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Focus and the exclusion of alternatives:

On the interaction of syntactic structure with pragmatic inference

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Abstract

The claim that focus evokes a set of alternatives is a central issue in several accounts of the effects of focus on interpretation. This article presents two empirical studies that examine whether this property of focus is independent of contextual conditions. The syntactic operation at issue is object-fronting in German, Spanish, Greek, and Hungarian licensed by contexts involving focus on the object constituent. This operation evokes the intuition that the fronted referent excludes some or all relevant alternatives. The presented experiments deal with the question whether this interpretative property obligatorily accompanies the operation at issue or not. The empirical findings show that in German, Spanish, and Greek this intuition depends on properties of the context and is sensitive to the interaction with further discourse factors (in particular, the predictability of the referent). Hungarian displays a different data pattern: our data does not provide evidence that the syntactic operation at issue depends on the context or interacts with further discourse factors. This finding is in line with the view that evoking alternatives is inherent part of constituent-fronting in this language.

Keywords

focus, word order, pseudocleft, exclusion of alternatives, pragmatic inference

1 Preliminaries

It is a commonplace that information structure has an influence on the grammatical composition of a clause, in particular on the linear arrangement of the clause's constituents, at least in those languages in which word order is flexible. At the same time,

it is often difficult to pin down exactly what property of the context of an utterance is responsible for the choice of a particular constituent order. Notions such as "focus" or "topic" certainly play a role, but it appears that they often figure more as necessary than as sufficient conditions for the acceptability of a marked word order, because topics and foci frequently also appear in the position determined by their grammatical function in normal word order.

Models that directly encode information structure in syntactic representations (such as the cartographic model of Rizzi, 1997, or É. Kiss, 1998) compete with theories that assume a more indirect interaction between the two domains (see Fanselow, 2006; Fanselow & Lenertová, 2010; Horvath, 2010; Wedgwood, 2003; Zimmermann, 2008 for the view that discourse properties are not formal features of the syntactic configuration). Such an indirect relation may result from constraints on sentence prosody (as argued for by Szendrői, 2003, among others), or it may simply reflect the need for *some* perhaps even extragrammatical motivation for the use of a marked structure. The use of a marked construction violates an expectation of the human parser that can be used to control the listener's attention and to signal that a non-default interpretation of the utterance is intended.

In this article, we will present two experiments that we hope shed an interesting light on the issue of a direct vs. indirect interaction of syntax and information structure. The idea behind the experiments is a simple one: if the connection between a certain syntactic construction and a concept such as "exhaustive focus" is established within the grammar (syntax), then this connection must always be visible, independently of the context in which the utterance appears. If, on the other hand, the connection is established only indirectly, e.g., as a consequence of a general rule that a marked structure just draws the attention of the addressee to a deviation from the canonical structure, then the connection between the construction and a particular pragmatic effect should be flexible, depending on properties of the textual and non-textual context of the utterance.

The experimental studies were carried out in four languages: German, Spanish, Greek, and Hungarian. All these languages have in common that they have a left peripheral focus position. Moreover, left peripheral focus in all these languages is not used for new information, but it has identificational properties. Identificational focus may

be either exhaustive, in which case it excludes all relevant alternatives (i.e., it operates on the open set of all potential alternatives), or contrastive, in which case it only excludes some relevant alternatives (i.e., it operates on a closed set of evoked alternatives).¹ The languages at issue differ in this respect: preverbal focus in Hungarian is exhaustive (according to several previous analyses, see in particular Szabolcsi, 1981, É. Kiss, 1998, Horvath, 2000), while preverbal focus in German (Frey, 2004, 2005), Greek (see Tsimpli, 1995; Georgiafentis, 2004), and Spanish (Dominguez, 2004) is contrastive.² The crucial property that is used by É. Kiss (1998: 268) in order to establish the difference between Hungarian and languages of the contrastive type is that even answers to constituent questions induce focus-fronting in Hungarian (but not necessarily so in the other languages). This empirical fact shows that the focus feature in Hungarian operates on the open set of all potential alternatives. Furthermore, identificational focus *must* be realized in the preverbal position in Hungarian (see É. Kiss, 1998; Szendrői, 2003) while it can also be realized *in situ* in German (see Steube, 2001), Spanish (Dominguez, 2004), and Greek (see Tsimpli, 1995; Alexopoulou, 1999; Gryllia, 2008:43, 55).³ Finally, in some languages the preverbal constituent is ambiguous between a focus and a topic interpretation. This is always the case in German (see Speyer, 2007, for a corpus study). Our claims in the following empirical studies relate to the interpretative properties of fronted foci in this language and not to the properties of any constituent that may surface preverbally. In the other languages in our sample, there are morphosyntactic properties that distinguish fronted object foci from fronted object topics at least for a subset of the

¹ See É. Kiss, 1998:267; see also Repp, 2010:1336, for the necessity of restricting the set of alternatives to those relevant in a particular context.

² See also Frey (2010) for the view that this operation is associated with a conventional implicature that leads to an emphatic reading in German.

³ With *in situ* focus we refer to a surface realization that is identical to the canonical order. Some authors assume that even this configuration involves covert movement to the specifier of a functional projection, which accounts for the interpretational properties of these constituents (see, for instance Dominguez, 2004: 180, for Spanish). This is a theoretical question that we do not consider in this article.

- A (Greek): [*Mia péstrofa*]_F *psárepse* *o* *Manólis*.
 a trout fished the Manolis
 ‘Manolis fished A TROUT.’
- A (Hungarian): [*Pisztrángot*]_F *fogott* *Matyi*.
 trout fished Matyi
 ‘Matyi fished A TROUT.’

