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CHAPTER 5

Processing additivity in Spanish

incluso vs. *además*

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This paper offers an experimental analysis of how additive discourse relations
are processed in Spanish. The processing data were obtained from an eye-track-
ing reading experiment on utterances in which the focus operator *incluso* 'even'
and the additive connective *además* 'furthermore' were either absent or present.
Incluso acts fundamentally on the level of the information structure, whereas
además is generally found in argumentative relations. Results show that, despite
some differences during semantic and syntactic integration, the presence of a
discourse marker affects principally high-level processing. These results seem to
underpin theoretical studies that claim for a mainly procedural meaning of dis-
course markers.

Keywords: *incluso*, *además*, information structure, argumentation, eye-tracking,
procedural meaning, additivity

1.   Introduction

During verbal comprehension and production, speakers resort to a number of
strategies to combine information. One of them is additivity,[1] in which two (or
more) linguistic elements are added up to perform a given discursive function
(Domínguez García 2007: 27; Martín Zorraquino and Portolés 1999: 4093) in either

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[1]   In their taxonomy of coherence relations based on semantic primitives, Sanders, Spooren
and Nordmann (1992) treat additivity as one of the two basic discursive operations together with
causality.

of these four discourse levels:[2] discourse organization,[3] reformulation,[4] information structure or argumentation.

In each of these levels, discourse segments can be linked by means of discourse markers, i.e. linguistic devices with a fundamentally procedural meaning that are the result of a process of grammaticalization. Their main function is to guide inferential processes in a communicative act (Blakemore 1987, 2002; Murillo 2010, amongst others). Thus, discursive organization can be signalled by markers such as *en primer lugar* 'firstly', *en segundo lugar* 'secondly'…; reformulation is marked by connectives like *esto es, o sea*, 'that is'; *incluso* 'even' or *también* 'also' are instances of discourse markers affecting the information structure[5] of an utterance. Finally, in the case of argumentation, co-oriented discourse members of an utterance can be linked by additive or consecutive connectives (*además* 'furthermore', *por tanto* 'therefore'), whereas anti-oriented arguments are combined by means of counter-argumentative connectives (*sin embargo* 'however', *no obstante* 'nonetheless'…).

In this paper, we propose an experimental analysis of how two additive particles behave in discourse: the focus operator *incluso* 'even', which acts fundamentally on the level of the information structure of the utterance; and the additive connective *además* 'furthermore', affecting mainly the argumentative dimension.[6] Both experiments were carried out separatedly, since our fundamental aim was to compare

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2.   These levels correspond to the textual plane of discourse. Discourse markers can also act in the interactional (*listen, no?*) and in the modality plane (*frankly, apparently*) (Loureda and Acín 2010: 24, see also Briz 2008).

3.   Discourse organization is understood here in terms of "discourse ordering" as "the continued development of a topic structured in several parts according to a certain order" (Garcés 2008: 7, our translation).

4.   Strictly speaking, reformulation is "a movement of two places (α and β)" (Pons 2013: 153, our translation) in which, even if the speaker regards the formulation stated in α as insufficient, and substitutes it by another formulation β, "the relation α.(φ) β remains active in the discursive memory, to the extend that what the speaker intends with his double formulation is that *both α and β hold a place in the global processing of this intervention*" (*idem* 163, our translations and our emphasis). In conclusion, compared to paraphrasing and correction, reformulation presupposes the discursive subsistence of both members.

5.   These are commonly "divided into two groups: 'additive' or 'inclusive' particles include some alternative(s) as possible value(s) for the variable of their scope; 'restrictive' or 'exclusive' particles imply that none of the alternatives under consideration satisfies the relevant open sentence." (König 1991: 33). In this work only additive markers (e.g. *incluso* 'even') will be dealt with.

6.   We will adhere to prototypical structures with *incluso* and *además*, thus leaving aside further possible uses of both *incluso* and *además* concerning other levels of discourse, namely the use of *incluso* in the argumentative plane and the use of *además* with functions affecting the information structure and, therefore, transcending its connective meaning (cf. Fuentes Rodríguez 2009).

how *incluso* and *además* affect processing when they are inserted in an utterance. In our view, these comparisons provide a good insight in how focus operators and additive markers in Spanish work as functional classes, permit to establish possible correlations between the pragmatic, semantic and syntactic features of particles and the cognitive effort needed to process utterances, and allow to draw conclusions on the processing of different sorts of additivity in Spanish.

