 5 feet (cp)

- Strength

Between the cp *John can jump six feet* and the tp *John can jump seven feet*, there is a relation of greater or lesser informativity. The proposition expressed by the *even*-utterance is more informative because it answers the question and allows the reader to infer that John can jump all values lower than seven feet.

Since *even* signals that the proposition expressed by the host utterance is always more informative, if that proposition is not more informative than any other proposition accessible in the context, then the *even*-utterance is pragmatically infelicitous as a result (Schwenter 2000: 175).

(80)

Can John jump six feet?
#He can **even** jump five feet.

Kay's work on *even* also introduces the concept of *contextual dependency*. This notion refers to the level of dependency that an FO has on the context in which it appears (Schwenter 2000: 174). On this matter, the proposition expressed by an *even*-utterance needs the contextual accessibility of other propositions with less informative value in the same SM.

Schwenter (2000, 2002) applies Kay's analysis to the pair of Spanish FOs *incluso/hasta* and argues that the FO *hasta* does not require a less informative proposition already accessible in the context. This distinction in the degree of contextual dependency allows him to make a distinction between the absolute FO *hasta* and the relative FO *incluso*.

(81)

¿Quién ha comido oreja de cerdo?
'Who has eaten pig's ear?'
a. #***Incluso*** *mi abuela la ha comido.*
#'**Even** my grandmother has eaten it.'
b. ***Hasta*** *mi abuela la ha comido.*
'**Even** my grandmother has eaten it.'
(Schwenter 2000: 179)

The question of the example (*¿Quién ha comido oreja de cerdo?*) does not entail any context proposition. Since there is no contextually accessible proposition, the *hasta*-

utterance (81b) is a pragmatically acceptable answer. Because of its endpoint-marking value, *hasta* places its tp at the extreme point of the pragmatic scale and, therefore, does not require a cp with which to compare. By contrast, the use of *incluso* in (81a) is pragmatically strange. Just like *even*, the Spanish FO *incluso* needs the existence of less informative propositions already accessible in the context. If this does not happen, its presence results as pragmatically infelicitous. The use of *incluso* would be possible if the question entails a cp with which the relative FO can establish a relation of informativity, as happens in (82):

(82)

¿Has comido oreja de cerdo?
'Have you eaten pigs' ear?'
***Incluso** mi abuela la ha comido.*
'**Even** my grandmother has eaten it.'

The use of *incluso* in (82) pragmatically entails a proposition ("I have eaten pigs' ear") that is contextually accessible and has less informative value than the proposition expressed by the *incluso*-utterance. Hence, the use of *incluso* becomes pragmatically acceptable in this case. The use of *hasta* is still possible because this absolute FO is not affected by the contextual accessibility of other less informative propositions.

From the given examples, it follows that the FOs *hasta* and *incluso* encode different semantic-pragmatic instructions regarding their behaviour with the discourse context. The reason why *hasta* does not require an accessible cp lies in the inherent endpoint-marking. The focus introduced by *hasta* always represents the ultimate value of the scale so that the focus (tp) does not need alternatives (cp) that are accessible in context with which to establish a scalar contrastive relation.

The lack of contextual dependency displayed by the FO *hasta* is related to the scalar strength that this FO can express and the endpoint-marking meaning. Because of its absolute nature, *hasta* does not usually occur twice in the same utterance "since this repetition results in a contradictory interpretation of the two focused elements" (Schwenter 2002: 125).

(83)

¿Vino Leo a la fiesta?
'Did Leo come to the party?'
*#No solo Leo, **hasta** vino Lisa y **hasta** Sara.*
#'Not only Leo, **even** Lisa and **even** Sara came.'
(Adapted from Schwenter 2002: 125)

The double presence of *hasta* in (83) seems to be infelicitous because the FO signals the ultimate value of the pragmatic scale so that the first focus (*Lisa*) is interpreted as the

most extreme value, and this interpretation is not cancellable. The difficulty of using *hasta* in such cases can be linked to its prepositional origin (Portolés 2007: 144).

The meaning of the *hasta*-preposition signals the final limit or term of a process in space or time (Martínez 1992; Cuervo 1993). The FO retains some traits of the prepositional value, in particular of the construction *desde … hasta.*[44] This construction creates a continuum of elements, the beginning and limit of which is marked by *desde* and *hasta,* respectively. Since this continuum includes the intermediate values, the FO *hasta* summons a scale in which all elements are preserved but not replaced. For that reason, the use of *hasta* is acceptable in additive scales – because all values are maintained on these scales –and it is not easy to find this FO in substitutive scales (see § 2.4.4).

The repetition of *incluso* in the same example would be pragmatically felicitous because the relative FO does not necessarily mark the endpoint of the evoked scale, and the repetition does not lead to an incompatible interpretation of the foci (Schwenter 2002). In a previous work, Schwenter (2000) provided the following example that seems to contradict this idea of non-repetition.

(84)

*Se diría que **hasta** para hablar, **hasta** para pronunciar algunas palabras le faltaban bríos*.
'One could say that to **even** speak, to **even** pronounce some words, he lacked determination.'
(Schwenter 2000: 183)

The author clarified that the member introduced by *hasta* (*pronunciar algunas palabras*) is a reformulation of the first member so that the use of *hasta* is pragmatically acceptable. In that connection, the explanation offered by Portolés (2007) about the difficulty of using *hasta* in substitutive scales should be noted. Here is again the example (48), now as (85a):

(85)

a. #*Los datos del paro son malos, **hasta** muy malos.*
#'The unemployment data is bad, **even** very bad.'
b. *Estos últimos años ha habido datos del paro malos y **hasta** muy malos algunas veces.*
'These last years, there has been bad unemployment data, and **even** very bad sometimes.'
(Portolés 2007: 143)

[44] The prepositional construction *desde...hasta* ('from…until/to') is documented early in Spanish language modifying locative or temporal units (Martínez 1992: 616-617). This correlative construction usually has a space-time value, where *desde* indicates the initial limit and *hasta* signals the end limit or spatial scope.

The endpoint-marking value of *hasta* makes its presence in substitutive scales difficult in which the upper value replaces the lower value, as happens in (85a). However, the double use of the FO becomes possible as long as the interpretation of the scale is additive instead of substitutive, as in (85b). Applying this to Schwenter's example, the use of *hasta* is acceptable as long as the second member introduced is not considered as a different proposition from the one expressed by the first member, but rather a reformulation that does not replace the first one.

The endpoint-marking value of *hasta* is particularly evident in closed scales in which there is an established order. For example:

(86)

¿Ganó Lisa en la tercera ronda?
'Did Lisa win in the third round?'
a.*¡Pues claro! #**Hasta** ganó la semifinal*!
'Of course! #She **even** won the semifinal!'
b.*¡Pues claro! **Hasta** ganó la final.*
'Of course! She **even** won the final.'

The elimination rounds of a tournament create a scale with a fixed and closed order: first, second and third round, quarterfinals, semi-finals, and finals. In (86a), the use of *hasta* is infelicitous because if the FO invariably marks an endpoint, *semi-final* is not the ultimate value on the elimination tournament scale. On the other hand, *hasta* is acceptable in (86b) because the final round does hold the last position of that scale.[45] Schwenter (2002) concluded that any scalar FO that does not require an accessible cp (like *hasta*) is an absolute FO with an endpoint-marking value. In the same way, a scalar FO that demands a cp (like *incluso*) is a relative FO compatible with an endpoint and non-endpoint interpretation.

[45] As relative FO, *incluso* would be acceptable in both answers: a) ***Incluso** ganó la semifinal* ('She **even** won the semi-final'); b) ***Incluso** ganó la final* ('She **even** won the final').

Chapter 4: Methodology

Pragmatics had formulated theories based on intuitions without complementing them with experimental data to confirm or reject their claims (Noveck & Sperber 2004: 1). The limits of these intuitions were addressed by applying psycholinguistic experimental methods to test the pragmatic accounts. This blend gave rise to the field of experimental pragmatics. Experimental research in linguistics incorporates a series of tools to provide empirical information to respond to how people acquire, produce, and understand language. The experimental methods used for language comprehension investigation can be divided into two main groups: online and offline techniques. Differences between both arise regarding the type of measure and when the measure is done (Irrazábal & Molinari 2005: 583).

The *offline methods* examine discourse comprehension after the participant has read or heard the linguistic material. Experiments assess discourse comprehension processes once these have been performed, and the results reflect conscious decision-making (Mertins 2016: 16). Data is collected employing memory measures such as recall or recognition tasks, and provides facts about the mental representation constructed after the phonological, lexical, syntactic, and semantic levels of the linguistic stimuli are integrated. Act-out, sentence-picture matching, questionnaires, and comprehension tests are offline methods.

The *online methods* provide detailed evidence of the moment-by-moment processing that takes place before the participant arrives at the final interpretation. These experimental methods have the great advantage of implementing techniques to measure minimal cognitive processes on a millisecond scale. Online methods are self-paced reading (SPR) and listening, eye-tracking, naming tasks, cross-modal priming, event-related potentials (ERPs), or functional magnetic resonance imaging (fMRI) (Keating & Jegerski 2015: 2). When we want to study sentence processing, online methods allow us to collect detailed data as each word is processed. With information about the online sentence comprehension, we can examine at precise locations within a sentence and precisely what or where may lie some difficulty in processing triggers.

4.1 The eye-tracking methodology

Eye-tracking methodology has been widely used as a measuring instrument of moment-by-moment cognitive processing (Rayner 1978, 1998). It provides a detailed data record with which researchers can analyse several reading measures to determine the time course of the effect caused by a manipulating linguistic variable. The main advantage of eye movement recording is a detailed data gathering while comprehension takes place and with a task similar to regular reading activity.

Eye movement data is assumed to reflect the cognitive processes underlying a particular task. The association between eye reading behaviour and mental activity is grounded on two assumptions: the *immediacy assumption* and the *eye-mind assumption* (Just & Carpenter 1980: 330).

a) The *immediacy assumption* states that a reader interprets each content word at the moment she encounters it, that is, the visual information is processed as the reader comes across it, and the interpretation of a word takes place as soon as possible.

b) The *eye-mind assumption* posits that the eyes of the reader remain fixated on a word while the word is being processed. Thus, the gaze duration reflects the time needed for a reader to process the currently fixated word. Therefore, if a word is difficult to process, its reading time will be longer.

Eye movements: fixations and saccades

When considering the research of eye movements applying the eye-tracking methodology, fixations and saccades are the two basic eye movements mainly studied. When we read, our eyes do not move steadily along a printed line. Rather they make a pattern of alternating saccades and fixations.

A *fixation* is a period during which eyes remain moderately still.[46] New information is acquired from the text only during a fixation, so it is widely assumed that the fixation

[46] Fixations are generally defined as the time span during which eyes remain still. However, fixations are composed of continuous small movements that prevent the visual stimulus becoming blurred while it is being fixated. The eyes make three types of small movements: nystagmus (or tremor), slow drifts, and micro-saccades. *Nystagmus* is an involuntary rhythmic oscillation of the eyes, and it can be physiological or pathological. Physiological nystagmus has the function of preserving a clear vision. It can be induced by head rotation (when looking at trees in a moving car) or when the stimulus in the visual field is moving fast. Pathological nystagmus makes the eyes drift away from the visual target, degrading vision and is caused by disease or illness. *Drifts* are slow ocular movements of small amplitude during voluntary gaze fixation. A few times per second, they are interrupted by the *micro-saccades*: small and high-velocity eye movements. Most researchers consider these small movements

gaze is a good indicator for the load of cognitive processing during reading comprehension (Wolverton & Zola 1983; Rayner 1998). The mean fixation duration in reading comprises 225-250 msec, though these values can vary greatly and range from 50 to 600 msec (Rayner 2009: 1460). The first fixations on a line are usually longer than the rest within the same line, and the last fixation is shorter (Rayner 1998: 375).[47]

When we read in normal conditions, we spent almost 90% of the time fixating words. For the remaining time, our eyes move across the text with saccades. From the fixated words, about 80-85% are content words and 20-35% are function words (Rayner 1998: 375). The more difficult a word is to process, the longer reading times it will have. It may also happen that the reader needs to make regressions to words already read. Fixations, as well as saccades, can be influenced by textual, typographical, or lexical factors or if the reading is in silence or aloud.[48]

The other movements that our eyes make when we read are the *saccades*. They are quick ballistic movements with the primary role of placing a new word into the foveal vision. In silent reading, the average saccade size usually covers from seven to nine letter spaces, and the saccade duration ranges between 10 and 100 milliseconds (Duchowski 2007: 42). The visual input is suppressed during these movements (known as *saccadic suppression*); otherwise, we could only perceive a blur. Although nearly no information is extracted during a saccade, cognitive processing activities such as lexical processing still take place (Irwin 1998: 9; Rayner 2009: 1458). Saccades are pre-programmed, which means that once a saccade is initiated, the destination point cannot be changed. The preparatory time needed to plan and execute the following saccade is called the *saccade latency*. This period ranges from 150 and 175 msec, suggesting that saccade programming is done in parallel with comprehension processes in reading (Rayner 1998: 374).[49]

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as 'noise' and treat them differently in the scoring procedure, for example, by combining fixations that are on adjacent characters, or merging fixations if both are on adjacent characters and one of them is shorter than 100 msec (Rayner 1998: 374).

[47] Our critical items were designed having this factor in mind. Therefore, the AOIs in our study are never the first or the last words of the stimulus.

[48] Font type, letter spacing, word predictability, frequency and length, text difficulty, writing system, or the ability of the reader can affect eye movements. If the content of a text is difficult to process, fixations are usually longer, saccades are shorter, and the reader makes more regressions. This eye movement pattern is also similar if the font type of the text is complex to read or if the words have low-frequency. Fixations are usually longer as well in oral reading than in silent reading because the eyes move faster than the reader can pronounce the words (Rayner 2009: 1459).

[49] A great deal of research has examined this phenomenon. The findings are that direction and amplitude for the upcoming saccade are computed separately and not in a serial order. More than one saccade can be programmed prior to saccade onset. Cognitive processes can also affect the mean of

Most saccades are progressive, that is, they are forward saccadic movements along the line of text. Only about 10-15% of the saccades are *regressions*: backward movements to a word on the current line or words on previous parts of the text (Keating 2014). Regressive saccades mainly reflect comprehension errors or difficulty processing, but some others are due to oculomotor errors or the ballistic nature of the saccade. When eyes fail to land on an optimal viewing position and they posit near the end of the word, they make a second fixation a few character positions back, from which the word identification is faster (Reichle et al. 2003: 451).

In addition to fixations and saccades, there are additional eye movements during reading. Some words are fixated more than once, and some others are skipped. About 15% of the words in a text are refixated (Rayner 1998: 387). *Refixations* can be due to an incomplete lexical process; in this case, making two or more fixations eases the word processing. Readers also can skip words in a text. *Word skipping* mainly occurs for two reasons: either because the saccadic movement propels the eyes too far forward or because the word was already identified parafoveally (Keating 2014: 74). In the latter case, there is an increase in the duration of the previous fixation (Rayner 1998: 381). Word skipping is influenced by several factors such as contextual constraint, morphological complexity, word frequency, and word length, the latter being the most significant when deciding which words are skipped. The words highly confined by the preceding context are not fixated more often than those that are skipped, as well as low-frequency words, function, and short words in comparison to high frequency, content, and longer words, respectively (Just & Carpenter 1980; Rayner 1998).[50] Word skipping data indicates that the processing of many words begins before being fixated, and their processing is completed when they are finally fixated.

The acquisition of information

The extent of the area we perceive with our eyes when we make a single fixation is the *visual field*. It is usually measured in degrees and can be divided into the foveal, parafoveal, and peripheral areas, each section having quite different levels of sensitivity (Rayner 1992: 374; Godfroid 2012: 234). The *fovea* is the central 1.5°–2° of the field of

saccadic latency. Since an efficient saccade planning takes time, a longer saccade latency leads to a more accurate target location of the saccadic movement.

[50] While content words are skipped less than 20% of the time, function words are not fixated for 60-80% (Just & Carpenter 1983). Short words (2-3 letters) are skipped around 75% of the time (Keating 2014). Words of eight or more characters are generally fixated. Word skipping is a factor taken into consideration when designing the present eye-tracking experiment and evaluating the data.

vision. The visual acuity here is excellent, allowing us to extract an enormous amount of detailed information. The area surrounding the fovea is the *parafovea*, which generally extends out to about 5° on either side of the fixation point. Although the visual acuity reduces notably in this region, it is still possible to obtain information to recognize the words located to the right of the fixation. Indeed, even though most processing is done in the fovea region due to its high acuity, some preliminary processing of the word located at the right of the fixation (in the parafovea) takes place. The area beyond the parafovea is the *perifovea* that covers 6.1°–12.1°. Here, the visual acuity is minimal so that we cannot identify letters but only the general characteristics of objects (Traxler 2011).

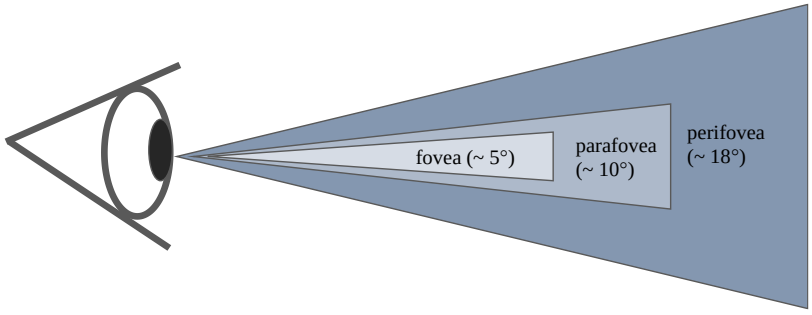

Figure 1. The foveal, parafoveal, and perifoveal regions

The *perceptual span* in reading is the region of the visual field from which readers extract useful information during a single fixation.[51] It extends from the beginning of the fixated word until 3–4 letters leftwards and 14–15 letter spaces to the right. The size and asymmetry can be affected by the writing system properties, attentional factors, font width, or reader's ability.[52] Within the perceptual span, there is the *word recognition span*, the area from which readers obtain specific letter information for word identification. It is smaller than the perceptual span itself and does not exceed 7–8 character spaces to the right of the fixation (Keating 2014: 72). At a further distance, the acquired information is associated with word length and spacing between words.

[51] The size of the perceptual span, as well as the amount and the kind of information that can be extracted from the text, have mainly been investigated using the e*ye-contingent display change technique.* In this technique, the text a reader looks at is entirely controlled and manipulated on every fixation. See Rayner (1998: 378-381) for a further discussion about these and other techniques.

[52] The asymmetry varies depending on the direction of reading in a language. In alphabetic languages which read from left to right, the span is asymmetric to the right of the fixation; while in right to left writing systems like Hebrew, the asymmetry extends to the left of fixation (Rayner 1998, 2009). Additionally, the perceptual span in orthographic languages is bigger than in the logographic ones such as Japanese kanji and Chinese, in which the span extends from 1-3 characters to the left of the fixation and 3-6 letters to the right. The perceptual span also becomes smaller when the fixated word or the text is difficult to process or for novice readers rather than skilled readers (Rayner 1998: 380).

Figure 2. Perceptual span for an average reader (taken from Keating 2014: 73)

Even though the region where words can be fully identified (word identification span) is quite limited, it does not mean that only one word is recognized on every single fixation. Readers acquire useful information mainly from the currently fixated word, but some preliminary processing (orthographic and phonological) of the word located at the right to the fixation begins before being fixated (Lima & Inhoff 1985: 272).

The effect in which the first letters of the upcoming word are processed parafoveally before fixating the entire word is the *parafoveal processing, parafoveal preview, or preview benefit.*[53] A preview benefit increases processing efficiency since the visual information obtained in the previous fixation reduces the duration of the subsequent fixation on the word. If the reader does not have a valid preview benefit, reading is less efficient (Rayner 1998, 2009). The amount of preview benefit depends on the processing difficulty of the foveal word. If the fixated word is linguistically complicated to process, the reader obtains little to no preview benefit from the upcoming word. The easier it is to process the fixated word, the greater the preview benefit (Rayner 2009: 1467).

How much information can be extracted on a fixation depends on variables such as length and difficulty of the word that is being fixated, as well as length, frequency, and predictability of the parafoveal word. Although there is evidence for many variables influencing the fixation times, the lexical and linguistic factors of word frequency, predictability, or lexical ambiguity are those with more significant effects on word recognition (Rayner & Sereno 1994; Clifton et al. 2007).

Word frequency. Words with a low frequency are fixated longer than high-frequency words (Just & Carpenter 1980; Rayner & Sereno 1994). The fact that high-frequency

[53] The preview effect benefit has been documented in numerous research studies. For an overview, see Rayner & Pollatsek (1987).

words receive shorter fixations on average leads to the conclusion that the lexical access of the word influences the duration of fixation. Besides, high-frequency words are skipped more often than those with a low frequency, especially if they are short.[54]

Word familiarity. Words with a high word familiarity are more likely to receive shorter fixations (Chaffin et al. 2001).

Age of acquisition. Age of acquisition is an important variable in word recognition. Words acquired in an early stage of language acquisition tend to be used more often in adulthood. Since they are recognised more quickly and easily, they receive shorter fixations (Gerhand & Barry 1999).

Lexical ambiguity. Contextual information guides the reader to activate the appropriate meaning of a word. If an unambiguous word is read in a non-disambiguating context, it registers longer fixations than a word with a single meaning, same length, and frequency (Duffy et al. 1988: 198).

Predictability. Words that can be predicted from the previous context are fixated for less time than those that are not (Balota et al. 1985: 385). Furthermore, predictability has a strong effect on skipping, and highly predictable words are most often skipped than less predictable words (Ehrlich & Rayner 1981).

4.2 Previous research on focus phenomena

Offline research conducted on focus phenomena has produced solid evidence about the processing benefits associated with linguistically focused information in sentence comprehension: focus information is identified faster and more accurately than non-focused information (Hornby 1974; Cutler & Fodor 1979; Langford & Holmes 1979); focus information is also better remembered than non-focused information (Singer 1976; Birch & Garnsey 1995; Gernsbacher & Jescheniak 1995); focus information facilitates inferences (Gerley 1992) and anaphor resolutions (Carpenter & Just 1977; McKoon et al. 1993; Gordon & Hendrick 1997, 1998; Almor 1999); and false information is more likely to be detected when it occurs as part of a sentence-focus structure (Langford & Holmes 1979; Baker & Wagner 1987; Bredart & Docquier 1989; Bredart & Modolo 1997). While the offline studies have shown that linguistic focus has clear effects on

[54] Longer fixation times in low-frequency words have a spillover effect because the fixation duration on the next word is inflated (Rayner & Duffy 1986). In addition, the frequency effect (for low and high-frequency words) generally reduces as the words repeatedly appear in a short text. Word frequency - determined from corpus data - is highly correlated with word length. Low-frequency words are usually longer than words with a high frequency.

language understanding at sentence level, eye-tracking research have yielded inconclusive data regarding the manipulation of syntactic focus structures and the associated reading times.

For example, Birch & Rayner (1997) found that syntactic focus has a late impact on processing. In their study, early measures did not exhibit differences between experimental conditions, but the rereading times for the focused word were longer in comparison to the non-focus condition. Since later stages of sentence processing are assumed to reflect the integration of information during reading, their effects in late measures seemed to indicate that syntactic focus causes additional cognitive effort as part of the integration process (Filik et al. 2011: 928). However, subsequent studies have shown opposite results. Morris & Folk (1998) observed shorter global reading times for focused words than for non-focused words. The association between focus and lower reading times are consistent with the claim that linguistic focus facilitates the integration of a word within a sentence context. Nevertheless, the follow-up study carried out by Ward & Sturt (2007) did not detect any differences in early or late measures and the authors advocated that focus may trigger a more detailed lexical-semantic representation, but the generation of this mental representation does not necessarily involve a more effortful encoding of information.

The effects of FOs (such as *only*, *also*, or *even*) during sentence online processing have also been examined. Much of the existing research explores the role of the English FO *only* as a guide to the comprehension difficulty of structural ambiguities (Ni et al. 1996; Paterson et al. 1999; Liversedge et al. 2002).[55] Research examines whether the presence of *only* can help in the syntactic processing of reduced relative clauses by removing any difficulty due to temporal syntactic ambiguity in sentences like:

(87)

a. The businessmen loaned money at low interest were told to record their expenses.
b. **Only** businessmen loaned money at low interest were told to record their expenses.

[55] Even though several kinds of FOs differ in their morphosyntactic, lexical, and semantic features as well as their focus function, much research is concerned with the FO *only* and its effects on focus assignment (Paterson et al. 2007) and sentence-structure processing (Paterson et al. 1999). Very few studies analyse and compare different FOs and whether or how their different properties have an impact on sentence comprehension. Some other investigations about FOs are related to child language production or acquisition in different languages. In Spanish, most experimental studies exploring FOs from an empirical perspective are carried out by the DPKog research group of Heidelberg University.

The phrase *loaned money at low interest* is temporarily ambiguous in (87a) and (87b) and the readers will resolve the disambiguation upon encountering the phrase *were told*. Ni et al. (1996) argued that the presence of *only* might act as guide during the initial parsing, reducing the disambiguation problems.[56] The authors claimed that the FO needs a contrast set and the requirement of two sets compels the readers to interpret the information after the word *businessmen* as a reduced relative clause, since the relative clause meets this requirement.

The study drew some criticism though. The stimuli were considered quite heterogenous and the disambiguation area too large so that the results could be due to these factors and not to the presence of *only*. In consequence, Paterson et al. (1999) conducted another eye-tracking experiment in which the disambiguating region was a single word. Sentences had either a reduced (ambiguous condition) or unreduced form (unambiguous condition) and began with the definite article *the* or with the FO *only*:

(88)

a. The teenagers allowed a party invited a juggler straightaway.
b. **Only** teenagers who were allowed a party invited a juggler straightaway.

The disambiguating word (*invited*) registered longer reading times in both conditions, which showed that readers experienced processing difficulties regardless of the insertion of the FO. However, the authors did find that the FO seemed to ease the reanalysis effort on the disambiguating word after the readers detect the garden path. In this case, the rereading time and total reading time were shorter for the critical regions before the disambiguating word in utterances with *only* than in their counterparts with the article *the*. Based on their outcomes, it was concluded that the inclusion of *only* has a late facilitating effect and eases the recovery of an initial incorrect parsing, but it does not guide the initial parsing.

Liversedge et al. (2002) further explored ambiguous relative sentences. They did not discover substantial differences between conditions for the first-pass measure. However, in the ambiguous sentences without *only*, the regressions were more frequent and the rereading time was longer. The investigations from Paterson et al. (1999) and Liversedge et al. (2002) showed that *only* helps to resolve processing conflicts in sentences in which it occurs, thus accelerating the disambiguation.

[56] Following the garden path theory, a reader initially processes sentences making parsing decisions based on knowledge about grammatical structures and without being influenced by semantic and contextual factors (Rayner, Carlson & Frazier 1983: 371). The parser is also more likely to assign a simple active analysis rather than a relative clause reading because the first one is less complex. When processing the disambiguating word, the readers experience some difficulty due to the initial analysis.

Another work of capital interest is that of Filik et al. (2009). Their investigation comprised two online experiments to assess how the different semantic functions associated with the FOs *only* and *even* influenced the processing of the host utterances. They tested critical items such as:

(89)

a. **Only** students taught by the best teacher passed the examination in the summer.
b. #**Only** students taught by the worst teacher passed the examination in the summer.

According to our world knowledge, passing an exam is a more likely event to happen in the situation described in (89a), while the information communicated in (89b) may be considered implausible because it does not fit with our cultural expectations. If we replace the FO *only* by the FO *even* in the previous utterances, the relation changes:

(90)

a. #**Even** students taught by the best teacher passed the examination in the summer.
b. **Even** students taught by the worst teacher passed the examination in the summer.

Since *even* expresses the state of unexpectedness, the fact that students taught by the worst teacher passed the exam now becomes felicitous (90b). On the other hand, the situation described in (90a) seems contradictory and the assumption triggered by the instruction of *even* is less plausible.

In both conditions – *only*-utterances and *even*-utterances – the critical region (*passed the examination*) becomes the first location wherein readers may find out the occurring incongruence and comprehension difficulty. The post-critical region (*in the summer*) is the second area at which the pragmatic incongruence is detectable. Findings from the first experiment demonstrate that first-pass reading times were longer for the critical region in *only*-utterances under the implausible condition. *Even*-sentences, however, presented longer reading times in the post-critical region when the procedural instruction collided with the reader's expectations. These results indicated that the semantic information associated with *even* had a later impact than *only* – probably due to a more complex semantic function (Filik et al. 2009: 681).

Given that the FO *even* triggers a scalar contrastive implicature, it seems probable that all computations required to process this information result in delayed effects for the condition marked with this scalar FO. Furthermore, the research outcomes denoted that not only do FOs carry information about contrasts between focus and alternatives, they can also induce expectations.

Further eye-tracking experimental study on discourse particles, and in particular on FOs, has been conducted by the *Diskurspartikeln und Kognition* (DPKog) research group. The

main aim was to examine the effect of the procedural meaning of discourse particles during online processing. The outcomes of their research sustain three arguments that can be attributed to the theoretical characteristics of the procedural meaning of these elements (see Loureda et al. 2015; Nadal et al. 2016; Cruz & Loureda 2019; Cruz 2020):

a) *The introduction of an FO triggers a different processing pattern*. Results have shown that an FO acts as an inferential guide and controls the processing of the utterance. Even though the reanalysis effort seems to be more demanding in utterances marked by an FO, this additional effort that the reader expends to confirm, enrich, or readjust the first constructed assumption is levelled out during the whole utterance processing.

b) *The instruction of an FO reassigns the values of the other elements involved in the focusing operation*. Results have shown that the instruction of any FO determines the value of the other elements involved in the focusing operation (focus and alternatives) by redistributing their relative values.

c) *The introduction of an FO does not involve more processing effort for the whole utterance.* An FO confers more semantic information to the host utterance that the reader must process. However, even though the utterance is informatively more complex, it is also more semantically determined. Thus, the additional information does not imply that the utterance with the FO requires more cognitive effort than an analogous utterance without the FO.[57]

Recent investigations on FOs also deal with the role of the alternatives in online processing (Kim 2012; Byram-Washburn 2013, Gotzner 2017). This research had provided empirical insights into the retrieval and recall of the set of alternatives, what kind of alternatives are activated upon processing different FOs, and to what extent contextual factors might have an impact on the construction of the set of alternatives.

Gotzner (2017) explored the impact of the German operators *nur* ('only') and *sogar* ('even') on the mental representation of alternatives employing a series of online recall experiments.[58] Her investigation yielded evidence to suggest that the inclusion of an FO

[57] This effect was also found in studies carried out on other elements with procedural meaning; for example, the connective *por tanto* (Narváez 2019; Recio 2020) and *sin embargo* (Nadal 2019).

[58] Firstly, she undertook two recall experiments in which participants listened to some conversations. Each discourse consisted of two context sentences and a critical sentence. The context sentences contained three elements that conformed the set of alternatives. Critical sentences were presented in three different conditions: with the exclusive FO *nur*, with the inclusive scalar FO *sogar*, and without a FO. See the examples taken from Gotzner (2017: 77):

Context I: In the fruit bowl, there are peaches, cherries, and bananas.

in discourse activates a set of alternatives in the listeners' minds. Data revealed that the presence of an FO improved the number of alternatives that readers could remember. However, although the presence of an FO has an impact on recall performance, the kind of FO (*only* or *even*) had no effect. Results also suggested that the FOs make readers better at remembering the alternatives, but alternatives are in general worse retrieved than foci. This evidence confirmed previous findings on focus, according to which individuals are sensitive to focal information and there are "many processing benefits associated with material that is in focus" (Filik et al. 2011: 930).

Gotzner (2017) conducted further experiments to investigate the mechanisms underlying the activation and retrieval of alternatives when FOs instantiate them. Using a probe recognition task and a lexical decision task, she compared the retrieval of mentioned alternatives to that of unmentioned alternatives, on the one hand, and the impact of FOs on those operations, on the other. Results from the probe recognition showed that participants required more time to reject an unmentioned alternative when an FO was present in the stimulus.[59] Interference effects were observed independently of the kind of FO, either *even* or *only*. According to the author, FOs "act like a placeholder triggering a search for alternatives from the mental lexicon" (p. 83). Therefore, those effects may seem to indicate that, even if there are already some alternatives mentioned in the context, participants do still consider further unmentioned alternatives.

The goal of the lexical decision task was intended to analyse whether mentioned and unmentioned alternatives become activated in the audience's mental lexicon due to priming effects.[60] The data demonstrated the influence of the FO *only* compared to the condition with no FO, which proves a major competition among alternatives when the

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Context II: I bet Carsten ate cherries and bananas.
Critical sentences in three conditions
(a) No, he only ate peaches; (b) No, he even ate peaches; (c) No, he ate peaches.

After listening to nine dialogues (approx. four minutes), participants were asked to remember the mentioned alternatives using a critical question such as *Which fruits were in the fruit bowl?*

[59] In the probe recognition task, participants listened to some discourses containing a set of three elements (e.g. peaches, cherries, and bananas) and a critical utterance in which the last word was in focus (e.g. peaches). After listening to the conversation, participants performed a recognition memory task on a visually presented probe. They had to indicate whether the probe was mentioned in the discourse or not. Reaction measure was the time needed by participants to (a) recognize a probe that was a mentioned alternative (e.g. cherries), (b) discard an unmentioned alternative (e.g. melons), and (c) discard a non-semantic associative element (e.g. clubs).

[60] Because no remarkable differences between exclusive and additive operators were seen in previous experiments, the condition with *even* is discarded. The materials were the same as those of delayed recall experiments. Stimuli were tested in condition with *only* and in condition with no FO. Target words were of three kinds: a) mentioned alternative, b) unmentioned alternative, and c) unrelated word. After listening to the material, participants performed a lexical decision task, wherein they had to answer whether the visually presented word is real or unreal.

procedural instruction is present. The participants recognized in less time the mentioned alternatives in the first place, the unmentioned alternatives in the second place, and finally, they needed more time to recognize unrelated items. Priming effects were confirmed for mentioned as well as unmentioned alternatives and in both utterances with *only* and without the FO.

The impact of contextual and pragmatic factors in the constitution of alternatives was also explored. Kim (2012) conducted a series of visual world experiments to investigate whether contextual information had a particular role when the addressee built the set of alternatives triggered by an FO.[61] Based on the outcomes, the author concluded that the presence of an FO as well as the conceptual features of the recent discourse determine the expectations of the readers regarding the upcoming material. The author also found that the semantic properties of different kinds of FO (*only*, *also*) elicit different expectations about the upcoming discourse – as Filik et al. (2009) had demonstrated as well in their study with *only* and *even*. In sum, all experiments carried out by Kim yielded further evidence that different sources of contextual information also take part when processing and interpreting FOs. The findings hint at the assumption that an FO makes participants access a set of alternatives, but that the selection of alternatives is also partially constrained by the context and further pragmatic aspects.

In light of the previous results, we gather the most relevant findings on the processing of focus phenomena:

a) Focus information triggers a processing benefit: focusing structures facilitate processing during disambiguation (Paterson et al. 1999); explicit alternatives are recalled better in the presence of an FO (Gotzner 2017).

b) FOs facilitate the reanalysis effort in the case of processing conflicts (Liversedge et al. 2002).