The answers in (1) typically also evoke the interpretation that further potential alternatives, e.g. a perch, a luce, etc. are excluded, i.e. they are identificational in the sense of É. Kiss (1998). The crucial issue is whether this interpretation comes from a conversational implicature that arises from the question/answer pair or from the syntactic construction of the answer. The question is a request to the addressee to assert the exact subset of instantiations of the *wh*- variable for which the proposition holds true (see Groenendijk and Stokhof, 1984). A cooperative answerer is expected to observe Grice’s maxim of quantity, i.e., to give a maximally informative answer to the question (Grice, 1975:45). This assumption leads to the inference that the utterer of *A* asserts the complete subset of relevant referents for which the proposition holds true, which motivates the abductive inference that the proposition does not hold true for further relevant referents (see Spector, 2005:229). This account predicts that the question-answer pair in (1) invites the interpretation that further alternatives are excluded.

In order to assess the contribution of the syntactic construction of the answer to the exhaustive nature of *A*’s interpretation, we have to compare the interpretative effect of the OVS order in (1) with the effect of the canonical order in (2). In a purely pragmatic view, the choice of the marked construction in (1) invites the interpretation that there should be some discourse-related reason for the choice of the marked order, otherwise the speaker would select the simplest possible construction (following Grice’s maxim of manner, see Grice, 1975:46). Crucially, such a conversational principle is universal, i.e., it does not predict differences between languages.

- (2) *A*´ (German): *Matthias hat [eine Forelle]_F geangelt.*

- A´ (Spanish): *Mateo ha pescado [una trucha]_F.*
 A´ (Greek): *O Manólis psárepse [mia péstrofa]_F.*
 A´ (Hungarian): *Matyi fogott [pizstrángot]_F.*

However, the syntax of the examined languages differs in two respects: the focus-fronting construction in (1) is the only option of expressing identificational focus in Hungarian, while identificational focus can also be realized *in situ* in German, Greek, and Spanish (see Section 1). Hence, an answer with the canonical order, as illustrated in (2), is felicitous in the object-focus context in the latter three languages. Second, the focus-fronting construction is interpreted as exhaustive in Hungarian, while it is interpreted as contrastive in German, Greek, and Spanish (see section 1). Hence, if the syntax of the individual languages matters, then we should obtain different data patterns in German, Spanish, Greek, and Hungarian.

The empirical issue that is addressed by the following study is to what extent the interpretative properties of OVS order hold independently of the context. If the identificational (contrastive or exhaustive) property is inherently linked to the syntactic configuration in (some of) these languages, then the form of the answer in (1) would make the exclusion of the relevant alternatives explicit, and this effect should be less dependent on context than the same intuition with canonical sentences.

2.2 Method

In order to examine the impact of the context on the interpretation of constituent-fronting, we designed an experiment in which we elicited scalar judgments on the interpretation of question-answer pairs appearing on a written questionnaire. The participants saw question-answer pairs such as (3), followed by a request to assess the extent to which the answer in the dialogue was exhaustive. The speakers had to express their judgment on a 7 point scale, with the value 7 expressing that further alternatives are possible and the value 1 expressing that such alternatives are excluded.

(3) Q: *Was hat Matthias geangelt?*

‘What did Matthias fish?’

A: *Eine Forelle hat Matthias geangelt.*

‘Matthias fished a trout.’

Kann es sein, dass Matthias außerdem noch andere Fische geangelt hat?

‘Is it possible, that Matthias also fished other fishes?’

In order to assess the effect of constituent fronting on the interpretation, we manipulated the form of answer. Object fronting as in (1) was compared with the unmarked and contextually unrestricted SVO order as in (2), and with a pseudocleft-like answer, see (4).⁴ This construction has an exhaustive interpretation that is the compositional effect of the equational predication: the presupposed set of referents in the relative clause is equated with the asserted set of referents. Moreover, this construction involves an existential presupposition (see Lambrecht, 2001:497; Hedberg, 2000:904; Doherty, 2001:460) which is not part of the effects of focus (see Rooth, 1996:§5). The crucial point for our purposes is that the interpretative properties of this construction are the result of semantic decomposition, i.e., they are expected to be independent of context. Hence, pseudoclefts are the appropriate control condition for a comparison of the effect of the context on focus-fronting with the effect of the context on a construction that inherently encodes the exclusion of alternatives.

(4) German: *Das, was Matthias geangelt hat, ist eine Forelle.*

‘What Matthias fished, is a trout.’

Spanish: *Lo que ha pescado Mateo es una trucha.*

‘What Mateo fished, is a trout.’

⁴ In the following, we refer to these constructions as “pseudoclefts”, ignoring the issue whether they involve a movement operation in the languages at issue or not. The crucial assumption for our purposes is that these constructions differ from the corresponding simple sentences in that they assert that the patient constituent identifies the exhaustive subset of potential patient referents for which the proposition holds true.

- Greek: *Aftó pu psárepse o Manólis íne mia péstrofa.*
 ‘What Manolis fished, is a trout.’
- Hungarian: *Az, amit Matyi fogott, egy pisztráng volt.*
 ‘What Matyi fished, is a trout.’

In order to assess the effect of the context on the interpretation, we employed different types of questions. The constituent question in (3, Q) (see 5a below) was compared with a question that induces a wide focus answer, as exemplified in (5b). This context is not a request for an exhaustive listing of the alternatives for which the proposition in the answer holds true. Additionally, we compared the contextual effect of the constituent question with a question type that involves the presupposition that there is a unique referent for which the proposition holds true, as it is implied by the pseudocleft question in (5c).