1. *Incluso* 'even' as an additive focus operator

Due to its processing instruction, *incluso* 'even' compels a reader to process the element it preceeds as more informative than the utterance alternative, that is, the set of possible substitutes for the focus (Rooth 1985). In (1):

(1) Y pienso en esta imagen de malienses desplazados de sus casas por otros malienses y por gentes venidas de otros países (muchos de los yijadistas que hoy ocupan el norte proceden de Argelia, Mauritania, Níger, Nigeria$_{[alternative]}$ o **incluso**$_{[FP]}$ Pakistán y Somalia$_{[contrastive\ focus]}$).

'And I imagine all those Malians displaced from their homes by other Malians and by people from other countries (many of the jihadists occupying the North today come from Algeria, Mauritania, Niger, Nigeria$_{[alternative]}$ or *even*$_{[FP]}$ Pakistan and Somalia$_{[contrastive\ focus]}$).' (CORPES XXI [17–2–16], our translation)

the countries mentioned at the end of the fragment constitute the commentary to an information topic (*Where do jihadists occupying the North come from?*). The countries can, in turn, be splitted into those conforming the alternative of the utterance – Algeria, Mauritania, Niger and Nigeria – and those conforming the contrastive focus[7] – Pakistan and Somalia. The latter countries are added to the former[8] and marked by means of *incluso* as the most informative expression within

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7. A *contrastive focus* (as opposed to an *informative focus*, that is, the focus that adds new information to the common ground by widening and expanding it [Escandell Vidal and Leonetti 2009: 15]) applies to the linguistic material "that the speaker calls to the addressee's attention, thereby often evoking a contrast with other entities that might fill the same position" (Gundel and Fretheim 2005: 181). For an overview of other denominations, see Portolés 2010, Loureda et al. 2015.

8. *Incluso* displays conventionally an additive structure, regardless of whether the alternative is explicit, as in (1), or only accessible contextually, as in the following adapted example in (1'):

(1') Y pienso en esta imagen de malienses desplazados de sus casas por otros malienses y por gentes venidas de otros países (muchos de los yijadistas que hoy ocupan el norte proceden **incluso** de Pakistán y Somalia).

the whole set due to its capacity to trigger greater contextual effects in the interlocutor (Sperber and Wilson 1995[1986]). In this sense, the discourse segments linked by *incluso* can be arranged in an additive scale in which the upper value is more informative than the previous one/s, since it corresponds to "the sum of the lower value plus a further element" (Portolés 2007: 139; 2010: 242), and in which, additionally, the discourse segment under the scope of *incluso*[9] – illustrated in small capital letters in the scale below – is informatively stronger than its alternative (whether explicit or not). For instance, "[many of the jihadists] come *even* from Pakistan and Somalia" may trigger the conclusion that Mali is being besieged by jihadists coming from everywhere. Thus, two information-structure related phenomena converge on the contrastive focus of the utterance (Portolés 2007: 145 ss.):

$$\left. \begin{array}{r} \text{+ strength} \\ \text{Algeria, Mauritania, Niger, Nigeria + } \text{Pakistan and Somalia} - \\ \text{Algeria, Mauritania, Niger, Nigeria } - \\ \text{– strength} \end{array} \right|$$

The scale evoked by *incluso* is due to the procedural meaning of the discourse particle and has, in turn, a pragmatic foundation (Portolés 2007: 137–138; Gast and van der Auwera 2011): our encyclopaedic knowledge allows us to access the fact that Algeria, Mauritania, Niger and Nigeria are closer to Mali than Pakistan and Somalia, and to the *topos* that distance between countries prevents people from moving from one state to another. The informative strength *incluso* conveys to its scope, and its syntagmatic polyfunctionality[10] can additionally affect the

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'And I imagine all those Malians displaced from their homes by other Malians and by people from other countries (many of the jihadists occupying the North today **even** come from Pakistan and Somalia).'