[61] Kim (2012) conducted several experiments with the visual world paradigm. Her first experiment was intended to examine whether the presence of *only* in auditory stimulus can determine the expectations of the upcoming material. Participants heard a discourse comprising two sentences like a) *Mark has candy and apples* and b) *Jane (only) has some oranges*. The discourse contained three items of the same semantic kind. In the given example, *apples* and *oranges* belong to the semantic type of fruits. While listening for the stimulus, participants were presented a display with four elements: the target item (oranges), a competitor with the same initial sound as the target item (oars), and two unrelated distractor items (pencils and mittens). The participants were asked to click on the item that the person in the second utterance had. The second experiment was conducted to compare the lexical meanings of *only* and *also* in contexts where the focused item was either already mentioned in the previous context or was new to the discourse but of the same semantic category as the previous elements. In a third experiment, the target item was presented in three versions: a) mentioned in the previous context, b) novel and with a share conceptual category, c) novel and with a different conceptual category.

c) FOs demand higher reanalysis effort but they have a regulatory effect on utterance processing (Nadal et al. 2016; Cruz & Loureda 2019; Ivanova & Bello 2019).

d) FOs trigger a mandatory set of alternatives as competitors to the focus (Gotzner 2017). The alternative activation takes place regardless of the kind of FO and is constrained by contextual and pragmatic factors (Kim 2012).

4.3 The current study

The aim of this investigation is to prove experimentally the role of the Spanish FO *hasta* as a procedural guide in information processing and verify how its inclusion in a given utterance determines the cognitive pattern during the processing. Additionally, it will examine to what extent the presence of the FO determines the processing effort of the host utterance and the recovery of the communicated assumptions. In pursuing these objectives, the present research comprises an online reading experiment using the eye-tracking methodology and an offline comprehension test.

Eye tracking is an online indirect method that allows us to study the eye movement of participants during a range of activities. In our eye-tracking reading task, the reading data reflects the processing effort demanded by each experimental condition and/or area of interest in real-time. The reader's eye movement pattern gives us insight into the ongoing mental processes that take place while reading the stimuli. The comprehension test is complementary. The outcomes reveal whether the critical utterances tested in the online reading experiment are a sufficient ostensive stimulus for the readers to recover the intended implicature. Comparing the data gathered from both kinds of techniques, we rely on qualitative and quantitative information to draw relevant conclusions on how native speakers process the different information focus structures under study.

4.3.1 Dependent variables

Cognitive processing in reading can be evaluated based mostly on two types of eye-tracking data: fixation times and regressions (Keating 2014: 75). Adopting the close bond between selective attention and gaze direction (*eye-mind assumption*, see Just & Carpenter 1980), fixation time is considered a good indicator of processing difficulties. Therefore, it has become the primary measurement metric used in eye-tracking research to determine the cognitive effort required during reading comprehension (Rayner & Sereno 1994; Rayner 1998, 2009).

Recording of fixations gives rise to different parameters that can be taken for the analysis of cognitive processes during reading. To measure the processing effort demanded by the entire utterance as well as of each area involved in the focusing relation, three eye-tracking parameters were treated as dependent variables: *first-pass reading time (FPRT)*, *second-pass reading time (SPRT)* and *total reading time (TRT)*. The information provided by the parameters reflects the time course of the cognitive processing underlying comprehension in each reading stage (during the construction of a first assumption and during the reevaluation of that initial assumption), thus yielding a more fine-grained overview of the effects of the manipulated linguistic variable.

TRT (also *total dwell time*) is the sum of all fixations made within a word or area of interest, both during the first reading and all rereadings.

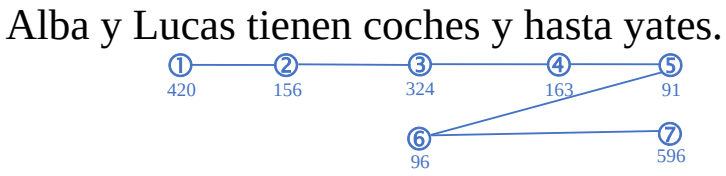

Figure 3. Example of a TRT sequence

Figure (3) illustrates a record of an imaginary eye behaviour with seven fixations for the entire sentence. Each fixation has been sequentially numbered and depicted by a small circle with a number inside. Digits below each circle indicate the gaze duration in milliseconds. The lines linking the circles represent the saccadic movements. The TRT corresponding to the entire utterance is 1846 msec, computed by summing each fixation made during the first reading (1 to 5) and the rereading (6 to 7). Considering that the TRT encompasses the fixations made in the initial and the successive readings, this parameter encompasses the effort needed for the construction of the first assumption and the reanalysis of the initial assumption. Therefore, this measure is an index of the cumulative cognitive effort needed by the readers to process the whole information.

To obtain a more detailed insight into the construction and reanalysis of the communicated assumption, it is recommended to divide the TRT into the FPRT and SPRT (Hyönä et al. 2003; Holmqvist et al. 2011). These individual parameters reflect two different stages of processing. The FPRT corresponds to the construction of an initial assumption, while the SPRT reflects the reanalysis in which that first assumption is confirmed, enriched, or corrected, since it is confronted with the given context and beliefs stored in the mind (Nadal et al. 2016: 55-56).

FPRT (also *first dwell pass*) is the sum of all fixations made on a word or area of interest before the eyes leave it either to the left or to the right (Rayner 1998). In Figure (4), the FPRT for the entire utterance is 1154 msec, calculated by summing the gaze durations made in the first reading (1 to 5).

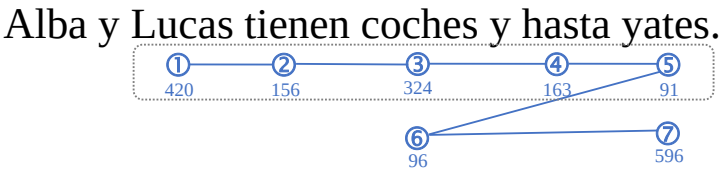

Figure 4. Example of a FPRT sequence

The reading values of this parameter reflect the effort that readers need to build the first assumption from the information of the utterance during an early stage of processing (Holmqvist et al. 2011). In this stage, the readers accomplish a series of cognitive tasks – most of them automatized – like word recognition, confirmation of the recognized lexical elements in the mental lexicon, syntactic parsing, syntactic-semantic integration of all elements of the utterance, and semantic proposition formation.[62] The linguistic input and the readers' assumptions are blended to develop the mental representation of the utterance. The result is the construction of an initial assumption based on the linguistic material, the prior and world knowledge, and the communicative situation in which the discourse takes place. From this assumption, an inferential process can be initiated (Nadal et al. 2016; Cruz & Loureda 2019; Loureda et al. 2021).

SPRT is the amount of time that the readers need to reread an Area of Interest (AOI).[63] In the example given below, the SPRT for the entire utterance is 692 msec (see Figure 5). The data is obtained by summing the gaze fixations made after the eyes fixate a word for the first time, and then they return to fixate it again (6 to 7).

[62] For a more detailed description of all subskills, see Grabe & Stoller (2002), and also Grabe (2009).
[63] The SPRT can be defined in different ways according to the conducted study. In some research studies, the SPRT is the sum of all fixations made on a region after being exited and re-entered for the first time. In other studies, the SPRT is the sum of all fixations made on a word, excluding first-pass times (that is, the TRT minus the FPRT). In this last definition, fixations made on a word by rereading more than once are included. The SPRT is also called by the general term "rereading time" (Keating 2014: 77). In our investigation, we will use rereading time and SPRT independently to refer to this parameter.

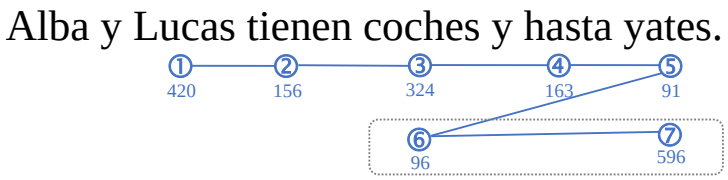

Figure 5. Example of an SPRT sequence

This late measure is an indicator of the cognitive effort concerning the reanalysis of the communicated assumption and reflects possible difficulties during reading (Rayner 1998; Hyönä et al. 2003; Holmqvist et al. 2011). In this stage, the readers reconsider the initial assumption. They combine the mental representation created during the early stage with contextual information to confirm, modify, or abandon the first assumption.

In Figure (5), the readers do not interpret the word *coches* as an alternative during the FPRT. Only after processing the FO and the focus *yates* do the readers read again the word *coches* to consider this element as an alternative to the focus and process the scalar contrastive relation between both elements. As with the processing of implausible information, the effects of the accommodation should be more apparent in this late stage of processing. The reanalysis of implausible utterances will reflect the cognitive effort needed by the readers to accommodate the incongruous information and create, if necessary, an *ad hoc* assumption to satisfy the requirements of the procedural mark.

4.3.2 Independent variables and hypothesis

The following qualitative independent variables (IV) were analysed in our research: (A) Size of the alternative set, (B) Focus marking, (C) Degree of pragmatic plausibility.

- The factor (A) *Size of the alternative set* has three levels, each one based on the number of alternatives building the pragmatic scale. The set can be implicit (the alternative is not syntagmatically given) or the set can include one or two explicit alternatives. The different levels are (1) implicit alternative, (2) simple alternative, and (3) complex alternative.
- The factor (B) *Focus marking* has two levels, each one based on the presence or absence of the FO *hasta* in the experimental utterance: (1) unmarked utterance (absence of the FO), and (2) marked utterance (presence of the FO).
- The factor (C) *Degree of pragmatic plausibility* has two levels, each based on whether the relation between the scalar instruction and the contextual assumptions causes a pragmatic mismatch for the reader: (1) plausible utterance (2) implausible utterance.

We are interested in the effects arising from the interaction of two factors and we examine two interactions in our investigation. Each analysed interaction gives rise to a two-way factorial design. In the first 2x2 factorial design, we test the relationship of the independent variables (A) and (B). In the second factorial design, we test the interactions from crossing the variables (A) and (C). Combinations of the three independent variables lead to nine experimental conditions.

In the first factorial design, we pair each level of factor (A) *Size of the alternative set* with each level of factor (B) *Focus marking*.

		IV A - Size of the alternative set		
		a1 implicit alternative	**a2 simple alternative**	**a3 complex alternative**
IV B - Focus marking	**b1 unmarked utterance**	a1b1	a2b1	a3b1
	b2 marked utterance	a1b2	a2b2	a3b2

Table 1. Interaction of (A) and (B) and the resulting experimental conditions

These six experimental conditions make it possible to compare the processing patterns of utterances without the FO *hasta* (a1b1, a2b1, a3b1) against utterances with the procedural element (a1b2, a2b2, a3b2).[64]

(a1b1) Unmarked utterance and implicit alternative

Alba y Lucas tienen yates.
'Alba and Lucas have yachts.'

(a1b2) Marked utterance and implicit alternative

Alba y Lucas tienen hasta yates.
'Alba and Lucas have even yachts.'

(a2b1) Unmarked utterance and simple alternative

Alba y Lucas tienen coches y yates.
'Alba and Lucas have cars and yachts.'

[64] We will use different labels throughout this dissertation to introduce the experimental conditions. In pursuing the linguistic economy principle, the conditions with the presence of the FO will also be referred to as *marked focus, marked utterance, marked condition*, and conditions with the absence of the FO will be labelled as *unmarked focus, unmarked utterance, unmarked condition*.

(a2b2) Marked utterance and simple alternative

Alba y Lucas tienen coches y hasta yates.
'Alba and Lucas have cars and even yachts.'

(a3b1) Unmarked utterance and complex alternative

Alba y Lucas tienen coches, motos y yates
'Alba and Lucas have cars, motorbikes, and yachts.'

(a3b2) Marked utterance and complex alternative

Alba y Lucas tienen coches, motos y hasta yates.
'Alba and Lucas have cars, motorbikes, and even yachts.'

IV A - Size of the alternative set

This variable explores to what extent the less or greater amount of lexical content encoded in the set of alternatives influences the utterance processing.

The lexical information provided by the set of alternatives semantically determines the utterance. Utterances with an implicit set of alternatives are more semantically undetermined than those with an explicit set (whether simple or complex). The interpretation of utterances with an implicit alternative is more context-dependent and requires a pragmatic enrichment of the literal meaning that entails more cognitive effort. Since the readers can only rely on the background information and their mental assumptions to integrate the new information into the CG, these operations are associated with more cognitive effort. Therefore, critical items with an implicit alternative are expected to generate more processing effort than critical items with an explicit alternative because of the high degree of underdeterminacy.

Likewise, since the lexical information provided by the set of alternatives semantically determines the utterance, less cognitive effort is expected as more conceptual information is introduced in the set of the alternatives. The introduction of a single explicit alternative in the stimulus makes the utterance more determined in comparison to utterances with an implicit alternative. The readers do not have to resort to the context to retrieve any given information because the single alternative stands in direct contrast with the focus, and the processing effort to build a relation between both kinds of information will be affected. Finally, the degree of semantic underdeterminacy of utterances with a complex set of alternatives is further reduced in comparison to the previous conditions, thus, the utterance processing is expected to be less effortful. The lexical concatenation will facilitate even more the processing of the utterance because

the conceptual information contained in the alternative might act as guidance to interpret the scalarity of the lexical enumeration and recover the communicated assumption.

Hypothesis IV A_1: The amount of explicit conceptual information encoded in the set of alternatives will facilitate the processing of the utterance.

IV B - Focus marking

This variable examines whether unmarked utterances and *hasta*-marked utterances trigger different cognitive processing paths (eye-tracking reading experiment), and to what extent the FO *hasta* in marked utterances guides the readers towards the intended communicated assumption (comprehension test).

Utterances without the FO *hasta* have an unmarked focus by default (see § 2.2). Concerning the topic *What vehicles do Alba and Lucas have?* the constituent *yates* in the stimulus *Alba y Lucas tienen yates* is an unmarked focus that introduces new information into the CG that the reader blends with the background information (Jackendoff 1972; Rooth 1985; Lambrecht 1994; van Kuppevelt 1996; Zubizarreta 1999; Portolés 2010). This unmarked focus has an identificational value and establishes a relation with the other constituents of the same utterance (Jackendoff 1972; König 1991; Kenesei 2006; Cruz & Loureda 2019). When the alternatives are explicitly mentioned in the utterance, the readers create an additive relation between the alternatives (given information) and the unmarked focus (new information). When the alternatives are not syntactically present – but they have been listed in the previous context – the readers must retrieve the set of possible alternatives from the context, which involves additional processing effort.

Marked utterances have a focus marked by the FO *hasta*. The scalar FO not only identifies a specific entity from a paradigm as the most relevant in a particular context, it also conventionally triggers a scalar contrastive relation between the focus and a set of alternatives (König 1991; Kay 1990; Iten 2002; Portolés 2007, 2010). From a cognitive perspective, the processing of marked utterances entails greater cognitive effort than that of unmarked utterances because the readers establish a scalar contrastive relation in comparison to the additive relation that must be created in unmarked utterances. However, even though the presence of the FO *hasta* adds more informative load to the utterance, the procedural instruction constrains the inferential process to recover the assumption. Therefore, the additional effort that may result from processing a higher informative load (= a scalar contrastive relation) is offset due to the role of the inferential guide that the procedural element plays during comprehension.

Furthermore, the FO also determines the processing path of the marked utterances. The FO is the element that activates the focusing operation. Hence, it will be the axis for the recovery of the communicated assumption and become the most demanding element within the marked utterance. However, the FO is assumed to hold the role of information manager, thus controlling and regulating any cognitive effort that may be produced by the other elements involved in the focusing relation (alternative and focus).

For this reason, different processing patterns are expected for unmarked and marked focusing structures: a *conceptual pattern* for unmarked utterances and a *procedural pattern* for marked utterances. In unmarked utterances, the readers recover the assumption from the conceptual elements, with particularly higher cognitive effort for the unmarked focus. In marked utterances, the FO is the centrepiece for the information retrieval; thereby, it demands more effort than the conceptual elements in the host utterance (Loureda et al. 2015; Cruz & Loureda 2019; Cruz 2020). Comparison of AOIs across conditions will also reflect how lexical items will require a different amount of cognitive effort. Whereas in an unmarked utterance, a higher cognitive effort associated with conceptual items is expected, this effort will be reduced when the lexical items are to be processed according to procedural instruction. Based on that, for this variable, it was hypothesized:

Hypothesis IV B_1: The processing of a marked utterance does not generate more global cognitive effort than the processing of an analogous unmarked utterance.

Hypothesis IV B_2: The processing of unmarked and marked utterances follows different processing patterns.

Comprehension test

The FO is a procedural guide that conventionally triggers a scalar contrastive relation between the lexical elements (focus and alternatives) and leads to the interpretation of a scalar implicature. The procedural instruction activates an inferential route and guides the readers during the comprehension process to arrive at the intended implicature. By contrast, the interpretation of an unmarked utterance is more ambiguous because of its linguistic underdeterminacy and the scalar contrastive relation between alternative and focus is a conversational implicature. Considering that, more readers will derive a scalar implicature from the *hasta*-marked utterances that from the unmarked utterance.

Hypothesis IV B_3: The presence of the FO *hasta* in an utterance conventionally leads towards a scalar contrastive implicature and the derivation of the intended assumption will be more effective than in an analogous utterance without the FO.

The second factorial design consists of all combinations of factor levels of (A) *Size of the alternative set* and (C) *Degree of pragmatic plausibility*.

		IV A - Size of the alternative set		
		a1 implicit alternative	**a2 simple alternative**	**a3 complex alternative**
IV C - Degree of pragmatic plausibility	**c1 plausible utterance**	a1c1(a1b2)	a2c1(a2b2)	a3c1(a3b2)
	c2 implausible utterance	a1c2	a2c2	a3c2

Table 2. Interaction of (A) and (C) and the resulting experimental conditions

The interaction of these two independent variables sheds light on the rigidity of the procedural meaning of FOs, in particular of *hasta*, and the asymmetric relation between conceptual and procedural meaning.

(a1c2) Implausible utterance and implicit alternative

Alba y Lucas tienen hasta coches.
'Alba and Lucas have even cars.'

(a2c2) Implausible utterance and simple alternative

Alba y Lucas tienen yates y hasta coches.
'Alba and Lucas have yachts and even cars.'

(a3c2) Implausible utterance and complex alternative

Alba y Lucas tienen yates, motos y hasta coches.
'Alba and Lucas have yachts, motorbikes, and even cars.'

IV C - Degree of pragmatic plausibility

This variable examines how the FO *hasta* affects the processing paths of utterances with a different degree of pragmatic plausibility and to what extent the rigidity of the procedural instruction determines the recovery of the assumptions with new information compatible or incompatible with the contextual assumptions.

Utterances differ regarding the degree of pragmatic plausibility that exist between the contextual assumptions and the procedural instruction in relation to a given context. The

FO *hasta* encodes the same instruction in all conditions, but the lexical elements that build the pragmatic scale are arranged differently within the utterance so that the instruction of *hasta* enforces the processing of two pragmatic scales that – regarding the contextual information – can be compatible or incompatible with our world knowledge.

In the plausible condition,[65] the pragmatic scale triggered by the procedural element is in line with our world knowledge. As it is compatible with the mental representation of the world that the readers have, the communicated assumption is adaptable to the context. In the implausible condition, the relation between the procedural instruction and the conceptual information gives rise to a pragmatic mismatch that leads to an assumption incompatible with the given context and, thus, less adaptable to the CG. Based on that, plausible and implausible utterances are expected to present different processing paths to integrate the plausible and implausible information into the CG and recover an assumption that is more or less adaptable.

While the readers will integrate the compatible information in the CG by activating adaptable assumptions, the readers confronted with pragmatic mismatches will initiate an accommodation process in an attempt to integrate the implausible information. The accommodation can lead to the modification of the communicated assumption or the creation of a new *ad hoc* assumption (Leonetti & Escandell 2004; Portolés 2001[1998]: 262-263, 2007; Curcó 2011; Escandell & Leonetti 2011; Loureda et al. 2013). However, if the accommodation demands a large amount of effort and the processing yields few positive cognitive effects, the readers can abandon the expectations of relevance and interrupt the utterance processing. If that happens, the accommodation process remain unconcluded. Since the accommodation is an inferential process, the effects of this repair mechanism are expected to be especially visible at late stages of processing, with higher reanalysis effort for the implausible conditions in comparison to the reanalysis of plausible conditions.

With IV A – *Size of alternative set*, more or less explicit conceptual information in the alternative set can also affect the processing and integration of the implausible

[65] The same experimental utterances were used to analyse the marked condition and plausible condition. Also, the contextualization before the stimulus is identical in both cases. The difference only lies in the comparison between conditions carried out in the statistical analyses. The marked utterances (condition b2) are contrasted with the unmarked utterances (condition b1); the implausible utterances (condition c1) are compared to the plausible utterances (condition b2). By doing so, we have followed a Balanced Incomplete Block Design (BIBD) since we have not included all treatments in every block, but all pairs of treatments occur together equally often in the same block. This design makes it possible to reduce the number of stimuli and participants required for the whole experiment (Ortega A., personal communication, October 22, 2017).

assumption. Leaving out the alternative (implicit alternative) may facilitate the integration of the conflicting information, while in utterances with an explicit alternative, the readers have more explicit contradictory information that can hinder the accommodation. Considering the above, we formulate the following alternatives hypotheses for this second study:

Hypothesis IV C_1: Processing an utterance with a pragmatic conflict between the procedural instruction and the reader's mental assumptions in relation to a given context generates more cognitive effort than processing an analogous utterance without a pragmatic conflict.

Hypothesis IV C_2: The presence of the FO *hasta* in utterances with different degrees of pragmatic plausibility triggers two different processing paths to accommodate plausible and implausible information and recover the communicated assumption.

Comprehension test

The rigidity of the FO *hasta* will force the readers to readjust the conceptual information towards the procedural meaning and so fulfil the scalar instruction. Therefore, the readers are expected to derive the scalar inferences in both conditions, even though the assumption communicated in the implausible condition contradicts the readers' world knowledge. Hence, no differences will be observable between the conditions.

Hypothesis IV C_3: The rigidity of the procedural meaning of the FO *hasta* compels the readers to derive a scalar implicature even though the accommodation of the assumption contradicts the readers' mental representation.

4.3.3 Areas of interest (AOIs)

Each experimental utterance has been divided into AOIs corresponding to the different elements involved in the focusing relation: the set of alternatives (A), the FO, and the focus (F). The eye-tracker registers the reading times for the entire utterance to compute the word processing averages in each sentence, but also records the processing costs for the above-mentioned regions.

For example, for the stimulus *Alba y Lucas tienen coches, motos y hasta yates*, the processing costs of the following three local AOIs were separately computed: the set of

alternatives (*coches, motos*), the FO (*hasta*) and the focus (*yates*).[66] In order to compare the different AOIs to each other, average time values per word were calculated from the global processing times for each region.

AOI	Critical item
Alternative (A)	Alba y Lucas tienen [**coches, motos**]$_{\text{ALTERNATIVE}}$ y hasta yates.
Focus operator (FO)	Alba y Lucas tienen coches, motos y [**hasta**]$_{\text{FOCUS OPERATOR}}$ yates.
Focus (F)	Alba y Lucas tienen coches, motos y hasta [**yates**]$_{\text{FOCUS}}$

Table 3. AOIs in condition a3b2

Subdividing the experimental utterance into AOIs enables the effects from the presence of the FO on each element engaged in the focusing relation to be examined at a local level. Besides the AOIs mentioned above, the processing time for an average word with conceptual meaning (conceptual mean, C) and for all words within the utterance (utterance mean, U) were computed for each critical item in every condition.

AOI	Critical item
Conceptual mean (C)	Alba y Lucas [**tienen coches, motos**] y hasta [**yates**].
Utterance mean (U)	[**Alba y Lucas tienen coches, motos y hasta yates**].

Table 4. Conceptual mean and utterance mean in condition a3b2

These global means allow different observations. The *conceptual mean* (C) corresponds to the average processing time for all words with conceptual meaning within the utterance. We exclude the FO *hasta*, as well as the proper names.[67] The conceptual mean reflects the cognitive effort that the elements with conceptual content demand and sets aside the processing time required by the FO during the construction of the mental representation. This mean reveals the effect of the instruction upon the conceptual words, and it allows one to observe how the focusing areas cognitively behave when they are under the scope of the FO. The *utterance mean* (U) corresponds to the processing costs for the whole utterance. It reflects the global processing effort that an

[66] In utterances with a complex alternative, the mean for the alternative have been computed for both lexical items together. The conjunction *y* has been excluded. As it is a single character, it has hardly been fixated across trials. The word has been processed parafoveally (see § 4.1).
[67] Proper names have been excluded from the conceptual media because they are considered elements with a designatory value instead of a representational value of the reality and a logical entry.

entire utterance needs without making any distinction of whether some linguistic items require a higher or lower effort. This value helps to verify if the inclusion of an FO in an utterance does or does not lead to a salient cognitive effort at an utterance level. By comparing the conceptual and utterance means, it is possible to determine whether the conceptual and procedural elements generate dissimilar processing costs, and whether the procedural expression has an impact on the processing of conceptual elements and, if they have, then to what extent.

4.3.4 Pretest on pragmatic scales

Considering the nine conditions we were testing, we designed nine pragmatic open scales to be included in each stimulus. Each pragmatic scale consists of three items belonging to the same topic paradigm (foreign languages, pets, European cities, sports, and others). Firstly, we conducted a rating questionnaire to test the plausibility of the pragmatic scales and design the clearest experimental utterance for our purposes. Each item was only selected to be part of the scale if it met specific criteria regarding the number of syllables and word frequency (§ 4.1.1).

We tested a group of 55 native Spanish speakers, between 20 and 40 years of age, and with a higher education degree. Each participant filled in an online questionnaire.[68] The questionnaire consisted of 25 incomplete utterances identical to the stimuli that would be displayed in the eye-tracking experiment. Below each incomplete utterance, the participants were given a minimum of three options to be ranked based on a scale of likelihood regarding a topic: from the element they think was the most likely to be expected to the least likely to be expected. Given below is an example of one of the utterances, along with the given options.

Alba y Lucas tienen…				
	1	**2**	**3**	**4**
motos	☐	☐	☐	☐
barcos	☐	☐	☐	☐
yates	☐	☐	☐	☐
coches	☐	☐	☐	☐

Table 5. Incomplete utterance and range of options

[68] The survey was created with the web tool *e-encuesta* (available at https://www.e-encuesta.com), which provides the necessary technology to create, distribute, and analyse online surveys of all kinds. See Appendix A for the complete survey.

Participants were informed about the purpose of the study, that is, the assessment of the world knowledge acquired by people from their own experiences. Therefore, there was no right or wrong arrangement, and the choices were personal. Before starting, clear instructions and the following example were offered:

> *Inglés, chino y francés en relación con la frase "Ana sabe hablar...".*
>
> *Si consideras que saber hablar "inglés" es más fácil que saber hablar "francés", y que ambas lenguas son más fáciles de aprender que "chino", la escala sería la siguiente: inglés (1), francés (2) y chino (3).*

> 'English, Chinese, and French regarding the phrase "Ana can speak ..."
>
> If you consider that speaking English is easier than speaking French and that both languages are easier to learn than Chinese, the scale would be the following: English (1), French (2), and Chinese (3).'

The participants were asked to select for each item a position (1, 2, 3, or 4). For the element they consider the most likely to be expected as a continuation of the sentence, the number 1 box should be marked. For the element that they consider the most least likely to be expected, the number 4 box should be marked. In the end, each element of the series should have a number or position. Table 6 illustrates this procedure for the scale *motos* ('motorbikes'), *barcos* ('boats'), *yates* ('yachts'), and *coches* ('cars'):

Alba y Lucas tienen…				
	1	**2**	**3**	**4**
motos	☐	☒	☐	☐
barcos	☐	☐	☒	☐
yates	☐	☐	☐	☒
coches	☒	☐	☐	☐

Table 6. Possible ordering of options

In the example given, the participant has decided that the ordering would be *coches* (1), *motos* (2), *barcos* (3), and *yates* (4). Cars would be the kind of vehicles that Alba and Lucas would be most likely to have, while yachts would be the least likely.

The data from the survey was analysed using a chi-square (χ^2) test for independence to determine whether the observed differences were due to chance (see § 4.4.3). Based on the statistical results, nine scales were selected to be used in the experimental utterances.[69] The items and their internal ordering in the pragmatic scale were defined in conformity with the percentage of differences between elements. The first alternative corresponds to the word that most participants selected in position 1. The second

[69] See Appendix B for the statistical outcomes.

alternative is the word that most participants selected in position 2, and the focus is the word that the majority of participants selected in position 4. For instance, the word *coches* had this ranking:

Coches		
Position	**Percentage (%)**	**Subjects**
1	**72.73**	**40**
2	16.36	9
3	3.64	2
4	7.27	4

Table 7. Ranking of positions for the item *coches*

Of the 55 participants, 40 of them selected position 1 for the item *coches*. That is, 72.73% of readers considered that of the four proposed vehicles that Alba and Lucas may have, a car is the most likely vehicle to possess. The options *motos*, *barcos*, and *yates* received the following ratings:

Motos			**Barcos**			**Yates**		
Pos.	**%**	**Subjects**	**Pos.**	**%**	**Subjects**	**Pos.**	**%**	**Subjects**
1	30.91	17	1	5.45	3	1	5.45	3
2	**65.45**	**36**	2	5.45	3	2	5.45	3
3	1.82	1	3	**76.36**	**42**	3	14.55	8
4	1.82	1	4	12.73	7	4	**74.55**	**41**

Table 8. Ranking of positions for the items *motos, yates*, and *barcos*

Based on the data collected in the questionnaire, the final ordering of the pragmatic scale is *Alba y Lucas tienen coches, motos y yates*. The set of alternatives consists of the two items that would have been selected the greatest number of times in positions 1 and 2. According to the data, *coches* is the first alternative of the set because 72.73% of participants selected it in the first position (see Table 7). The word *motos* is the second alternative because 65.45% of participants selected it in the second position (see Table 8). The focus corresponds to *yates* since 74.55% of participants had selected it in the fourth position. This pretest allowed us to create nine pragmatic scales, the internal ordering of which was defined by a group of individuals of a particular community and

with certain shared beliefs and assumptions. The characteristics of this group were to be similar to the experimental group.

4.3.5 Comprehension test

The purpose of the comprehension test is to verify to what extent each experimental utterance can be considered a stimulus to derive the scalar contrastive implicature.[70] For each experimental utterance, three possible answers were given: *Sí/No/No se puede saber* ('Yes/No/Not known'). An affirmative answer indicates that the utterance is a sufficient ostensive stimulus so that the participants can draw the scalar implicature; a negative answer indicates that the utterance is not a sufficient stimulus to derive the scalar implicature, and the answer *No se puede saber* indicates that the utterance is weakly determined to activate a scalar implicature. Finally, a chi-squared test was used to determine whether there is an association or independence between the variables (see § 4.4.3).

Comprehension test I

In this test, participants read simple instructions in which no specific linguistic terms were employed (words like *utterance* or *implicature* were excluded). They were requested to answer each question considering only the information provided in the utterance and not to draw any conclusion relying on the previous reading or on their own beliefs. Each participant read 20 utterances, nine of which were experimental. Each utterance (stimulus and fillers) was followed by a question about the implicature that the readers could derive and three possible answers.

Stimulus 1	*Alba y Lucas tienen coches, motos y yates.* 'Alba and Lucas have cars, motorbikes, and yachts.'
Question	*Según la frase, ¿tener yates es menos esperable que tener los otros vehículos mencionados?* 'According to the sentence, is having yachts to be less expected than having the other mentioned vehicles?'
Answers	a) *Sí* b) *No* c) *No se puede saber* a) Yes b) No c) Not given

Table 9. Stimulus and question of comprehension test I (unmarked condition)

[70] The test was designed and conducted with the Google Forms app: a free tool to create online surveys and collect the answers. It is available at https://www.google.com/forms/about/. See Appendix C for the comprehension tests used to collect participant responses.

Stimulus 1 in Table 9 does not contain any procedural guide that leads the readers towards the implicature proposed in the question. Even though no procedural cue is available, the linguistic content along with the readers' world knowledge can induce a scalarity among all the lexical elements and the scalar implicature must be reached conversationally. For the conditions with simple and implicit alternatives, this implicature will be more difficult to derive. The utterances are more semantically underdetermined and prone to different interpretations.

Stimulus 2	*Alba y Lucas tienen coches, motos y* ***hasta*** *yates.* 'Alba and Lucas have cars, motorbikes, and even yachts.'
Question	*Según la frase, ¿tener yates es menos esperable que tener los otros vehículos mencionados?* 'According to the sentence, is having yachts to be less expected than having the other mentioned vehicles?'
Answers	a) *Sí* b) *No* c) *No se puede saber* a) Yes b) No c) Not given

Table 10. Stimulus and question of comprehension test I (marked condition)

Stimulus 2 in Table 10 contains the FO *hasta* that leads the readers towards a scalar implicature. An affirmative answer means that the FO is an unequivocal guide for the processing of a scalar interpretation. The answers *No* and *No se puede saber* imply that other factors – like the personal mental assumptions of the participant – have determined the utterance interpretation.

Comprehension test II

For IV C - *Degree of pragmatic plausibility*, we conducted a further comprehension test. The lack of global differences between the plausible and the implausible utterances observed in the eye-tracking experiment, along with the consistent lower reading values registered for the implausible utterance at a local level (see Chapter 6), could be due to two different reasons.

On the one hand, assuming that the procedural instruction must be satisfied, the analogous cognitive effort triggered by both conditions could be interpreted as the successful processing of the scalar interpretation despite the pragmatic incongruence. However, from a theoretical point of view, processing information in implausible contexts demands more cognitive effort in general because of a possible accommodation process. Considering this claim, our reading data could indicate a processing breakdown

and the cancellation of the communicated assumption. Comprehension test II was intended to confirm the latter hypothesis.

Like test I, 180 native Spanish speakers completed the test.[71] Each participant read 13 utterances, six of which were experimental utterances (three for the plausible condition, three for the implausible condition). Each utterance was followed by a question about the inference that could be deduced and three possible answers (*Sí/No/No se puede saber*). The difference between test I and test II lies in how the question was formulated. At the beginning of the task, participants were asked to answer considering the utterance which the question referred to. However, unlike test I, participants were not explicitly asked about the instruction of the FO.

Stimulus 1	*Alba y Lucas tienen yates, motos y **hasta** coches.* 'Alba and Lucas have yachts, motorbikes, and **even** cars.'
Question	*¿Tener coches es menos esperable que tener otros vehículos?* 'Is having cars to be less expected than having other vehicles?'
Answers	a) *Sí* b) *No* c) *No se puede saber* a) Yes b) No c) Not given

Table 11. Stimulus and question of comprehension test II (implausible condition)

Despite the mismatch between the instruction and the participants' assumptions, a significant number of readers should be able to draw the scalar implicature given the rigidity of the procedural meaning. However, the world knowledge of the participants might also play a more determining role in the interpretation. A heterogeneity in responses will mean that the readers have difficulty in accepting the communicated assumption if this is incompatible with the mental representation of the world that they have. These results would be in line with the outcomes from the eye-tracking experiment to support the argument that the procedural instruction of *hasta* makes it difficult for readers to accommodate an implausible assumption. A homogeneous distribution of responses will involve an efficient processing of the inference, regardless of the pragmatic incongruence.

[71] Test II was also designed and conducted with the Google Forms app. The access link was sent to native Spanish speakers via different social networks.

4.4 Experimental design

4.4.1 Materials

The linguistic material has been created considering the so-called paradigm-like token sets (Cowart 1997: 13). This approach makes the confounding factors spread across all conditions so that the observed differences only have to do with the phenomenon under investigation (Krug & Schlüter 2013). Following these criteria, the number of experimental conditions will define the number of token sets (material lists) that must be designed for the whole experiment (Gries 2008; Krug & Schlüter 2013).