- (5) (a) O-focus question: ‘What did Matthias fish?’
 (b) All-focus question: ‘Why are the people on the bridge happy?’
 (c) Pseudocleft question: ‘What is that what Matthias fished?’

A note is due with respect to the congruence of the form of questions and answers. It is clear that a pseudocleft answer is not congruent with an all-focus question. A pseudocleft utterance is a possible answer to an all-focus question only in a discourse situation that presupposes some shared knowledge that is not conveyed by the question, in particular the assumption of the utterer of *A* that the proposition ‘Matthias fished *x*’ is part of the knowledge of the addressee. We suppose that the judgments of the participants indicating that alternatives are excluded stem from such a richer common ground that is evoked by the pseudocleft structure of the answer.⁵

⁵ If the non-congruent question-answer pair would be a non-interpretable stimulus, we would expect an increase of the variance in the obtained results. As may be observed in the standard errors of the obtained data (see Table 1 below), there is no such effect in the data.

In sum, we examined two factors with three levels each: (a) QUESTION: all focus question, object question, pseudocleft question; (b) ANSWER: canonical order answer, object fronting answer, pseudocleft answer. The 9 permutations of these factors were implemented in 36 items involving different lexicalizations of simple transitive clauses, resulting in a set of $36 \times 9 = 324$ question-answer pairs (see the German material in Appendix A). This material was distributed on nine different questionnaires, with each questionnaire using each of the 36 items once; hence, each experimental condition (i.e., each of the nine QUESTION/ANSWER permutations) occurred four times. The experimental items of each questionnaire were mixed with an equal number of fillers. Each questionnaire was presented to two different native speakers, i.e., the experiment was carried out with 18 native speakers of each language.⁶ The same procedure and material were used in all four languages.

2.3 Results

Each speaker gave 4 judgments per condition which resulted in a data set of 18 (speakers) \times 4 (judgments) = 72 (judgments) per condition (648 judgments per language). A few judgments were missing in the completed questionnaires: German (1 judgment), Spanish (3 judgments), and Hungarian (1 judgment). The means (and standard error of the means) of the speaker-aggregated data are given in Table 1 and are plotted in Figure 1 for each language separately.

Table 1. Exclusion of alternatives in question-answer pairs

<insert Table 1 here>

⁶ German: 11 female and 7 male participants; residents of Berlin/Brandenburg; age range = 20-32, age average = 24.1; Spanish: 6 female and 12 male participants; residents of Madrid; age range = 26-59, age average = 38.4; Greek: 12 female and 6 male participants; residents of Athens; age range = 19-37, age average = 27.4; Hungarian: 14 female and 4 male participants; residents of Budapest; age range = 20-35, age average = 23.1.

Figure 1. Exclusion of alternatives in question-answer pairs

<insert Fig. 1>

A repeated-measures analysis of variance at an alpha-level of .05 revealed that the main effect of the ANSWER is significant in all four languages (German: $F_{2,16} = 21.4$, $p < .001$; Spanish: $F_{2,16} = 8.4$, $p < .05$; Greek: $F_{2,16} = 9.1$, $p < .01$; Hungarian $F_{2,16} = 15.3$, $p < .001$). The main effect of the QUESTION is significant only in German ($F_{2,16} = 26.2$, $p < .001$) and Greek ($F_{2,16} = 4.4$, $p < .05$). The interaction QUESTION×ANSWER is significant in German ($F_{4,14} = 13.6$, $p < .01$) and Hungarian ($F_{4,14} = 5.6$, $p < .05$). The findings in the overall 3×3 interaction do not allow for any straightforward conclusions, hence we discuss the components of these effects in the following.

The comparison between the two control conditions (pseudoclefts and SVO) shows the expected sensitivity of the interpretation of the answer to the question context. Our assumption is that the exhaustive interpretation of pseudoclefts is independent of context, while a similar interpretation for the SVO configuration only arises when the context motivates a statement excluding the relevant alternatives. This assumption predicts that the difference between the all-focus question and the O-focus question in Table 1 will be larger for SVO utterances than for pseudoclefts. This prediction is borne out in German (difference 1.47 for SVO and .67 for pseudoclefts), in Spanish (difference .89 for SVO and .14 for pseudoclefts), and in Hungarian (difference .78 for SVO and -.05 for pseudoclefts), but not in the Greek data (difference .66 for SVO and 1.1 for pseudoclefts). The result in the Greek data is surprising and can only be accounted for if we take into account that pseudoclefts are particularly rare in Greek and so that some speakers do not have strong assumptions about their interpretation.⁷

The purpose of the present experimental study is a comparison of the OVS order with the control conditions. If focus-fronting is inherently associated with the intuition of excluding alternatives, then this interpretative property will be independent of context,

⁷ Observe also in Table 1 that the standard errors of the means are larger for pseudocleft answers in Greek (and this is not the case for the other languages).

i.e., it will pattern with the pseudoclefts rather than with the SVO order. In order to examine this hypothesis we have to consider the interaction of the OVS order with the two control conditions. Beginning with the comparison of OVS with the SVO order, the factors QUESTION (all-focus vs. O-focus) and ANSWER (SVO vs. OVS) interact significantly only in Hungarian ($F_{1,17} = 4.4, p < .05$). This interaction effect reflects the fact that the impact of the question on the interpretation of the SVO order (difference .78) practically disappears in OVS (difference .08), i.e., the impact of the context is significantly greater on the construction with the target constituent *in situ* than on the focus-fronting construction. In cross-linguistic view, Hungarian is the only language in the sample for which we obtained evidence that focus-fronting is inherently associated with the exclusion of alternatives holding across contexts. This finding is quite in line with claims made in the literature.