(adapted from CORPES XXI [14–2–16], our translation)

Note that with an open lexical paradigm like the world countries, and with no further contextual constraints, as in (1′), the conventional implicature drawn from *incluso* evokes "other countries" as the minimum alternative, more underdetermined than the alternative in (1). This does not occur when both alternative and focus build a closed paradigm that generally has its basis on idiomatic-semantic or terminological structures, like, for instance, the paradigm of basic arithmetic operations (add, subtract, multiply and divide). Schwenter and Vasishth (2000) remind that the contextual accessibility of the alternative is a requirement for any proper use of *incluso*.

9. Although in our experimental utterances focus and scope coincide, this must not necessarily be the case (König 1991).

10. Bazzanella (1995) assigns two types of polyfunctionality to discourse markers: one of syntagmatic nature, relative to their capacity to display in the same context functions adscribed to different levels (three, for Bazzanella: interactional, meta-textual and cognitive); and one of paradigmatic nature, by which discourse markers can take over different values if the context varies.

argumentative level of discourse. More precisely, *incluso* can introduce a "sufficient" argument for the continuation of discourse (Portolés 2001[1998]), as in (2):

(2) María ayuda a sus hermanos, a sus amigos e **incluso** a los desconocidos. Es muy buena[conclusion].

'María helps her siblings, her friends and *even* strangers. She is very kind.[conclusion]'

The ability to trascend the level of information structure endows *incluso* with features concerning argumentation also shared by the additive connective *además*.

2. *Además* as an additive argumentative connective

Additivity can also be marked in Spanish by means of the connective *además* 'furthermore'. As a connective, *además* links two discourse members guiding the hearer or reader towards a conclusion drawn from both members as a whole (Martín Zorraquino and Portolés 1999: 4093):

(3) La mixomatosis golpea a las poblaciones de conejos todavía hoy, principalmente durante los meses de calor (…). La EVH los ataca, por su parte, en los meses fríos[1st argument]. **Además**[CONN], las pautas de gestión del campo han cambiado (…)[2nd argument]. Todo ello ha provocado descensos abismales en la abundancia de conejos [conclusion].

'Myxomatosis strikes rabbit population still today, mainly during the warm months (…). VHD, in turn, attacks in the cold months.[1st argument]. *Furthermore*[CONN], field management has changed. [2nd argument]. That all has lead to major decreases in rabbit abundance.[conclusion]'

(CORPES XXI [17–2–16], our translation)

Además links "two utterances with the same argumentative orientation, in such a way that the second member gives rise to inferences that must be added to the inferences already drawn from the previous member, so that the conclusion obtained will be far more constrained" (Montolío Durán 2001: 142). Indeed, such inferences allow to restrict the possible contexts that can be accessed by the interlocutor during the intepretation of the utterance. *Además* integrates the discourse segment it introduces with the previous one (or ones). This way, it confers to its host segment the nature of an "over-argument". As a result, when added to the first segment(s) "by a procedure of argumentative accumulation, what it really leads to is an increase of the weight of the preceding arguments, which it reinforces" (Domínguez García 2007: 60). Thus, the segments connected by *además* can be arranged in an additive scale, as happens with *incluso*, but in which the second discourse member does not necessarily bear a greater argumentative strength, nor is sufficient for the discourse continuation:

$$\left. \begin{array}{r} \text{+ strength} \\ \text{Myxomatosis + VHD + changes in field management} \\ \text{Myxomatosis + VHD} \\ \text{– strength} \end{array} \right|$$

Proof of this is that *además* generally allows to alter the order of the arguments it combines, without leading to an utterance that is pragmatically costly to process (Portolés 2007: 145):

(4)   'Field management has changed.[1st argument] ***Además***, myxomatosis strikes rabbit population still today, mainly during the warm months (…) and VHD attacks in the cold months.[2nd argument] That all has lead to major decreases in rabbit abundance.[conclusion]'

Contrarily, reversing the order of the arguments is not possible with *incluso* without leading to a certain pragmatic oddity, like in (5b) (versus the pragmatically sound version in [5a]):

(5)   a.   David habla inglés, francés, italiano, **incluso chino**
            'David speaks English, French, Italian, *even* Chinese'

      b.   #David habla chino, inglés, francés, **incluso italiano**
            'David speaks Chinese, English, French, *even* Italian'