In our research, we analyse nine experimental conditions so that nine material lists have been created. A total of 81 stimuli was designed. All stimuli were distributed across the nine counterbalanced lists using a Latin square design so that every material list contains exactly nine stimuli, each one in a different experimental condition and theme.[72] Every participant then reads stimuli in all conditions but only a critical item of each condition and a different topic. In the end, every condition is administered an equal number of times to more than one informant and is tested in each of the nine topics.

Table 12 shows stimuli from token set 1, as well as in which condition and theme they appear.[73] Within the same set, stimuli differ from each other only in terms of the condition under investigation. Syntactic and semantic structures remain as similar as possible.

[72] The Latin square design (Winer 1962) and the *paradigm-like token set* (Cowart 1997) are counterbalancing measures according to which the experiment must be replicated with different topics or token sets as many experimental conditions are being analysed.
[73] The nine token sets are listed in Appendix E.

Token set 1			
Theme	**Condition**		**Experimental utterance**
T1 Cities	a1b1	unmarked utterance + implicit alternative	*Carla y Diego conocen Oslo.*
T2 Countries	a2b1	unmarked utterance + simple alternative	*Raúl y Elsa conocen México y Bolivia.*
T3 Food	a3b1	unmarked utterance + complex alternative	*Pablo y David comen pollo, pavo y cerdo.*
T4 Sports	a1b2	marked utterance + implicit alternative	*Óscar y Hugo practican **hasta** lucha.*
T5 Jobs	a2b2	marked utterance + simple alternative	*Luis y Eva conocen maestros y **hasta** actores.*
T6 Pets	a3b2	marked utterance + complex alternative	*Inés y Ana tienen perros, gatos y **hasta** loros.*
T7 Vehicles	a1c2	implausible utterance + implicit alternative	*Alba y Lucas tienen **hasta** coches.*
T8 Cattle	a2c2	implausible utterance + simple alternative	*Iván y Rosa crían cabras y **hasta** vacas.*
T9 Idioms	a3c2	implausible utterance + complex alternative	*Juan y Sara saben persa, griego y **hasta** latín.*

Table 12. Token set 1 with all experimental utterances

Stimuli, fillers, and contextualization

Experimental utterances created to examine the effect interaction must be as identical as possible to make valid comparisons and statistical correlations between conditions and AOIs so that no hidden variables may skew data (Gries 2008; Raney et al. 2014). Therefore, all critical items of the same experimental condition share identical or similar features regarding the semantic and syntactic structures of the utterance, and the length, frequency, and familiarity of words.[74]

All stimuli follow an unmarked syntactic structure in Spanish (SVO) so that each region of interest is located in similar positions across conditions (Jegerski 2014: 30). The subject is always composed of two proper names joined by a conjunction (*Alba y Lucas*),[75] the verb is conjugated in the simple present tense (*tienen*), and the direct object that constitutes the argument of the verb (*coches*, *motos*, *yates*) has different constructions depending on which independent variable is being explored. Each critical item presents a focus structure in which the focused element is a lexical item that is

[74] See Appendix F for all experimental conditions in each topic.
[75]The first fixation on a printed line is usually longer than the others (Rayner 1998). Hence, we include two proper names at the beginning of the utterance to prevent an AOI from being at that initial position.

always linguistically present and conveys new information. The alternative area can be implicit or explicit. If the set of alternatives is explicit, it consists of one lexical element (simple alternative) or two lexical elements (complex alternative).

Hidden variables such as frequency, length, and familiarity of the words that comprise the critical items were controlled in the design of the utterances (Clifton et al. 2007, see § 4.1).

Word length. The length of the word strongly influences fixation time and word skipping. Hence, words in the stimulus must have approximately the same number of letters and syllables. Considering that in the statistical analysis, an average processing time per word is computed for each AOI, all words within the utterance must have a similar average word length to make the values comparable, and to avoid this confounder causing higher processing times for a given AOI. Since the FO *hasta* has five characters, the effects of the word length and word skipping were controlled, selecting for the AOIs (alternative and focus) words with more than four characters and between two and three syllables.[76]

Word frequency. The lexical frequency has a noteworthy influence on language processing at the levels of comprehension and production (Almela et al. 2005: 115). Lexical access to words with high frequency takes place more quickly than for low-frequency words. Thus, words with a high frequency are fixated in less time, while words with lower frequency register longer fixations (Just & Carpenter 1980; Rayner & Sereno 1994). The words of the stimuli are registered in the dictionary of frequencies *Diccionario de frecuencias de las unidades lingüísticas del castellano* (Almela et al. 2005) and the frequency list in the *Corpus de Referencia del Español Actual* (CREA). Most of the words are assigned with a high or very high frequency.[77]

Lexical ambiguity. Ambiguous words, especially if not preceded by a non-disambiguating context, register longer fixations (Rayner & Duffy 1986; Duffy et al. 1988). For that reason, polysemic and homonymous words were avoided within the stimuli. Along with that, words open to a misunderstanding of any kind were also ruled

[76] Statistical analysis based on mixed models allows the word length to be controlled, along with any influence on processing times that the world length differences might have (Keating & Jegerski 2014: 19).
[77] Except *pavo, cabras, motos, yates, loros*, and *persa*. These mentioned words have a low frequency in Almela et al.'s dictionary (2005) and neither are they included among the 10,000 most common forms from the list provided by CREA. Except for *moto*, the rest of items are the focus (marked or unmarked) of the critical utterance.

out.[78] By doing so, it is possible to avoid the influence of any possible external factor that may bias the results, for example, if a participant fixates longer on a word that he does not know or is not familiar with.

Readers usually fixate on the words at the end of the sentence for a longer time, and the focus area is the last word of the stimulus. For this reason, an additional second sentence was included after the experimental utterance. Inserting additional information immediately after the target item largely avoids *wrap-up effects* (Just & Carpenter 1980), that is, an increase in reading times at the end of a sentence as a consequence of the semantic integration that takes place at this point. An experimental utterance and additional sentence are shown on the same display. The information provided by the last sentence was not directly related to the critical item. In this way, information from the second utterance did not prompt readers to reread previous areas of the stimulus. Eye movements were also recorded for this segment but the data was not statistically computed.

The critical item and additional sentence were presented vertically centred on the screen and ranged left since a centred display is less like usual reading (Jegerski 2014: 23). The text was displayed in a black font (Calibri, size 72 pt) on a grey background. All experimental utterances were in the same line and any necessary line break was entered in the additional sentence, thus avoiding any possible return sweep affecting an AOI. Return sweeps, when eyes move from the end of one line to the beginning of another, are often inaccurate and eyes usually land to the right of the first word in a line.

[78] This was the case with the initial scale of cities (topic 1), in which the elements were the Spanish cities *Sevilla, Granada* and *Córdoba* (*Sevilla* and *Granada* being the alternative set and *Córdoba* the focus). However, after conducting a pilot study at Heidelberg University, this pragmatic scale was subject to further revision. Native speakers from Latin American countries found ambiguity for the city *Córdoba*. The context and the alternatives lead to thinking of *Córdoba* as the Andalusian city; however, their geographical origin had a substantial influence on their background knowledge, and they firstly identified *Córdoba* with the Argentinian city. The Spanish city-scale was discarded and replaced with a scale of European cities to avoid any confounding factors. The European cities (*Roma, Paris*, and *Oslo*) were chosen based on several online lists accounting for the ten most visited cities in Europe. While *Roma* and *Paris* scored high in rankings, the city of *Oslo* did not appear in any list.

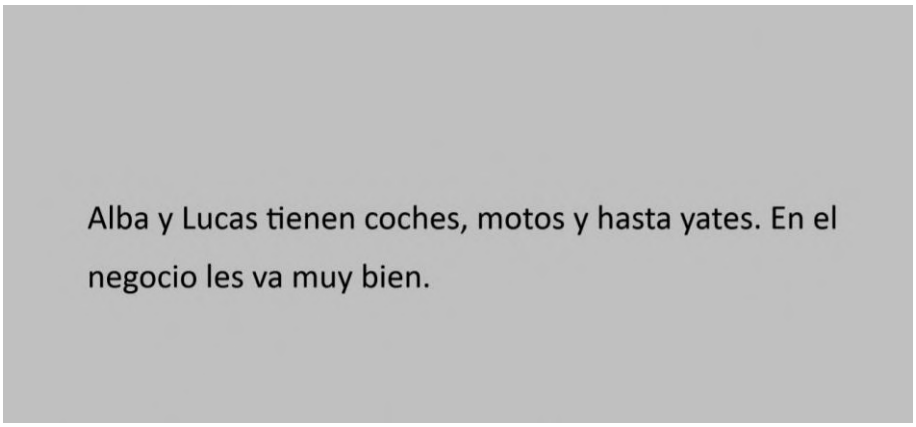

Figure 6. Stimulus and additional utterance on the computer screen

The readers need a background contextual knowledge that enables them to interpret the utterance. Hence, it is essential to create a cognitive contextual background in the reader's mind to be able to reach the intended implicature. Contextual knowledge unfolds previous to the presentation of the stimulus. Each experimental utterance is incorporated into a brief story that serves as a short contextualization. The story consists of five slides. The first slide introduces the protagonists with a picture and a sentence about who they are and what they are doing. The next slide contains a filler item in which alternatives are mentioned for the first time. A blank screen with a fixation cross follows. The fourth slide presents the critical item along with the additional sentence to avoid wrap-up effects. The final slide, number five, is the second filler. The short story builds a solid block.

All stimuli, fillers, and distractors must be similar so that the participants cannot identify the target sentences (Jegerski 2014: 32). Contexts and fillers preceding the stimulus should also be roughly matched across conditions to processing difficulty to avoid contextual constraint possibly influencing the gaze duration for subsequent words (Raney et al. 2014). Contexts and fillers are also related thematically to the corresponding experimental item and remain identical regardless of the experimental condition being examined. This means that for condition a1b2 (*Alba y Lucas tienen hasta yates*) or for condition a2b2 (*Alba y Lucas tienen coches y hasta yates*), the context, the additional utterance, and the two filler items are precisely the same. Only the alternatives specified in the first filler item vary when testing the degree of pragmatic plausibility.[79]

[79] Pragmatic scales consist of three elements: alternative + alternative + focus. When we examine the degree of plausibility (condition c1), the focus and the first alternative switch roles as indicated:
Plausible condition → alternative + alternative + plausible focus: *coches* + *motos* + *yates.*

Context	*Alba y Lucas dirigen una empresa de alquiler de vehículos en Ibiza.*
Filler (with alternatives)	*Actualmente tienen una flota muy moderna de vehículos; entre ellos, coches y motos.*
Stimuli (additional sentence)	***Alba y Lucas tienen coches, motos y hasta yates****. (En el negocio les va muy bien.)*
Filler	*En su tiempo libre recorren Ibiza en moto para conocer mejor la isla.*

Table 13. Context, fillers, and stimulus for condition a3b2

Distractors aim to mask the goal of the experiment and to help avoid any lack of attention that participants may suffer during the reading. Distractors in our experiment are of two kinds: they are either critical items from other experiments,[80] or basic comprehension questions about the information just read by the readers. The possible answers for those comprehension questions (*Sí/No/No se puede saber*) were presented in a row below the question. Readers responded with the mouse, and no feedback about the accuracy of the reply was given.[81] In the end, each informant read a total of 93 sentences, from which nine are critical items for this current research.

Counterbalancing

The current experiment has a within-subjects design (also known as repeated-measures design), which means that the same participant is tested in all experimental conditions of an independent variable (Sandra 2009). Such a design requires fewer participants and reduces the possibility of individual differences skewing the results. However, a within-subjects design also sets out some weaknesses: the *carryover effects* and *order effects*.

The order in which experimental conditions are administered to participants can affect their performance or draw a specific response, either due to practice (the participant performs better in the later conditions because he has practiced) or fatigue (when a participant performs worse in the later conditions because he is tired or less motivated).

Implausible condition → alternative + alternative + implausible focus: *yates* + *motos* + *coches*.

[80] Our experimental investigation has been designed, programmed, and conducted within the framework of the Doctoral School *Promotionskolleg* at *Iberoamerika Zentrum* (Heidelberg University). In consequence, our critical items and distractors used from other investigations follow similar methodological guidelines.

[81] Our distractors are aimed at obscuring the objective of the research as well as keeping the reader's attention. If the difficulty level of questions is elementary and response accuracy is not relevant to the ongoing investigation, it is habitual to discard reading time data from trials with incorrect distractor task responses in research with adult native speakers (Keating & Jegerski 2015: 19). Therefore, the response was not recorded.

Being tested in all treatments also increases the chance that participants guess the purpose of the study, changing their behaviour intentionally because they think that is how they are expected to answer. These confounding factors can bias data making as the researcher does not know if differences among the conditions have arisen from the phenomenon being studied or from the confounder.

The current experiment and stimuli have been designed by implementing several counterbalancing rules to offset these confounding factors (see Gries 2008: 47-53). The experiment was counterbalanced by subjects and by items (Jegerski & VanPattern 2014: 33). Critical items were alternated with fillers items and distractors to reduce the possibility that participants figure out what the research is about or develop reading strategies and learning effects due to the order of presentation. Stimuli were interspersed with filler items in a 1:3 ratio to control for order or learning effects. They were also subsequently alternated with distractors in a 1:1 ratio to prevent readers from becoming aware of the purpose of the study (Gries 2013; Keating & Jegerski 2014). In addition to this, the stories – in which critical items were included – were pseudorandomized across participants and lists. By doing so, the presentation order of material was outweighed. Given that the first stimulus is usually read with stronger attention, the same condition always appears in the first position to eliminate the risk (Cowart 1997; Gries 2013; Keating & Jegerski 2014).

4.4.2 Participants, apparatus, and procedure

Participants

Each list was tested with exactly 20 participants.[82] Having nine lists, a homogeneous sample of 180 participants took part in the experiment. All of them have a similar profile: they were native speakers of Spanish, aged between 20 and 40 years, and had completed a degree of higher education. Every participant volunteered to read the experiment. They presented ordinary visual accuracy and were not aware of the purpose of the reading. All participants had to fill out a prior written consent to participate. In this document, they declared that they had understood the explanations and indications about the experiment and procedure given by the researcher. The researcher also filled in a

[82] Following methodological recommendations, researchers generally select a representative sample of participants (groups of 20-30 persons) (Perret & Kandel 2014). The experiment was conducted at the *Facultad de Filología, Traducción y Comunicación* at Valencia University (Spain). Most of the informants were students from different university careers. They voluntarily agreed to be part of the investigation, and they received a small compensation for their participation.

datasheet about each participant to assess the suitability of the participant (age, grade of instruction, mother tongue, and knowledge of foreign languages).

Apparatus

The reading experiment is an online SPR task monitored by an eye-tracker device.[83] The eye-tracker apparatus registers in real-time the eye movements during reading activity and enables us to measure the moment-to-moment language comprehension process under circumstances that emulate usual reading practice as much as possible. Furthermore, the reading was in silence since fixations are longer in oral reading than during silent reading (Duchowski 2007: 213).

The reading experiment was programmed with the software *SMI Experiment Suite 36*°. Eye movement data was recorded using a RED250mobile eye-tracking system by SMI, with a position accuracy of 0.4° visual angle and at a temporal resolution of 250 Hz.[84] The eye-tracker apparatus with the infrared light source was placed beneath a 17-inch laptop screen and the video camera was placed above. The eye-tracker was equipped with an eyewear compatibility function, which allows excellent performance with most glasses and lenses, head movement compensation technology, and a video camera that can operate at 50-80 cm.

[83] SPR is a computerized method to record reading times for words or phrases in an experimental stimulus (Jegerski 2014: 20). In an SPR, the readers have control over the timing at which stimuli are displayed on the screen by pressing a button so that they can read at their own pace. The SPR paradigm was developed by psycholinguists in the 1970s and is also referred to as *self-paced* and *subject-paced* because the participant decides the time he or she spends on reading each segment (word or phrase).

[84] The sampling rate must be set up according to the research objectives. The most common sampling rates nowadays are 1,000 Hz, 500 Hz, 250 Hz, and 60 Hz. The temporal sampling rate has considerable influence on error so that the lower the temporal resolution, the higher the sampling error. The average temporal error with a sampling rate of 1000 Hz is 0.5 msec, and a sampling rate of 60 Hz is approximately 8 msec. Although an 8 msec error might be considered too large to study the saccade durations, this value is not too large when fixation durations are taken as metric (Raney, Campbell & Bovee 2014: 2). Eye positions recording at a 250 Hz sampling rate is then more than appropriate in our experiment.

Figure 7. RED250mobile eye-tracking system

Procedure

The experimental procedure was identical for each participant: they were informed orally and in writing about the proceeding before running the real experiment; their eyes were calibrated until a valid accuracy value was obtained, and they could begin with the experiment after reading some trial utterances. After having completed the reading experiment, they proceeded with the comprehension test.

Informing and preparing the participant. The procedure was explained to every participant carefully and in simple terms. Researchers took care to not reveal any essential facts that could make the participant aware of the purpose of the study. If they agreed, they were asked to fill in the written consent. They were seated at a distance of 60-65 cm away from the monitor, and the seat height was adjusted so that their eyes were centred on the video display. Before reading the instructions on the screen, they were asked not to talk during reading since talking makes the head move up and down, thus reducing the tracking accuracy.

Reading the instructions. Participants read clear instructions on the screen in silence and at their own pace. They decided for how long text would be displayed on the screen by pressing the spacebar. The following instructions were presented:

① You will read short stories about people, their likes or dislikes, interests, and hobbies. Read the stories in silence and at your own pace.

② After having read the text on the screen, press the spacebar to read the next slide.

③ When a cross appears, look at it and wait until the next slide appears automatically.

④ Try to remain as still as possible during the whole experiment and do not move the head to permit the eye-tracker to follow your eyes.

⑤ A calibration will be performed first to allow the eye-tracker to register your pupils.

Calibrating the participant. Calibration is a procedure necessary to obtain accurate quality data. It consists of displaying a set of moving targets that stop at certain locations where pupil and corneal reflections are recorded by the software to estimate the point of gaze. Participants are required to keep their eyes focused on a small red point inside a bigger white circle () until the target disappears. The fixation dot moves around the screen following a square pattern consisted of several predefined points that encompass the area within which the stimulus is later presented.[85] If needed, calibration was repeated until reaching an optimal value (0.5° or lower).

Getting reading for the reading experiment. After the calibration, participants read some trial utterances to familiarise them with the reading exercise. The trial story was like the story with the critical item but shorter. It consisted of four slides. The first slide showed a picture and a short introduction about the protagonists around which the story turns. The second slide contained what in the real experiment would be a filler. It followed a blank screen with a fixation cross and then another slide with another sentence. Participants read two trial stories. After one of them, the readers needed to answer (with the mouse) a comprehension question with three possible options. After completing the practice trials, participants had time to ask any questions. If they were ready to start, they pressed the spacebar.

Running the reading experiment. Participants read the experiment in silence, which had a maximum duration of 10 minutes. During the procedure, one or two researchers were in the same room, to ensure that no external factor could interfere with the reading activity. If this happened (for example, the participant relaxed in the chair and the eye-tracking accuracy was affected), the researchers took appropriate measures while participants read any sentence other than the stimulus item. Once they finished the task, they completed the offline comprehension test.

Debriefing. After completing both experiments (reading activity and comprehension test), participants were asked about their impressions, whether they could figure out the

[85] The number of fixation points depends on the space that the stimulus occupies. If the text fills a large proportion of the display, calibration should use a 9-dot formation. In our case, the stimuli are presented only in one line, and the calibration used 5 points (Raney et al. 2014). Calibration should be as short and easy as possible. A complex calibration with many dots is not recommended because participants might become tired or displeased and lose concentration.

objective of the study, and if anything attracted their attention during the reading. This short interview also served to prove the adequacy of the participant and to overcome any flaw with the experimental design for future investigations. Finally, participants were informed about the purpose of the research.

4.4.3 Statistical data treatment

The software SMI BeGaze™ was used to visualize the results and extract the recorded gaze data. Data time was given in milliseconds (msec) for each whole target utterance and each area of interest composing an experimental utterance. Every AOI was preset in the BeGaze program before data evaluation, and reading times were calculated by the software summing the fixation times for each critical region.

Experimental designs with repeated measures, as with our experiment, present some challenges when it comes to the analysis of data. Repeated-measures data is usually correlated because not all observations coming from the same participant are independent. Each participant has an idiosyncratic reading behaviour which makes his observations correlated and non-independent across conditions. Besides that, data is sometimes unbalanced or incomplete, which represents another problem for the standard statistical models.[86] *Linear mixed-effects models*, or mixed models for short, have become the standard method of statistical analysis in the last decade for treating data obtained from repeated measures (Keating & Jegerski 2015: 19). These statistical models offer several advantages: they account for missing values, take into consideration the dependency among observations (correlation structure) using fixed- and random-effects parameters, are less affected by the missing data, and provide more accurate estimates of the effect.

Linear mixed-effects regression models were used to analyse the gathered data using the statistical software R (R Core Team 2014).[87] A model was computed for every dependent variable: FPRT, SPRT, and TRT. The functions "gam" and "predict.gam" of the *mgcv* package were applied to compute each model (Wood 2017). The AOIs of each

[86] The set of data is incomplete or unbalanced if there is an unequal number of observations for each level of a factor. That could happen due to technical problems when collecting the data or as a result of the data trimming. An accepted method of dealing with outliers and extreme values consists in replacing those values by an average or median, or in removing them.

[87] The statistical analysis of results has been performed in collaboration with the statistical consulting unit StaBLab (*Statistische Beratungslabor*) at the Institute for Statistics of the Ludwig-Maximilians-Universität (Munich). Prof. Dr Helmut Küchenhoff leads the consulting team. We especially thank Alexander Bauer and Linda Marchioro for the statistical assessment and for developing the mixed models for this research.

condition (set of alternatives, FO, focus, utterance mean, and conceptual mean) were considered *fixed effects*, while participants and topics were treated as *random effects* (Keating & Jegerski 2014: 25; Cruz & Loureda 2019). The word length of AOIs was treated as a *non-linear effect*, that is, the effect of the word length was eliminated when estimating the parameters for every AOI and condition so that any resulting differences between two AOIs are due exclusively to the semantic properties of the compared AOIs.

We tested several comparisons per model. Nine models were computed for each dependent variable, and for each model, one hypothesis was tested. Because of the large number of pairwise comparisons, there is an increased possibility of getting false results (i.e., Type I error). Therefore, it is recommended to quantify the magnitude of the difference between conditions based on the effect size and estimated relevance rather than on tests of statistical significance (see Clark 2004; Vasishth et al. 2018; Loureda et al. 2021). While the p-values do not measure the magnitude of the difference found between two groups, the effect sizes indicate if the observed differences are meaningful rather than merely statistical.[88]

For the present study, the average processing times per word were calculated for each AOI across conditions, and a scale of effect sizes was defined to quantify the magnitude of the differences found between conditions (Argimon 2002). The interpretation scale with effect sizes and designations are illustrated in Table 14.

Effect sizes in %	**Type of effect**
> 20	very large effects
from 10 to 19.99	large effects
from 7 to 9.99	medium-large effects
from 5 to 6.99	medium-small effects
from 4 to 4.99	small effects
< 3.99	trivial effects

Table 14. Scale of effect sizes

[88] The misuse of the p-value has been increasingly recognized by the scientific community and led to discouraging its use in favour of other procedures, such as prediction intervals or methods that emphasize the estimation in the test (Vasishth et al. 2018) or procedures that evaluate models using the maximum likelihood criterion.

Outliers and extreme values were discarded if:

a) the FPRT was 0 msec for the AOI utterance mean (first skip);

b) the FPRT and the SPRT for the AOI utterance mean were lower than 30 msec per word (fast readers, see Pickering et al. 2000; Reichle et al. 2003); and

c) the TRT for the AOI utterance mean was higher than 800 msec per word (slow readers, see Pickering et al. 2000; Reichle et al. 2003).

The experiment had 1650 observations (180 participants, nine observations per participant). From them, 27 observations (1.67%) were considered outliers and deleted. No observation (0%) corresponded to conditions of first skip, six observations (0.37%) corresponded to fast reader and 21 observations (1.30%) to slow reader. The statistical analysis that we have described ensures that differences found in results, according to the manipulated linguistic variable among conditions and AOIs, can be interpreted as exponents of distinct processing patterns.

The *chi-square test for independence* (χ^2) was applied to evaluate the outcomes obtained from the pretest on pragmatic scales and the offline comprehension tests.[89] The statistical hypothesis testing had the goal of accepting or confirming that there is an association between the analysed variables and that the results did not come about by chance. This test only determines the independence or association of the variables; it does not report the magnitude of this association.

The chi-square test is performed by assuming that the null hypothesis or hypothesis of no association (H_0) is true, which means that there is no association between variables. The alternative hypothesis (H_1) states that there is some association between variables. The significance level chosen for the results is $p < 0.05$. If the test yields a chi-square value that is less than or equal to this alpha value ($p < 0.05$), the null hypothesis is rejected. Inversely, if the result is higher than the alpha value ($p > .05$), the null hypothesis is accepted.

[89] See Appendix B for the statistical outcomes of the rating questionnaire and Appendix D for those of the comprehension tests.

Chapter 5: The information manager role of *hasta*

This chapter presents the results and discussion of the processing data obtained for the unmarked vs. marked focusing structures. The analysis of IV B – Focus marking examines how the presence of the FO *hasta* in a given utterance affects the processing path that readers follow to process an analogous utterance without the FO so that unmarked and *hasta*-marked utterances trigger different processing patterns.

We expected a conceptual pattern for unmarked utterances. Without a procedural cue that activates the focusing operation, the readers will rely mainly on the conceptual elements to recover the communicated assumption. Therefore, the expressions with conceptual meaning (alternative and focus) will register higher reading times. On the contrary, a procedural pattern is expected for marked utterances. The FO *hasta* activates the focusing operation and the readers will mainly rely on this procedural element to recover the communicated assumption. Hence, the FO becomes the most effort-demanding element. The conceptual elements (alternative and focus) within the host utterance will require a different amount of effort compared to the effort required by the same elements in the unmarked utterance. Irrespective of the local distribution of effort among the different AOIs, the marked utterance will no need major processing effort than the unmarked utterance at a global level. In addition to this, the results of the comprehension test allow us to explore to what extent the procedural instruction guides the readers towards the communicated assumption.

The IV A – Size of the alternative set (implicit alternative, simple alternative, and complex alternative) investigates whether the different levels of lexical content of the utterance affect the processing effort of the utterance. In this regard, utterances with implicit alternatives are assumed to generate a more effortful processing; while utterances with explicit alternative (simple or complex) bring about less effort because the reader can rely on conceptual and procedural information to recover the assumption.

First, we discuss the data for the eye-tracking reading experiment (§ 5.1) and then for the comprehension test (§ 5.2). The analysis of the processing data begins with comparisons of the global AOIs between conditions, followed by comparisons of the local AOIs within conditions. The results are arranged by the dependent variables: TRT (total reading time), FPRT (first-pass reading time), and SPRT (second-pass reading time) for all AOIs. Likewise, we present the outcomes of the conditions as follows: utterances with simple alternative (§ 5.1.1), utterances with complex alternative (§ 5.1.2), and

utterances with implicit alternative (§ 5.1.3). Finally, we include a joint analysis of all utterances (§ 5.1.4) to explore the processing effort required by utterances with a different degree of linguistic underdeterminacy.

5.1 Focus marking (IV B)

5.1.1 Utterances with simple alternative

Conditions

(a2b1)	unmarked utterance	*Alba y Lucas tienen coches y yates.* 'Alba and Lucas have cars and yachts.'
(a2b2)	marked utterance	*Alba y Lucas tienen coches y hasta yates.* 'Alba and Lucas have cars and even yachts.'

Regarding the topic *What vehicles do Alba and Lucas have?* the word *yates* is identified as a focus that introduces new information in both conditions. In the unmarked condition (a2b1), the unmarked focus is related to the alternative – known information explicitly mentioned in the utterance – to establish an additive relation between both lexical elements. In the marked condition (a2b2), the FO conventionally evokes a scalar contrastive relation between the focus and the explicit alternative. Furthermore, the absolute nature of *hasta* imposes an end-of-scale interpretation of the focused element.

Global level

The data from TRT reflects that the processing effort of the conceptual information is not identical between conditions. The conceptual mean registers slight differences, with the values for the unmarked utterance being higher than those for the marked utterance (340.40 msec vs. 321.76 msec, -5.48%, medium-small effects, Table 15).

TRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	340.40	321.76	-18.64	-5.48%	medium-small

Table 15. Comparison of conceptual means – simple alternative (TRT)

These first outcomes reveal that the inclusion of the FO does not entail a more global processing effort for the host utterance despite the additional semantic load (a contrastive scalar relation) that the procedural guide adds[90]. Quite the opposite, the processing of the

[90] Utterance mean shows virtually no differences when contrasting the global processing of two conditions (315.55 msec vs. 320.19 msec, 1.47%, trivial effects). First, data corroborates that the

conceptual information when the readers can rely on a procedural instruction is less effortful than when it must be done without the instruction. The data from TRT leads us to another finding: unmarked and marked utterances present different information structures that correspond to different underlying processing paths, revealed by the different degree of effort demanded by the conceptual meaning in each utterance. We resort to further processing measures to observe in more detail the processing effort needed for each condition during the construction of the first assumption (FPRT) and the reanalysis of the initial construction (SPRT).

During the construction of the first assumption, there is a processing pattern comparable to the TRT. The conceptual meaning in the marked structure is processed with less effort than in the unmarked utterance (238.88 msec vs. 212.03 msec, -11.24%, large effects, Table 16).[91]

FPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	238.88	212.03	-26.85	-11.24%	large

Table 16. Comparison of conceptual means – simple alternative (FPRT)

The faster processing of the conceptual elements with the presence of *hasta* signals that the procedural instruction exerts an early impact upon the conceptual meaning. Since both utterances follow the same SVO structure and the role of the alternative is activated after processing the FO or the unmarked focus, the effects in the first reading would be ascribed to the processing of the focus information.

The reanalysis of the initial assumption describes a reverse situation. Second-pass reading time reports considerably more processing costs for the marked utterance (101.65 msec vs. 109.83 msec, 8.05%, medium-large effects, Table 17).[92]

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presence of the procedural element does not lead to a more effortful global processing of the utterance. Besides that, the lack of differences here in comparison to the less effort revealed by the conceptual mean for the marked utterance is an indicator that the procedural element demands higher effort during processing, and any local differences are offset during the whole processing.

[91] The utterance mean between conditions does register big differences (213.01 msec vs. 209.91 msec, -1.46%, trivial effects). Considering the large effects at the conceptual mean, the absence of differences at the utterance meaning manifests that the instruction is very demanding during the construction of the first assumption, and the readers interpret the conceptual meaning based on the processing instruction.

[92] The utterance mean also presents a large increase for the *hasta*-marked utterance (103.04 msec vs. 110.80 msec, 7.53%, medium-large effects). The comprehension test results indicate that a scalar relation is not necessarily triggered in the unmarked structure. For that reason, the reevaluation of the contrastive implicature requires more reprocessing time in the marked utterance.

SPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	101.65	109.83	8.18	8.05%	medium-large

Table 17. Comparison of conceptual means – simple alternative (SPRT)

The procedural instruction increases the reanalysis effort needed by the lexical elements, but this delayed reaction is to be expected. The SPRT is assumed to reflect the cognitive effort in the later stages of processing – during which, the readers confirm, enrich or modify the initial assumption. The FO activates a complex relation between the alternative and the focus and the reevaluation of these areas is done only after processing the instruction in the first reading. The overprocessing for the marked structure during the reanalysis is then a consequence of the scalar contrastive relation triggered by the instruction. Since this contrast is not necessarily activated in the unmarked structure, the readers do not need to reconsider the lexical elements in a scalar contrastive relation.

The analysis of the global comparison supports our claim that the processing of an *hasta*-marked utterance is not cognitively more demanding than an unmarked utterance, despite the major informative load that the FO confers to the utterance. The FO holds the role of information manager because it accelerates and regulates the effort that the conceptual elements demand in the utterance processing. During the construction of the first assumption and, in comparison, to an unmarked utterance, the procedural instruction has an acceleration effect upon the conceptual meaning during the first reading; but it also triggers more reanalysis effort because of the complex relation triggered by *hasta* between the alternative and the focus. However, the higher reprocessing costs are even throughout the entire utterance processing, as the lower conceptual mean for the marked utterance in the TRT has proved. The additional processing effort observed during the reanalysis could be considered "additional regulatory effort" (Cruz 2020), since such reprocessing effort is necessary to establish the evoked scalar contrastive relation and to confirm the initial assumption built during the first reading.

In conclusion, the FO introduces more information into the utterance in form of semantic instructions; but it also acts as a guide that activates a more efficient inferential route that leads the readers to the intended implicature without causing additional global effort.

Local level

A comparison of the focusing areas between conditions shed light on how exactly the cognitive path of each information structure unfolds during processing and how the

procedural instruction redistributes the processing costs of each conceptual element. Total reading time shows that the alternative in both conditions is processed with analogous effort (293.62 msec vs. 290.31 msec, -1.13%, trivial effects, Table 18). Considering the values from all AOIs, the FO (418.87 msec) concentrates the bigger attention, and its impact is visible upon its scope: the marked focus is processed 15.95% faster than the unmarked focus (404.26 msec vs. 339.80 msec, -15.95%, very large effects, Table 18).

TRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
alternative	293.62	290.31	-3.31	-1.13%	trivial
operator	----	418.87	----	----	----
focus	404.26	339.80	-64.46	-15.95%	very large

Table 18. Comparison of AOIs – simple alternative (TRT)

The FO articulates the information and therefore it stands out as the more cognitively demanding element within the utterance. *Hasta* conventionally triggers a scalar contrastive relation between the single explicit alternative and the focus. In doing so, the instruction determines the cognitive effort needed by the readers to identify these elements and recover the assumption. As the marked focus, the FO exerts an acceleration effect on it and greatly minimizes its processing effort in comparison to the same element in the unmarked condition. The identification of its informative status is done faster than when the new information must be recognized and integrated without a conventional guide. As the alternative, the processing of a simple alternative does not show any global differences between conditions. The FO conventionally activates the value of the alternative, however, any possible local overstrain for this area in the *hasta*-condition might have been balanced during the processing of the whole utterance.

Reading data from the FPRT reports that the construction of the first assumption undertakes with little effort for the alternative area, which is the less costly AOI in both conditions, and the effects between them are not substantial (191.27 msec vs. 198.82 msec, 3.95%, trivial effects, Table 19).[93] For its part, the FO shows longer reading times (273.92 msec) in comparison to the other areas, and its presence makes the processing of

[93] The alternative in the marked utterance is slightly harder to process. A plausible reason for this increment might be the parafoveally processing of the FO. When fixating on a word, the first letters of the next word can be processed parafoveally. See § 4.1, for further detail about the parafoveal processing in information acquisition.

the marked focus 27.66% faster than the unmarked focus (324.22 msec vs. 234.54 msec, very large effects, Table 19).

FPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
alternative	191.27	198.82	7.55	3.95%	trivial
operator	----	273.92	----	----	----
focus	324.22	234.54	-89.68	-27.66%	very large

Table 19. Comparison of AOIs – simple alternative (FPRT)

The analysis of the FPRT provides the following findings. The acceleration effect of the focus visible in the TRT begins already at an early stage of processing. The instruction of the FO has an immediate impact upon the focus, thus reducing the processing effort of this area during the initial reading. The trivial differences for the alternative also find an explanation. The role of the alternative is not activated – conventionally or conversationally – until processing the elements responsible for triggering the focusing operation within their utterances: the unmarked focus and the FO. Therefore, any effect that might be generated by reconsidering the alternative as such will manifest during the reanalysis.