In the other three languages, the interaction effect of this comparison is not significant – even not in Spanish, though the data pattern looks superficially similar to the Hungarian one ($F_{1,17} = 2.4$). The Greek results reveal a data pattern which is in line with the previous claim that there is no interpretative difference between *ex situ* and *in situ* focus in this language (see previous experimental findings in Gryllia, 2008:43, 55). The German data pattern involves a significant main effect of the ANSWER ($F_{1,17} = 7.6, p < .05$), i.e. the intuition of excluding alternatives is stronger with OVS than with SVO order, but the absence of an interaction with the question context comes from the fact that the context has a substantial impact both in the SVO (difference 1.47) and the OVS order (difference .79). Even if the differences descriptively suggest an impact of the form of the answer, the crucial issue is the comparison between languages: in identical speaker samples, we observe that the influence of the form of the answer is greater in Hungarian than in the other languages. This observation is justified by the fact that only the Hungarian data reveal a significant interaction effect.

The comparison between OVS and the other control conditions, viz. pseudoclefts is expected to yield a significant interaction if the interpretation of constituent-fronting is sensitive to the question context (in contrast to the interpretation of the pseudoclefts). A significant interaction effect between QUESTION (all-focus vs. O-focus) and ANSWER (OVS vs. pseudocleft) was not obtained in any of the four datasets, which means that this

control condition is not informative for our purposes. In all languages, we obtained a significant main effect of the ANSWER (OVS vs. pseudocleft),⁸ which reflects the fact that the intuition that the proposition can also hold true for further relevant alternatives decreases if the target utterance is a pseudocleft construction. The fact that pseudoclefts have a stronger impact on the exhaustive interpretation shows the difference between reordering operations and pseudocleft constructions: the exhaustive interpretation comes from the equational predication in the latter case, i.e., from the fact that the subset of focused referents is asserted to be equal to the variable in the relative clause.

This experiment shows that the exclusion of alternatives in the interpretation of question-answer pairs is the product of an interaction between the presuppositions introduced by the question context and the structural properties of the target utterance. The data patterns in the four languages are different, but the crucial finding for our hypothesis is the following: only in one language, namely in Hungarian, there is a significant interaction effect between the contextual sensitivity of the object-fronting construction and the contextual sensitivity of the SVO configuration. The Greek data do not contain any interaction between the factors ANSWER (OVS vs. SVO) and QUESTION (all-focus vs. object-focus), and the German and Spanish data display a non-significant interaction effect. This result indicates that the evidence that focus-fronting holds independently of context is stronger in Hungarian than in the other languages.⁹ The comparison between OVS and pseudoclefts does not lead to informative conclusions, since it does not involve any significant interaction in the four languages. This means that the empirical data neither justify nor falsify our prediction of an interaction effect in languages in which focus-fronting is sensitive to the context.

⁸ German ($F_{1,17} = 26.4, p < .001$), Spanish ($F_{1,17} = 6.1, p < .05$), Greek ($F_{1,17} = 6.4, p < .05$), Hungarian ($F_{1,17} = 15.9, p < .001$).

⁹ See also the comparison between Hungarian and German preverbal focus in Onea and Beaver (2010).

3 The array of focus interpretations

3.1 *Non-predictability vs. exclusion of alternatives*

In constructions that are not inherently associated with an exhaustive interpretation, the exclusion of alternatives is the result of an inferential process based on conversational reasoning. In languages in which constituent-fronting is not inherently exhaustive, it should be conceived as a semantically vacuous operation (Fanselow and Lenertová, 2010). We assume that this operation is not associated with a truth-conditionally relevant property, but it has the effect of attracting the hearer's attention to that portion of the utterance that may not be in line with the hearer's expectations (see Hartmann and Zimmermann, 2007:389; Zimmermann, 2008). The focus interpretation is a result of the general principle that what is to be said has to be said in the clearest and simplest possible way (see maxim of manner in Grice, 1975:46). Whenever the speaker selects a marked construction, the hearer infers that there is at least one reason motivating the choice of a marked rather than an unmarked pattern. The markedness in the constructions at issue lies in the object-fronting operation, i.e., the inference is that there is at least one reason for the object not occurring in its canonical position.¹⁰ Directing the hearer's attention to the fronted constituent may be due to various reasons: an exhaustive interpretation, a contrast to a discourse-salient alternative, a selection among eligible alternatives in the common ground, a correction of stated hearer's assumptions, etc. There are several classifications of these uses of focus in discourse (see Dik, 1997; Gussenhoven, 2007, for some elaborated proposals), however all these concepts are generalizations about the contexts in which a focus construction may occur and not necessarily discourse features that are associated with particular syntactic or phonological configurations. The crucial issue is that all these context-dependent properties have a core concept in common (see Hartmann

¹⁰ The syntactic operation may coincide with prosodic properties, in particular with the fact that focus-fronting results in the placement of the focus to the maximally prominent position in the prosodic structure (see Büring 2010). However, since the mapping of syntax to prosody is a further complicated issue, we restrict our discussion to the properties of syntactic markedness.

and Zimmermann, 2007:366): the concept of drawing the attention of the addressee to the focused constituent. If this view on focus interpretation is on the right track, we expect to find evidence that the interpretation of excluding alternatives is not a necessary concomitant of constructional focus. Our hypothesis is outlined in (6).

- (6) If the exclusion of alternatives is a member of an array of focus interpretations that are eligible depending on contextual conditions, then this interpretation need not appear if another member of the array is motivated by the context.