In summary, *incluso* 'even' and *además* 'furthermore' generate additive structures but exhibit differences concerning the level of discourse in which they mainly act, as well as relative to their impact on their host members. *Incluso* marks a processing instruction related to information structure that may as well have consequences for argumentation. One could speak of a "quantitative" – it adds elements –, and at the same time "qualitative" instruction – it marks the utterance focus as more informative and argumentatively stronger than the alternative; in contrast, *además* operates as an argumentative connective combining pieces of information, thus expressing a fundamentally "quantitative" instruction (Table 1):[11]

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11.   This work concentrates on *incluso* as a focus operator, not on its use as a connective. As a focus operator, *incluso* is syntactically integrated in the utterance and modifies the phrase or clause under its scope, with which it shares a melodic contour. In its connective use, conversely, it is detached from its host member, usually separated from it by a comma, and forms an independent intonational group. The connective *además* always ocurrs between pauses and forms an independent intonational group (Fuentes Rodríguez 2009, DPDE).

Table 1. *Incluso* vs. *además*.

incluso 'even'	*además* 'furthermore'
Generates fundamentally **informative structures**	Generates mainly **argumentative structures**
Adds an informatively focused element to a **set of alternatives** (given sintagmatically or accessible from the context)	Adds two or more **co-oriented discourse segments** leading to a conclusion ($a1 + a2 \rightarrow c$)
Generates a whole of which the focused element is **more informative** that the set of alternatives	Generates a whole of which both discourse segments display a **similar argumentative strength**

3. An experimental approach to additivity processing in Spanish

In spite of the fact that both *incluso* and *además* give rise to additive structures, as has been pointed out above, the actual realization of such structures diverges due to their morphosyntactic, pragmatic and semantic characteristics. In this sense, and returning to our view of communication as a cognitive process, we shall argue that their different manners of "adding" can result in different processing patterns. To verify this, the processing patterns have been analysed for a series of utterances containing *incluso / además* (what we here call "the explicit condition") and contrasted to those patterns resulting from processing identical utterances without a discourse particle ("the implicit condition").

Our hypothesis was tested in an eye-tracking reading experiment. This type of experiment allows establishing possible correlations between the morphosyntactic, semantic and pragmatic features of linguistic devices – here, the focus operator *incluso* and the connective *además* – and the cognitive activity they arouse (Just and Carpenter 1980). We took participants' eye fixations – i.e. the relative stops of the eye, considering that the eyes do not progress lineally throughout a text during reading – as the main index of the attention generated by a linguistic stimulus. The underlying assumption is that a greater attention correlates with a higher processing effort, i. e. with longer fixations (Coulson and Matlock 2009: 94, Rayner 2009). As mentioned before, our aim was to obtain experimental data on possible parallelisms between the inferential routes generated by the presence versus the absence of the additive discourse markers *incluso* and *además* during linguistic processing.

3.1   Methodology, experimental design, apparatus

Two independent reading studies were carried out with a remote eye tracker RED 500 (SMI) at a sampling rate of 500 Hz. The eye movements of 40 and 20 participants were recorded for the experiment with *incluso* and the experiment with *además,* respectively. The independent variable was discourse marking in two conditions: presence – (6a) and (7a) – and absence – (6b) and (7b) – of an additive particle. Several areas of interest (AOI) in the experimental utterances were set to measure processing costs: firstly, an average utterance word, and secondly, the key regions of the focalization operation – (6a) and (6b) – and of the connection operation – (7a) and (7b):

(6)   a.   [David habla inglés, francés, italiano$_{[AOI1: set of alternatives]}$, **incluso**$_{[AOI2: focus particle]}$ chino.$_{[AOI3: focus]}]_{[AOI4: average utterance word]}$

   b.   [David habla inglés, francés, italiano$_{[AOI1: set of alternatives]}$ y chino.$_{[AOI3: focus]}]_{[AOI4: average utterance word]}$.
‘David speaks English, French, Italian [*incluso*/and] Chinese.’

(7)   a.   [Estos niños comen mucha fruta$_{[AOI1: argument 1]}$. **Además,** beben mucha leche$_{[AOI2: argument 2]}$. Están sanos.$_{[AOI3: conclusion]}]_{[AOI4: average utterance word]}$

   b.   [Estos niños comen mucha fruta$_{[AOI1: argument 1]}$. Beben mucha leche$_{[AOI2: argument 2]}$. Están sanos$_{[AOI3: conclusion]}]_{[AOI4: average utterance word]}$.
‘These children eat a lot of fruit. [*Además*,] [t]hey drink a lot of milk. They are healthy.’