The impact of the procedural instruction deploys during the reconstruction of the first assumption as well (Table 20). The reanalysis of the alternative reports now large effects, being the processing of the alternative in the marked utterance considerably lower (102.87 msec vs. 91.96 msec, -10.61%, large effects, Table 20). The focus area also presents wide differences: the reanalysis of the marked focus is 31.30% more demanding than of the unmarked focus (80.54 msec vs. 105.75 msec, very large effects, Table 20). The FO *hasta* (145.66 msec) remains the AOI with the highest processing time from all elements.

SPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
alternative	102.87	91.96	-10.91	-10.61%	large
operator	----	145.66	----	----	----
focus	80.54	105.75	25.21	31.30%	very large

Table 20. Comparison of AOIs – simple alternative (SPRT)

In an unmarked utterance, the readers need to confirm or reconsider the function assigned to the conceptual elements during the construction of the first assumption to recover the additive relation between the conceptual elements. This revision is done with an additional processing time for the alternative in the unmarked condition. On the contrary, the procedural instruction in the marked utterance regulates the processing effort to recover a more complex relation – a scalar contrastive relation instead of an additive one.

The FO conventionally evokes a pragmatic scale, and the readers must reevaluate the conceptual elements according to the scalar instruction. The adjustment of the alternative value is a more guided process than in the unmarked condition because the instruction has a regulatory effect and minimizes the reanalysis effort of this area. On the other hand, the integration of new information is tied to major processing costs. The focused element must comply with an end-of-scale interpretation; therefore, the marked focus undergoes a substantial effort in comparison to the unmarked focus.[94]

The global and local analysis of data collected for utterances with simple alternative has revealed that the processing of unmarked utterances and *hasta*-marked utterances follows different patterns.

Unmarked utterances follow a conceptual pattern because the readers recover the additive relation from the conceptual elements (alternative and focus). During the construction of the first assumption, the greater processing effort for the unmarked focus indicates that the additive relation is established at an early stage of processing, precisely while processing this element. During the reanalysis, the readers review the informative value of the conceptual elements to confirm the first assumption or modify it. The reanalysis of unmarked utterances aims to control the linguistic underdeterminacy of the utterance from which the readers have built the first assumption. The cognitive effort

[94] A closer look at the processing costs of the alternative, FO, and focus in the marked structure leads to an interesting finding for utterances with simple alternative. It seems that the FO and the focus might form a single block for information retrieval. The values of FO and focus are higher than those of the alternative during the construction and the reconsideration of the first assumption (Table 19, Table 20). We assume that the readers resort to these units (FO and focus) to retrieve the focusing operation for two different reasons: first, the FO articulates the contrastive scalar relation and, second, the readers must put an endpoint interpretation on the focus. Indeed, the results of the utterances with complex alternative support this idea (see § 5.1.2). In this condition, we find an opposite behaviour. In this case, the set of alternatives acts as a lexical guide towards the scalar assumption and minimizes the impact of the FO upon the utterance processing. During the FPRT, the FO and the focus trigger longer reading times than the alternative (Table 25), however, the set of alternatives absorbs higher reading values than the FO and the focus during the reanalysis (Table 26). This proves that to retrieve the scalar assumption, the FO and the focus function together as a block.

expended to reduce this degree of underdeterminacy involves longer reading times in the global utterance processing compared to the marked utterance.

In marked utterances there is a procedural pattern because the readers recover the scalar contrastive relation from the procedural instruction. The FO articulates the information and so assimilates a large processing effort in contrast to the conceptual elements. However, in return, it regulates the processing effort of the focusing areas upon which it acts. During the initial reading, the presence of *hasta* exerts an early acceleration effect upon the focus. After the construction of the first assumption, the readers reconsider the informative value of both conceptual elements and retrieve the assumption according to the scalar instruction.[95] Even though the reanalysis is done with greater effort, such effort is considered "additional regulatory" (Cruz & Loureda 2019; Cruz 2020), since this overstrain is offset during the entire processing of the utterance, as the conceptual mean in the TRT revealed (see Table 15).

Concluding, the FO has a dual function during the processing of the host utterance. Firstly, it optimally guides the construction of the first assumption, that is, without generating additional effort for establishing a more complicated assumption than in unmarked utterances. Secondly, the FO controls the reanalysis of that initial assumption. The reanalysis of *hasta*-marked utterances is intended to verify the scalar assumption, but any cognitive overstrain that results from confirming or reconsidering the complex assumption does not slow down the total processing of the utterance, since marked utterances are equal or less demanding than unmarked utterances.

[95] The processing path is different in the case of the FO *incluso* (see Cruz & Loureda 2019; Cruz 2020). In utterances with simple alternative, the reanalysis of the alternative entails more effort in the marked condition (48.54 msec vs. 55.99 msec, 15.35%, large effects); while this reactivation with *hasta* entails less effort (102.87 msec vs. 91.96 msec; -10.61%, large effects). The difference might be due to the endpoint-marking of *hasta*. Examining the data between alternative and focus can support this idea. In *incluso*-marked utterances, the alternative requires more effort than the focus (55.99 msec vs. 44.16 msec, 26.79%, very large effects). In *hasta*-marked utterances, the alternative is less demanding than the focus (91.96 msec vs. 105.75 msec, 13.04%, large effects). We assume that the end-of-scale interpretation imposed by *hasta* upon the focus is more complicated in terms of cognitive effort. The FO *incluso* does not necessarily indicate a scalar endpoint and, for that, the establishment of the scalar relation generates more reanalysis effort for the alternative. Nevertheless, despite the additional reanalysis time registered at the conceptual mean for the marked condition (*incluso*: 10.68%; *hasta*: 8.05%), data from TRT reveals that the processing of marked utterances trigger is less demanding than unmarked utterances (*incluso*: -9.40%; *hasta*: -5.48%).

5.1.2 Utterances with complex alternative

Conditions	
(a3b1) unmarked utterance	*Alba y Lucas tienen coches, motos y yates.* 'Alba and Lucas have cars, motorbikes, and yachts.'
(a3b2) marked utterance	*Alba y Lucas tienen coches, motos y hasta yates.* 'Alba and Lucas have cars, motorbikes and even yachts.'

The inclusion of the FO *hasta* in an utterance with a complex alternative is also expected to change the processing path unfolded in an analogous unmarked utterance, as it happened in utterances with a simple alternative. In the unmarked condition, the readers will process an additive relation between the lexical elements and these areas will register longer reading times (conceptual pattern). Furthermore, the greater lexical information provided by the complex alternative can facilitate the processing of a scalar interpretation among all conceptual elements; however, the integration of new information into the lexical concatenation may lead to a higher processing effort in comparison to the previous condition as well. In the marked condition, the readers now have more conceptual information to readjust according to the instruction, and this operation might involve more effort for the alternative area. On the other hand, since the readers can resort to procedural and conceptual content to recover the assumption, the complex alternative might lessen the impact that the FO *hasta* had on the processing of the conceptual elements in utterances with simple alternative. In other words, the FO might register less global reading time than in utterances with a simple alternative or other AOIs during the rereading because the readers can rely on the lexical enumeration and the procedural cue to recover the scalar assumption.

Global level

Total reading time reveals that even though the readers have now more conceptual information to process, there are no substantial differences when comparing the global effort needed by the conceptual content in each condition (321.38 msec vs. 313.52 msec, -2.45%, trivial effects, Table 21).

TRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	321.38	313.52	-7.86	-2.45%	trivial

Table 21. Comparison of conceptual means – complex alternative (TRT)

The outcomes support the finding that an utterance marked by an FO does not generate more processing effort than an unmarked one despite the additional semantic load that the FO confers to the marked utterance.[96] Nevertheless, the greatest amount of conceptual information seems to slow down slightly the processing of the marked condition at the utterance level in comparison to utterances with a simple alternative (see § 5.1.1, Table 15).[97] The trivial differences do not show whether the processing of the focusing structures follows identical or different processing paths.

The effects observed in the TRT are similar for the FPRT, since both structures show a trivial effect for the conceptual mean (213.96 msec vs. 206.70 msec, -3.39%, trivial effects, Table 22).

FPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	213.96	206.70	-7.26	-3.39%	trivial

Table 22. Comparison of conceptual means – complex alternative (FPRT)

Unmarked and marked utterances demand comparable effort during the construction of the first assumption, although the processing of the *hasta*-utterance is slightly faster. This finding reveals that during the construction of the first assumption, the lexical information contained in the set of alternatives helps build the additive relation among the conceptual elements in the unmarked condition while reducing the acceleration effect visibly in the marked utterances with a simple alternative (see Table 16).

The reanalysis data accounts for a reading pattern not much different from the TRT and FPRT. The effects between conditions are nearly non-existent during the reevaluation of the assumption, and the conceptual mean reports almost identical times (107.40 msec vs. 106.80 msec, -0.56%, trivial effects, Table 23).[98]

[96] The utterance mean does not present substantial differences between conditions (304.18 msec vs. 312.07 msec, 2.59%, trivial effect).

[97] For utterances with simple alternative, small effects were already observed in the same parameter: the conceptual information in the marked utterance needed 5.48% less time than when the same information was subordinated to the FO (Table 15).

[98] The trivial effects at the utterance mean between conditions during the TRT (2.59%), FPRT (3.63%) and SPRT (0.66%) leads us conclude that the additional amount of conceptual information in form of the complex alternative minimizes the effects of the FO observed in utterances with a simple alternative (see § 5.1.1).

SPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	107.40	106.80	-0.60	-0.56%	trivial

Table 23. Comparison of conceptual means – complex alternative (SPRT)

The incorporation of more conceptual content does not imply a particularly greater effort for any of the conditions during the reanalysis either. In the marked utterance, the increased conceptual content seems to facilitate the construction of the additive relation between the lexical items, hence there is no need for an effortful reanalysis to confirm or modify the assumption built during the first reading. Something similar happens in the marked condition. The lexical concatenation and the procedural instruction guide the readers towards the same assumption. The joint interaction of conceptual and procedural guidance reinforces the construction of a scalar contrastive assumption during the FPRT so that only a minimal revision is necessary during the reanalysis.

Local level

The previous analysis confirms that the different information structures in our study require a similar processing time at a global level. However, the lack of substantial differences between the conceptual means does not allow us to identify if the processing paths of unmarked and marked utterances are different or not. The local comparison will show how exactly the processing costs are allocated across the focusing areas and allow us to find out whether or not the distribution of the cognitive effort is identical across conditions and hence the processing patterns.

The interaction of the FO with a complex set of alternatives did not generate a higher processing effort at a global level, but the TRT for each focusing area reports that the FO eases the processing of one of the focusing areas. While no remarkable effects are registered for the alternative area (295.52 msec vs. 290.48 msec, -1.71%, trivial effects, Table 24); the marked focus needs far less reading time than the unmarked one (368.94 msec vs. 307.12 msec, 16.76%, large effects, Table 24). The FO *hasta* is the area of major attention within the host utterance (360.84 msec), which suggests its leading role when it comes to the processing of the marked utterance.

TRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
alternative	295.52	290.48	-5.04	-1.71%	trivial
FO	----	360.84	----	----	----
focus	368.94	307.12	-61.82	-16.76%	very large

Table 24. Comparison of AOIs – complex alternative (TRT)

The procedural instruction determines how to interpret the conceptual elements and thus regulates the processing effort demanded by each of them. The combination of the conceptual and procedural information guiding to the same implicature produces an acceleration effect upon the processing of the marked focus in comparison to the same element in the opposite condition. The set of alternatives presents the same processing behaviour as in utterances with the simple alternative: firstly, the alternative needs similar processing effort in both utterances; and, secondly, the alternative is also the AOI that assimilates the least effort within every kind of information structure.

The data corresponding to the FPRT describes a similar picture. During the construction of the first assumption, the alternative area does not show great differences between conditions (174.70 msec vs. 172.44 msec, -1.29%, trivial effects, Table 25) and the marked focus is 18.41% easier than the unmarked focus (301.10 msec vs. 245.67 msec, large effects, Table 25). In addition, the FO (276.07 msec) remains the area with the major effort within the utterance.

FPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
alternative	174.70	172.44	-2.26	-1.29%	trivial
FO	----	276.07	----	----	----
focus	301.10	245.67	-55.43	-18.41%	very large

Table 25. Comparison of AOIs – complex alternative (FPRT)

The lower reading values registered for the marked utterance confirm that the presence of *hasta* accelerates the processing effort of the marked focus while building the first assumption. If the readers cannot rely on a procedural instruction to relate the new information to the background information, as is the case in the unmarked information structure, then the unmarked focus undergoes a more effortful processing than the

marked focus. Considering the reading values of this parameter, the integration of more conceptual information does not seem to change the processing path described for utterances with simple alternative during the FPRT drastically (see § 5.1.2, Table 19). The lexical concatenation might function as conceptual guidance already in an early stage of processing in both conditions, however, the role of guidance will be best revealed in the rereading, during which the readers reconsider the initial assumption and the alternative value is reevaluated.

The SPRT shows that more conceptual content has noteworthy implications for the reanalysis impact of the FO. Contrary to what was happening so far, the FO (85.47 msec) is no longer the area with the greatest reading times in the host utterance.[99] The alternative entails a similar degree of effort between conditions (121.20 msec vs. 118.40 msec, -2.31%, trivial effects, Table 26), and the marked focus requires 9.35% less time than the unmarked one (68.32 msec vs. 61.93 msec, medium-large, Table 26).

SPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
alternative	121.20	118.40	-2.80	-2.31%	trivial
FO	----	85.47	----	----	----
focus	68.32	61.93	-6.39	-9.35%	medium-large

Table 26. Comparison of AOIs – complex alternative (SPRT)

During the reconsideration of the first assumption, the alternative area does not show important differences between conditions. However, a closer look within each utterance reveals that the set of alternatives triggers more processing efforts than the corresponding focus. This behaviour signals that the readers bring renewed attention to the set of alternatives to put them in relation with the focus after building the first assumption.

The lexical information encoded in the complex alternative has different effects depending on the kind of focusing structure. In unmarked utterances, the complex alternative act as conceptual guidance facilitating the recovery of the additive

[99] During the reanalysis of utterances with the complex alternative, the set of alternatives in the marked structure demands 38.53% more time than the FO (118.40 msec vs. 85.47 msec, very large effects), and 91.18% more than the marked focus (118.40 msec vs. 61.93 msec, very large effects). In utterances with simple alternative (see § 5.1.1, Table 20), the roles are reversed. The FO needs 58.39% more reanalysis time than the alternative, and the marked focus needs 15% more than the alternative. These outcomes manifest that the size of the alternative affects the reprocessing because it constitutes itself a prompt of scalarity between the two values: the set of alternatives and the focus.

assumption than in utterances with simple alternative (see § 5.1.1).[100] In marked utterances, the set of alternatives operates as a lexical guidance and reinforces the scalar interpretation evoked by *hasta.* Since the readers can count also on a conceptual guide, the guiding role in processing that the FO had in utterances with simple alternative is minimized. Nevertheless, the FO still holds a regulatory function concerning the focus so that the revision of the initial assumption is carried out with minor effort for the marked focus than for the unmarked focus.

The data for utterances with complex alternatives has shown that unmarked and marked information structures also follow different processing patterns regardless of the size of the alternative set (conceptual pattern vs. procedural pattern). During the construction of the first assumption, the readers establish in unmarked utterances an additive relation between the set of alternatives and the focus that entails additional effort for the element in focus. The establishment of this additive relation is reinforced by the complex alternative, which acts as lexical guidance. The linguistic underdeterminacy of unmarked utterances causes a reanalysis during which the readers verify whether the additive relation during the first reading is still valid. However, the lexical guidance in the form of the complex alternative accelerates this reevaluation thus reducing the effects between areas (alternative and focus) found in utterances with simple alternative.

In marked utterances, on the other hand, the FO conventionally triggers a scalar contrastive relation between the set of alternatives and the focus. During the construction of the first assumption, *hasta* is the focusing operation trigger and thus absorbs the greater processing effort. However, it also immediately accelerates the processing of the focused element during the first reading. During the reanalysis, the procedural element controls the effort that the readers need to readjust the informative value of the conceptual elements to confirm, enrich, or modify the first assumption. The set of alternatives helps to process a scalar assumption and relying on lexical and procedural guidance together largely reduces the time needed to identify and integrate the new information. The combination of two kinds of instructions – conceptual and procedural – produces an effort-saving effect visible at the global utterance level in comparison to the unmarked utterances.

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[100] In utterances with simple alternative, the alternative area displayed during the reanalysis a difference of 10.06%, triggering the alternative in the unmarked condition more processing time (102.87 msec vs. 91.96, -10.61%, large effects, Table 20). In this condition, there is no difference between alternatives, which means that the processing of alternatives in the unmarked condition has been accelerated.

5.1.3 Utterances with implicit alternative

Conditions		
(a1b1)	unmarked utterance	*Alba y Lucas tienen yates.* 'Alba and Lucas have yachts'
(a1b2)	marked utterance	*Alba y Lucas tienen hasta yates.* 'Alba and Lucas have even yachts.'

Utterances with implicit alternative present a higher degree of linguistic underdeterminacy in comparison to utterances with explicit alternative, whether simple or complex. The interpretation of undetermined utterances is highly context-dependent and involves a pragmatic enrichment by the readers that translates into a cognitive effort since they must add the new information to the CG solely on the based on the context. The high underdeterminacy also entails a broad array of interpretations that can affect how the readers build the additive relation between the focus and the alternatives. Therefore, the different levels of linguistic underdeterminacy of utterances in this condition are assumed to affect the processing paths and the cognitive effort of the different information structures. In this regard, unmarked utterances will be more demanding than *hasta*-utterances because the presence of the FO reduces the degree of underdeterminacy of the host utterances. Furthermore, utterances with implicit alternative are expected to generate more processing efforts because the readers must fall back on the context to relate new information and given information.

Global level

The conceptual mean from the TRT reports a large effect between conditions. The conceptual information in marked utterances demands far less processing effort than unmarked utterances (381.25 msec vs. 339.14 msec, -11.05%, large effects, Table 27).

TRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	381.25	339.14	-42.11	-11.05%	large

Table 27. Comparison of conceptual means – implicit alternative (TRT)

The TRT data yields two findings consistent with the previous outcomes (see §§ 5.1.1, 5.1.2). We can consider first the finding that unmarked and marked utterances present two different processing paths since the conceptual content of each utterance requires a dissimilar amount of cognitive effort. In the unmarked utterance, the identification and

integration of the new information within the context implies more processing effort at the utterance level. The presence of the FO, on the other hand, has an acceleration effect upon the conceptual content, thus decreasing the effort that the readers need to establish a contrast between the focus and the alternative derivable from the context.

The results also corroborate a second finding: the inclusion of an FO does not translate into more cognitive effort despite that the instruction adds more semantic information to the utterance. The FO generates a regulation effect upon the whole utterance that compensates the additional effort that the readers expend to recover a more complex assumption than in unmarked utterance. In this way, even though the FO introduces more information to retrieve, it also conventionally constrains the inferential routes and make the utterance less underdetermined and, consequently, less unambiguous.

The pattern seen in the TRT does not change during the FPRT. The conceptual mean reflects a lower processing effort for the marked utterance than for the unmarked one (251.53 msec vs. 220.09 msec, -12.50%, large effects, Table 28).

FPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	251.53	220.09	-31.44	-12.50%	large

Table 28. Comparison of conceptual means – implicit alternative (FPRT)

Given these first results, and in line with the findings from previous conditions, the FO facilitates the construction of the assumption in comparison to the unmarked condition. While the procedural element controls and regulates the effort that the readers need to interpret the conceptual information during the initial reading, this process becomes more effortful in the absence of a procedural instruction.

The acceleration effect of the FO *hasta* is also observed during the reconsideration of the first assumption - but to a lesser extent. The processing of the conceptual content in the marked condition needs 7.71% less time than in the unmarked condition (129.67 msec vs. 119.67 msec, medium-large effects, Table 29).

SPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
conceptual mean	129.67	119.67	-10	-7.71%	medium-large

Table 29. Comparison of conceptual means – implicit alternative (SPRT)

When the alternative information is implicit, the utterance is more linguistically undetermined and leads to a more ambiguous interpretation. The introduction of the FO makes the utterance more determined because the procedural mark constrains the range of possible interpretations. As a result, the integration of new information following the procedural instruction is carried out in less time than in the opposite condition. Unmarked utterances, on the other hand, present a high degree of linguistic underdeterminacy and the recovery of the assumption is more demanding because the reader must resort to the previous context and the mind-stored assumptions to pragmatically enrich the utterance. The cognitive effort needed to accomplish these operations is reflected in the greater reading times for this condition.

The reanalysis data backs up the claim that unmarked and marked focusing structures trigger different processing patterns in the sense that neither the amount of processing effort required by each structure nor the distribution of that effort among the different AOIs involved in the focusing area within the utterance is identical. The reason for the high processing effort of unmarked utterances in comparison to the marked utterances lies in their underlying linguistic underdeterminacy. The interpretation of such utterances takes place through processes of pragmatic enrichment, which require more cognitive effort in contrast to the interpretation of utterances that are more linguistically determined, as is the case with *hasta*-marked utterances. The presence of the FO in the marked utterances reduces the degree of underdeterminacy: the procedural cue introduces a more semantic load into the utterance in the form of procedural instructions that restrict the interpretation possibilities optimally guiding the readers towards the correct assumption. In short, the presence or absence of a procedural instruction affects the processing of the conceptual content by varying the effort that the readers need to expend to process an additive or contrastive relation between the elements with conceptual meaning.

Local level

The analysis at the global level has shown that the presence of the FO *hasta* in a given utterance does not automatically convey more cognitive effort. Quite the reverse, it has an acceleration effect at the utterance level across all parameters. The analysis of the focusing areas in the TRT shows for the focus area the same behaviour as in the previous conditions: the marked focus needs less time than the unmarked focus (362.89 msec vs. 333.93 msec, 7.48% medium-large effects, Table 30).

TRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
FO	----	402.27	----	----	----
focus	362.89	333.93	-28.96	-7.48%	medium-large

Table 30. Comparison of AOIs – implicit alternative (TRT)

The comparison between foci reveals that the underdeterminacy of an unmarked utterance causes an overprocessing of the unmarked focus. When there is no procedural instruction, the readers are confronted with a broad range of interpretations and the integration of an unmarked focus into the CG is a demanding process. In addition to this, when the alternative is implicit, the readers establish the additive relation between new and given information resorting to the context; and this pragmatic enrichment calls for a major effort. In the marked condition, the FO encodes the instruction to process the scalar contrastive relation thus becoming the centrepiece from where the readers process the focusing operation. This leading role is supported by the high times that the FO has during reading. Further, by conventionally signalling how to interpret the focused element, the processing of this area – marked focus – is minimized.

During the construction of the first assumption, the FO (248.90 msec) becomes the most effortful element in the host utterance, but it exerts an early acceleration effect upon the focus reducing 9.37% of the processing of this element in comparison to the unmarked focus (269.57 msec vs. 244.32 msec, medium-large effects, Table 31).

FPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
FO	----	248.90	----	----	----
focus	269.57	244.32	-25.25	-9.37%	medium-large

Table 31. Comparison of AOIs – implicit alternative (FPRT)

The analysis of the data for utterances with implicit alternative corroborates the findings for utterances with an explicit alternative during the construction of an initial assumption. The FO regulates and controls the processing effort of the focus, which is reflected in a minimization of the cognitive effort related to the identification and integration of this element. These same operations are associated with a major effort for the unmarked condition because of the high semantic underdeterminacy. The underdeterminacy of unmarked utterances implies a broad range of interpretations and

relating the focus and the background information is a more cognitively demanding activity as in marked utterances.

During the reevaluation of the first assumption, the differences between the focus areas have been drastically reduced (93.72 msec vs. 91.23 msec, -2.66%, trivial effects, Table 32). The FO remains the most demanding element to process (154.07 msec).

SPRT	unmarked utterance	marked utterance	diff (msec)	diff (%)	effect size
FO	----	154.07	----	----	----
focus	93.72	91.23	-2.49	-2.66%	trivial

Table 32. Comparison of AOIs – implicit alternative (SPRT)

The FO triggers the existence of a potential set of alternatives that must be contrasted to the focus. Given that the alternatives are implicit, the readers retrieve this information dwelling at the FO, as the higher reading values of the procedural instruction signals.[101] Even so, the effortful reanalysis triggered by the FO does not have a global or local slowing down effect on the overall processing of the marked utterance. In unmarked utterances, the additive relation between the focus and the background information is carried out mainly during an early stage of processing. Since the unmarked focus does not necessarily activate the search for alternatives, the readers do not have to recover any scalar contrastive relation. As a result, the reconsideration of the initial assumption leads to little reanalysis effort for the unmarked focus area in comparison to utterances with explicit alternative, in the sense that when the alternative is explicit, there are considerable effects between the focus areas (see §§ 5.1.1, 5.1.2).

The global and local analysis of utterances with implicit alternative confirms that the different information structures under study (unmarked and marked) present different processing patterns. Unmarked utterances follow a conceptual pattern in which the readers recover the assumption extracting the information from the explicit conceptual

[101] To account for this, we compare the reading times across all conditions. The FO *hasta* takes in longer reading times in utterances with implicit alternative in comparison to those with explicit alternative. The FO needs 154.07 msec in utterances with implicit alternative, 145.66 msec in utterances with simple alternative, and 85.47 msec in utterances with complex alternative. Besides this, the effects between the FO and marked focus shows that the FO has a dominant role during the reanalysis in utterances with implicit alternative. Indeed, the FO is 68.88% more difficult to process than the marked focus (91.23 msec vs. 154.07 msec, very large effects) in utterances with implicit alternative. In utterances with simple alternative, the FO is 37.74% more demanding than the focus (105.75 msec vs. 145.66 msec, very large effects), and in utterances with complex alternative, the FO needs 38.01% more time than the focus (61.93 msec vs. 85.47 msec, very large effects).

element: the unmarked focus. The identification and integration of this element take place mainly at an early stage of processing, as the high reading times for this area during the construction of the first assumption suggest. The lack of alternatives affects the reconsideration of this area by minimizing the effort needed to reconsider the focused element. On the other hand, marked utterances follow a procedural pattern. The FO demands a great deal of cognitive effort thus becoming the axis for the recovery of the communicated assumption. The procedural cue guides the inferential process by constraining the possible interpretations of the utterance in doing so regulates and controls the interpretative effort necessary for the focus.

5.1.4 Focus marking – Overview

The six conditions were simultaneously tested in a further model. This model allows us to compare how the different degree of linguistic underdeterminacy of utterances affects the cognitive engagement of the readers to recover the intended assumption.

From a relevantist approach, the same explicature can be carried by utterances with a different degree of explicitness (Sperber & Wilson 1995[1986]; Wilson & Sperber 2012: § 1.1). This degree of explicitness refers to the correlative contribution of decoding and pragmatic inference to derive the explicature and implicature. With a low degree of explicitness, the utterance is linguistically underdetermined, hence, the decoding contribution is smaller, and the pragmatic contribution is higher. And inversely, with a high degree of explicitness, the utterance becomes more semantically determined so that there is a smaller pragmatic contribution and a higher decoding contribution. In terms of cognitive effort, the processing of a linguistically underdetermined utterance requires more inferential effort that is reflected in longer processing times.

Our conditions differ in their degree of linguistic underdeterminacy. While the condition a1b1 (*Alba y Lucas tienen yates*) is the most linguistically underdetermined utterance from all; the condition a3b2 (*Alba y Lucas tienen coches, motos y hasta yates*) is the most semantically saturated one. The introduction of the FO *hasta* and more amount of lexical information in the set of alternatives are factors that reduce the linguistic underdeterminacy of utterances and guide the readers towards the communicated assumption with less cognitive effort. Therefore, we expect the processing effort of different utterances to change according to their degree of semantic saturation.

Table 33 includes the conceptual mean of each of the six conditions during the TRT. The unmarked utterance with the implicit alternative is by far the most demanding condition

(381.25 msec), and the differences in the processing effort that arise between this condition and the rest are largely affected (10.71% - 17.77%). The marked utterance with complex alternative (313.52 msec) triggers the shortest reading time, and it is equally demanding as the unmarked utterance with complex alternative (321.38 msec) and the marked utterance with simple alternative (321.76 msec).

unmarked, implicit	**381.25**					
unmarked, simple	10.71%	**340.40**				
marked, implicit	11.05%	0.37%	**339.14**			
marked, simple	15.60%	5.48%	5.12%	**321.76**		
unmarked, complex	15.70%	5.59%	5.24%	0.12%	**321.38**	
marked, complex	17.77%	7.90%	7.55%	2.56%	2.45%	**313.52**
	unmarked, implicit	**unmarked, simple**	**marked, implicit**	**marked, simple**	**unmarked, complex**	**marked, complex**

Table 33. Differences across unmarked and marked utterances (TRT)

The data supports the finding that the more undetermined the utterance is, the more processing effort it demands. The unmarked condition with implicit alternative – whose content is the least linguistically determined – is the most difficult to process; while the marked utterance with complex alternative – which has the highest level of linguistic determinacy – triggers the lowest values. The values also support the idea that when it comes to recovering the implicature two main factors play a role in the reduction of the cognitive processing: the presence of the FO in the utterance and the lexical information provided by the set of alternatives. These two aspects make the utterance less underdetermined, thus minimizing the cognitive effort that the readers need to process the utterance and recover the communicated assumption.

The differences found across conditions let us establish a processing scale along which the utterances are ranked from the most to the least effortful in descending order (Figure 8). The utterances are classified into three groups depending on the effects found among them. Within the same group, differences among conditions are trivial (<3.99%).

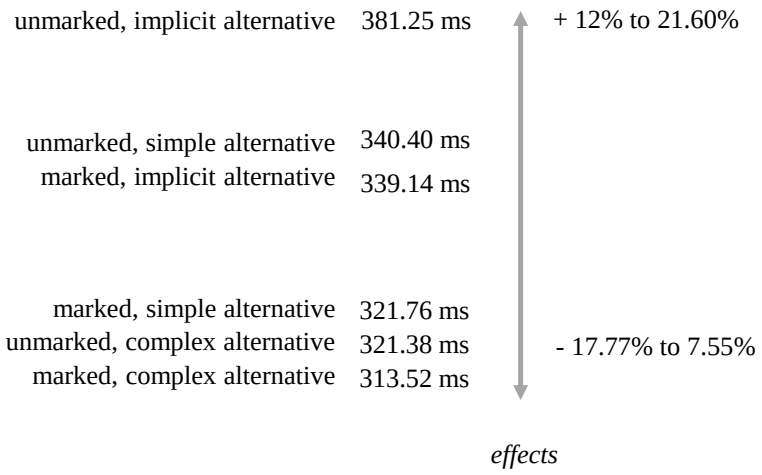

Figure 8. Processing scale of unmarked and marked utterances (TRT)

The presence of a procedural instruction and the size of the set of alternatives are factors that constrain inferential computations. Of the two of them, the procedural instruction is the primary aspect that allows processing the implicature with the least effort, which can be proved by comparing the conceptual means between the pairs of unmarked and marked conditions (Table 34).

Condition	**Set of the alternatives**		
	implicit	*simple*	*complex*
unmarked	381.25	340.40	321.38
marked	**339.14**	**321.76**	**313.52**
difference	-11.05%	-5.48%	-2.45%

Table 34. Conceptual mean between unmarked and marked utterances (TRT)

The conceptual mean of a marked utterance is either lower than or equal to the conceptual mean of the analogous unmarked utterance. The FO regulates and controls the processing of the host utterance by optimally guiding the readers towards the appropriate implicature. In unmarked utterances, the pragmatic enrichment processes that the readers must accomplish to arrive at the interpretation translates into an increase of processing effort.

During the construction of the first assumption (FPRT), the processing effort across conditions does not differ substantially regarding the previous parameter (Table 35). The unmarked utterance with implicit alternative triggers the longest reading time (251.53 msec) and it causes from medium-small to very large effects concerning the other conditions (5.30% - 21.69%). The unmarked utterance with simple alternative always presents differences that range from medium-large to large effects (7.87% - 13.47%). As

the utterances become more linguistically determined – because of the presence of the FO or the size of alternatives – they generate smaller or trivial effects (0.90% - 6.08%).

unmarked, implicit	**251.53**					
unmarked, simple	5.03%	**238.88**				
marked, implicit	12.50%	7.87%	**220.09**			
unmarked, complex	14.94%	10.43%	2.79%	**213.96**		
marked, simple	15.70%	11.24%	3.66%	0.90%	**212.03**	
marked, complex	17.82%	13.47%	6.08%	3.39%	2.51%	**206.70**
	unmarked, implicit	**unmarked, simple**	**marked, implicit**	**unmarked, complex**	**marked, simple**	**marked, complex**

Table 35. Differences across unmarked and marked utterances (FPRT)

The presence of the FO and the set of alternatives restrict the possible interpretations already during the construction of the first assumption. As it happened in the TRT, the focus marking is the most cost-constraining aspect. This finding can be supported if we examine again the conceptual mean between the pairs of unmarked and marked conditions (Table 36).

Condition	**Set of the alternatives**		
	implicit	*simple*	*complex*
unmarked	251.53	238.88	213.96
marked	**220.09**	**212.03**	**206.70**
difference	-12.50%	-11.24%	-3.39%

Table 36. Conceptual mean between unmarked and marked utterances (FPRT)

The marked utterances always need less processing than their unmarked counterparts. This reduction is due to the control and regulation that the FO has upon the conceptual information. If there is no procedural guide, the size of the alternative set makes the utterance more semantically determined, thus, lessening the processing values between unmarked and marked conditions to similar levels.

During the reconsideration of the first assumption (SPRT), the effort demanded by some utterances differs concerning that of the first reading (Table 37).[102]

[102] The most remarkable change occurs with the unmarked utterance with simple alternative. This condition was one of the most effortful to process in the TRT and FPRT (Table 18, Table 19). Now it triggers the lowest reading values and seizes differences with the other conditions that range from small to very large effects. This minimization can be explained due to the absence of the FO. Without a procedural cue that conventionally activates the role of the alternative, the readers do not reactivate this element so that there is less reanalysis effort in comparison to the other utterances.

unmarked, implicit	**129.67**					
marked, implicit	7.71%	**119.67**				
marked, simple	15.30%	8.22%	**109.83**			
unmarked, complex	17.17%	10.25%	2.21%	**107.40**		
marked, complex	17.64%	10.75%	2.76%	0.56%	**106.80**	
unmarked, simple	21.61%	15.06%	7.45%	5.35%	4.82%	**101.65**
	unmarked, implicit	**marked, implicit**	**marked, simple**	**unmarked, complex**	**marked, complex**	**unmarked, simple**

Table 37. Differences across unmarked and marked utterances (SPRT)

The differences are mainly due to two factors. On the one hand, since the FO conventionally triggers a scalar contrastive relation, the readers must reevaluate the conceptual elements following the procedural instruction and such reevaluation can involve more reprocessing effort. If a single alternative is explicit, the direct contrast between new information and given information becomes very demanding. However, if the readers count on more lexical information due to the complex alternative, the lexical concatenation facilitates the utterance processing in both conditions (unmarked and marked condition). In addition to this, the interaction of conceptual and procedural guidance in the marked utterance eases the utterance processing even more. The impact of the procedural and conceptual guidance upon the processing costs can be appreciated by comparing the pairs of unmarked and marked conditions (Table 38).