A speaker may use a marked focus construction in order to draw the attention of the addressee to that part of the proposition that conveys non-predictable information, i.e., information that is not expected according to the assumed information state of the addressee (see Lambrecht, 1994:207; Zimmermann, 2008). In the view advocated in this article, non-predictability is a member of the array of focus interpretations in discourse. Assuming that the array of pragmatic uses of focus contains at least two members {excluding alternatives, marking non-predictable information} allows us to implement the hypothesis in (6). The prediction of (6) is that the marked realization of a structural focus will not force the interpretation that contextually available alternatives are excluded when the markedness is also contextually motivated by the non-predictability of the asserted referent. For instance, in a context that introduces a set of alternatives, as illustrated in (7), the utterance in (7a) motivates the interpretation that the speaker focuses on the object constituent in order to exclude the relevant alternatives in discourse. The resulting inference is that the ‘fisherman’ did not catch pikes, perches or bottles. In contrast to (7a), the utterance in (7b) involves focus on a referent that is an unexpected patient of the ‘fishing’ event. In the conversational reasoning of the hearer, the non-predictability of this referent in the given context may account for the fact that the speaker selects a marked construction that focuses on this referent. As a consequence, the inference of exclusion of alternatives is not motivated, i.e., the ‘fisherman’ may have or have not caught ‘pikes’, ‘trout’, or ‘perches’.

- (7) CONTEXT: {A fisherman sits on the bridge. In the river there are pikes, trout, perches, but unfortunately also bottles and old shoes. Caroline says:}
- (a) *Eine FORELLE hat Matthias geangelt.*
‘Matthias caught a TROUT.’
- (b) *Eine FLASCHE hat Matthias geangelt.*
‘Matthias caught a BOTTLE.’

Predictability may interact with the exclusion of alternatives in those languages in which constituent-fronting is semantically vacuous. Based on the findings in Section 2, we do not expect to find effects of predictability in a language such as Hungarian, in which the interpretative effects of focus-fronting are independent of contextual manipulations.

3.2 Method

Just as in the previous experiment, we presented the critical contexts on written questionnaires and instructed the speakers to give scalar judgments on a 1-to-7 scale representing the extent to which the target utterance allows for possible alternatives to hold true (1= ‘no, it is not possible’; 7= ‘yes, it is possible’), see illustration (8) in German.

- (8) *Ein Fischer sitzt auf der Brücke. Im Wasser sind Barsche, Hechte und Forellen, und leider auch Flaschen und alte Schuhe.*
Caroline sagt: Eine FORELLE hat der Fischer geangelt.
In diesem Kontext und anhand des letzten Satzes: Kann es sein, dass der Fischer außerdem noch etwas anderes geangelt hat?
‘A fisherman sits on the bridge. In the river there are pikes, trout, perches, but unfortunately also bottles and old shoes.
Caroline says: The fisherman fished a TROUT.

In this context and on the basis of the last sentence: Is it possible that the fisherman fished something else?’

The experimental design involved the factor PREDICTABILITY that was manipulated by the choice of a predictable referent (see ‘trout’ in (8)) or a non-predictable referent in the context at issue (i.e., ‘bottle’ instead of ‘trout’ in (8)). This factor was crossed with the factor STRUCTURE that involved the same three levels as in the previous experiment (SVO; OVS; pseudocleft). The pseudocleft utterances are a control condition: they are expected to have an exhaustive interpretation independently of the predictability of the referent, since exhaustivity is the compositional result of the structure at issue. The canonical SVO utterances offer a further control condition that will allow us to estimate the effects of predictability and/or possible item-specific effects on the interpretation that hold independently of the grammatical factors characterizing the critical OVS utterances.

The object in the OVS order (and only in this order) was highlighted by the use of capital letters as illustrated in (8), in order to exclude the reading that the preverbal object is a topic. Hence, there is a danger of confounding effects of word order with effects of prosodic prominence as represented by orthographical convention. The aim of this experiment is not to disentangle the impact of prosodic prominence and syntactic structure on the intuition that alternatives are excluded, but to examine whether the interpretation of a focus construction is sensitive to the availability of readings that do not involve the exclusion of alternatives. In order to examine the hypothesis in (6), we need to compare an utterance in the canonical word order without any indication for a prosodically marked reading (i.e., SVO order without particular prominence on the O) with an unambiguous instance of a focus construction (i.e., OVS order with prominence on the O excluding the object-topic reading). The hypothesis in (6) predicts that the canonical order will not evoke the exclusion of alternatives, while the focus construction will evoke this interpretation except if an alternative interpretation of the focus is available in the context.

The six permutations of the two examined factors were implemented in 24 items containing different lexical material (see Appendix B), which resulted in $24 \times 6 = 144$ texts. This material was distributed on six different questionnaires that contained all items once

and each condition four times. The 24 target tasks were mixed with 48 fillers and pseudo-randomized for each session. 18 native speakers of German, Spanish, Greek, and Hungarian participated to this experiment.¹¹

3.3 Results

Each speaker gave 4 judgments per condition which resulted in a data set of 18 (speakers) \times 4 (judgments) = 72 (judgments) per condition, i.e., 432 judgments in total (per language). A single missing value was encountered in Spanish. The means and standard errors of the speaker-aggregated data are presented in Table 2.

Table 2. Exclusion of alternatives and predictability

<insert Table 2>

Figure 2. Exclusion of alternatives and predictability

<insert Figure 2>

A repeated-measures analysis of variance at an alpha-level of .05 revealed a significant main effect of STRUCTURE in all languages (German: $F_{2,16} = 74.5, p < .001$; Spanish: $F_{2,16} = 16.5, p < .001$; Greek: $F_{2,16} = 21.5, p < .001$, Hungarian: $F_{2,16} = 29.5, p < .001$). The factor PREDICTABILITY had a significant main effect in German ($F_{1,17} = 10.9, p < .004$), Spanish ($F_{1,17} = 7.5, p < .05$), and Greek ($F_{1,17} = 5.9, p < .05$), but not in Hungarian. The interaction effect was not significant in any language.