Participants were provided with a context that was shown on the screen previously to the experimental utterances. This allowed us to control the common ground in order to ensure an adequate context selection by the readers (Sperber and Wilson 1986: 142). We examined the processing effort by looking at three dependent variables: the *total reading time* of an AOI, the *first-pass dwell time* and the *second-pass dwell time* of an AOI. The total reading time corresponds to the sum of all fixations on an AOI and is an indicator of the total effort needed to process the stimulus; first-pass dwell times are calculated by adding the duration of all fixations on an AOI before that AOI is left. This measure is generally associated to lexical access, parsing and to an initial construction of the assumption communicated with the utterance (Holmqvist et al. 2011: 390); finally, high-level processes are mainly reflected in re-reading times (second-pass) and reflect the reconstruction of the communicated assumption, i.e. the time needed to reinforce, modify or cancel the initially constructed assumption; and the activation of inferential processes (Escandell 2005, Dominiek 2009).

In our experimental setting, the critical stimuli (the experimental utterances) were combined with fillers in a 1:2 ratio. We created several lists of stimuli with the same number of utterances, in which the utterances were arranged according to a Latin square design (Winer 1962). Word frequency and length were controlled for (all words in the experiment on *incluso* were weighed to seven characters; in the experiment with *además*, the connective was weighed to five characters to equal its length to that of all other lexical items of the utterance). All participants had a high-education level (University degree) and were between 20 and 40 years old.

During the experiment, participants sat at 70 cm distance from the computer screen. Participants read the instructions on the same computer screen on which they would perform the reading task before proceeding to the experiment itself. Within the experiment, utterances appeared in a pseudorandomized order and were read silently. Reading was not timed, and participants decided when to move on to the next utterance. After completing the reading task, participants were informed by the researcher about the aim of the experiment.

3.2   Results of the processing study with *incluso*

The effects of the presence and absence of the scalar operator *incluso* on the processing of utterances like (6a) and (6b), repeated here for clarity, were analyzed:

(6)   a.   [David habla inglés, francés, italiano$_{[AOI1: set of alternatives]}$,
             incluso <u>chino</u>$_{[AOI2: contrastive focus]}$·]$_{[AOI3: average word]}$
             'David speaks English, French, Italian, *even* Chinese.'

       b.   [David habla inglés, francés, italiano$_{[AOI1: set of alternatives]}$ y
             chino$_{[AOI2: informative focus]}$·]$_{[AOI3: average word]}$
             'David speaks English, French, Italian and Chinese.'

In (6a) a speaker presents the fact that David speaks Chinese as more informative than him speaking the languages in the alternative, with which the focus introduced by *incluso* is contrasted. In (6b), in contrast, no conventional instruction is provided to build a scale whose last element is presented as the most informative. However, both utterances can lead towards the same conclusion. Nevertheless, whereas in (6a) access to the conclusion is facilitated conventionally by the focus particle, in (6b) it can only be accessed contextually and on the basis of the enrichment that the context provides to the propositional structure derived of the lexical content of the utterance.

Gathered data for both experiments were evaluated statistically by means of paired t-tests. Outlying values were maintained. In the processing results obtained

for the experiment on *incluso*, the *total reading time* for an average word in utterances like (6a) was always significantly higher than for an average word in utterances like (6b) (p = .03, which equals to an increase of the processing time by over 30%). Contrarily, the alternatives and the foci of both utterances did not show any significant differences (p = .22 and p = .52, respectively) (Table 2):

Table 2. *Total reading times* (in milliseconds).

	Alternative (Alt)	Focus operator (FP)	Focus (F)	Average Word (W)
(6a) David habla inglés, francés, italiano, *incluso* chino	607.40	834.15	554.76	652.07
(6b) David habla inglés, francés, italiano y chino	506.92	–	583.85	500.63
TTEST	Alt vs Alt		F vs F	W vs W
	$t(36) = -1.26$		$t(26) = -.65$	$t(39) = -2.32$
	$p = .22$		$p = .52$	$p = .03$

During the total reading time the presence of the scalar operator generates a more explicit informative structure with a higer informative load. The hearer/reader processes that additional instruction, which translates into an increase of the general processing effort, as represented by the average word of the utterance.