Condition	**Set of the alternatives**		
	implicit	*simple*	*complex*
unmarked	**129.67**	101.65	**107.40**
marked	119.67	**109.83**	106.80
difference	-7.71%	8.05%	-0.56%

Table 38. Conceptual mean between unmarked and marked utterances (SPRT)

The presence of a procedural and/o a conceptual guide entails less cognitive effort during the processing of the utterance. While the reanalysis of unmarked conditions aims at reducing the linguistic underdeterminacy of the utterance from which the communication has been built, the reanalysis of marked utterances is done to check the validity of the initial assumption, and it can have a wide range of reprocessing effects depending on the lexical properties of the utterance. For that reason, the marked implicit condition triggers less reading time than the unmarked condition (-7.71%); the marked simple condition triggers more reading time (8.05%) and there are no important differences between conditions when the set of alternatives consist of two explicit elements (-0.56%).

Nevertheless, any slowing down effect visible in the reanalysis involves a higher processing effort in the overall processing of the utterance (Table 34).

Based on this joint analysis, we can claim that the degree of linguistic underdeterminacy of an utterance affects the processing effort that the readers expend to process it. And more specifically, the more linguistically underdetermined an utterance is, the more processing effort it demands. In addition, the presence of a procedural or conceptual guide makes the utterance more semantically determined and eases the processing at an utterance level. From both kinds of guides, the procedural guide is a more crucial factor in minimizing the processing effort.

5.2 Comprehension test

The outcomes of the comprehension test show if the readers derive the intended implicatures from the experimental utterances. On account of its fundamentally procedural meaning, it is expected to be a more successful comprehension of a scalar contrastive implicature for the marked utterances (condition b2) than for unmarked utterances (condition b1). In the latter case, the scalar contrastive implicature can only be recovered as a conversational implicature.

Utterances with implicit alternative

(a1b1) *Alba y Lucas tienen yates.*

(a1b2) *Lucas a Alba tienen hasta yates.*

Según la frase, ¿tener yates es menos esperable que tener otro tipo de vehículos?

	YES	**NO**	**NK**
(a1b1)	2.78%	**80.55%**	16.67%
(a1b2)	**90%**	7.22%	2.78%
The chi-square statistic is 267.8712. The p-value is < 0.00001.			

Table 39. Answers for utterance with implicit alternative (test I)

Utterances with simple alternative

(a2b1) *Alba y Lucas tienen coches y yates.*

(a2b2) *Alba y Lucas tienen coches y hasta yates.*

Según la frase, ¿tener yates es menos esperable que tener coches?

	YES	**NO**	**NK**
(a2b1)	3.89%	**90%**	6.11%
(a2b2)	**89.44%**	7.78%	2.78%
The chi-square statistic is 267.8712. The p-value is < 0.00001.			

Table 40. Answers for utterance with simple alternative (test I)

Utterances with complex alternative

(a3b1) *Alba y Lucas tienen coches, motos y yates.*

(a3b2) *Alba y Lucas tienen coches, motos y hasta yates.*

Según la frase, ¿tener yates es menos esperable que tener los otros vehículos mencionados?

	YES	NO	NK
(a3b1)	7.22%	**81.67%**	11.11%
(a3b2)	**85%**	12.78%	2.22%
The chi-square statistic is 219.186. The p-value is < 0.00001.			

Table 41. Answers for utterance with complex alternative (test I)

The results confirm that no scalar interpretation is processed unless there is a conventional instruction that indicates to do so. The FO constrains the inferential route that the readers must follow in comprehension and the successful derivation of a scalar implicature is reflected in the large percentage of positive answers for the *hasta*-marked utterance (yes rate: 89.44%, 85%, 90%). Conversely, the high no-answer percentages for the unmarked condition (90%, 81.67%, 80.55%) reveals that the lack of a procedural instruction makes the utterance an insufficient stimulus to trigger a scalar interpretation – independently whether the alternative is syntactically mentioned or unmentioned in the utterance.

The comprehension results support the findings of the eye-tracking study: each kind of information structure activates a different inferential path and leads to a different assumption: an additive relation or a scalar contrastive relation. The procedural instruction imposes its conditions to the utterance and the context and makes the host utterance a sufficient ostensive stimulus to recover the scalar implicature (**hypothesis IV B_3 confirmed**). An utterance with no procedural instruction is more prone to ambiguity and the comprehension of a scalar implicature is not performed. Furthermore, the additional conceptual information provided by the complex alternative does not act as a satisfactory lexical guidance to trigger a scalar interpretation.

5.3 Final discussion

The analysis of IV B and IV A has proved that the utterances examined in this study present different information structures – unmarked and marked focusing structures – underlying different patterns of processing to recover the communicated assumption (**hypothesis IV B_2 confirmed**).

We argue a conceptual pattern for unmarked focusing structures because the readers recover the additive relation extracting the information from the conceptual elements of the utterance. The establishment of the additive relation usually occurs during the first

reading and, in particular, dwelling at the unmarked focus. During the construction of the assumption, unmarked utterances demand either more processing effort (implicit and simple conditions) or similar processing effort (complex condition) than their analogous marked utterances. The differences found between conditions signal that the recovery of the additive relation is an effortful operation that can be even more demanding as the linguistic underdeterminacy of the utterances increases, as happened in utterances with implicit alternative.

During the reanalysis, the reevaluation of an additive relation can involve a more or less processing effort depending on the size of the set of alternatives. In utterances with simple and complex alternative, the revision of the assumption does not entail so much effort as it does its construction during the first reading. In this case, the reanalysis of unmarked utterances intends to verify the initial assumption and reduce the underdeterminacy of the utterance.[103] On the other hand, the reanalysis of utterances with implicit alternative is done with greater effort due to the low semantic saturation of this kind of utterances.

In marked utterances, the presence of the FO settles the processing pattern, therefore we claim there is a procedural pattern. The introduction of *hasta* in a given utterance provides more semantic information to process, namely a scalar contrastive relation between a focus and a potential set of alternatives and a scale among the lexical words with an endpoint-marking interpretation. This additional information does not entail more processing effort though. On account of its instructional character, the FO conventionally signals how the conceptual information must be interpreted and related to each other, thus controlling and regulating the processing effort that the interpretation of the conceptual elements could demand to recover the assumption.

The presence of the FO affects the processing of the focus, upon which the instruction exerts an early *acceleration effect*. This acceleration makes the marked focus less processing effortful than the unmarked one. This benefit (speeding up impact) during the construction of the first assumption is also global, even though a marked focus might need higher reanalysis effort in utterances with simple alternative (see § 5.1.1). After constructing the initial assumption, the readers are compelled to reevaluate the alternative and focus according to the instruction to confirm, enrich, or correct the initial

[103] The data confirms that the alternative is 27.73% more effortful than the unmarked focus (102.87 msec vs. 80.54 msec, very large effects, Table 20) in utterances with simple alternative. In utterances with complex alternative, the alternative demands 77.40% more time than the unmarked focus (121.20 msec vs. 68.32 msec, very large effects, see Table 26).

assumption. In this late stage of processing, there is an activation of the role of the alternative, if any.[104]

The role of the alternative is only under consideration after processing the FO. Hence, when the scalar contrastive relation is conventionally triggered, the readers reconsider the function assigned to this area during the first reading. However, the reanalysis of the alternative is a more guided process in the marked utterance than in the unmarked condition. Thus, even though the reevaluation of the alternative as a competitor to the focus in the marked utterance is a more complex operation than in the unmarked utterance, the reanalysis of this area does not demand major effort than the same counterpart in the utterance without an FO. As the focus, the endpoint interpretation that *hasta* imposes upon the marked focus can cause an increased reprocessing effort in comparison to the unmarked one. However, this additional effort is considered an *additional regulatory effort*, since the reanalysis of marked utterances aims to verify the validity of the initial assumption, and any overstrain is balanced out during the entire utterance processing.

The differences found between the two processing paths observed for marked and unmarked utterances lead to the conclusion that an FO, as an element with procedural meaning, holds two functions during the processing of marked focusing structures: it guides the construction of a first assumption and controls the reanalysis effort. The role of the information manager of the FO can be further supported when comparing the processing correlation between the lexical elements within and between conditions (Table 42).

Condition	**simple alternative**	**complex alternative**
alternative vs. unmarked focus	293.62 vs. 404.26 110.64 msec - 37.68% (very large)	295.52 vs. 368.94 73.42 msec - 24.84% (very large)
alternative vs. marked focus	290.31 vs. 339.80 49.49 msec - 17.05% (large)	290.48 vs. 307.12 16.64 msec - 5.73% (medium-small)

Table 42. Differences in reading values between alternative and focus (TRT)

[104] In utterances with implicit alternative, the data has shown that the readers process the FO longer than in the other conditions during reanalysis: implicit alternative: 154.07 msec, simple alternative: 145.66 msec, complex alternative: 85.47 msec (Tables 20, 26). Since the FO conventionally activates the search for alternatives, the readers dwell on this area to infer a contextually restricted set of alternatives.

The FO facilitates the identification of the informative value of the conceptual elements involved in the focusing operation, and thus it manages to regulate the processing effort that each one requires. Therefore, the processing differences between the alternative and the focus are far minor in the marked utterance than in the unmarked one. This result supports the rigidity and asymmetry of the procedural meaning concerning the conceptual meaning. A procedural expression, as a FO, imposes certain rules for the conceptual elements and compels the modification of the mental representations formed by the concepts (Leonetti & Escandell 2004; Escandell et al. 2011).

The analysis of IV B and IV A has proved that the introduction of the FO *hasta* in a given utterance does not automatically call for a greater global processing effort at the utterance level (**hypothesis IV B_1 confirmed**). The FO eases the retrieval of more complex information, an endpoint–marking pragmatic scale, by generating a regulation effect in the whole of the utterance and the area of the marked focus. This optimization of the cognitive effort during the utterance processing outweighs any additional effort that the lexical contrast of the alternative and the focus might cause. In this way, even though the FO introduces more information to the host utterance (a scalar contrastive implicature), this higher semantic load does not translate into a major cognitive effort at an utterance level. The procedural instruction conventionally constrains the inferential routes and leads unequivocally to the intended assumption.

The properties of the alternative also play a role in the processing of marked utterances (**hypothesis IV A_1 confirmed**). When the readers must rely on implicit background information to create the contrast between the focus and the implicit alternative, the processing effort increases compared to when they can rely on explicit conceptual information (see § 5.1.4). The interpretation of an unmarked utterance with implicit alternative requires further pragmatic enrichment. The reader must resort to the context to integrate the new information into the CG, which results in a bigger cognitive effort for the whole utterance processing comparison with utterances with the explicit alternative. However, the explicitness of the alternative makes the utterance more linguistically determined. In particular, when the readers can count on a lexical enumeration that can act as a conceptual guide towards the same implicature as the FO, the utterance processing is even less effortful.

As the comprehension test, the procedural instruction unambiguously guides the recovery of the intended implicatures. The instruction recovery constrains the range of possible interpretations of the utterance so that the derivation of the scalar implicature is

less vague than in the unmarked utterances. On the contrary, an unmarked utterance does not represent a sufficient stimulus to lead to a scalar implicature (**hypothesis IV B_3 confirmed**). Even the extended conceptual information in the complex alternative condition does not constitute guidance to establish a scalar contrastive relation between the alternatives and the focus.

Chapter 6: The endpoint-marking value of *hasta*

This chapter presents the results and discussion of the processing data obtained for the pragmatically plausible vs. implausible utterances. The analysis of IV C – *Degree of pragmatic plausibility* examines whether utterances with a different degree of pragmatic plausibility concerning a context trigger different processing paths to integrate the congruent or incongruent information. The pragmatic incongruency arises when the assumption communicated by the conceptual and procedural elements is incompatible with our world knowledge in the given context.

In addition to this, IV C also investigates whether the processing of plausible and implausible information triggers different cognitive effort to integrate the new assumption into the CG. In this respect, previous studies have proved that the processing of pragmatic implausibility is a demanding activity since, from a cognitive perspective, implausible utterances are more complex than plausible utterances (§ 1.2).

In plausible utterances, the communicated assumption is adaptable to the CG. The new assumption that the readers derive from the linguistic input matches with their beliefs, and the new information just confirms what is already entertained by them. In this condition, the FO *hasta* triggers a contrastive inferential path to modify, enrich or confirm the initial assumption during the reanalysis. On the contrary, in implausible utterances the new information contradicts the mind-stored assumptions and is less adaptable to the context and CG. In this condition, the FO triggers a different processing pattern to accommodate the new conflicting information. Guided by the principle of relevance, the reader tries to accommodate the incongruous information to save the communication. The accommodation process involves the reconsideration of the existing mental assumptions and readjusting them to correct the initially built assumption or creating a new *ad hoc* one. These operations demand more cognitive effort and, for this reason, accommodation is assumed to happen with higher processing effort for implausible utterances and at later stages of processing.

The IV A – Size of the alternative set explores whether the more or less availability of incongruous lexical information has an effect on the processing effort. Utterances with implicit alternative are assumed to generate less effort, while utterances with explicit alternative (simple or complex) are subjected to an increased processing effort because the readers have more conflicting information to accommodate. Furthermore, the lexical

concatenation can become the first sign of plausibility and activate the accommodation earlier than in the other conditions.

6.1 Degree of pragmatic plausibility (IV C)

6.1.1 Utterances with simple alternative

Conditions		
(a2b2)	plausible utterance	*Alba y Lucas tienen coches y hasta yates.* 'Alba and Lucas have cars and even yachts.'
(a2c1)	implausible utterance	*#Alba y Lucas tienen yates y hasta coches.* #'Alba and Lucas have yachts and even cars.'

The FO *hasta* imposes in both conditions the processing of a pragmatic scale between the conceptual elements. In condition (a2b2), the scalar implicature is in line with one's world knowledge and the assumption is easily interpretable in the context. In condition (a2c1), the conceptual elements are organized in such a way that the FO triggers a pragmatic scale that becomes implausible in the context at hand. However, the rigidity of the procedural meaning forces the readers to readjust the conceptual information to satisfy the instruction and the readers can carry out a repair strategy to accommodate the conflicting information. This accommodation process is assumed to generate high levels of processing effort. Furthermore, according to the degree of pragmatic plausibility of the utterances, two different processing paths are expected in order to accommodate information that is consistent and inconsistent with the CG.

Global level

Total reading time reveals that the processing of the conceptual content does not show differences between conditions (321.76 msec vs. 314.77 msec, -2.17%, trivial effects, Table 43).[105] The readers seem to integrate congruent or incongruent new information with analogous effort. However, it does not mean that both structures have the same processing path, as any possible differences that might have arisen at early or late stages of the processing could have been compensated and not be perceptible at the global utterance level.

[105] Nor are there any differences at the utterance mean, and both conditions trigger almost identical global processing times (320.18 msec vs. 319.71 msec, -0.15%, trivial effects).

TRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	321.76	314.77	-6.99	-2.17%	trivial

Table 43. Comparison of conceptual means – simple alternative (TRT)

During the construction of the first assumption, no major differences are found between conditions for the conceptual mean either (212.03 msec vs. 216.51 msec, 2.11%, trivial effects, Table 44).[106]

FPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	212.03	216.51	4.48	2.11%	trivial

Table 44. Comparison of conceptual means – simple alternative (FPRT)

A possible explanation for the lack of differences may lie in the time course of when the readers detect the anomaly. The incongruence is identified when the focus information must be processed according to the instruction. Hence, any additional effort caused by accommodating the conflicting information will be visible during the revision of the first assumption.

The SPRT reports meaningful differences between conditions. The conceptual mean shows a great decrease in the reading values for the implausible utterance (109.83 msec vs. 98.34 msec, -10.46%, large effects, Table 45).[107]

SPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	109.83	98.34	-11.49	-10.46%	large

Table 45. Comparison of conceptual means – simple alternative (SPRT)

The reanalysis data reveal that the degree of pragmatic plausibility of the utterance generates different processing costs. After detecting the conflict in the implausible utterance, the readers are compelled by the rigidity of the procedural meaning to accommodate the incongruous information, but the accommodation that the readers seem to start does not generate the high processing costs that were expected. This finding

[106] Neither for the average processing word (209.91 msec vs. 215.51 msec, 2.67%, trivial effects).

[107] In contrast to previous parameters (TRT and FPRT), the utterance mean reports reanalysis differences between conditions (110.80 msec vs. 104.70 msec, -5.51%, medium-small effects). Contrary to what was expected, the implausible condition does not generate more effort. The lower values might suggest a disruption of the utterance processing.

contradicts previous experimental results of pragmatic implausibility since an accommodation process is generally related to greater cognitive effort (Filik et al. 2009; Nadal 2019; Cruz 2020). Based on the results of our data, we can consider a relevant finding for implausible *hasta*-utterances: the minimal effort for the implausible condition could be due to a breakdown of the utterance processing.

Even though the global comparison does not allow us to confirm a successful accommodation, it does show that the plausible and implausible utterances follow two different internal processing paths – at least during the reconsideration of the initial assumption – since the readers expend a different amount of cognitive effort to process plausible utterance and implausible.

Local level

The TRT reveals that the procedural element in both conditions triggers the highest processing effort within the corresponding host utterance. Further, the FO area does not present major differences between conditions (418.87 msec vs. 428.28 msec, 2.25%, trivial effects, Table 46). The other focusing areas display the most notable differences: the implausible alternative is 12.63% more effortful to process than the plausible one (290.31 msec vs. 326.97 msec, large effects, Table 46), while the implausible focus needs far less effort than the plausible one (339.80 msec vs. 266.64 msec, -21.53%, very large effects, Table 46).

TRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
alternative	290.31	326.97	36.66	12.63%	large
FO	418.87	428.28	9.41	2.25%	trivial
focus	339.80	266.64	-73.16	-21.53%	very large

Table 46. Comparison of AOIs – simple alternative (TRT)

The dissimilar distribution of the global effort across the AOIs reflects that the procedural instruction causes different processing paths when it interacts with conceptual information that is compatible or incompatible with the reader's mental beliefs. If the assumption is plausible, the FO guides the inferential process, thus, regulating the interpretative effort of the other focusing areas (§ 5.1.). In the implausible condition, the FO exerts two different effects upon the conceptual elements: quick processing of the focus and effortful processing of the alternative. The little effort for the implausible

focus can be a consequence of the absolute nature of *hasta* since the endpoint-marking value of this FO largely determines the kind of focus that can be under its scope in relation to a particular context. Upon detecting the conflict in the focus area, the readers dwell at the alternative to reevaluate it in an attempt to accommodate the incongruous information and build a scale between alternative and focus.

These findings corroborate that the FO activates two different processing paths to integrate plausible and implausible information since the cognitive effort that the conceptual elements under the scope of the instruction require is not identical between conditions. However, the claim that the accommodation of implausible information is cognitively more demanding can only be verified at a local level for the area of the alternative. Still, the major effort required by the implausible alternative is offset by the lower effort of the implausible focus so that the local cognitive differences are not observed at the global utterance level (Table 43).

The differences between the processing paths observed for the global processing begin to occur already during the FPRT (Table 47). During the construction of the first assumption, the conceptual areas present a similar behaviour to that observed during the TRT. In the implausible condition, whereas the alternative demands higher processing than in the opposite condition (198.82 msec vs. 219.17 msec, 10.24%, large effects, Table 47), the focus triggers lower reading values (234.54 msec vs. 212.12 msec, -9.56%, large effects, Table 47). The FO is the element with the most processing effort in each utterance. This area reports medium-small differences between conditions, being the procedural instruction in the implausible utterance 5.70% more difficult to process (273.92 msec vs. 289.54 msec, medium-small effects, Table 47).[108]

[108] This effect can be related to the parafoveal processing of the alternative. With the given context, the readers may identify the alternative in the implausible condition as the first sign of the pragmatic implausibility and this overstrain of the alternative can affect the processing of the FO. Indeed, in utterances with simple and complex alternative, the alternative presents effects between conditions. In utterances with simple alternative, the alternative in the implausible condition is 10.24% more difficult to process than the same area in the plausible condition (198.82 msec vs. 219.17 msec, large effects, Table 47). In utterances with complex alternative, the alternative in the implausible condition is 8.23% more demanding than the alternative in the plausible condition (172.44 msec vs. 186.63 msec, medium-large effect, Table **Error! Main Document Only.**). Nevertheless, in utterances with implicit alternative (see § 6.1.3), the FO does not present any difference between conditions during the FPRT (248.90 msec vs. 246.01 msec, 1.16%, trivial effects, Table 59**Error! Main Document Only.**). In all conditions, the reading values of the implausible focus reflect quick processing in comparison to the plausible focus. Given that the FO presents noteworthy effects only with explicit alternative and the focus presents the same behaviour even if there is no alternative, the additional costs of FO in the implausible condition may be due to the processing of the alternative.

FPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
alternative	198.82	219.17	20.35	10.24%	large
FO	273.92	289.54	15.62	5.70%	medium-small
focus	234.54	212.12	-22.42	-9.56%	medium-large

Table 47. Comparison of AOIs – simple alternative (FPRT)

The pragmatic implausibility has early effects on utterance processing. The procedural instruction is the axis during the utterance processing in both conditions, as the high reading values for this area bring to light. In both cases, the presence of *hasta* affects immediately its scope, but with two different effects. The analysis of IV B has proved that the presence of a procedural instruction has a positive acceleration effect upon the marked focus in comparison to an unmarked focus (see § 5.1). However, for the analysis of IV C, we argue that the lower effort for the implausible focus is a sign of an abandonment effect. The absolute nature of *hasta* highly restricts the range of possible focus and the detection of the pragmatic mismatch causes an early processing disruption of the focused element to start an accommodation attempt.

We can consider another relevant finding based on the data for the alternative. Although the utterances have an SVO structure, and the value of the alternative is activated after processing the instruction, there are already important differences in this area during the first reading. The great effort could be due to a "semantic abnormality", i.e., the occurrence of such alternative is unusual in the given context (Dimitrova et al. 2009; Pan et al. 2001). Likewise, the early identification of the pragmatic conflict at the alternative extends to the instruction. In this way, relating the alternative information to the procedural information causes that the FO is also more demanding in the implausible condition during the initial reading (see footnote 108).

In the reanalysis, the differences become even more acute. The alternative in the implausible condition stills demands more processing than in the plausible condition (91.96 msec vs. 108.27 msec, 17.74%, large effects, Table 48), and the implausible focus triggers far less effort than the plausible focus (105.75 msec vs. 54.99 msec, 48%, very large effects, Table 48). From all AOIs, the FO continues to be the area with the minor differences between conditions (145.66 msec vs. 139.43 msec, -4.28%, trivial effects, Table 48), which is a sign that the readers try to accommodate the information from the conceptual elements.

SPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
alternative	91.96	108.27	16.31	17.74%	large
FO	145.66	139.43	-6.23	-4.28%	small
focus	105.75	54.99	-50.76	-48%	very large

Table 48. Comparison of AOIs – simple alternative (SPRT)

During the SPRT, the readers reevaluate the initial assumption for its confirmation, modification, or cancellation. However, the high effort expected for possible accommodation of the incongruous information is not visible in the focus. The end-of-scale interpretation of *hasta* seems to hamper the accommodation of this element and causes a reevaluation of the alternative in an attempt to accommodate this lexical element to the instruction.

Based on the data, it can be concluded that the FO *hasta* interacts with the conceptual information in two different ways according to the degree of pragmatic plausibility of the communicated assumption. If the assumption is adaptable to the context for being consistent with the reader's world knowledge, the reanalysis aims at reconsidering the conceptual elements and confirming the assumption. If the assumption is barely adaptable, the rigid semantics of the FO *hasta* initiates an early accommodation to readjust the conceptual elements during the reanalysis and satisfy the scalar instruction. The accommodation attempt is done with a local overstrain of the alternative. However, the absolute nature of *hasta* hinders the integration of the conflicting new information and there is an abandonment effect for the focus, as the constant lower reading values reflect. Nevertheless, the lack of differences at the global processing cannot be considered a reflection of successful accommodation. The major processing costs of the implausible alternative are offset with the lower processing costs of the implausible focus so that the additional local effort is not visible at the utterance level across conditions (see Table 43).

6.1.2 Utterances with complex alternative

Conditions		
(a3b2)	plausible utterance	*Alba y Lucas tienen coches, motos y hasta yates.* 'Alba and Lucas have cars, motorbikes and even yachts.'
(a3c1)	implausible utterance	*#Alba y Lucas tienen yates, motos y hasta coches.* #'Alba and Lucas have yachts, motorbikes and even cars.'

Different processing paths are also expected between these conditions according to the degree of plausibility of the utterance. In the plausible condition (a3b2), the procedural and conceptual meaning will act as guidance easing the recovery of the assumption. In the implausible condition (a3c1), the FO is expected to activate a similar processing path as in utterances with simple alternative to accommodate the clashing information. The accommodation attempt will involve the processing disruption of the focus and an extensive reanalysis of the alternative. However, these effects will be visible only locally. The size of the alternative set will make the reanalysis of this area even more demanding as in utterances with simple alternative.

Global level

The TRT yields similar results as those observed in the processing of utterances with simple alternative, and the conceptual mean between conditions does not present appreciable differences (313.52 msec vs. 310.02 msec, -1.12%, trivial effects, Table 49).[109]

TRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	313.52	310.02	-3.50	-1.12%	trivial

Table 49. Comparison of conceptual means – complex alternative (TRT)

The additional conceptual information provided by the complex alternative does not seem to generate more effort in accommodating the implausible utterance. However, as it happened in the previous model (§ 6.1.1), the trivial differences at the global utterance level do not mean that the same processing path is followed to process and integrate congruous and incongruous information, and much less that no accommodation attempt entails a greater processing effort for any of the conceptual elements.

[109] The utterance level does not repot differences (312.07 msec vs. 314.08 msec, 0.64%, trivial effects).

The reading values during the construction of the first assumption reveal a slight difference between conditions in contrast to the TRT since the conceptual meaning is slightly easier to process in the implausible utterance (206.70 msec vs. 197.12 msec, -4.63%, small effects, Table 50).[110]

FPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	206.70	197.12	-9.58	-4.63%	small

Table 50. Comparison of conceptual means – complex alternative (FPRT)

Since the conceptual mean reflects the impact of the FO over the conceptual elements, the differences in this area are the first effect of the inclusion of more lexical information that is not easily adaptable to the context. Considering the early disruption of the focus processing in utterances with simple alternative, the complex alternative might cause even an earlier interruption of the focus in this condition. Particularly, the additional conflicting information included in the lexical concatenation itself could make the scalar contrastive relation between the lexical elements more difficult to build than in utterances with a single alternative. Consequently, such difficulty could speed up the abandonment of the implausible focus. In any case, these differences in the FPRT are not passed to the global processing, where both utterances trigger a very similar level of effort (see Table 49).

The SPRT reveals that any attempt to accommodate the inconsistent information is tied to higher effort during the reanalysis in utterances with complex alternative (106.80 msec vs. 112.90 msec, 5.71%, medium-small effects, Table 51).[111]

SPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	106.80	112.90	6.10	5.71%	medium-small

Table 51. Comparison of conceptual means – complex alternative (SPRT)

Both the data from the first reading and the rereadings reflect two different processing paths to try to accommodate a plausible and implausible assumption and fulfil the scalar instruction. In the plausible condition, the co-occurrence of procedural and conceptual

[110] Utterance mean shows the same pattern as in the TRT, and only trivial effects are found (209.60 msec vs. 206.83 msec, -1.32%, trivial effects).
[111] Utterance mean of the implausible condition shows a small increment in the reading times in comparison to the plausible condition (102.56 msec vs. 107.35 msec, 4.67%, small effects).

guidance – *hasta* and the complex alternative, respectively – facilitates the processing and integration of information that is adaptable to our mental assumptions (see § 5.1.2). In the implausible condition, the readers now have more lexical elements to reevaluate according to the instruction, which slows down the reanalysis and makes the accommodation attempt more demanding. Anyhow, the greater effort in the reanalysis is not detectable when comparing the global processing of both conditions.

Local level

The global values for each AOI confirm the existence of different processing patterns according to the degree of plausibility of the utterance. The FO is the element that requires the longest time within each utterance and the area with the smallest effect between conditions (360.84 msec vs. 374.38 msec, 3.75%, trivial effects, Table 52). As it also happened in utterances with simple alternative, the implausible focus requires less time than the plausible focus (307.12 msec vs. 243.27 msec, -20.79%, very large effects, Table 52), whereas the alternative in the implausible condition results as more complicated to process than in the plausible condition (290.49 msec vs. 315.60 msec, 8.65%, medium-large effects, Table 52).

TRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
alternative	290.49	315.60	25.11	8.65%	medium-large
FO	360.84	374.38	13.54	3.75%	trivial
focus	307.12	243.27	-63.85	-20.79%	very large

Table 52. Comparison of AOIs – complex alternative (TRT)

The analysis of the data for utterances with complex alternative supports the findings for utterances with simple alternative. The FO is the centrepiece for the information retrieval during the processing of both utterances, but it exerts a different effect upon the conceptual elements depending on the degree of plausibility of the assumption being communicated. When the pragmatic scale triggered by the FO is in line with the mind-stored assumptions of the readers, the FO has the role of information manager and regulates the processing effort of the alternative and focus during the whole comprehension, as the IV B has proved. When the assumption clashes with the reader's world knowledge, the absolute nature of *hasta* hampers the accommodation process so that the implausible focus undergoes an abandonment effect during processing. Even

though the complex alternative involves more conflicting information to readjust, the additional reanalysis effort is not reflected at the conceptual mean in the utterance level due to the lower reading time triggered by the focused element (see Table 49).

The first-reading pass reflects a processing path similar to the one described for the TRT. In each utterance, the FO needs the most considerable effort during the construction of the first assumption, and differences between conditions do not present important effects (276.07 msec vs. 289.78 msec, 4.97%, small effects, Table 53). The alternative in the implausible utterance demands higher values than in the plausible one (172.44 msec vs. 186.63 msec, 8.23%, medium-large effects, Table 53), and the focus area reports considerable effects, being the implausible focus much less demanding (245.67 msec vs. 197.18 msec, -19.74%, large effects, Table 53).

FPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
alternative	172.44	186.63	14.19	8.23%	medium-large
FO	276.07	289.78	13.71	4.97%	small
focus	245.67	197.18	-48.49	-19.74%	large

Table 53. Comparison of AOIs – complex alternative (FPRT)

The differences found in the alternative area indicate that the lexical concatenation may be the first pragmatic inconsistency that the readers detect during the construction of the first assumption. Further, when the readers must relate the lexical concatenation with the focus following the scalar instruction, the difficulty in integrating the focus into an extended set of alternatives contributes to a quick processing disruption of the focused element to start the accommodation of the information.[112]

The reanalysis data confirms that plausible and implausible utterances with complex alternative are processed following two different cognitive paths (Table 54). The FO presents almost no differences between conditions (85.47 msec vs. 85.32 msec, -0.18%, trivial effects, Table 54), while the alternative and focus areas report considerable effects. The implausible focus demands less effort than the plausible one (61.93 msec vs.

[112] This affirmation can be reinforced if we examine and compare the processing values between the foci during the FPRT in the condition with simple alternative and complex alternative. In utterances with simple alternative, the implausible focus triggers 9.56 % less time than the plausible one (234.54 msec vs. 212.12 msec, medium large effect, Table 47). In utterances with complex alternative, the implausible focus triggers 19.74% less processing time than the plausible focus (245.67 msec vs. 197.18 msec, large effect, Table 53).

46.60 msec, -24.75%, very large effects, Table 54), and the complex alternative in the implausible utterance needs 9.31% more reanalysis time than in the opposite condition (118.40 msec vs. 129.42 msec, medium-large effects, Table 54).

SPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
alternative	118.40	129.42	11.02	9.31%	medium-large
FO	85.47	85.32	-0.15	-0.18%	trivial
focus	61.93	46.60	-15.33	-24.75%	very large

Table 54. Comparison of AOIs – complex alternative (SPRT)

During the reanalysis of both utterances, the readers increase their attention to the alternative to review the initial assumption. The complex alternative now plays a major role in the reanalysis than in utterances with simple alternative since it is the area with the higher reading times of host utterance. In the implausible condition, the accommodation attempt is characterised by a cognitively demanding reevaluation of the alternative, while the endpoint interpretation of *hasta* hinders the accommodation of the conflicting focus and causes it to have lower processing effort than the plausible one.

The findings obtained from utterances with complex alternative are consistent with those of the utterances with simple alternative and back up our claims. Firstly, the presence of the FO *hasta* triggers different processing paths according to the degree of pragmatic plausibility of the utterance since the processing patterns are associated with different loads and allocation of the cognitive effort. However, the lack of differences at the utterance level between conditions should not be interpreted as the result of a successful accommodation of the implausible assumption. The local analysis and the results of the comprehension test (see § 6.2) indicate that the absolute nature of *hasta* hampers the accommodation of the conflicting information, which leads to a breakdown processing of the utterance and, consequently, the cancellation of the communicated assumption.

The accommodation failure is reflected by the constant lower effort for implausible utterances. Experimental previous studies on pragmatic mismatches caused by procedural elements showed that the processing of implausible information is tied to higher reading times at a global and/or local level (Filik et al. 2009; Loureda et al. 2016, 2021; Nadal 2019; Nadal & Recio 2019). For accommodation to happen, the reader needs to access the mind-stored assumptions and readjust them according to the procedural information or, if necessary, to create a new one. These operations require

more cognitive effort than simply accessing and confirming mental assumptions. The lack of such cognitive overstraining in the measurement parameters in our study indicates an unconcluded accommodation. Secondly, the pragmatic implausibility has early effects. In this condition, the set of alternatives becomes the first trigger of the pragmatic anomaly during the construction of the initial assumption and the early detection accelerates the abandonment of the implausible focus during the first reading even more.

6.1.3 Utterances with implicit alternative

Conditions		
(a1b2)	plausible utterance	*Alba y Lucas tienen hasta yates.* 'Alba and Lucas have even yachts.'
(a1c1)	implausible utterance	*#Alba y Lucas tienen hasta coches.* #'Alba and Lucas have even cars.'

This model includes the conditions with implicit alternative. From a semantic point of view, these utterances are more underdetermined in comparison to utterances with explicit alternative (simple or complex). As happened in utterances with explicit alternative, here two different processing patterns are also expected according to the degree of plausibility of the utterance. However, differences from previous conditions are also expected. The accommodation attempt was aimed at reconsidering the alternative in utterances with explicit alternative. Since there is no alternative here, the FO is assumed to be the element to which readers turn to resolve the conflict. Therefore, this area will register a greater processing effort. Furthermore, the absence of alternatives might facilitate the accommodation of the assumption, since the readers do not have an explicit set of alternatives to reevaluate and integrate the focus into. A possible successful accommodation could be reflected in longer reading times for the implausible utterance than for the plausible one.

Global level

The TRT reports considerable differences between conceptual means, triggering the conceptual information in the implausible condition less processing effort (339.14 msec vs. 298.51 msec, -11.98%, large effects, Table 55).

TRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	339.14	298.51	-40.63	-11.98%	large

Table 55. Comparison of conceptual means – implicit alternative (TRT)

This finding is in line with the local analysis of utterances with explicit alternative. Outcomes of utterances with explicit alternative have shown that implausible utterances undergo a processing disruption of the focus and an intense reanalysis of the alternative at a local level. However, such differences are not visible at the global utterance level because they are balanced out during the entire reading (see Table 43, Table 49). Since the conceptual mean reflects the direct impact of the FO upon the conceptual content (here only the focus), the absence of alternatives in the utterance accounts for these large differences.

The processing costs registered for the construction of the first assumption display the same tendency as in global processing (Table 56). The conceptual information in the implausible condition demands less effort than in the plausible condition (220.09 msec vs. 193.07 msec, -12.28%, large effects, Table 56). This apparent great effort would only be the result of the processing disruption of the implausible focus already seen in the previous conditions (see §§ 6.1.1, 6.1.2).

FPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	220.09	193.07	-27.02	-12.28%	large

Table 56. Comparison of conceptual means – implicit alternative (FPRT)

The reanalysis data confirms the processing disruption that the implausible utterances go through across the measure parameters: the conceptual mean in the implausible utterance demands less processing time than in the plausible utterance (119.67 msec vs. 105.64 msec, -11.72%, large effects, Table 57).

SPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
conceptual mean	119.67	105.64	-14.03	-11.72%	large

Table 57. Comparison of conceptual means – implicit alternative (SPRT)

The assumption communicated by the implausible utterance is not easily adaptable to the CG because of the end-of-scale interpretation that *hasta* imposes. The detection of the anomaly during the construction of the initial assumption activates an immediate reanalysis to accommodate the new conflicting information. However, since the readers have no explicit alternatives to reevaluate, there is even an earlier abandonment of the focus as the low processing times for the implausible condition reveals.

Local level

The comparison of the AOIs in the TRT confirms that the processing of plausible and implausible utterances follows different paths (Table 58). The FO triggers the longest reading times within utterance and does not show substantial effects between conditions (402.27 msec vs. 389.55 msec, -3.16%, trivial effects, Table 58). Conversely, the implausible focus results much less demanding than the plausible focus (333.93 msec vs. 261.78 msec, -21.61%, very large effects, Table 58).

TRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
FO	402.27	389.55	-12.72	-3.16%	trivial
focus	333.93	261.78	-72.15	-21.61%	very large

Table 58. Comparison of AOIs – implicit alternative (TRT)

The FO *hasta* registers the highest reading times within each utterance as it is the element that triggers the focusing operation and guides the processing in each condition. Furthermore, when the FO evokes a scalar implicature that is not easily adaptable to the context, the readers resort to the procedural instruction in utterances without an alternative to resolve the conflict. The lower reading values of the implausible focus continue to confirm the abandonment effect of this element in the implausible utterance.

During the construction of the first assumption, the FO stands again as the area with the longer reading times in each utterance and with trivial differences between conditions (248.90 msec vs. 246.01 msec, -1.16%, trivial effects Table 59). Again, the implausible focus triggers much less processing effort than the plausible focus (244.32 msec vs. 187.16 msec, -23.40%, very large effects, Table 59).

FPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
FO	248.90	246.01	-2.89	-1.16%	trivial
focus	244.32	187.16	-57.16	-23.40%	very large

Table 59. Comparison of AOIs – implicit alternative (FPRT)

The FO have different effects upon the conceptual content based on the degree of pragmatic plausibility of the utterance. In utterances without a pragmatic conflict, the FO *hasta* holds the role of information manager and regulates the processing effort of the focus during the construction of the first assumption (see § 5.1.3). In utterances with a pragmatic conflict, the absolute nature of *hasta* causes an early processing disruption of the conflicting focus to initiate a reconsideration of the initial assumption.

The reanalysis data validates the unleashing of two processing paths to integrate plausible or implausible information (Table 60). The FO has the longest values within the utterance and reports medium-small effects between conditions, being the FO in the implausible condition less demanding (154.07 msec vs. 144.28 msec, -6.35%, medium-small effects, Table 60). Likewise, the implausible focus needs 17.63% less time than the plausible focus (91.23 msec vs. 75.15 msec, -17.63%, large effects, Table 60).

SPRT	plausible utterance	implausible utterance	diff (msec)	diff (%)	effect size
FO	154.07	144.28	-9.79	-6.35%	medium-small
focus	91.23	75.15	-16.08	-17.63%	large

Table 60. Comparison of AOIs – implicit alternative (SPRT)

As there is no explicit alternative to reevaluate in an attempt to accommodate the incongruous information, the FO is the area that the readers dwell on to resolve the conflict during the revision of the initial assumption. However, the endpoint-marking of *hasta* hinders any possible accommodation and, in the absence of alternatives to reconsider, the cancellation of the communicated assumption occurs earlier as in the previous conditions. This is verified by the major differences of the conceptual mean

during the reanalysis and the differences triggered by the FOs in comparison to utterances with explicit alternative (see Table 48, 54).[113]

The findings of utterances with implicit alternative reinforce the claims presented previously. Firstly, the procedural instruction triggers different processing paths according to the degree of plausibility of the communicated assumption. When the readers detect a mismatch between the instruction and the contextual information, they initiate an accommodation attempt to meet the requirements of the procedural element. This repair mechanism is aimed at reconsidering the explicit alternative while the focus undergoes an abandonment effect driven by the absolute nature of *hasta*. With no explicit alternative to reconsider, there is an earlier breakdown processing of the utterance. Secondly, the pragmatic implausibility is detected early, during the construction of the first assumption, where the implausible focus becomes the first trigger of the conflict.

6.1.4 Pragmatic plausibility – Overview

The six conditions were simultaneously tested in a further model. This model allows us to compare the different processing paths for utterances with and without a pragmatic conflict between the scalar instruction and the readers' mental assumptions.

In plausible utterances, the FO *hasta* guides the utterance processing and controls the cognitive effort needed during the construction and revision of the communicated assumption. This regulatory effect has been proven in IV B (see Chapter 5). In implausible utterances, the FO triggers an accommodation process to integrate the conflicting information. However, the endpoint interpretation of *hasta* hampers the accommodation and leads to a processing breakdown of the utterance and the cancellation of the incongruous assumption. The constantly low processing times, at a global and local level, for the implausible condition support this claim. The outcomes of the present model are expected to confirm the above results and implausible utterances will show lower reading times in comparison to their analogous plausible utterances.

[113] Across all models the conceptual and utterance mean show considerable differences between conditions, triggering the implausible condition in less processing time. However, the conceptual mean in the SPRT for utterances with implicit alternative is where the differences are the greatest (implicit alternative -11.72%, simple alternative -10.46%, complex alternative -5.71%). Also, the differences between FOs increase in the condition with implicit alternative, where the FO in the implausible condition registers always less effort (implicit alternative -6.35%, simple alternative -4.28%, complex alternative -0.18%).

Table 61 gathers the conceptual mean for every condition. The plausible utterance with implicit alternative registers the highest times (339.14 msec). Besides that, this condition triggers from medium-small to large effects (5.40% - 13.61%) in comparison to the rest. As the least demanding utterances, we find the implausible utterance with implicit alternative (298.51 msec) and with complex alternative (310.02). Both cases show no major differences when compared to each other (3.71%).

plausible, implicit	**339.14**					
plausible, simple	5.12%	**321.76**				
implausible, simple	7.19%	2.17%	**314.77**			
plausible, complex	7.55%	2.56%	0.40%	**313.52**		
implausible, complex	8.59%	3.65%	1.51%	1.12%	**310.02**	
implausible, implicit	11.98%	7.23%	5.17%	4.79%	3.71%	**298.51**
	plausible, implicit	**plausible, simple**	**implausible, simple**	**plausible, complex**	**implausible, complex**	**implausible, implicit**

Table 61. Differences across plausible and implausible utterances (TRT)

Data shows that implausible utterances always need less processing time than their corresponding plausible counterpart does. Furthermore, the additional lexical information provided by the complex alternative that the readers must reevaluate does not increase the processing effort of the implausible utterances. In this regard, the implausible utterances with complex alternative and with implicit alternative are just as demanding to process. By comparing the pairs of plausible and implausible conditions, the data can support the finding that implausible utterances undergo a processing disruption, and no accommodation process takes place (Table 62).

Condition	**Set of the alternatives**		
	implicit	*simple*	*complex*
plausible	**339.14**	**321.76**	**313.52**
implausible	298.51	314.77	310.02
difference	-11.98%	-2.17%	-1.12%

Table 62. Conceptual mean between plausible and implausible utterances (TRT)

In no case, the implausible utterances demand more processing effort than their corresponding plausible utterances. The absolute nature of *hasta* makes it difficult to accommodate the incongruous information, the conflict is not resolved, and the utterance processing is stopped because it does not generate sufficient positive cognitive effects.

The differences in the overall comparison allow the creation of a processing scale along which the conditions are arranged in decreasing order according to the cognitive effort that each utterance demands (Figure 9). The utterances are grouped into three main groups. To define the groups, the range from small to large effects was taken as a benchmark as far as possible. In the same group, the utterances do not show considerable differences in processing times (<3.99%).[114]

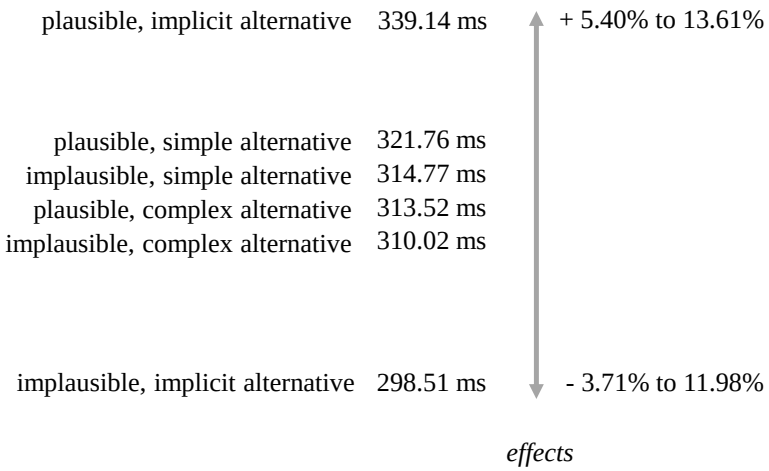

Figure 9. Processing scale of plausible and implausible utterances (TRT)

Utterances with implicit alternative are at the extremes of the scale. The plausible utterance shows the highest values due to its linguistic underdeterminacy. The complete interpretation of this utterance is achieved through a pragmatic enrichment that entails a great deal of cognitive effort, which is reflected in the high reading times. On the other hand, the implausible utterance reflects the processing breakdown of the utterance we have argued so far. When the alternative is explicit, the accommodation attempt aims at reconsidering this element. Without an explicit alternative, the slower times of the implausible focus – resulting from the abandonment effect – are not offset and the implicit utterance accumulates little processing time. The integration of the implausible information would suppose the modification of a well-established belief so that the readers do not complete the accommodation and abandon the communicated assumption.

During the construction of the first assumption, the reading values confirm that the pragmatic implausibility has an early impact on the processing (Table 63).

[114] The implausible utterance with implicit alternative is indeed at the threshold between the bottom and the intermediate group. The utterance is slightly harder to process than the implausible utterance with simple alternative (298.51 msec vs. 310.02 msec, 3.86%, trivial effects) and the plausible utterance with complex alternative (298.51 msec vs. 310.02 msec, 1.36% trivial effects). However, the utterance has been included in the intermediate group because the effects, with respect to the plausible utterance with complex alternative, are smaller (3.86% vs. 1.36%).

plausible, implicit	**220.09**					
implausible, simple	1.63%	**216.51**				
plausible, simple	3.66%	2.07%	**212.03**			
plausible, complex	6.08%	4.53%	2.51%	**206.70**		
implausible, complex	10.44%	8.96%	7.03%	4.63%	**197.12**	
implausible, implicit	12.28%	10.83%	8.94%	6.59%	2.05%	**193.07**
	plausible, implicit	**implausible, simple**	**plausible, simple**	**plausible, complex**	**implausible, complex**	**implausible, implicit**

Table 63. Differences across plausible and implausible utterances (FPRT)

We observe a similar classification as in the TRT: implausible utterances are processed in less or similar time than their plausible counterparts. Under the implausibility condition, the utterance with simple alternative (216.51 msec) requires more time than the utterances with complex or implicit alternative (197.12 msec; 193.07, respectively), which are placed at the bottom of the classification. The less effortful processing of the implausible utterances is better observed if we compare the pairs of plausible and implausible conditions (Table 64).

Condition	**Set of the alternatives**		
	implicit	*simple*	*complex*
plausible	**220.09**	212.03	**206.70**
implausible	193.07	**216.51**	197.12
difference	-12.28%	2.11%	-4.63%

Table 64. Conceptual mean between plausible and implausible utterances (FPRT)

The comparison demonstrates again that implausible conditions are not more demanding than plausible ones. Likewise, the presence of an explicit set of alternatives slows down the processing disruption of the implausible utterances. Hence, when there is no alternative, the effects between utterances are bigger than when utterances contain a simple or a complex alternative. During the reconsideration of the first assumption, the reading values manifest a sharp contrast between the most or the least demanding utterance and the rest of the conditions (Table 65).

plausible, implicit	**119.67**					
implausible, complex	5.66%	**112.90**				
plausible, simple	8.22%	2.72%	**109.83**			
plausible, complex	10.75%	5.40%	2.76%	**106.8**		
implausible, implicit	11.72%	6.43%	3.81%	1.09%	**105.64**	
implausible, simple	17.82%	12.90%	10.46%	7.92%	6.91%	**98.34**
	plausible, implicit	**implausible, complex**	**plausible, simple**	**plausible, complex**	**implausible, implicit**	**implausible, simple**

Table 65. Differences across plausible and implausible utterances (SPRT)

Implausible utterances generate less processing effort than their plausible counterparts. The high degree of linguistic underdeterminacy of the plausible utterance with implicit alternative makes it the more demanding utterance during the reanalysis. Furthermore, it triggers from medium-small to very large effects in comparison to the other utterances (6.00% - 21.69%). At the bottom of the classification are the implausible utterances with simple and implicit alternative, whose lower values confirm the abandonment effect. Of all the implausible utterances, the condition with complex alternative (112.90 msec) needs more reanalysis time. The reason lies in the fact that the readers have more amount of incongruous lexical information to try to accommodate during this late stage of processing.

A more detailed look at the pairs of conditions reveals that implausible utterances demand less reanalysis time than plausible utterances, but if the utterance contains a complex alternative, then the readers spend more time in trying to accommodate the conflicting information in comparison to the conditions with implicit alternative and simple alternative (Table 66).

Condition	**Set of the alternatives**		
	implicit	*simple*	*complex*
plausible	**119.67**	**109.83**	106.80
implausible	105.64	98.34	**112.90**
difference	-11.72%	-10.46%	12.90%

Table 66. Conceptual mean between plausible and implausible utterances (SPRT)

The data from the SPRT support two claims. Firstly, there is an abandonment effect underlying the processing of pragmatic implausibility caused by the absolute nature of the FO *hasta*. This abandonment effect is reflected by the constant lower effort of implausible utterances. Secondly, the explicitness of the alternative set is more relevant during the reanalysis. However, regardless of the properties of the alternative, the end-

of-scale interpretation of the FO hinders the accommodation process and the lower reading values for all implausible utterances reveal a processing disruption of the utterance. The outcomes of the comprehension test reveal that there is also cancellation of the incongruous assumption.

6.2 Comprehension test

In IV C, the rigidity of the procedural meaning of FOs is expected to force the readers to derive a scalar implicature regardless of the pragmatic implausibility between the instruction and the readers' mental assumptions concerning a given context. Therefore, we expect that the readers derive a scalar implicature for both plausible utterances (condition b2) and implausible utterances (condition c1), which will be reflected in homogeneous results.

Comprehension test I

Utterances with implicit alternative

(a1b2) *Alba y Lucas tienen hasta yates.*

(a1c1) *#Lucas a Alba tienen hasta coches.*

Según la frase, ¿tener yates/coches es menos esperable que tener otro tipo de vehículos?

	YES	**NO**	**NK**
(a1b2)	**90%**	7.22%	2.78%
(a1c1)	**81.11%**	10.56%	8.33%
The chi-square statistic is 6.9562. The p-value is .030866.			

Table 67. Answers for utterance with implicit alternative (test I)

Utterances with simple alternative

(a2b2) *Alba y Lucas tienen coches y hasta yates.*

(a2c1) *#Alba y Lucas tienen yates y hasta coches.*

Según la frase, ¿tener yates/coches es menos esperable que tener coches/yates?

	YES	**NO**	**NK**
(a2b2)	**89.44%**	7.78%	2.78%
(a2c1)	**80.55%**	15.56%	3.89%
The chi-square statistic is 5.8366. The p-value is .054025.			

Table 68. Answers for utterance with simple alternative (test I)

Utterances with complex alternative

(a3b2) *Alba y Lucas tienen coches, motos y hasta yates.*

(a3c1) *#Lucas a Alba tienen yates, motos y hasta coches.*

Según la frase, ¿tener yates/coches es menos esperable que tener los otros vehículos mencionados?

	YES	**NO**	**NK**
(a3b2)	**85%**	12.78%	2.22
(a3c1)	**73.89%**	21.67%	4.44
The chi-square statistic is 6.861. The p-value is .032371.			

Table 69. Answers for utterance with complex alternative (test I)

If participants are asked specifically towards the instruction of the FO in the utterance, most of them answered positively (*yes*-answer) in both conditions. The yes-rate is an indicator that the procedural instruction leads to the scalar interpretation whether or not there is a mismatch between the instruction and the mental assumptions.

The outcomes verify the properties of the rigidity and asymmetry of the procedural meaning concerning the conceptual meaning. The rigidity of the procedural meaning imposes its condition to the utterance and the context and compels the readers to fulfil the instruction by adjusting the conceptual meaning to create an appropriate assumption (Escandell & Leonetti 2011; Curcó 2016; Escandell 2017). Nevertheless, the eye-tracking data had revealed that implausible utterances did not generate more processing effort than plausible utterances because of the accommodation process to satisfy the procedural instruction. We attributed these outcomes to the abandonment effect of the implausible focus and the corresponding cancellation of the assumption caused by the absolute nature of the Spanish FO *hasta*. However, the results from test I did not support this argument. We assumed that if participants are asked explicitly about the scalar instruction, they were aware of the comprehension task, and the results did not reflect if the readers accepted the implausible assumption during the reading task. For that reason, a second test was conducted.

Comprehension test II

In comprehension test II, the participants were reminded to select the answer considering the utterance to which the question refers. Nevertheless, they were not directly asked for the instruction of the FO.

Utterances with implicit alternative

(a1b2) *Alba y Lucas tienen hasta yates.*

(a1c1) *#Lucas a Alba tienen hasta coches.*

¿Tener yates/coches es menos esperable que tener otros vehículos

	YES	**NO**	**NK**
(a1b2)	62.78%	21.67%	15.56%
(a1c1)	47.78%	33.89%	18.33%
The chi-square statistic is 8.9132. The p-value is .011602.			

Table 70. Answers for utterance with implicit alternative (test II)

Utterances with simple alternative

(a2b2) *Alba y Lucas tienen coches y hasta yates.*

(a2c1) *#Alba y Lucas tienen yates y hasta coches.*

¿Tener yates/coches es menos esperable que tener otros vehículos?

	YES	**NO**	**NK**
(a2b2)	66.67%	20%	13.33%
(a2c1)	44.44%	41.11%	14.44%
The chi-square statistic is 21.2073. The p-value is .000025.			

Table 71. Answers for utterance with simple alternative (test II)

Utterances with complex alternative

(a3b2) *Alba y Lucas tienen coches, motos y hasta yates.*

(a3c1) *#Lucas a Alba tienen yates, motos y hasta coches.*

¿Tener yates/coches es menos esperable que tener otros vehículos?

	YES	**NO**	**NK**
(a3b2)	67.78%	23.89%	8.33%
(a3c1)	42.78%	46.67%	10.56%
The chi-square statistic is 23.8827. The p-value is .000001.			

Table 72. Answers for utterance with complex alternative (test II)

This second test yielded a wide variation in responses. If the communicated assumption is in line with our world knowledge, more participants derive the scalar implicature (62.78%, 66.67%, and 67.78%). If the assumption clashes with the mind-stored mental assumptions, then fewer participants infer the scalar implicature (47.78%, 44.44%, and 42.78%). The heterogeneity across responses reflects that if the question is not precisely oriented to evaluate the procedural instruction, the world beliefs of the participants have a stronger role in the utterance interpretation, and they do not always infer the intended implicature if the information contradicts the existing mental assumptions.

The eye-tracking data, along with the outcomes of comprehension test II, confirm that the FO *hasta* hinders the accommodation of the implausible focus in a non-supportive context. The accommodation attempt of such contradicting information generates an unbalanced effort-effect relation (very few positive cognitive effects in return of the amount for invested processing effort) so that the stimulus becomes less relevant, and the readers end up cancelling the assumption.

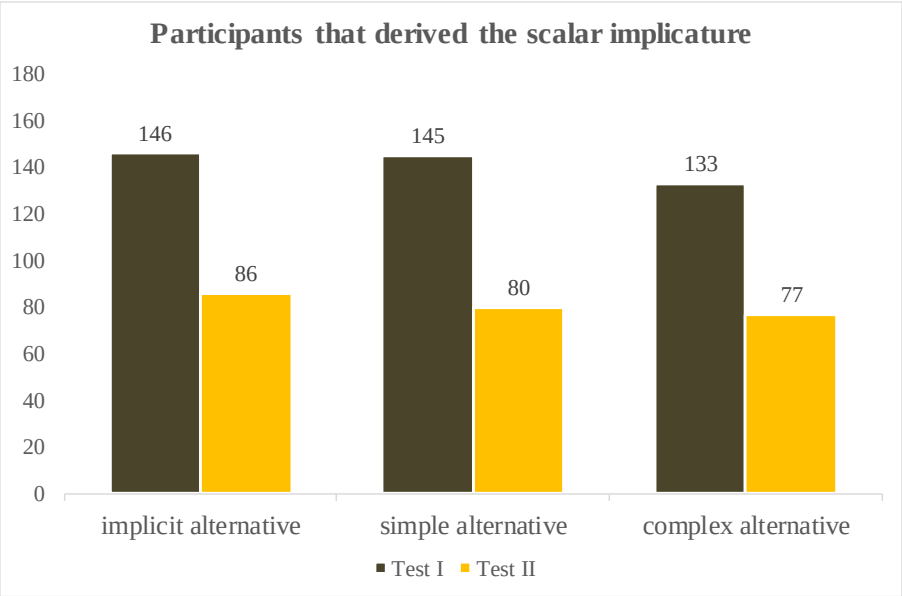

Figure 10. Comparison of yes-answers for the implausible utterance in both tests

6.3 Final discussion

The utterances analysed in IV C follow the same SVO structure and contain the FO *hasta* that compels the readers to build a pragmatic scale about a topic. The difference between the pair of conditions lies in the degree of pragmatic plausibility of each utterance. In plausible utterances (condition b2), the procedural instruction enforces the process of a pragmatic scale that is in line with our world knowledge and, thus, integrate an assumption adaptable to the CG. On the contrary, implausible utterances (condition c1) communicate an assumption that clashes with our world knowledge. The pragmatic mismatch between the procedural instruction and the CG requires the readers to reevaluate the conceptual elements in a scalar contrastive relation and modify an existing mental assumption or create a new *ad hoc* one to resolve the pragmatic conflict and satisfy the instruction of the FO.

The results of IV C – Degree of pragmatic plausibility had shown that plausible and implausible utterances in our study follow different processing paths to integrate the new information into the CG and recover the assumption both in conditions (**hypothesis IV C_2 confirmed**). Plausible and implausible utterances demand different levels of processing effort, and the required effort is distributed differently between the different areas of interest (alternative, FO and focus). However, experimental data does not support the claim that implausible utterances are more effortful than plausible utterances.

On the contrary, processing utterances with a pragmatic mismatch generates equal or less effort than processing utterances without the conflict (**hypothesis IV C_1 rejected**).

The two different cognitive patterns are visible at a local level during the construction of the first assumption and the reevaluation of this initial assumption. The FO is the centrepiece for information retrieval in both conditions. *Hasta* is the most demanding element in comparison to the other focusing areas, and the instruction does not show global differences at the utterance level in any model. This finding is theoretically consistent with the claim that the FO guides the inferential processing and compels the readers to readjust the conceptual elements to satisfy the instruction, thus influencing the cognitive effort demanded by the lexical elements. On the other hand, the endpoint interpretation of *hasta* raises specific expectations about the focus and highly constrains the element that can appear under its scope. For that reason, the detection of an implausible focus during the initial reading causes an early disruption processing of this area (*abandonment effect*) to start an accommodation process and modify the initial assumption or create a new *ad hoc* one.

The rigid semantics of the FO triggers an accommodation process to adapt the information and fulfil the instruction. The absolute nature of *hasta* entails two different reanalysis effects upon the conceptual elements.[115] Regarding the alternative, the mismatch causes an extensive reconsideration of this area (if it is explicit) in the pursuit to accommodate the new information. As for the focus, there is an abandonment effect across all parameters and regardless of the properties of the alternative (implicit, simple, or complex).

The construction of an assumption contradicting a well-established belief generates maximal inferential effort and minimum positive effects. Therefore, the accommodation does not take place and there is a processing breakdown without recovering the communicated assumption. Two findings support this idea. Firstly, the systematically lower reading times for the focus area across all parameters. Secondly, the similar TRT for both conditions – plausible and implausible – does not reflect an accomplished accommodation. Accommodation is a very cognitively demanding process. The readers need to revaluate the conceptual elements within a scalar contrastive relation following the procedural instruction and they also need to alter an existing assumption or create a new *ad hoc* assumption. These operations entails more effort than the confirmation of a

[115] The FO *incluso* has a relative semantic nature, and it triggers an accommodation process of the implausible assumption that results in more local and global processing effort (see Cruz 2020).

plausible assumption. Nevertheless, reading data in the total reading does not reveal particularly effortful processing for the implausible utterances.

The outcomes of IV A – Size of the alternative set reveals that the alternative is the first focusing area where the pragmatic inconsistency is detected, leading to a higher effort for this element during the construction of the assumption with incongruous information. The detection of the pragmatic inconsistency at the alternative also affects the processing of the FO. In utterances with explicit alternative (simple and complex), when the readers relate the information alternative with the procedural instruction, the pragmatic inconsistency is reaffirmed causing a major effort for the FO in the implausible condition. However, the increased local effort of the accommodation attempt is not observable at the global utterance level.

Considering the results from IV C, we argue that utterances with and without a pragmatic mismatch between a procedural element and the contextual assumptions follow two different processing paths. The existence of two different cognitive patterns is especially reflected by observing differences in the cognitive effort required by each area at the local level.

When the readers process a plausible utterance, they build and confirm an assumption that is adaptable to the CG. In this case, the FO acts as an inferential guide that regulates the processing effort demanded by each conceptual element involved in the focusing operation (see Chapter 5). When the readers process an implausible utterance, they are forced by the rigid instruction to initiate an accommodation process to meet the procedural rules. The accommodation aims at modifying the initial assumption, but the operation is highly restricted by the absolute nature of *hasta*. Therefore, the implausible focus undergoes an early abandonment during the whole reading in comparison to the plausible focus and the implausible alternative goes through a much further reanalysis concerning the same element in the plausible condition. However, the local higher processing effort associated with the accommodation attempt during the reanalysis is levelled out with the local lower processing effort of the implausible focus through the entire processing. Outcomes from IV C also show that the readers detect the pragmatic implausibility at an early stage of processing.

The results from comprehension test I and II (see § 6.2) show that if the participants are not specifically asked for the scalar instruction, they are more susceptible to answer based on their world knowledge if they find a contradiction between the instruction and their beliefs (**hypothesis IV C_3 rejected**). The findings of comprehension test I and II

support two claims. On the one hand, the results of test I support the rigidity and asymmetry of the procedural meaning (Leonetti & Escandell 2004; Escandell & Leonetti 2011). When the readers are asked specifically about the instruction, the responses are more homogeneous and prove that the readers derive a scalar implicature that collides with one's mental assumptions. On the other hand, test II reveals that not all elements with procedural meaning enable the accommodation with the same ease. The degree of adaptation of assumptions to the context and the inferential effort expended to adapt the new information can constrain the accommodation (Ahern & Leonetti 2004; Beaver & Zeevat 2007; Singh et al. 2016; Müller 2018).

Conclusion and prospects for further research

The role of information manager of *hasta*

The aim of IV B was to explore whether utterances with different information structures, unmarked and *hasta*-marked focusing structures, trigger different cognitive processing patterns and whether there is a correlation between the morphosyntactic, semantic and pragmatic properties of the FO *hasta* and the cognitive activity that its production and processing trigger in native Spanish speakers.

In the first place, the reading data gathered with the eye-tracking experiment has provided empirical evidence to prove that the processing of a marked utterance does not generate more global cognitive effort than the processing of an analogous unmarked utterance (**hypothesis IV B_1 confirmed**).

Utterances with unmarked and marked focus structures have different semantic and syntactic properties. The FO *hasta* imposes a particular information structure that is much more complex than the information structure underlying an unmarked utterance. The FO highlights an element of a paradigm as the most informative in a specific and accessible context and elicits the existence of alternatives that must be contrasted with the focused element (König 1991; Portolés 2007, 2010). Further, the absolute nature of *hasta* presents the focus as the ultimate value from a pragmatic scale in which all components are ranked in terms of likelihood (Schwenter 2002; Portolés 2007, 2010; Briz et al. 2008).

Although the introduction of the FO in an utterance implies the processing of more semantic content, this additional information does not lead to a major global cognitive effort in comparison to an analogous unmarked utterance. This additional information is given conventionally as procedural instructions that confer the FO a guiding role during utterance processing. Therefore, the presence of a procedural mark regulates the additional processing effort that the readers need to recover the scalar contrastive assumption communicated by the *hasta*-utterance. Since the FO articulates the information in the host utterance, it becomes the centrepiece for the information retrieval and requires more processing effort than the conceptual elements involved in the focusing operation (Loureda et al. 2014, 2015; Nadal et al. 2016; 2017; Cruz & Loureda 2019; Cruz 2020).

In an unmarked structure, however, the readers need to recover an additive assumption. The unmarked focus primarily indicates new information – identificational value – that must be integrated within the context to create the additive relation between the given information (alternative) and the new information (focus) according to a topic. While the FO is the axis for the information retrieval in a marked utterance, the results have shown that in an unmarked utterance the readers recover the assumption dwelling at the unmarked focus. Therefore, this element always triggers major global cognitive effort than a marked focus. The higher effort demanded by the unmarked focus and the FO in their respective utterances leads us to conclude that the additive relation in an unmarked utterance takes place at the focus area (conceptual pattern), whereas the procedural instruction is the element that activates the scalar contrastive relation in the marked utterance (procedural pattern).

We also argue that the FO acts as an information manager with the capacity of optimizing the processing effort demanded by the elements upon which it directly operates. This role is further strengthened if we compare the correlation processing between focus and alternative in both utterances. Due to its instructional nature, the FO facilitates the recovery of the scalar contrastive relation between the conceptual elements so that the processing effort between the alternative and the focus in the marked condition is more balanced than in the unmarked condition. Indeed, the establishment of the relation between the given and the new information in an unmarked structure is more demanding than when the relation is given conventionally (a 121% more effortful in utterances with simple alternative; and 333% in utterance with complex alternative).

The analysis of data collected also supports the finding that the inclusion of an FO in an utterance not only imposes a particular information structure, but it also activates a processing path to recover the assumption different from the processing path of an analogous utterance without an FO (**hypothesis IV B_2 confirmed**).

The alternative and focus are related to each other and can be informatively different. While in the unmarked structure these elements are informatively equal, the FO reassigns their informative values in the marked utterance so that the alternative and focus have a different informative value – having the focus more informativity than the alternative. The activation of the scalar contrastive relation by the FO automatically implies the existence of these two values. However, procedural instruction also facilitates the identification of the informative status of these elements.

On the one hand, the presence of *hasta* eases the processing of the focused element during the construction of the first assumption. This processing benefit is manifested as an immediate acceleration effect upon the marked focus so that a focus marked by an FO is less effort demanding than an unmarked focus.

The search for alternatives is activated after processing the FO. The rigid FO compels the readers to reevaluate, according to the scalar instruction, the functions assigned to this element during the construction of the initial assumption to confirm, enrich, or modify the initial assumption if needed. These operations are performed at late stages of processing and their effects are observable during the SPRT. Therefore, the role of the alternative is more salient in the reanalysis, during which the readers reconsider this informative value.

The reevaluation of the alternatives in a scalar contrastive relation is more complex than in an additive relation. Despite this, the reanalysis of this area in the marked utterance demands less or similar processing effort than in the unmarked utterance. While in the latter case, the purpose of the reevaluation is to check the linguistic underdeterminacy of the utterance from which the assumption has been created, the presence of the FO exerts a regulatory effect that levels out any additional effort caused by the contrastive relation between the alternative and focus triggered by the procedural instruction.

The properties of the alternative also determine the processing of the focusing structures. While a simple alternative slows down the integration of the new information into the CG, the complex alternative accelerates this process (**hypothesis IV A_1 confirmed**).

The conceptual enrichment that occurs when the complex alternative is explicit provides readers with lexical guidance that also leads to the scalar assumption already during the construction of the first assumption. Along with the procedural instruction, the readers count on two different guides to recover the communicated assumption with less effort than in utterances with a single alternative. On the other hand, the direct contrast between a single alternative and the focus seems to be more cognitively effortful. The simple alternative does not constitute a sufficient stimulus to facilitate the recovery of the intended implicature and the scalar contrastive relation is confirmed with higher reanalysis effort for the focus (see § 5.1.1). Either way, this additional effort is not reflected in the global processing of the utterance. Such overstrain is considered as an additional regulatory effort, since this step is needed to verify the validity of the initial assumption and interpret the scalar relation with the minimal global effort.

The analysis of the comprehension test revealed that marked and unmarked utterances are not equally optimal stimuli for readers to derive a scalar contrastive implicature (**hypothesis IV B_2 confirmed).** The different answer ratios for unmarked and marked utterance indicates that unmarked utterances do not conventionally lead to a scalar contrastive implicature, as the higher no-answers ratio for these condition signals. Unmarked utterances are subject to a linguistic underdeterminacy that widens the range of possible interpretations. On the other hand, the insertion of a procedural element in the utterance restricts the inferential process and makes the interpretation process less ambiguous. Nor does the amount of conceptual information encoded in the set of alternatives (complex alternative) constitute a sufficient stimulus to establish a scalar contrastive relation.

In conclusion, the internal distribution of the processing effort among the different elements in the stimulus (alternative, focus, and FO) proves that the processing of unmarked and marked utterances present two different processing paths to recover the communicated assumption. Unmarked structures present a conceptual pattern because the readers retrieve the assumption by resorting to the conceptual elements, in particular the unmarked focus, as this is the element that introduces the new information and activates the additive relation. On the contrary, marked utterances follow a procedural pattern, since the FO articulates the information and requires increased effort than the other elements from the host utterance. In parallel, the FO fulfil two functions during the utterance processing. Firstly, it regulates the processing effort necessary to construct the initial assumption by accelerating the identification of the informative value of the focused element. Secondly, it controls the cognitive effort that the operations for the confirmation, enrichment or modification of the assumption can cause during the reanalysis of the initial assumption.

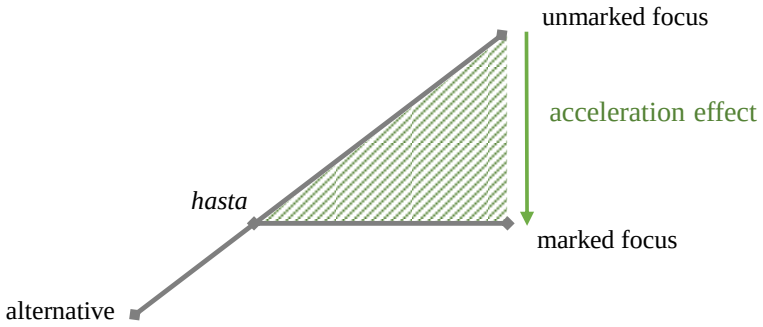

Figure 11. Regulation effect of the FO *hasta* upon the focusing elements

The endpoint-marking value of *hasta*

The experimental data has proved that utterances with a pragmatic mismatch between a procedural element and the contextual assumptions – as the one studied in the present work – present two different processing paths to integrate new information that is compatible and incompatible with the reader's world knowledge (**hypothesis IV C_2 confirmed**).