The critical finding in Figure 2 is the fact that in some languages the intuition of exclusion of alternatives in the interpretation of the OVS order is influenced by the

¹¹ In German, this experiment was carried out in different experimental sessions from the experiment in Section 2 (12 female and 6 male participants; Berlin/Brandenburg; age range = 19-50, age average = 25.5). In Spanish, Greek, and Hungarian the items of this experiment were part of the same experimental sessions with the items of the experiment in Section 2 (see speaker samples in footnote 6).

predictability of the object-verb combination. Based on the observation of the averages in Figure 2, the languages at issue are German and Spanish. The crucial observation is that the OVS order with a predictable object (see 9a) evokes the intuition that alternatives are excluded to a larger extent than the same construction with a non-predictable object (see 9b).

- (9) (a) German: *Eine FORELLE hat der Fischer geangelt.*
 Spanish: *Una TRUCHA ha pescado el pescador.*
 ‘The fisherman caught a TROUT.’
- (b) German: *Eine FLASCHE hat der Fischer geangelt.*
 Spanish: *Una BOTELLA ha pescado el pescador.*
 ‘The fisherman caught a BOTTLE.’

This observation implies a twofold interaction effect in the comparison of the object-fronting construction with the further two levels of the factor STRUCTURE. However, this prediction is statistically confirmed only for German. The comparison between the OVS and the SVO order reveals a significant interaction effect for German ($F_{1,17} = 7.8$, $p < .02$), but not for Spanish, Greek, and Hungarian. This analysis of variance reveals a significant main effect of STRUCTURE for all languages (German: $F_{1,17} = 5.1$, $p < .04$; Spanish: $F_{1,17} = 8.6$, $p < .01$, Greek: $F_{1,17} = 12.5$, $p < .01$, Hungarian: $F_{1,17} = 17.8$, $p < .001$) and a significant main effect of PREDICTABILITY for German ($F_{1,17} = 11.9$, $p < .003$) and Spanish ($F_{1,17} = 9.9$, $p < .01$).

The pseudocleft construction serves again as a control condition, evoking an exhaustive interpretation independently of context (see also Section 2.3). The comparison between the OVS order and the pseudoclefts reveals a significant interaction effect in German ($F_{1,17} = 5.1$, $p < .04$) and Spanish ($F_{1,17} = 4.1$, $p < .05$), which confirms the observation for these two languages in Figure 2. Furthermore, the analysis of variance reveals a significant main effect of STRUCTURE for all languages (German: $F_{1,17} = 53.3$, $p < .001$; Spanish: $F_{1,17} = 8.1$, $p < .05$; Greek: $F_{1,17} = 14.5$, $p < .001$, Hungarian $F_{1,17} = 15.1$, $p < .001$) and a significant main effect of PREDICTABILITY for German ($F_{1,17} = 13.4$, $p < .002$), Spanish ($F_{1,17} = 5.1$, $p < .05$), and Greek ($F_{1,17} = 4.7$, $p < .05$).

The evidence for interaction effects is exactly the empirical proof of the predictions derived from the hypothesis in (6). In our sample, we identified two languages that provide evidence for such interaction effects between the focus-fronting construction and the two control conditions: German (in both comparisons) and Spanish (only in the OVS vs. pseudocleft comparison). In these languages, the inference that the focused constituent contrasts with the relevant alternatives does not arise in contexts that allow a further contextual condition licensing focus. This is the case for OVS sentences but not for pseudocleft sentences, since in the latter case the exhaustive interpretation is the product of the compositional interpretation of constituent structure. The fact that the effect is in general absent in Hungarian is in line with the findings of the experiment in Section 2 and the conclusion that the interpretative properties of focus-fronting are not sensitive to the context in this language.

The results from Greek are again surprising: following our assumptions about Greek, we would expect this language to pattern with Spanish – which is not confirmed by our empirical data. The occurrence of non-predictable information evokes the intuition that an exhaustive interpretation is not necessary independent of the structure at issue (canonical, focus-fronting or pseudocleft). A comparison of the Greek data in both experiments reveals that Greek speakers are sensitive to the discourse factor (CONTEXT in experiment 1 and PREDICTABILITY in experiment 2) as well as to the impact of the structure of the target utterance, which gives rise to the corresponding main effects. However, the Greek data lack any interaction effect, which suggests a system in which the impact of the context is identical for any type of construction – even for constructions that compositionally encode the exhaustive identification of the referent(s), i.e., the pseudoclefts. This system results in a data pattern in which both main effects are cumulated, as may be observed in Figure 1(c) and Figure 2(c). Our reluctance to draw strong conclusions from this data comes from the fact that it is not in line with the statements about Greek in the previous literature.

4 Conclusions

The aim of this article was to investigate conflicting predictions arising from theories that assume that syntactic operations related to focus are triggered/licensed by grammatical features related to subclasses of focus, and theories that assume that interpretative effects such as exhaustivity or contrast are due to pragmatic inferences. We presented two experimental studies comparing the interpretative properties of OVS sentences with canonical sentences and with a pseudocleft-like construction that involves a compositional expression of exhaustivity. The experiments were run in German, Greek, Hungarian, and Spanish.