During the first-pass dwell time we observe a slightly changed processing pattern (see Table 3):

Table 3. *First-pass dwell time* (in milliseconds).

	Alternative (Alt)	Focus operator (FP)	Focus (F)	Average Word (W)
(6a) David habla inglés, francés, italiano, *incluso* chino	246.83	333.23	326.61	283.84
(6b) David habla inglés, francés, italiano y chino	235.96	–	420.00	271.03
TTEST	Alt vs Alt		F vs F	W vs W
	$t(36) = -.64$		$t(26) = 1.39$	$t(39) = -.76$
	$p = .52$		$p = .18$	$p = .45$

Here, the average words of the utterances did not show any statistically significant differences anymore (p = .45), nor did the alternatives or the foci (p = .52 and p = .18, respectively). It seems that during this stage, in which an initial assumption is constructed on the base of the semantic and syntactic information of the utterance, (6a) and (6b) are processed similarly.

In contrast, significant differences between both conditions were obtained during *second-pass dwell time* at the area of an utterance average word (see Table 4):

Table 4. *Second-pass dwell time* (in milliseconds).

	Alternative (Alt)	Focus operator (FP)	Focus (F)	Average Word (W)
(6a) David habla inglés, francés, italiano, *incluso* chino	360.57	500.92	228.15	368.23
(6b) David habla inglés, francés, italiano y chino	270.95		163.85	229.60
TTEST	**Alt vs Alt**		**F vs F**	**W vs W**
	$t(36) = -1.17$, $p = .25$		$t(26) = -.35$, $p = .73$	$t(39) = -2.20$, $p = .03$

Similarly to the results in the *total reading time*, during high-level processing – i.e. the reanalysis or readjustment of the communicated assumption – an average word in the utterance with *incluso* also needed a higher processing effort than in the implicit condition ($p = .03$ or over 60% more time). The alternatives and the foci, however, still did not differ ($p = .25$ and $p = .73$, respectively).

In summary, we found significant differences when we compared the time needed in each condition to process one average word during *total reading time* and during *second-pass dwell time*. The utterance with *incluso* required a higher processing effort than the utterance in the implicit condition. That indicates that the procedural instruction of *incluso* results in a reanalysis (reflected in *second-pass dwell time* and *total reading time*) of the assumption constructed during *first-pass dwell time*, which does not happen in absence of a procedural guide. Specifically, *incluso* forces the hearer/reader to mentally construct a scale considering the focused element as more informative than the alternative. This is done during high-level processing, since it implies deriving implicatures. In this case, the implicature consists in arranging the items of the alternative and the focus in a scale, contrasting the focus with the set of alternatives, and triggering the inferences to process the focus as unexpected.

As shown above, such differences could not be found during *first-pass dwell time*, which seems to indicate that the absence of a highly syntactically integrated particle like *incluso* does not lead to an additional processing effort in low-level processing.

3.3   Results of the processing study with *además*

In order to determine how the additive connective *además* can condition the processing costs of utterances, we compared the reading times recorded for utterances like (7a) and (7b):

(7) a. [Estos niños comen mucha fruta.[AOI1: DM1] **Además,** beben mucha leche[AOI2: DM2]. Están sanos. [AOI3: conclusion]][AO4: average word]

 b. Estos niños comen mucha fruta. Beben mucha leche. Están sanos..

 'These children eat a lot of fruit. [*Además,*] [t]hey drink a lot of milk. They are healthy.'

Both utterances consist of three discourse segments, the first two having the status of two arguments orienting towards the conclusion stated in the third segment. In (7a), both arguments are explicitly linked by the connective *además*, whereas in (7b), the argumentative relation can only be inferred.

    Table 5 shows the total reading times for every discourse segment of each utterance – first discourse member (DM 1), second discourse member (DM 2) and conclusion –, both in the explicit (7a) and the implicit condition (7b). For each AOI the average processing time per word was calculated to make the comparison possible:

Table 5. *Total reading times* (in milliseconds).