When constructing the interpretation of an utterance, the readers follow the path of least effort and stop the process when they find the interpretation that best satisfies their expectations of relevance. For that, the assumption should be relevant in the given context based on the relation between processing effort and cognitive effects: the more positive effects and the less processing effort, the more relevant the utterance (Sperber & Wilson 1995[1986]); Yus 2003). Sometimes, the readers can also opt for a more effort-demanding interpretation if, with the expended additional effort, they obtain eventual additional effects and they are worth the effort.

When the new information of an utterance conflicts with the background of assumptions held in the CG, the readers – guided by the principle of relevance – begin an accommodation process to readjust the context and save the communication (Beaver & Zeevat 2007; Rodríguez Rosique 2008). The accommodation process is a repair mechanism that takes place on a processing effort basis since it involves altering the mind-stored assumptions, abandon them to make room for a new one or create an *ad hoc* assumption (Wilson & Sperber 2004, 2012; Escandell et al. 2011: 96). Therefore, it should be done while maintaining a well-balanced relation of processing effort and cognitive effects. If the accommodation of implausible information generates a great deal of effort in return for few or no cognitive effects, the readers can stop the interpretative process and abandon the assumption because the expectations of relevance are not achieved. In short, the integration or cancellation of the assumption that is being communicated will be determined by the cognitive effects produced during the processing of the utterance.

Unlike previous research carried out on pragmatic incongruence between contextual assumptions and procedural meanings, our study reveals that the processing of implausible utterances is not more demanding that the processing of plausible utterances. On the contrary, implausible utterances in our study demand similar or less global processing effort than plausible utterances (**hypothesis IV C_1 rejected**). This relevant

finding can be theoretically justified because of the inherent endpoint-marking value of the FO *hasta*.

Focus operators present their focus as the most informative element and can raise expectations about the upcoming discourse (Filik et al. 2009: 679). The Spanish FO *hasta* has an absolute nature and its focus always constitutes the endpoint value of the evoked scale (Schwenter 2000, 2002; Portolés 2007, 2010). Therefore, *hasta* highly constrains the range of possible elements that can appear under its scope. The detection of an implausible focus causes a processing disruption of this element and the rigid semantics of the FO *hasta* compels the readers to start an early accommodation attempt to resolve the conflict and satisfy the procedural instruction.

The analysis of the data has provided the following findings concerning the effects of the FO *hasta* in implausible utterances. The FO has two different impacts upon the conceptual elements involved in the focusing relation:

a) *An abandonment effect of the focus*. A plausible focus should be consistent with an endpoint interpretation in the given context, but *hasta* obliges to create a pragmatic scale that collides with well-established mental assumptions. The detection of the mismatch at this AOI causes an immediate processing disruption of this element during the construction of the first assumption to initiate an accommodation. During the reanalysis, the difficulty in readjusting an implausible focus as the ultimate value of the pragmatic scale continues to result in lower effort for this AOI. The creation of an *ad hoc* assumption that complies with the procedural instruction does not yield enough positive effects. The absolute nature of the FO *hasta* hinders the accommodation process and the readers eventually abandon the pursuit of relevance, which leads to the cancellation of the communicated assumption.

b) *A readjustment effect of the alternative*. After detecting the mismatch in the focus area during the first reading, the readers try to accommodate the implausible information dwelling at the explicit alternative during the reanalysis. The properties of the set of alternatives appear not to have an impact on the processing path, since the pattern across all conditions constantly entails an early abandonment of the focus during the first reading and an extensive reanalysis of

the alternative during the reanalysis.[116] In the case of utterances with implicit alternative, the FO becomes the area from which the readers try to retrieve the necessary contextual effects.

The outcomes also reveal that the explicit alternative can be the first area at which the readers identify the pragmatic implausibility. Regardless of whether it is a simple or complex alternative, the alternative requires more effort in the implausible condition than in the opposite condition during the construction of the first assumption. The processing of the implausible alternative concerning a particular context leads to a 'semantic strangeness' that produces a higher effort for this element. In addition to this, the lexical concatenation provided by the complex alternative contains in itself an incongruent enchaining that the readers identify even sooner than in the case of utterances with a simple alternative. In either case, the detection of the mismatch at the alternative area also affects the processing of the FO by producing slightly more processing effort for the procedural cue in the implausible condition during the initial reading. This finding is corroborated because the FO shows no processing differences during the construction of the first assumption in utterances without alternative.[117]

The unconcluded accommodation process that the absolute nature of *hasta* causes in implausible utterances can be reinforced by examining the processing path that the Spanish FO *incluso* triggers in the same conditions (see Cruz 2020). The FO *incluso* has a relative nature, that is, it does not necessarily indicate that the focus is the endpoint of the evoked scale so that the interpretation of the implausible utterance can be more ambiguous and prone to a successful accommodation.

In comparison with *hasta*, the low-semantic constraints of *incluso* facilitate the accommodation of the implausible assumption triggering different processing paths to resolve the conflict. On the one hand, when the readers are confronted with the conflict

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[116] The constant effect seen in both areas (alternative and focus) across parameters can be considered another effect of the endpoint-marking value of *hasta*. Cruz (2020) explored the same variable in her doctoral investigation on the relative FO *incluso.* Data revealed that the size of the set of alternatives affects how the processing path of implausible utterances with *incluso* unfolds. The complex alternatives become the first area at which the readers detect the mismatch so that the accommodation becomes more demanding, and the higher processing effort generated at a local level is visible in the global processing effort too. The global processing of implausible *hasta*-utterances never requires higher effort than plausible utterances.

[117] During the FPRT, the FO registers small or medium effects between conditions when the alternative is explicit. In the model of simple alternative, the FO in the implausible condition generates 5.70% more effort than the FO in the plausible condition (237,92 msec vs. 289.54 msec), while in the model of complex alternative, the FO in the implausible stimulus triggers 4.97% more processing time (276,07 msec vs. 289.78 msec). On the contrary, when no alternative is explicit, there are no differences between the mentioned areas (248.90 msec vs. 246.01 msec, 1.16% trivial effects).

originated by the FO *incluso*, they can follow a path of **immediate accommodation** (see Cruz 2020, path A). The readers try to accommodate the information by intensifying the processing effort in the immediately affected area: the focus. This increased effort is visible both during the construction of the first assumption and the reanalysis so that the global processing of the focus in the implausible condition is slowed down in comparison to the plausible utterance. It can also happen that the readers follow a path of **immediate reactivation** (see Cruz 2020, path B), in which the increased effort for the focus area occur only during the reanalysis of the first assumption and be also manifested in the total processing time.[118] The properties of the alternative also influence the conflict-resolution path in the case of *incluso*. In utterances with complex alternative, the set of alternatives becomes the first area at which the readers detect the mismatch. When that happens, the accommodation becomes more demanding, and the higher processing effort generated at a local level is visible in the global processing effort too. In any of the paths, either A or B, the accommodation process can result in the creation of an *ad hoc* assumption or the cancellation of the assumption if the readers do not obtain enough cognitive effects.

The comparison of the processing paths triggered by *incluso* and *hasta* allows us to claim that when the readers encounter a pragmatic mismatch caused by the Spanish FO *hasta*, a **processing breakdown** of the utterance occurs.[119]

The high-semantic constraints of this FO restrict far more than *incluso* the range of possible interpretations of the utterance and hinder any possible accommodation of incongruous information. The integration of such implausible assumption into the CG would substantially contradict a well-established belief or would force to create an *ad hoc* assumption that would collide with the world knowledge. From a relevance-oriented perspective, the stimulus does not have the optimal relevance (trade-off of effort and cognitive effects) and the readers opt to stop the interpretative process and cancel the communicated assumption. For this reason, implausible utterances do not generate more processing effort than plausible utterances in our study (**hypothesis IV C_3 rejected**).

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[118] This accommodation process with major reanalysis efforts was also observed with connectives (Loureda et al. 2016; Nadal 2019; Nadal & Recio 2019; Narváez 2019; Recio 2020). In an utterance such as *Juan y Miguel comen mucho dulce. Por tanto están sanos*, the reader tries to accommodate the new input dwelling at the connective and the elements under its scope (*Por tanto están sanos*).

[119] Recio (2020) examined the causal and counter-argumentative relations in non-native Spanish speakers. The experimental data revealed that the degree of linguistic competence also influenced the strategy implemented by the readers to deal with implausible information. Therefore, a processing breakdown effect could also be observed in the processing pattern of those readers with a low degree of linguistic proficiency.

Concluding, the rigidity of both Spanish FOs (*hasta*, *incluso*) initiates a conflict-resolution path in an attempt to accommodate the implausible information and fulfil the procedural instruction. How this conflict-resolution path unfolds will be determined by the semantic nature of the FO in question and the degree of informativity provided by the background information, that is, properties of the set of alternatives.

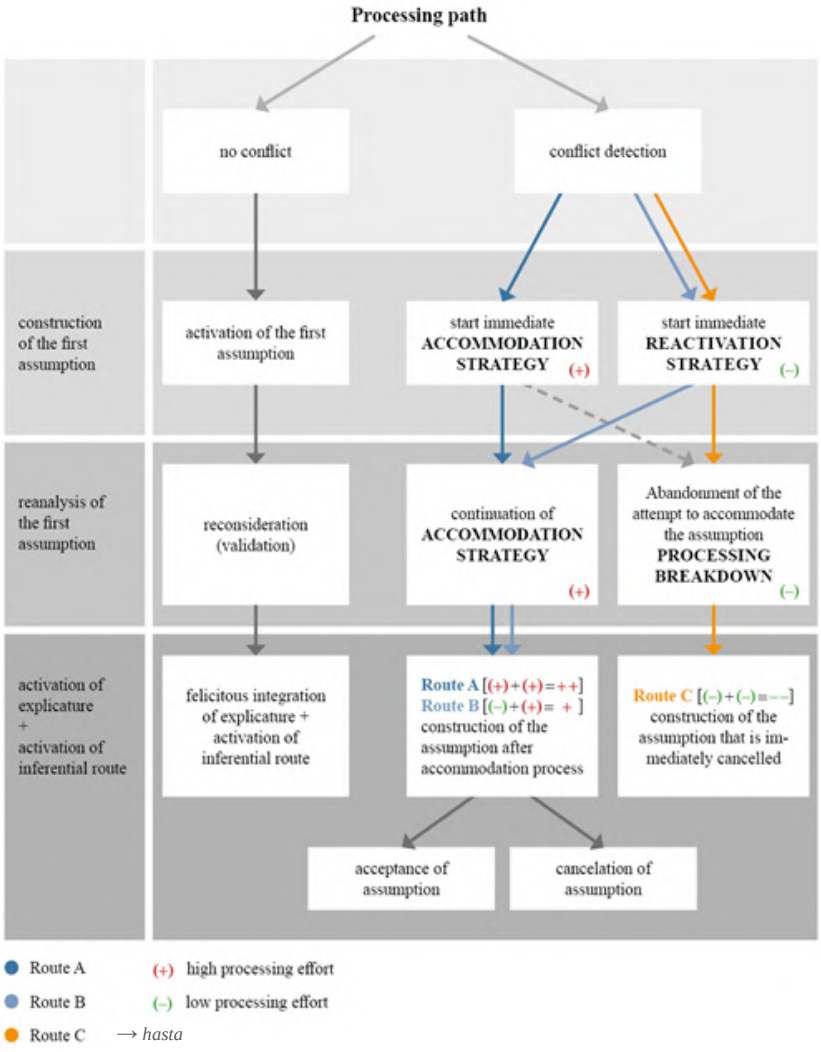

Figure 12. Processing paths after a conflict detection (Cruz 2020)

Prospects for further research

This doctoral investigation aims at offering an insight view on the cognitive impact of the Spanish FO *hasta* on the processing and comprehension of utterances with a pragmatic scale. In the case of *hasta*, our findings provide empirical data to confirm the theoretical notions about the specific semantic-pragmatic features of an absolute FO (see Schwenter 2000, 2002; Schwenter & Vasishth 2011). This research also leads to a more

fine-grained understanding of the processing pattern triggered by different FOs of the same paradigm with specific morphosyntactic, semantic, and pragmatic properties (*hasta* vs. *incluso*). However, as with any project, there are more aspects to take in and expand on that constitute perspectives for further research.

Particularly interesting might be more work on the size of the alternative set. The scales we have analysed are all pragmatic scales with an open set of alternatives. For that reason, an interesting area would be to compare the reading behaviour when processing pragmatic scales with an open and closed set of alternatives. In this regard, the limited number of possible alternatives that can be included in the set might impose a conceptual constraint that accelerates the utterance processing.

Another area for research on focusing would be the different kinds of scales with which FOs interact (see § 2.4). Since our study investigates only pragmatic scales, it would be particularly helpful to have experimental data on semantic scales for comparison, for example, and to explore whether different kinds of scales trigger different amounts of processing effort and cognitive patterns too. In comparison to pragmatic scales, the elements of a semantic scale are arranged according to their semantic content so that the scalar value might be more accessible for the readers and the establishment of the scale could trigger less processing time. Conversely, the establishment of a pragmatic scale entails a major pragmatic contribution by the readers. The readers need to resort to their world knowledge to assign a particular ordering for the different elements according to a topic. These operations are more complex and associated with major cognitive effort than in the case of semantic scales.

Particularly interesting are studies on further FOs in Spanish and other languages. The studies conducted on the Spanish FOs *hasta* and *incluso* (Cruz 2020) had shown that despite the different semantic properties of the relative and absolute FO, it is possible to draw general conclusions about the focusing operation triggered by them. Along with previous research, our results lead to the conclusion that focusing operations undergo similar processing patterns independently of the type of FO or language (see § 4.2). Therefore, other researchers need to examine different kinds of FOs (inclusive and exclusive) in different languages and their effects on processing and comprehension more closely. Furthermore, in this regard, more evidence would be needed from processing studies on pragmatic implausibility caused by different kinds of FOs. Follow-up studies should deepen into the mismatch resolution triggered by different procedural elements belonging to the same paradigm and to what extent accommodation processes

vary depending on the features of those. New investigations could shed more light on the factors that ease or hinder the accommodation as a repair mechanism and to what extent the rigidity of the procedural meaning allows the inferential resolution of linguistic mismatches.

Finally, the merge of theoretical-descriptive studies along with this and further experimental research can boost language-related investigation in a variety of subareas of linguistics, including applied fields such as translation studies and foreign language teaching.

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Appendices

Appendix A. Rating questionnaire on pragmatic scales

Presentation and instructions

Nuestro conocimiento del mundo

A continuación va a leer un total de 25 frases incompletas. Debes ordenar las distintas opciones propuestas en el orden que quieras. Cada serie debe ordenarse de menor a mayor grado de dificultad. La palabra que consideres **menos** extraña/difícil debe ir en **(1)** y la **más** extraña/difícil en **(5)**.

A continuación, te ofrecemos un ejemplo:

Inglés, chino y francés en relación con la frase "Ana sabe hablar…". Si consideras que saber hablar "inglés" es más fácil que saber hablar "francés" y que ambas lenguas son más fáciles de aprender que "chino", la escala sería la siguiente: inglés (1), francés (2) y chino (3).

El objetivo es valorar el conocimiento del mundo que las personas han desarrollado a partir de los hechos experimentados o vividos. Por tanto, recuerda que la valoración es completamente personas y no hay un orden correcto o incorrecto.

¡Gracias por participar!

General questions about the participants

Información previa

Por favor, responde a las siguientes preguntas sobre ti mismo antes de comenzar.

Soy…

- ○ Hombre
- ○ Mujer

¿Es tu idioma materno el español?…

- ○ Sí
- ○ No

¿Cuántos años tienes?…

- ○ Menos de 20 años
- ○ 20-30 años
- ○ 30-40 años
- ○ 40-50 años
- ○ Más de 60 años

¿Cuáles son tus estudios máximos cursados?

- ○ Educación Secundaria Obligatoria o equivalente
- ○ Bachillerato o equivalente
- ○ Formación profesional o equivalente
- ○ Formación profesional o equivalente
- ○ Estudios superiores universitarios
- ○ Formación profesional o equivalente
- ○ Otros

Questions

1. Ana y Pedro compran…

	1	2	3	4
sellos	○	○	○	○
latas	○	○	○	○
chapas	○	○	○	○
cromos	○	○	○	○

2. Ana y Borja venden…

	1	2	3	4
llaveros	○	○	○	○
monedas	○	○	○	○
imanes	○	○	○	○
dedales	○	○	○	○

3. Letizia y Paola conocen…

	1	2	3	4
Sevilla	○	○	○	○
Granada	○	○	○	○
Málaga	○	○	○	○
Córdoba	○	○	○	○

4. Isabel y Lucía comen…				
	1	2	3	4
cerdo	○	○	○	○
pavo	○	○	○	○
vaca	○	○	○	○
pollo	○	○	○	○

5. Susana y María conocen…				
	1	2	3	4
Colombia	○	○	○	○
Bolivia	○	○	○	○
Ecuador	○	○	○	○
México	○	○	○	○

6. Paula y Daniel beben…				
	1	2	3	4
batido	○	○	○	○
zumo	○	○	○	○
sorbete	○	○	○	○
agua	○	○	○	○
leche	○	○	○	○

7. Belén y Carlos visitan…				
	1	2	3	4
castillos	○	○	○	○
iglesias	○	○	○	○
ruinas	○	○	○	○
museos	○	○	○	○

8. David y Jorge practican…				
	1	2	3	4
vela	○	○	○	○
remo	○	○	○	○
tiro	○	○	○	○
judo	○	○	○	○

9. Isabel y Lucía comen …				
	1	2	3	4
pescado	○	○	○	○
fruta	○	○	○	○
carne	○	○	○	○
legumbres	○	○	○	○
pasta	○	○	○	○
verdura	○	○	○	○

10. Carmen y Ana saben…				
	1	2	3	4
peinar	○	○	○	○
cortar	○	○	○	○
teñir	○	○	○	○

11. Esteban y Amalia plantan…				
	1	2	3	4
lechugas	○	○	○	○
patatas	○	○	○	○
cebollas	○	○	○	○
guisantes	○	○	○	○

12. Antonio y Mercedes conocen…				
	1	2	3	4
médicos	○	○	○	○
pilotos	○	○	○	○
maestros	○	○	○	○
actores	○	○	○	○

13. David y Sonia conducen…				
	1	2	3	4
motos	○	○	○	○
buses	○	○	○	○
bicis	○	○	○	○
coches	○	○	○	○

14. Elena y Carmen venden…				
	1	2	3	4
sombreros	○	○	○	○
pamelas	○	○	○	○
tocados	○	○	○	○
viseras	○	○	○	○

15. Pedro y Carmen tienen como mascotas…				
	1	2	3	4
loros	○	○	○	○
gatos	○	○	○	○
perros	○	○	○	○
peces	○	○	○	○

16. Clara y Laura venden…				
	1	2	3	4
piñas	○	○	○	○
kiwis	○	○	○	○
cocos	○	○	○	○
mangos	○	○	○	○

17. Miguel y Laura producen…				
	1	2	3	4
sidra	○	○	○	○
vino	○	○	○	○
licor	○	○	○	○
cerveza	○	○	○	○

18. Miguel y Tomás practican…				
	1	2	3	4
fútbol	○	○	○	○
tenis	○	○	○	○
lucha	○	○	○	○
pádel	○	○	○	○

19. Sonia y Carlos tienen …				
	1	2	3	4
motos	○	○	○	○
barcos	○	○	○	○
yates	○	○	○	○
coches	○	○	○	○

20. Francisco e Isabel crían…				
	1	2	3	4
cabras	○	○	○	○
llamas	○	○	○	○
cerdos	○	○	○	○
vacas	○	○	○	○

21. Elsa y Ana toman…				
	1	2	3	4
menta	○	○	○	○
mate	○	○	○	○
tila	○	○	○	○
café	○	○	○	○

22. Susana y Natalia tienen…				
	1	2	3	4
zapatos	○	○	○	○
bolsos	○	○	○	○
joyas	○	○	○	○
sombreros	○	○	○	○

23. Luisa y Sara saben…				
	1	2	3	4
latín	○	○	○	○
chino	○	○	○	○
persa	○	○	○	○
inglés	○	○	○	○
griego	○	○	○	○

24. Sonia y Lola en verano llevan…				
	1	2	3	4
tenis	○	○	○	○
sandalias	○	○	○	○
botas	○	○	○	○

25. David y José son escultores y trabajan…				
	1	2	3	4
madera	○	○	○	○
piedra	○	○	○	○
marfil	○	○	○	○
hierro	○	○	○	○

Appendix B. Rating questionnaire on pragmatic scales – Chi-square results

1. Ana y Pedro compran…

Position	**Number of answers**			
	sellos	**latas**	**chapas**	**Cromos**
1	20	20	10	13
2	22	11	10	9
3	5	14	16	16
4	8	9	17	17
χ^2 = 25.3678		**p-value = 0. 00259**		

2. Ana y Borja venden…

Position	**Number of answers**			
	llaveros	**monedas**	**imanes**	**dedales**
1	38	9	15	2
2	12	14	18	9
3	4	18	16	14
4	1	14	6	30
χ^2 = 95.6372		**p-value 0.00001**		

3. Letizia y Paola conocen…

Position	**Number of answers**			
	Sevilla	**Granada**	**Málaga**	**Córdoba**
1	41	9	6	8
2	8	23	16	7
3	2	16	15	19
4	3	6	17	20
χ^2 = 94.1924		**p-value = 0.00001**		

4. Isabel y Lucía comen…

Position	**Number of answers**			
	cerdo	**pavo**	**vaca**	**pollo**
1	9	7	12	41
2	14	10	17	10
3	23	8	14	3
4	8	29	11	0
χ^2 = 103.059		**p-value = 0.00001**		

5. Susana y María conocen…

Position	Number of answers			
	Colombia	**Bolivia**	**Ecuador**	**México**
1	21	3	4	35
2	24	6	14	7
3	5	20	26	4
4	5	26	11	9
	χ^2 = 106.640		**p-value = 0.00001**	

6. Paula y Daniel beben …

Position	Number of answers					
	batido	**zumo**	**horchata**	**sorbete**	**agua**	**leche**
1	8	4	1	0	51	5
2	5	9	2	2	2	35
3	14	24	2	2	0	8
4	22	13	7	5	0	4
5	2	5	10	32	0	3
6	3	0	32	14	1	0
	χ^2 = 525.929			**p-value = 0.00001**		

7. Belén y Carlos visitan…

Position	Number of answers			
	castillos	**iglesias**	**ruinas**	**museos**
1	10	14	9	38
2	17	20	8	7
3	19	7	18	5
4	9	14	20	5
	χ^2 = 64.743		**p-value = 0.00001**	

8. David y Jorge practican…

Position	Number of answers			
	vela	**remo**	**tiro**	**judo**
1	14	7	9	25
2	9	25	11	7
3	17	16	11	10
4	15	7	24	13
	χ^2 = 42.374		**p-value = 0.00001**	

9. Isabel y Lucía comen …

Position	Number of answers					
	pescado	**fruta**	**carne**	**legumbres**	**pasta**	**verdura**
1	9	15	16	3	26	10
2	6	10	17	7	7	7
3	11	13	4	8	5	9
4	9	7	5	10	9	9
5	12	10	6	5	5	11
6	8	0	7	20	3	9
	χ^2 = 8.913			**p-value = 0.0116029**		

10. Carmen y Ana saben …

Position	Number of answers		
	peinar	**cortar**	**Teñir**
1	45	10	7
2	6	30	17
3	4	15	31
	χ^2 = 81.6532	**p-value = 0.00001**	

11. Esteban y Amalia plantan…

Position	Number of answers			
	lechugas	**patatas**	**cebollas**	**guisantes**
1	17	25	7	5
2	17	17	20	3
3	15	9	24	7
4	4	3	3	39
	χ^2 = 121.650	**p-value = 0. 00001**		

12. Antonio y Mercedes conocen…

Position	Number of answers			
	médicos	**pilotos**	**maestros**	**actores**
1	25	3	29	8
2	24	2	23	4
3	6	23	2	20
4	0	27	1	23
χ^2 = 134.358		**p-value = 0. 00001**		

13. David y Sonia conducen…

Position	Number of answers			
	motos	**buses**	**bicis**	**coches**
1	8	2	22	31
2	18	2	19	15
3	28	3	14	6
4	1	48	0	3
χ^2 = 207.738		**p-value = 0. 00001**		

14. Elena y Carmen venden…

Position	Number of answers			
	Sombreros	**pamelas**	**tocados**	**viseras**
1	34	2	4	15
2	17	10	8	21
3	3	24	24	7
4	1	19	19	12
χ^2 = 97.1963		**p-value = 0. 00001**		

15. Pedro y Carmen tienen como mascotas…

Position	Number of answers			
	loros	**gatos**	**perros**	**peces**
1	5	8	49	3
2	4	41	2	9
3	9	4	3	34
4	37	2	1	9
χ^2 = 280.805		**p-value = 0. 00001**		

16. Clara y Laura venden…

Position	Number of answers			
	Piña	**kiwis**	**cocos**	**mangos**
1	29	13	8	9
2	16	21	8	9
3	9	9	24	15
4	1	12	15	22
χ^2 = 56.5744		**p-value = 0. 00001**		

17. Miguel y Laura producen…

Position	Number of answers			
	sidra	**vino**	**licor**	**cerveza**
1	6	28	3	20
2	17	16	13	6
3	14	8	20	13
4	17	2	18	15
χ^2 =52.9981		**p-value = 0. 00001**		

18. Miguel y Tomás practican…

Position	Number of answers			
	fútbol	**tenis**	**lucha**	**pádel**
1	46	5	5	4
2	4	32	5	13
3	1	16	19	18
4	4	1	26	20
χ^2 = 173.373		**p-value = 0. 00001**		

19. Sonia y Carlos tienen …

Position	Number of answers			
	motos	**barcos**	**yates**	**coches**
1	17	3	3	40
2	36	3	3	9
3	1	42	8	2
4	1	7	41	4
χ^2 = 280.679		**p-value = 0. 00001**		

20. Francisco e Isabel crían…

Position	Number of answers			
	cabras	**llamas**	**cerdos**	**vacas**
1	6	2	26	29
2	12	1	22	17
3	35	2	6	9
4	2	50	1	0
	χ^2 = 242.068		**p-value = 0. 00001**	

21. Elsa y Ana toman…

Position	Number of answers			
	menta	**mate**	**tila**	**café**
1	2	6	5	52
2	12	9	31	2
3	31	9	10	0
4	10	31	9	1
	χ^2 = 219.555		**p-value = 0. 00001**	

22. Susana y Natalia tienen…

Position	Number of answers			
	zapatos	**bolsos**	**joyas**	**sombreros**
1	51	6	4	5
2	2	44	3	3
3	1	5	30	16
4	1	0	18	31
	χ^2 = 286.721		**p-value = 0. 00001**	

23. Luisa y Sara saben…

Position	Number of answers			
	griego	**latín**	**inglés**	**chino**
1	2	2	49	1
2	6	32	2	10
3	27	11	1	7
4	14	4	1	29
	χ^2 = 234.145		**p-value = 0. 00001**	

24. Sonia y Lola en verano llevan…

Position	**Number of answers**		
	tenis	**chanclas**	**botas**
1	11	42	5
2	40	9	2
3	4	4	48
χ^2 = 158.053		**p-value = 0.00001**	

25. David y José son escultores y trabajan…

Position	**Number of answers**			
	madera	**piedra**	**marfil**	**hierro**
1	31	20	4	4
2	13	19	2	17
3	6	14	11	20
4	5	2	38	13
χ^2 = 112.015	**df = 9**	**p-value = 0. 00001**		

Appendix C. Comprehension tests

Comprehension test I

Experimental questions

Test de comprensión

Ahora olvídate de lo que acabas de leer, de tu conocimiento del mundo y responde a las siguientes preguntas SOLO y ÚNICAMENTE sobre la frase a la que se refieren.

Carla y Diego conocen Roma y Oslo.

Según la frase, ¿conocer Oslo es menos esperable que conocer Roma?

□ Sí
□ No.
□ No se puede saber.

Inés y Ana tienen hasta perros.

Según la frase, ¿tener perros es menos esperable que tener otra clase de animales?

□ Sí
□ No.
□ No se puede saber.

Raúl y Elsa conocen México, Colombia y Bolivia.

Según la frase, ¿conocer Bolivia es menos esperable que conocer los otros países mencionados?

□ Sí
□ No.
□ No se puede saber.

Pablo y David comen hasta cerdo.

Según la frase, ¿comer cerdo es menos esperable que comer otro tipo de carne?

□ Sí
□ No.
□ No se puede saber.

Óscar y Hugo practican fútbol y hasta lucha.

Según la frase, ¿practicar lucha es menos esperable que practicar fútbol?

□ Sí
□ No.
□ No se puede saber.

Luis y Eva conocen maestros, médicos y hasta actores.

Según la frase, ¿conocer actores es menos esperable que conocer a maestros o médicos?

□ Sí
□ No.
□ No se puede saber.

Alba y Lucas tienen yates y hasta coches.

Según la frase, ¿tener coches es menos esperable que tener yates?

□ Sí
□ No.
□ No se puede saber.

Juan y Sara saben persa.

Según la frase, ¿saber persa es más difícil que saber otras lenguas?

□ Sí
□ No.
□ No se puede saber.

Iván y Rosa crían cabras, cerdos y hasta vacas.

Según la frase, ¿criar vacas es menos esperable que criar los demás animales mencionados?

□ Sí
□ No.
□ No se puede saber.

Filler questions

Los hijos de Iván y Rosa no quieren vivir en el campo.

Según la frase, ¿vivir en el campo es más difícil que vivir en la ciudad?

□ Sí
□ No.
□ No se puede saber.

Alba y Lucas recorren Ibiza en moto para conocer mejor la isla.

Según la frase, ¿recorrer la isla en moto es mejor que visitarla con otro tipo de vehículo?

□ Sí
□ No.
□ No se puede saber.

Óscar y Hugo van a entrenar a menudo al gimnasio.

Según la frase, ¿entrenar en el gimnasio es más esperable que entregar en cualquier otro sitio?

□ Sí
□ No.
□ No se puede saber.

Raúl y Ana trabajan como fotógrafos para una revista de viajes.

Según la frase, ¿Raúl y Ana viajan mucho porque trabajan para una revista de viajes?

□ Sí
□ No.
□ No se puede saber.

Comprehension test II

Experimental questions

Test de comprensión

Por favor, responde a las siguientes preguntas sobre la frase a la que se refieren..

Carla y Diego conocen Roma y hasta Oslo.

¿Conocer Oslo es menos esperable que conocer otras ciudades?

□ Sí
□ No.
□ No se puede saber.

Inés y Ana tienen hasta perros.

¿Tener perros es menos esperable que tener otros animales?

□ Sí
□ No.
□ No se puede saber.

Raúl y Elsa conocen México, Colombia y Bolivia.

¿Conocer Bolivia es más esperable que conocer países?

□ Sí
□ No.
□ No se puede saber.

Pablo y David comen hasta cerdo.

¿Comer cerdo es más raro que comer otro tipo de carne?

□ Sí
□ No.
□ No se puede saber.

Óscar y Hugo practican fútbol y hasta lucha.

¿Practicar lucha es menos esperable que practicar otros deportes?

□ Sí
□ No.
□ No se puede saber.

Luis y Eva conocen maestros, médicos y hasta actores.

¿Conocer actores es menos esperable que conocer personas de otras profesiones?

□ Sí
□ No.
□ No se puede saber.

Alba y Lucas tienen yates y hasta coches.

¿Tener coches es menos esperable que tener otros vehículos?

□ Sí
□ No.
□ No se puede saber.

Juan y Sara saben persa.

¿Saber persa es más difícil que saber otras lenguas?

□ Sí
□ No.
□ No se puede saber.

Iván y Rosa crían cabras, cerdos y hasta vacas.

¿Criar vacas es menos esperable que criar otros animales?

□ Sí
□ No.
□ No se puede saber.

Appendix D. Comprehension tests – Chi-square results

IV B - Focus marking

Utterances with implicit alternative[120]

	yes	no	not known	
unmarked utterance	5 *83.50* (73.80)	145 *79.00* (55.14)	30 *17.50* (8.93)	180
marked utterance	162 *83.50* (73.80)	13 *79.00* (55.14)	5 *17.50* (8.93)	180
	167	158	35	360

χ^2 = 275.734 **_p_-value = 0.00001**

Utterances with simple alternative

	yes	no	not known	
unmarked utterance	7 *84.00* (70.58)	162 *88.00* (62.23)	11 *8.00* (1.12)	180
marked utterance	161 *84.00* (70.58)	14 *88.00* (62.23)	5 *8.00* (1.12)	180
	168	176	16	360

χ2 = 267.871 **p-value =0.00001**

Utterances with complex alternative

	yes	no	not known	
unmarked utterance	13 *83.00* (59.04)	147 *85.00* (45.22)	20 *12.00* (5.33)	180
marked utterance	153 *83.00* (59.04)	23 *85.00* (45.22)	4 *12.00* (5.33)	180
	166	170	24	360

χ2 = 219.186 **p-value = 0.00001**

[120] Expected values are displayed in *italics;* individual χ^2values are displayed in (parentheses).

IV C - Degree of pragmatic plausibility

Comprehension test I

Utterances with implicit alternative

	yes	no	not known	
plausible utterance	162 *154.00* (0.42)	13 *16.00* (0.56)	5 *10.00* (2.50)	180
implausible utterance	146 *154.00* (0.42)	19 *16.00* (0.56)	15 *10.00* (2.50)	180
	308	32	20	360

χ^2 = 6.956 ***p*-value = 0.030866**

Utterances with simple alternative

	yes	no	not known	
plausible utterance	161 *153.00* (0.42)	14 *21.00* (2.33)	5 *6.00* (0.17)	180
implausible utterance	145 *153.00* (0.42)	28 *21.00* (2.33)	7 *6.00* (0.17)	180
	306	42	12	360

χ^2 = 5.8366 ***p*-value = 0.054025**

Utterances with complex alternative

	yes	no	not known	
plausible utterance	153 *143.00* (0.70)	23 *31.00* (2.06)	4 *6.00* (0.67)	180
implausible utterance	133 *143.00* (0.70)	39 *31.00* (2.06)	8 *6.00* (0.67)	180
	286	62	12	360

χ^2 = 6.861 ***p*-value = 0.032371**

Comprehension test II

Utterances with implicit alternative

	yes	no	not known	
plausible utterance	113 *99.50* (183)	39 *50.00* (2.42)	28 *30.50* (0.20)	180
implausible utterance	86 *99.50* (1.83)	61 *50.00* (2.42)	33 *30.50* (0.20)	180
	199	100	61	360

χ^2 = 8.9132 ***p*-value = 0.011602**

Utterances with simple alternative

	yes	no	not known	
plausible utterance	120 *100.00* (4.00)	36 *55.00* (6.56)	24 *25.00* (0.04)	180
implausible utterance	80 *100.00* (4.00)	74 *55.00* (6.56)	26 *25.00* (0.04)	180
	200	110	50	360

χ^2 = 21.2073 ***p*-value = 0.000025**

Utterances with complex alternative

	yes	no	not known	
plausible utterance	122 *99.50* (5. 90)	43 *63.50* (6.62)	15 *17.00* (0.24)	180
implausible utterance	77 *99.50* (5. 90)	84 *63.50* (6.62)	19 *17.00* (0.24)	180
	199	127	34	360

χ^2 = 23.8827 ***p*-value = 0.00001**

Appendix E. Token sets

Latin Square

Conditions and themes of the different token sets

Experiment		1	2	3	4	5	6	7	8	9
Themes	A	1a2a	1b2a	1c2a	1a2b	1b2b	1c2b	1a3a	1b3a	1c3a
	B	1b2a	1c2a	1a2b	1b2b	1c2b	1a3a	1b3a	1c3a	1a2a
	C	1c2a	1a2b	1b2b	1c2b	1a3a	1b3a	1c3a	1a2a	1b2a
	D	1a2b	1b2b	1c2b	1a3a	1b3a	1c3a	1a2a	1b2a	1c2a
	E	1b2b	1c2b	1a3a	1b3a	1c3a	1a2a	1b2a	1c2a	1a2b
	F	1c2b	1a3a	1b3a	1c3a	1a2a	1b2a	1c2a	1a2b	1b2b
	G	1a3a	1b3a	1c3a	1a2a	1b2a	1c2a	1a2b	1b2b	1c2b
	H	1b3a	1c3a	1a2a	1b2a	1c2a	1a2b	1b2b	1c2b	1a3a
	I	1c3a	1a2a	1b2a	1c2a	1a2b	1b2b	1c2b	1a3a	1b3a

Critical items per token set

	Condition	Critical item
Token set 1	a1b1	Carla y Diego conocen Oslo.
	a2b1	Raúl y Elsa conocen México y Bolivia.
	a3b1	Pablo y David comen pollo, pavo y cerdo.
	a1b2	Óscar y Hugo practican hasta lucha.
	a2b2	Luis y Eva conocen maestros y hasta actores.
	a3b2	Inés y Ana tienen perros, gatos y hasta loros.
	a1c2	Alba y Lucas tienen hasta coches.
	a2c2	Iván y Rosa crían cabras y hasta vacas.
	a3c2	Juan y Sara saben persa, griego y hasta latín.