Experiments 1 and 2 showed that exhaustivity is a constructional property of the focus position in Hungarian. The effect is not sensitive to the context (experiment 1) and cannot be modulated by predictability (experiment 2). This observation is in line with the claims made in the literature. German, Spanish and Greek behave differently. Experiment 1 revealed that these languages do not display a significant interaction between the question context and the structure of the answer. Experiment 2 showed, then, that non-predictability also motivates the fronting of an object in German, Spanish and Greek, reducing thereby the likelihood of linking fronting to an exhaustive interpretation. The two experiments thus show that Hungarian on the one hand and German, Spanish and Greek, on the other, show different systems of focus fronting. This is the major finding of these experimental studies. Beyond this distinction, we obtained further differences between German, Spanish, and Greek, that are not motivated by well-established differences in independent grammatical properties between these languages. The major difference among them is that the OVS order is ambiguous between an object-topic and an object-focus interpretation in German, but not in Spanish and Greek (in which the topic interpretation of the object would require clitic doubling). However, this difference does not seem to play any role for our data, because Greek rather than German shows a particular behavior. There is no interaction between context and structure in the Greek results. This finding cannot be related to any particular aspect of Greek syntax and prosody. Hence it must be left to future investigations which property of Greek leads to the obtained interpretations.

The data presented in this article have clear consequences for the theory of information structure. A purely pragmatic theory cannot account for our data, since the intuitions differ depending on language, which cannot be explained in terms of universal conversational principles. Exhaustivity IS a structural property in Hungarian, which can be expressed in terms of a formal feature that has to be checked through movement to a particular position. Our findings are compatible both with the view that exhaustivity arises as a side-effect of focus placement (É. Kiss, 1998) and the view that it constitutes a property of its own right (Horvath, 2000, 2010).

In German, Spanish, and Greek, exhaustivity is not a necessary concomitant of the focus-fronting operation. As shown by experiment 2, the speakers of these languages infer that the occurrence of the object in a marked position must be motivated by a marked interpretation, but which one is chosen does not seem to matter. The consequences of this finding for the features of the left peripheral configurations depend on further assumptions. In an architecture of grammar that assumes that formal features are truth-conditionally relevant operators, these phenomena are better captured as interface effects that are not encoded in the syntactic representations. In a cartographic approach, the same range of phenomena can be captured only if we assume an underspecified operator that can be instantiated differently depending on content and context. We argue for the former view, since we have shown that the interpretative effects in these languages can be derived through pragmatic inferences motivated by the syntactic markedness of focus constructions.

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Appendix A

Items of experiment I (German)

- Item 1.* Warum hatte Oma Angst?/Was hat Opa abgewaschen?
Opa hat eine Steckdose abgewaschen.
- Item 2.* Ihr macht nicht den Eindruck, dass Ihr zufrieden seid!/Was hat Ede abgewischt?
Ede hat ein Ölgemälde abgewischt.
- Item 3.* Wieso lachen die Leute auf der Brücke?/Was hat Matthias geangelt?
Matthias hat einen Schuh geangelt.
- Item 4.* Wieso war Dein Bruder geärgert?/Was hat Margret angezündet?
Margret hat eine Geburtstagskerze angezündet.
- Item 5.* Warum staunt Ihr?/Was hat der Nachbar aufgehängt?
Der Nachbar hat ein Kissen aufgehängt.
- Item 6.* Warum sind alle so begeistert?/Was hat der Bäcker gebacken?
Der Bäcker hat eine Krabbenpizza gebacken.
- Item 7.* Warum haben sich alle im Wohnzimmer versammelt?/Was hat Johannes gebaut?
Johannes hat einen Thron gebaut.
- Item 8.* Was wichtiges mussten Sie mit mir besprechen?/Was hat der Kammerjäger besprüht?
Der Kammerjäger hat ein Kopfkissen besprüht.
- Item 9.* Warum ist der Kellner überrascht?/Was hat der Mann bestellt?
Der Mann hat eine Froschsuppe bestellt.
- Item 10.* Warum war Max überrascht?/Was hat der Lehrer durchgestrichen?
Der Lehrer hat ein Fremdwort durchgestrichen.
- Item 11.* Warum ist Mona aufgeregt?/Was hat Paul eingecremt?
Paul hat einen Schuh eingecremt.
- Item 12.* Warum lacht Martin?/Was hat Felix eingepackt?
Felix hat eine Matrosenmütze eingepackt.
- Item 13.* Warum bist Du sauer?/Was hat Opa gegessen?
Opa hat eine Torte gegessen.
- Item 14.* Wieso schreien die Leute auf der Mole?/Was hat Yvon gefangen?
Yvon hat einen Schwertfisch gefangen.
- Item 15.* Warum ist der Malermeister sauer?/Was hat Lukas gefärbt?
Lukas hat eine Steckdose gefärbt.
- Item 16.* Warum lachen alle?/Was hat Sara gegossen?