	DM 1	DM 2	Conclusion	Average Word
(7a) Estos niños comen mucha fruta. *Además* beben mucha leche. Están sanos.	270.98	527.36	391.00	371.90
(7b) Estos niños comen mucha fruta. Beben mucha leche. Están sanos.	341.22	450.78	403.03	428.99
TTEST	M1 vs M1	M2 vs M2	M3 vs M3	W vs W
	$t(19) = -1.36$	$t(19) = 0.81$	$t(19) = -.15$	$t(19) = -1.04$
	$p = .19$	$p = .43$	$p = .87$	$p = .30$

As a global accumulated parameter that takes into account all fixations on an AOI during the first pass and successive readings, the total reading time did not show any significant processing differences regarding the comparison between utterances whose segments are linked by means of *además* versus those with juxtaposed discourse segments. Indeed, comparing the two discourse members and the conclusion between conditions did not lead to any statistically significant differences (at an alpha-level of 0.05). Similarly, processing times for an average word did not differ significantly between conditions.

No significant statistical differences during the processing of the AOIs involved in the argumentative operation of addition (the connection of the two discourse segments by *además* and the conclusion) could be found in (7a) versus (7b) for first-pass reading, which gives account of how initial, low-level processing is carried out. Reading behaviour did not statistically differ either for the second-pass dwell time, which mainly reflects pragmatic processing associated with the repair of processing mistakes and implicature drawing. The presence of *además* in (7a) does not seem to redistribute processing of any of the three functional areas of the discursive operation of argumentation, if it is compared to what happens in (7b), where the connective is absent. However, differences between conditions were registered when the effort needed to process an average utterance word was compared by looking at the first-pass and second-pass dwell times.

Globally, an average word in the implicit condition (7b) is quantitatively more costly to process ($p < .001$, 79% more time) than a word in the condition with *además* (7a) during first-pass dwell time (see Table 6):

Table 6. *First-pass dwell time* (in milliseconds).

	DM 1	DM 2	Conclusion	Average Word
(7a) Estos niños comen mucha fruta. *Además* beben mucha leche. Están sanos.	137.98	150.40	174.08	148.93
(7b) Estos niños comen mucha fruta. Beben mucha leche. Están sanos.	139.13	98.08	191.68	267.55
TTEST	**M1 vs M1**	**M2 vs M2**	**M3 vs M3**	**W vs W**
	$t(19) = -.07$	$t(19) = 1.57$	$t(19) = -.45$	$t(19) = -4$
	$p = .94$	$p = .13$	$p = .65$	$p < .001$

It seems that the absence of *además* hinders the reader to carry out the syntactic integration – at an over-sentential level – of the utterance segments. In fact, when the reader encounters three juxtaposed discursive segments, he must reconstruct an argumentative structure in which the first two segments function as the co-oriented arguments for the conclusion stated in the third member. By contrast, *además* makes clear already at a very early stage of processing the role that should be attributed to the second discourse segment (and consequently to the first segment as well), so that the third discourse member can now only be the conclusion of the utterance drawn from the previous text. In other words, the absence of the procedural instruction triggered by *además* leaves it up to the reader to realize that the three discourse segments do not share the same argumentative status. The increase in the average processing cost per word in the implicit condition reflects the extra

effort needed to rearrange the utterance segments and to assign to them their own argumentative role.

This reading pattern is reversed during re-reading (Table 7):

Table 7. *Second-pass dwell time* (in milliseconds).

	DM 1	DM 2	Conclusion	Average Word
(7a) Estos niños comen mucha fruta. *Además* beben mucha leche. Están sanos.	91.67	318.92	190.63	179.74
(7b) Estos niños comen mucha fruta. Beben mucha leche. Están sanos.	148.77	287.43	175.08	66.17
TTEST	M1 vs M1	M2 vs M2	M3 vs M3	W vs W
	$t(19) = -1.4$	$t(19) = .33$	$t(19) = .23$	$t(19) = 2.51$
	$p = .17$	$p = .74$	$p = .81$	$p = .02$