	Condition	Critical item
Token set 2	a2b1	Carla y Diego conocen Roma y Oslo.
	a3b1	Raúl y Elsa conocen México, Colombia y Bolivia.
	a1b2	Pablo y David comen hasta cerdo.
	a2b2	Óscar y Hugo practican fútbol y hasta lucha.
	a3b2	Luis y Eva conocen maestros, médicos y hasta actores.
	a1c2	Inés y Ana tienen hasta perros.
	a2c2	Alba y Lucas tienen yates y hasta coches.
	a3c2	Iván y Rosa crían cabras, cerdos y hasta vacas.
	a1b1	Juan y Sara saben persa.

	Condition	Critical item
Token set 3	a3b1	Carla y Diego conocen Roma, París y Oslo.
	a1b2	Raúl y Elsa conocen hasta Bolivia.
	a2b2	Pablo y David comen pollo y hasta cerdo.
	a3b2	Óscar y Hugo practican fútbol, tenis y hasta lucha.
	a1c2	Luis y Eva conocen hasta maestros.
	a2c2	Inés y Ana tienen loros y hasta perros.
	a3c2	Alba y Lucas tienen yates, motos y hasta coches.
	a1b1	Iván y Rosa crían cabras.
	a2b1	Juan y Sara saben latín y persa.

	Condition	Critical item
Token set 4	a1b2	Carla y Diego conocen hasta Oslo.
	a2b2	Raúl y Elsa conocen México y hasta Bolivia.
	a3b2	Pablo y David comen pollo, pavo y hasta cerdo.
	a1c2	Óscar y Hugo practican hasta fútbol.
	a2c2	Luis y Eva conocen actores y hasta maestros.
	a3c2	Inés y Ana tienen loros, gatos y hasta perros.
	a1b1	Alba y Lucas tienen yates.
	a2b1	Iván y Rosa crían vacas y cabras.
	a3b1	Juan y Sara saben latín, griego y persa.

	Condition	Critical item
Token set 5	a2b2	Carla y Diego conocen Roma y hasta Oslo.
	a3b2	Lucía y Fernando conocen México, Colombia y hasta Bolivia.
	a1c2	Pablo y Miguel comen hasta pollo.
	a2c2	Óscar y Hugo practican lucha y hasta fútbol.
	a3c2	Luis y Eva conocen actores, médicos y hasta maestros.
	a1b1	Inés y Ana tienen loros.
	a2b1	Alba y Lucas tienen coches y yates.
	a3b1	Manuel y Carmen crían vacas, cerdos y cabras.
	a1b2	Luis y Sara saben hasta persa.

	Condition	Critical item
Token set 6	a3b2	Carla y Diego conocen Roma, París y hasta Oslo.
	a1c2	Raúl y Elsa conocen hasta México.
	a2c2	Pablo y David comen cerdo y hasta pollo.
	a3c2	Óscar y Hugo practican lucha, tenis y hasta fútbol.
	a1b1	Luis y Eva conocen actores.
	a2b1	Inés y Ana tienen perros y loros.
	a3b1	Alba y Lucas tienen coches, motos y yates.
	a1b2	Iván y Rosa crían hasta cabras.
	a2b2	Juan y Sara saben latín y hasta persa.

	Condition	Critical item
Token set 7	a1c2	Carla y Diego conocen hasta Roma.
	a2c2	Raúl y Elsa conocen Bolivia y hasta México.
	a3c2	Pablo y David comen cerdo, pavo y hasta pollo.
	a1b1	Óscar y Hugo practican lucha.
	a2b1	Luis y Eva conocen maestros y actores.
	a3b1	Inés y Ana tienen perros, gatos y loros.
	a1b2	Alba y Lucas tienen hasta yates.
	a2b2	Iván y Rosa crían vacas y hasta cabras.
	a3b2	Juan y Sara saben latín, griego y hasta persa.

	Condition	Critical item
Token set 8	a2c2	Carla y Diego conocen Oslo y hasta Roma.
	a3c2	Raúl y Elsa conocen Bolivia, Colombia y hasta México.
	a1b1	Pablo y David comen cerdo.
	a2b1	Óscar y Hugo practican fútbol y lucha.
	a3b1	Luis y Eva conocen maestros, médicos y actores.
	a1b2	Inés y Ana tienen hasta loros.
	a2b2	Alba y Lucas tienen coches y hasta yates.
	a3b2	Iván y Rosa crían vacas, cerdos y hasta cabras.
	a1c2	Juan y Sara saben hasta latín.

	Condition	Critical item
Token set 9	a3c2	Carla y Diego conocen Oslo, París y hasta Roma.
	a1b1	Raúl y Elsa conocen Bolivia.
	a2b1	Pablo y David comen pollo y cerdo.
	a3b1	Óscar y Hugo practican fútbol, tenis y lucha.
	a1b2	Luis y Eva conocen hasta actores.
	a2b2	Inés y Ana tienen perros y hasta loros.
	a3b2	Alba y Lucas tienen coches, motos y hasta yates.
	a1c2	Iván y Rosa crían hasta vacas.
	a2c2	Juan y Sara saben persa y hasta latín.

Appendix F. Critical items and fillers (token set 1)

Critical items and fillers

Context	*Carla y Diego comparten piso. Se llevan muy bien y por eso viajan mucho juntos.*
Filler	*El mes pasado recorrieron Europa y estuvieron en Roma y París, entre otras ciudades.*
Critical item	***Carla y Diego conocen Roma, París y hasta Oslo.*** *La aventura fue inolvidable.*
Filler	*Ahora quieren ahorrar para visitar Asia.*

'Carla and Diego share a flat. They get along very well, and that is why they travel a lot together. Last month they travelled in Europe and were in Rome and Paris, among other cities. **Carla and Diego know Rome, Paris, and even Oslo**. The adventure was unforgettable. Now they want to save money to visit Asia.'

Context	*Raúl y Ana trabajan como fotógrafos para una revista de viajes..*
Filler	*Han publicado reportajes sobre distintos países latinoamericanos, entre ellos México y Colombia.*
Critical item	***Raúl y Ana conocen México, Colombia y hasta Bolivia.*** *Son muy buenos en su trabajo.*
Filler	*Siempre están buscando las mejores fotografías.*

'Raul and Ana work as photographers for a travel magazine. They have published reports on various Latin American countries, including Mexico and Colombia. **Raul and Ana know Mexico, Colombia, and even Bolivia**. They are very good at their job. They are always looking for the best photographs.'

Context	*Pablo y David son dos hermanos de 9 y 12 años. Están un poco gorditos.*
Filler	*Les gusta comer sobre todo carne, como la de pollo o la de pavo.*
Critical item	***Pablo y David comen pollo, pavo y hasta cerdo.*** *Su madre cocina muy bien.*
Filler	*Por las tardes juegan al fútbol con los amigos en la calle.*

'Paul and David are brothers, and they are 9 and 12 years old. They are a little fat. They like to eat meat specially, like chicken or turkey. **Pablo and David eat chicken, turkey, and even pork**. His mother cooks very well. In the afternoons they play football with their friends on the street.'

Context	*Estos son Óscar y Hugo. Son amigos desde pequeños.*
Filler	*Dedican su tiempo libre a deportes como el fútbol o el tenis.*
Critical item	***Óscar y Hugo practican fútbol, tenis y hasta lucha***. *A menudo van a entrenar al gimnasio.*
Filler	*Estudian en la universidad y pronto acabarán los estudios.*

'They are Oscar and Hugo. They are friends since they are little. They spend their free time in sports like football or tennis. **Oscar and Hugo practice football, tennis, and even wrestling.** They often go to train at the gym. They study at university and will soon finish their studies.'

Context	*Luis y Eva son una joven pareja de Madrid. Llevan muchos años juntos.*
Filler	*Tienen amigos de distintas profesiones, como maestros o médicos.*
Critical item	***Luis y Eva conocen maestros, médicos y hasta actores.*** *Su vida social es muy activa.*
Filler	*Quieren casarse pronto y celebrar una gran boda.*

'Luis and Eva are a young couple from Madrid. They have been together for many years. They have friends from different professions, such as teachers or doctors. **Luis and Eva know teachers, doctors, and even actors.** Their social life is very active. They want to get married soon and have a big wedding.'

Context	*Inés y Ana trabajan como voluntarias en una protectora de animales.*
Filler	*Acogen en su casa a animales, como perros y gatos, para buscarles un nuevo dueño.*
Critical item	***Inés y Ana tienen perros, gatos y hasta loros.*** *Se preocupan mucho por su bienestar.*
Filler	*Por las tardes sacan a pasear a los perros.*

'Ines and Ana work as volunteers in an animal shelter. They welcome animals, such as dogs and cats, into their home to find them a new owner**. Ines and Ana have dogs, cats, and even parrots.** They care a lot about them. In the afternoons, they take the dogs for a walk.'

Context	*Alba y Lucas dirigen una empresa de alquiler de vehículos en Ibiza.*
Filler	*Actualmente tienen una flota muy moderna de vehículos; entre ellos, coches y motos.*
Critical item	***Alba y Lucas tienen coches, motos y hasta yates.*** *En el negocio les va muy bien.*
Filler	*En su tiempo libre recorren Ibiza en moto para conocer mejor la isla.*

'Alba and Lucas run a vehicle hire company. They currently have a very modern fleet of vehicles, including cars and motorcycles. **Alba and Lucas have cars, motorcycles and even yachts.** In business, they are doing very well. In their free time, they travel around Ibiza by motorbike to get to know the island better.'

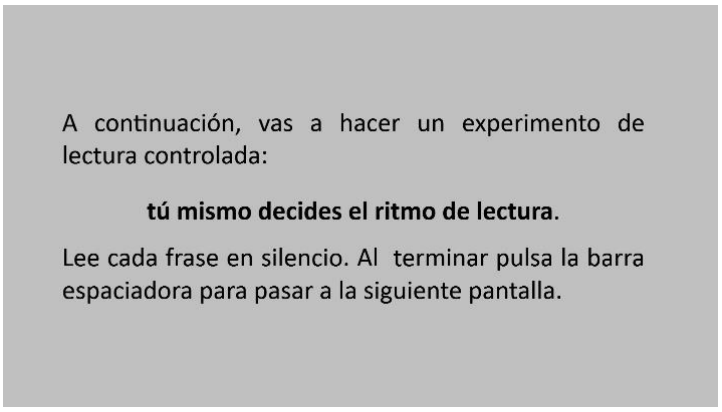
Context	*Iván y Rosa son ganaderos y dueños de una gran finca.*
Filler	*Se levantan muy temprano para cuidar de los animales; entre ellos, vacas y cerdos.*
Critical item	***Iván y Rosa crían vacas, cerdos y hasta cabras.*** *El trabajo que hacen no es fácil.*
Filler	*A sus hijos no les gusta la vida en el campo.*

'Ivan and Rosa are farmers and owners of a large farm. They get up very early to take care of the animals, including cows and pigs**. Ivan and Rosa raise cows, pigs, and even goats**. Their job is not easy. Their children do not like living in the countryside.'

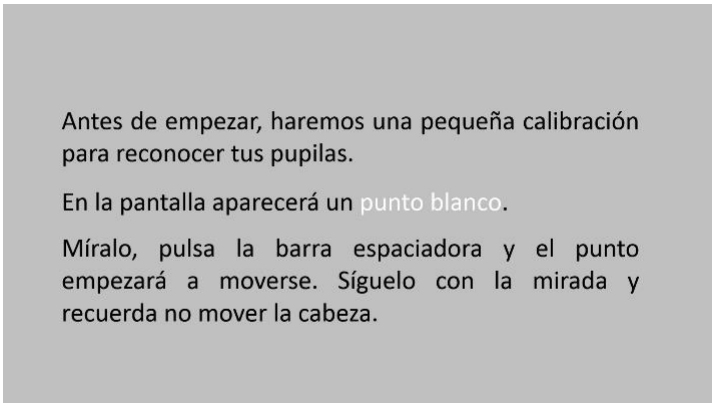
Context	*Juan y Sara son dos expertos en la Antigüedad clásica. Por eso les gusta visitar Grecia y Roma.*
Filler	*Tienen excelentes conocimientos de distintas lenguas, como el latín o el griego.*
Critical item	***Juan y Sara saben latín, griego y hasta persa.*** *Les encanta la filología clásica.*
Filler	*Pasan mucho tiempo en la biblioteca estudiando textos clásicos.*

'Juan and Sara are two experts in classical antiquity. For that reason, they like to visit Greece and Rome. They have excellent knowledge of different languages, such as Latin or Greek. **Juan and Sara know Latin, Greek, and even Persian**. They love classical philology. They spend much time in the library studying classical texts.'

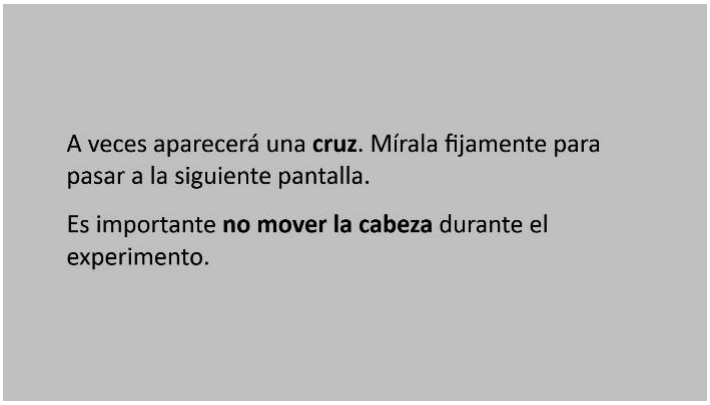
Appendix G. Instructions of the eye-tracking experiment



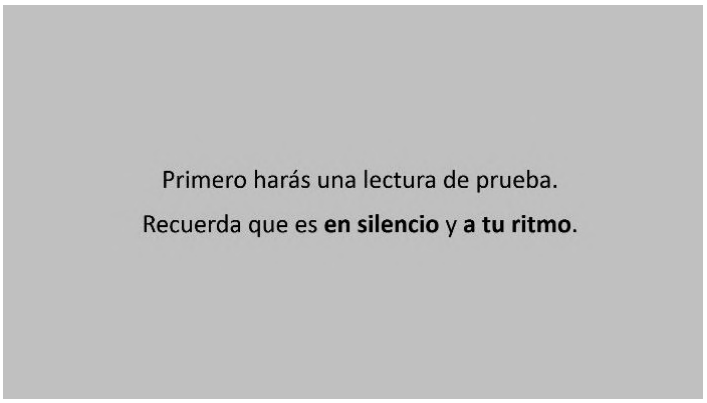
'Now, you are going to take a self-pace reading experiment: **you decide your own reading pace.** Read every sentence in silence. When you have finished, press the space bar to go to the next screen.'



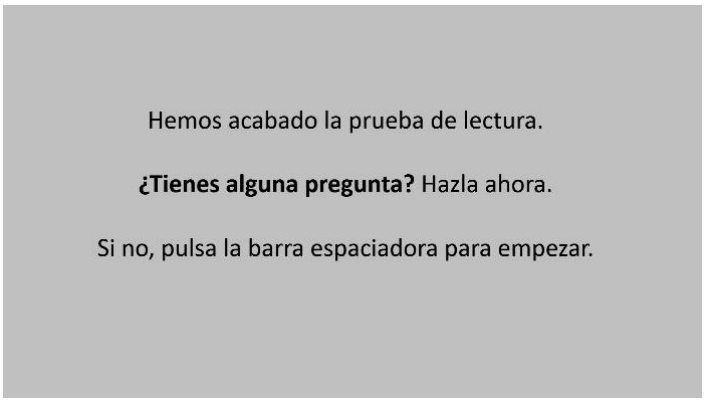
'Before starting, we will do a small calibration to recognize your pupils. On the screen, a white dot will appear. Look at it, press the space bar, and the dot will start moving. Follow it with your gaze and remember not to move your head.'



'From time to time, a **cross** will appear. Look at it to go to the next slide. It is important **not to move your head** during the experiment.'



'You will first do a practice trial. Remember that it is **in silence and at your own pace**.'



'The practice trial is over. **Do you have any questions?** Ask it now. If not, press the space bar to start.'

Appendix H. Statistical results

Conditions

Focus marking
(a1b1): unmarked utterance and implicit alternative
(a1b2): marked utterance and implicit alternative
(a2b1): unmarked utterance and simple alternative
(a2b2): marked utterance and simple alternative
(a3b1): unmarked utterance and complex alternative
(a3b2): marked utterance and complex alternative

Degree of pragmatic plausibility
(a1b2): plausible utterance and implicit alternative
(a1c2): implausible utterance and implicit alternative
(a2b2): plausible utterance and simple alternative
(a2c2): implausible utterance and simple alternative
(a3b2): plausible utterance and complex alternative
(a3c2): implausible utterance and complex alternative

Areas of Interest (AOI)

C: conceptual mean
U: utterance mean
A: alternative
FO: focus operator
F: focus (unmarked, marked)

Models

Model	Conditions under study	Hypothesis (utterance mean in TRT)
1	a1b1 / a1b2	a1b1 = a1b2
2	a2b1 / a2b2	a2b1 = a2b2
3	a3b1 / a3b2	a3b1 = a3b2
4	a1b2 / a1c2	a1b2 < a1c2
5	a2b2 / a2c2	a2b2 < a2c2
6	a3b2 / a3c2	a3b2 < a3c2
7	a1b1, a2b1, a3b1 / a1b2, a2b2, a3b2	-
8	a1b2, a2b2, a3b2 / a1c2, a2c2, a3c2	-

Model 1: unmarked/marked utterance and implicit alternative (a1b1 / a1b2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b1	219.38	8.35	5.05	217.99	8.4
U	a1b2	-9.78	10.41	5.04	208.21	8.3
C	a1b1	33.54	10.60	5.88	251.53	8.34
C	a1b2	2.10	10.54	5.88	220.09	8.25
FO	a1b2	30.91	10.41	5.00	248.90	8.31
F	a1b1	51.58	10.51	5.43	269.57	8.38
F	a1b2	26.33	10.44	5.44	244.32	8.28

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b1	118.32	11.84	5.05	118.33	11.84
U	a1b2	2.28	14.71	5.04	120.61	11.72
C	a1b1	11.34	15.00	5.88	129.67	11.81
C	a1b2	1.34	14.90	5.88	119.67	11.67
FO	a1b2	35.74	14.71	5.00	154.07	11.73
F	a1b1	-24.61	14.85	5.43	93.72	11.77
F	a1b2	-27.10	14.75	5.44	91.23	11.63

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b1	337.53	14.75	5.05	335.76	14.83
U	a1b2	-7.82	17.89	5.04	327.94	14.67
C	a1b1	45.48	18.28	5.88	381.25	14.73
C	a1b2	3.38	18.16	5.53	339.14	14.57
FO	a1b2	66.51	17.90	5.00	402.27	14.69
F	a1b1	27.13	18.08	5.43	362.89	14.78
F	a1b2	-1.83	17.96	5.44	333.93	14.62

Model 2: unmarked/marked utterance and simple alternative (a2b1 / a2b2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a2b1	214.39	8.29	5.17	213.01	8.32
U	a2b2	-3.10	10.36	5.15	209.91	8.25
C	a2b1	25.88	10.49	5.81	238.88	8.30
C	a2b2	-0.97	10.43	5.81	212.03	8.22
A	a2b1	-21.74	10.47	5.66	191.27	8.34
A	a2b2	-14.19	10.41	5.65	198.82	8.26
FO	a2b2	60.91	10.37	5.00	273.92	8.29
F	a2b1	111.21	10.44	5.44	324.22	8.34
F	a2b2	21.53	10.38	5.44	234.54	8.26

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a2b1	103.03	11.75	5.17	103.04	11.75
U	a2b2	7.75	14.64	5.15	110.80	11.66
C	a2b1	-1.40	14.84	5.81	101.65	11.74
C	a2b2	6.78	14.76	5.81	109.83	11.63
A	a2b1	-0.18	14.79	5.66	102.87	11.72
A	a2b2	-11.08	14.71	5.65	91.96	11.61
FO	a2b2	42.61	14.65	5.00	145.66	11.70
F	a2b1	-22.51	14.74	5.44	80.54	11.71
F	a2b2	2.70	14.66	5.44	105.75	11.61

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a2b1	317.31	14.64	5.17	315.55	14.69
U	a2b2	4.64	17.82	5.15	320.19	14.57
C	a2b1	24.86	18.07	5.81	340.40	14.65
C	a2b2	6.21	17.97	5.81	321.76	14.53
A	a2b1	-21.93	18.01	5.66	293.62	14.71
A	a2b2	-25.23	17.91	5.65	290.31	14.58
FO	a2b1	103.33	17.83	5.00	418.87	14.66
F	a2b1	88.71	17.96	5.44	404.26	14.72
F	a2b2	24.25	17.86	5.44	339.80	14.59

Model 3: unmarked/marked utterance and complex alternative (a3b1 / a3b2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3b1	203.64	8.21	5.65	202.26	8.19
U	a3b2	7.34	10.30	5.50	209.60	8.19
C	a3b1	11.71	10.38	6.28	213.96	8.33
C	a3b2	4.44	10.38	6.27	206.70	8.33
A	a3b1	-27.56	10.52	6.67	174.70	8.54
A	a3b2	-29.81	10.52	6.66	172.44	8.53
FO	a3b2	73.82	10.40	5.00	276.07	8.29
F	a3b1	98.85	10.35	5.45	301.10	8.26
F	a3b2	43.42	10.35	5.44	245.67	8.26

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3b1	101.88	11.61	5.65	101.89	11.61
U	a3b2	0.67	14.56	5.50	102.56	11.60
C	a3b1	5.51	14.67	6.28	107.40	11.80
C	a3b2	4.91	14.67	6.27	106.80	11.80
A	a3b1	19.31	14.86	6.67	121.20	12.07
A	a3b2	16.51	14.86	6.66	118.40	12.06
FO	a3b2	-16.42	14.68	5.00	85.47	11.70
F	a3b1	-33.57	14.57	5.45	68.32	11.61
F	a3b2	-39.96	14.57	5.44	61.93	11.61

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3b1	305.95	14.50	5.65	304.18	14.47
U	a3b2	7.89	17.72	5.50	312.07	14.47
C	a3b1	17.20	17.87	6.28	321.38	14.74
C	a3b2	9.34	17.87	6.27	313.52	14.74
A	a3b1	-8.66	18.16	6.67	295.52	15.15
A	a3b2	-13.69	18.16	6.66	290.48	15.14
FO	a3b2	56.66	17.91	5.00	360.84	14.66
F	a3b1	64.76	17.80	5.45	368.94	14.59
F	a3b2	2.94	17.80	5.44	307.12	14.59

Model 4: plausible/implausible utterance and implicit alternative (a1b2 / a1c2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b2	209.60	8.26	5.04	187.16	8.30
U	a1c2	-8.33	10.34	5.09	244.32	8.31
C	a1b2	11.88	10.46	5.88	246.01	8.25
C	a1c2	-15.13	10.51	6.00	248.90	8.30
FO	a1b2	40.69	10.33	5.00	193.07	8.31
FO	a1c2	37.80	10.34	5.00	220.09	8.33
F	a1b2	36.11	10.36	5.44	199.88	8.28
F	a1c2	-21.05	10.42	5.67	208.21	8.30

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b2	120.60	11.71	5.04	120.61	11.72
U	a1c2	-5.73	14.62	5.09	114.88	11.73
C	a1b2	-0.95	14.80	5.88	119.67	11.67
C	a1c2	-14.98	14.88	6.00	105.64	11.73
FO	a1b2	33.46	14.60	5.00	154.07	11.73
FO	a1c2	23.67	14.62	5.00	144.28	11.76
F	a1b2	-29.38	14.64	5.44	91.23	11.63
F	a1c2	-45.46	14.73	5.67	75.15	11.66

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b2	329.71	14.60	5.04	327.94	14.67
U	a1c2	-13.81	17.79	5.09	314.13	14.68
C	a1b2	11.20	18.04	5.88	339.14	14.57
C	a1c2	-29.43	18.13	6.00	298.51	14.67
FO	a1b2	74.33	17.76	5.00	402.27	14.69
FO	a1c2	61.61	17.79	5.00	389.55	14.72
F	a1b2	5.99	17.83	5.44	333.93	14.62
F	a1c2	-66.16	17.94	5.67	261.78	14.65

Model 5: **plausible/implausible utterance and simple alternative** (a2b2 / a2c2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a2b2	211.30	8.22	5.15	209.91	8.25
U	a2c2	5.60	10.36	5.15	215.51	8.32
C	a2b2	2.12	10.38	5.81	212.03	8.22
C	a2c2	6.60	10.44	5.82	216.51	8.30
A	a2b2	-11.09	10.35	5.65	198.82	8.26
A	a2c2	9.26	10.39	5.44	219.17	8.34
FO	a2b2	64.01	10.30	5.00	273.92	8.29
FO	a2c2	79.63	10.36	5.00	289.54	8.37
F	a2b2	24.63	10.33	5.44	234.54	8.26
F	a2c2	2.21	10.42	5.68	212.12	8.34

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a2b2	110.78	11.65	5.15	110.80	11.66
U	a2c2	-6.10	14.64	5.15	104.70	11.76
C	a2b2	-0.97	14.68	5.81	109.83	11.63
C	a2c2	-12.45	14.77	5.82	98.34	11.74
A	a2b2	-18.83	14.63	5.65	91.96	11.61
A	a2c2	-2.53	14.67	5.44	108.27	11.71
FO	a2b2	34.86	14.56	5.00	145.66	11.70
FO	a2c2	28.63	14.65	5.00	139.43	11.81
F	a2b2	-5.05	14.58	5.44	105.75	11.61
F	a2c2	-55.80	14.72	5.68	54.99	11.72

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a2b2	321.95	14.53	5.15	320.18	14.57
U	a2c2	-0.48	17.82	5.15	319.71	14.70
C	a2b2	1.57	17.88	5.81	321.76	14.53
C	a2c2	-5.41	17.99	5.82	314.77	14.65
A	a2b2	-29.88	17.82	5.65	290.31	14.58
A	a2c2	6.79	17.87	5.44	326.97	14.71
FO	a2b2	98.68	17.72	5.00	418.87	14.66
FO	a2c2	108.10	17.83	5.00	428.28	14.78
F	a2b2	19.61	17.76	5.44	339.80	14.59
F	a2c2	-53.54	17.93	5.68	266.64	14.71

Model 6: plausible/implausible utterance and complex alternative (a3b2 / a3c2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3b2	210.98	8.20	5.50	209.60	8.19
U	a3c2	-2.77	10.31	5.52	206.83	8.21
C	a3b2	-2.90	10.41	6.27	206.70	8.33
C	a3c2	-12.47	10.43	6.28	197.12	8.35
A	a3b2	-37.15	10.57	6.66	172.44	8.53
A	a3c2	-22.96	10.54	6.55	186.63	8.50
FO	a3b2	66.48	10.36	5.00	276.07	8.29
FO	a3c2	80.18	10.38	5.00	289.78	8.31
F	a3b2	36.08	10.34	5.44	245.67	8.26
F	a3c2	-12.42	10.36	5.67	197.18	8.28

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3b2	102.55	11.60	5.50	102.56	11.60
U	a3c2	4.78	14.58	5.52	107.35	11.63
C	a3b2	4.24	14.73	6.27	106.80	11.80
C	a3c2	10.34	14.75	6.28	112.90	11.83
A	a3b2	15.84	14.94	6.66	118.40	12.06
A	a3c2	26.86	14.89	6.55	129.42	12.00
FO	a3b2	-17.09	14.63	5.00	85.47	11.70
FO	a3c2	-17.24	14.65	5.00	85.32	11.73
F	a3b2	-40.63	14.56	5.44	61.93	11.61
F	a3c2	-55.97	14.59	5.67	46.60	11.64

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3b2	313.84	14.49	5.50	312.07	14.47
U	a3c2	2.00	17.74	5.52	314.08	14.50
C	a3b2	1.45	17.94	6.27	313.52	14.74
C	a3c2	-2.05	17.97	6.28	310.02	14.77
A	a3b2	-21.58	18.25	6.66	290.49	15.14
A	a3c2	3.53	18.19	6.55	315.60	15.06
FO	a3b2	48.77	17.84	5.00	360.84	14.66
FO	a3c2	62.31	17.87	5.00	374.38	14.69
F	a3b2	-4.95	17.78	5.44	307.12	14.59
F	a3c2	-68.80	17.81	5.67	243.27	14.61

Model 7: Focus marking all conditions (a1b1, a2b1, a3b1, a1b2, a2b2, a3b2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b1	219.38	8.35	5.05	217.99	8.40
U	a3b1	-15.73	10.48	5.65	202.26	8.19
U	a2b1	-4.98	10.45	5.17	213.01	8.32
U	a2b2	-8.08	10.39	5.15	209.91	8.25
U	a1b2	-9.78	10.41	5.04	208.21	8.30
U	a3b2	-8.39	10.45	5.50	209.60	8.19
C	a1b1	33.54	10.60	5.88	251.53	8.34
C	a3b1	-4.02	10.66	6.28	213.96	8.33
C	a2b1	20.89	10.56	5.81	238.88	8.30
C	a2b2	-5.95	10.50	5.81	212.03	8.22
C	a1b2	2.10	10.54	5.88	220.09	8.25
C	a3b2	-11.29	10.65	6.27	206.70	8.33

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b1	118.32	11.84	5.05	118.33	11.84
U	a3b1	-16.44	14.79	5.65	101.89	11.61
U	a2b1	-15.29	14.77	5.17	103.04	11.75
U	a2b2	-7.53	14.69	5.15	110.80	11.66
U	a1b2	2.28	14.71	5.04	120.61	11.72
U	a3b2	-15.77	14.74	5.50	102.56	11.60
C	a1b1	11.34	15.00	5.88	129.67	11.81
C	a3b1	-10.93	15.11	6.28	107.40	11.80
C	a2b1	-16.69	14.93	5.81	101.65	11.74
C	a2b2	-8.50	14.85	5.81	109.83	11.63
C	a1b2	1.34	14.90	5.88	119.67	11.67
C	a3b2	-11.53	15.11	6.27	106.80	11.80

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a1b1	337.53	14.75	5.05	335.76	14.83
U	a3b1	-31.59	18.04	5.65	304.18	14.47
U	a2b1	-20.22	17.98	5.17	315.55	14.69
U	a2b2	-15.58	17.88	5.15	320.19	14.57
U	a1b2	-7.82	17.89	5.04	327.94	14.67
U	a3b2	-23.69	17.98	5.50	312.07	14.47
C	a1b1	45.48	18.28	5.88	381.25	14.73
C	a3b1	-14.38	18.41	6.28	321.38	14.74
C	a2b1	4.64	18.19	5.81	340.40	14.65
C	a2b2	-14.01	18.09	5.81	321.76	14.53
C	a1b2	3.38	18.16	5.88	339.14	14.57
C	a3b2	-22.24	18.41	6.27	313.52	14.74

Model 8: Pragmatic plausibility all conditions (a1b2, a2b2, a3b2, a1c2, a2c2, a3c2)

First-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3c2	-11.16	10.47	5.52	206.83	8.21
U	a2b2	-8.08	10.39	5.15	209.91	8.25
U	a1c2	-18.11	10.42	5.09	199.88	8.31
U	a1b2	-9.78	10.41	5.04	208.21	8.30
U	a3b2	-8.39	10.45	5.50	209.60	8.19
U	a2c2	-2.48	10.45	5.15	215.51	8.32
C	a3c2	-20.87	10.67	6.28	197.12	8.35
C	a2b2	-5.95	10.50	5.81	212.03	8.22
C	a1c2	-24.91	10.58	6.00	193.07	8.30
C	a1b2	2.10	10.54	5.88	220.09	8.25
C	a3b2	-11.29	10.65	6.27	206.70	8.33
C	a2c2	-1.48	10.56	5.82	216.51	8.30

Second-pass reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3c2	-10.98	14.77	5.52	107.35	11.63
U	a2b2	-7.53	14.69	5.15	110.80	11.66
U	a1c2	-3.45	14.73	5.09	114.88	11.73
U	a1b2	2.28	14.71	5.04	120.61	11.72
U	a3b2	-15.77	14.74	5.50	102.56	11.60
U	a2c2	-13.63	14.77	5.15	104.70	11.76
C	a3c2	-5.43	15.13	6.28	112.90	11.83
C	a2b2	-8.50	14.85	5.81	109.83	11.63
C	a1c2	-12.69	14.98	6.00	105.64	11.73
C	a1b2	1.34	14.90	5.88	119.67	11.67
C	a3b2	-11.53	15.11	6.27	106.80	11.80
C	a2c2	-19.99	14.93	5.82	98.34	11.74

Total reading time

AOI	Condition	Estimate	StdErr	NLetters	FRT.Pred	FRT.Pred.StdErr
U	a3c2	-21.69	18.01	5.52	314.08	14.50
U	a2b2	-15.58	17.88	5.15	320.19	14.57
U	a1c2	-21.63	17.92	5.09	314.13	14.68
U	a1b2	-7.82	17.89	5.04	327.94	14.67
U	a3b2	-23.69	17.98	5.50	312.07	14.47
U	a2c2	-16.05	17.98	5.15	319.71	14.70
C	a3c2	-25.74	18.44	6.28	310.02	14.77
C	a2b2	-14.01	18.09	5.81	321.76	14.53
C	a1c2	-37.25	18.24	6.00	298.51	14.67
C	a1b2	3.38	18.16	5.88	339.14	14.57
C	a3b2	-22.24	18.41	6.27	313.52	14.74
C	a2c2	-20.99	18.19	5.82	314.77	14.65

Hypothesis tests (p-values)

Model	Hyptohesis	FPRT	SPRT	TRT
1	a1b1 = a1b2	1	1	1
2	a2b1 = a2b2	1	1	1
3	a3b1 = a3b2	1	1	1
4	a1b2 < a1c2	0.6309	0.6309	0.6309
5	a2b2 < a2c2	0.8832	0.8832	0.8832
6	a3b2 < a3c2	1	1	1

As of the high number of hypothesis tests all p-values were corrected using the Holm method.