At this processing stage, the only significant difference obtained concerns the time needed to interpret an average utterance word (since no statistically significant differences were obtained for the comparisons of the other AOIs between conditions). Reprocessing (7a) is more costly than reprocessing (7b) ($p = .02$, nearly 172%). It seems that the discourse member introduced by *además* is processed as more relevant for obtaining the conclusion stated in the third member, since this time it has been added to the first member by means of a conventional item. The procedural guide adds further information to the utterance and compels the reader to add the second member to the first discourse. Furthermore, it indicates that combining DM1 and DM2 is more relevant for drawing the conclusion. The argumentative strength of both segments as a whole increases in relation to the argumentative strength of the first segment on its own. This causes a facilitating effect to draw the conclusion. The inferential computations undergone to integrate this information lead to a global increase of the reprocessing costs of the utterance. When the connective is not given, and during first-pass reading the first two discourse segments have been mentally represented as co-oriented and as premises for the conclusion in the third member, processing does not need to be continued. The reader considers that he has inferred all possible information from the stimulus and that he has recovered the assumption that satifies his expectation of maximal relevance in relation to the processing effort employed. In fact, drawing additional inferences without further or more specific processing cues would lead to extra processing costs, which stays in contradition with the Principle of Relevance. For this reason, re-reading times decrease considerably in this condition.

4.   Discussion

The following conclusions on additivity were drawn based on the results obtained from two independent processing experiments on the Spanish discourse particles *incluso* and *además*.

Additivity (here, meaning both the addition of two arguments that belong syntactically to two different clauses, and the accumulation of elements of a list that belong to the same constituent) seems to be processed, at least partially, in a similar way when it is marked by the argumentative connective *además*, which acts at the supra-sentential level and gives rise to an additive scale (it adds the two elements it links), or by the focus operator *incluso*, which always instructs the reader to build up an additive culminative scale in which the marked focus is deemed to be more informative than its alternative/s. The comparison of how the presence or absence of a discourse particle affects processing only generated differences between conditions in terms of the effort needed to process an average utterance word.

Different strategies to extract information could be observed already during low-level processes. Whereas the presence of *incluso* in an utterance does not lead to any effect versus its absence during first-pass reading, inserting *además* reduces the reading times during low-level processing significantly as to its implicit condition. The additive instruction of *además* elucidates the relation existing between the three discourse segments (argument 1 + argument 2 → conclusion) at this stage (if the same construction is processed without *además*, the reader must infer the relation between the juxtaposed segments). This extra inferential effort explains why the processing costs in the utterance without *además* increase significantly compared to the utterance in the explicit condition. For its part, *incluso* does not seem to facilitate nor to hinder processing during an initial reading stage, since the AOIs involved in the focalization operation – the alternative, the focus operator and the focus – build an enchainment of elements that belong to the same syntactic constituent (as shown before, *incluso* is highly integrated in the clause syntax).

During high-level processing, i.e. the reanalysis of the initially recovered assumption, both *incluso* and *además* have an impact on the global processing costs of their utterances and lead to an increase of the re-reading times in comparison to the implicit conditions. It is mainly during second pass when procedural expressions are processed. In both cases, the discourse markes add information that must be integrated during the reconstruction of the comunicated assumption. For this reason, the utterances with *incluso* and *además* exhibit higher reprocessing costs compared to their implicit conditions. The reader now considers that it is worth to carry out further inferring, since the presence of a procedural instruction raises to a great extent the probability of deriving the implicatures carried by the ostensive stimulus at a lower cognitive effort. On the one hand, *incluso* leads to higher reading

times during second pass because alternative and focus must be arranged in a scale and the focus must be conferred the highest informative load. On the other hand, the connective *además* forces the reader to build up an additive scale between the connected segments: the sum of the two arguments exhibits the highest argumentative strength. In summary, both particles give rise to a re-analysis of the addition carried out during early processing stages.

According to the results presented here, it seems plausible to affirm that *incluso* and *además* are mainly procedural elements. They confer a higher load of information to utterances and can influence the processing strategies during the reconstruction of a communicated assumption. A discourse marker signals the need to readjust the first assumption drawn from the utterance (compared to the utterance without the discourse marker, in which processing is concluded before). This readjustment can lead to an increase of the processing effort affecting high-level cognitive operations.

Our results underpin theoretical studies dealing with the procedural meaning of additive discourse markers that affect the structure of an utterance on an argumentative or informative level, and prove that psycholinguistic experiments are a sound way to approach the cognitive processes underlying linguistic processing.

Acknowledgements

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