- Sara hat einen Kaktus gegossen.
- Item 17.* Wofür ist diese Sauce?/Was hat Konrad gegrillt?
Konrad hat ein Büffelsteak gegrillt.
- Item 18.* Warum freut sich Bernd?/Was hat Eva gekauft?
Eva hat ein Stickeralbum gekauft.
- Item 19.* Was ist im Diebstahl passiert?/Was hat der Dieb geklaut?
Der Dieb hat eine Whiskeyflasche geklaut.
- Item 20.* Wieso riecht es hier so komisch?/Was hat Markus gekocht?
Markus hat eine Stinktiersuppe gekocht.
- Item 21.* Wieso fährst Du zur Werkstatt zurück?/Was hat der Mechaniker lackiert?
Der Mechaniker hat eine Reife lackiert.
- Item 22.* Warum seid Ihr so begeistert?/Was hat Lili gemalt?
Lili hat eine Meerjungfrau gemalt.
- Item 23.* Warum schreit Stephan?/Was hat Gabriel geölt?
Gabriel hat ein Pedal geölt.
- Item 24.* Warum bist Du enttäuscht?/Was hat Manuel gepflanzt?
Manuel hat einen Kaktus gepflanzt.
- Item 25.* Warum lacht Oma?/Was hat die Putzfrau poliert?
Die Putzfrau hat einen Schlüssel poliert.
- Item 26.* Was gibt es neues in der Werkstatt?/Was hat der Mechaniker repariert?
Der Mechaniker hat einen Oldtimer repariert.
- Item 27.* Warum war die Mutter auf dem Strand aufgeregt?/Was hat Johny gesammelt?
Johny hat eine Zigarettenkippe gesammelt.
- Item 28.* Warum lachst Du?/Was hat Martin geschält?
Martin hat eine Aprikose geschält.
- Item 29.* Wieso schreien die in der Küche?/Was hat Tante Lene geschnitten?
Tante Lene hat ein Küchentuch geschnitten.
- Item 30.* Warum ist die Lehrerin außer sich geraten?/Was hat Julia geschrieben?
Julia hat ein Schimpfwort geschrieben.
- Item 31.* Warum willst Du Dich beschweren?/Was hat der Mahler gestrichen?
Der Mahler hat eine Fensterscheibe gestrichen.
- Item 32.* Warum sind sie sauer?/Was hat der Schwiegersohn verkauft?
Der Schwiegersohn hat ein Familienbild verkauft.
- Item 33.* Wissen Sie schon das Neueste?/Was hat Robert verloren?
Robert hat eine Kundenakte verloren.
- Item 34.* Warum war der Lehrer sauer?/Was hat Elke vorgelesen?
Elke hat eine Tabellenüberschrift vorgelesen.
- Item 35.* Warum schreit Oma?/Was hat Opa gewaschen?
Opa hat einen Geldschein gewaschen.
- Item 36.* Warum bist Du so angeekelt?/Was hat Klaus gezeichnet?
Klaus hat eine Kuchenschabe gezeichnet.

Appendix B

Items of experiment II (German)

- Item 1.* Opa muss die Küche saubermachen. In der Küche sind zwei Tische, drei Stühle, ein Schrank und ein Stapel mit Gerätehandbücher. Tante Ema sagt:
Opa hat einen Tisch/ein Gerätehandbuch abgewaschen.
- Item 2.* Der Jäger ist im Wald. Dort gibt es Rehe, Hasen, Wildschweine und auch Förster. Maria erzählt:
Der Jäger hat ein Reh/einen Förster gejagt.
- Item 3.* Ein Fischer sitzt am Fluss. Im Wasser sind verschiedene Fische, z. B. Barsche, Hechte und Forellen, und leider auch Flaschen und alte Schuhe. Caroline berichtet:
Der Fischer hat eine Forelle/eine Flasche geangelt.

- Item 4.* Mutter kümmert sich um die Wäsche im Keller. Da sind eine Bluse, drei Hemde, einige Socken, Geldscheine und Taschentücher. Willi sagt:
Mutter hat eine Hose/einen Geldschein gewaschen.
- Item 5.* In der Abschlussveranstaltung wurde ein junger Sänger eingeladen. Sein Repertorium umfasst verschiedene Volkslieder, Kirchenlieder, Tanzlieder, Kampflieder und mittelalterliche Minnelieder. Elke sagt:
Der Sänger hat ein Volkslied/ein Minnelied gesungen.
- Item 6.* Der Bäcker hat Paprika, Pizzateig, Schinken, Käse, Möhren, Croissants, Mehl und natürlich Backbleche, Töpfe und Topflappen. Max bemerkt:
Der Bäcker hat eine Pizza/einen Topflappen gebacken.
- Item 7.* Der Gärtner ist im Garten. Dort gibt es Blumen, Gras, Pflanzkellen, Unkrautstecher und Gartenhandschuhen. Jutta sagt:
Der Gärtner hat eine Blume/einen Gartenhandschuh gegossen.
- Item 8.* Die alte Oma sitzt am Mittagstisch mit der Familie. Auf dem Tisch gibt es Möhren, Tomaten, Artischocken, Auberginen und selbstverständlich Besteck und Servietten. Onkel Robin erzählt:
Oma hat eine Tomate/eine Serviette gegessen.
- Item 9.* Mona geht im Wald spazieren. Es gibt dort Petersilie, Kräuter, Oregano und Giftpilze. Markus berichtet:
Mona hat ein Kraut/einen Giftpilz gesammelt.
- Item 10.* Im Hof haben wir ein Schwein. Papa hat heute Vormittag Heu, Bohnen, Fruchtschalen und seine Dokumente am Eingang des Hofes gelassen. Am Abend sagt er:
Das Schwein hat eine Schale/ein Dokument gefressen.
- Item 11.* Bernd ist drei Jahre alt. Auf dem Tisch im Kindergarten liegen Bonbons, Lutscher, Mandel, Stifte und Münzen. Die Erzieherin erzählt:
Bernd hat ein Bonbon/eine Münze gelutscht.
- Item 12.* Tante Angela geht Früchte einkaufen. Im Wochenmarkt findet man Äpfel, Birnen, Orangen, sowie exotische Früchte wie Kaktusfeigen und Mangos. Elisabeth sagt:
Tante Angela hat einen Apfel/eine Kaktusfeige gekauft.
- Item 13.* Moritz war im Streichelzoo. Dort gibt es Schafe, Kaninchen, Ziegen und Igel. Seine Schwester erzählt:
Moritz hat ein Schaf/einen Igel gestreichelt.
- Item 14.* Wilhelm ist auf der Baustelle. Da gibt es Ziegelsteine, Mörtelkästen, Säcke mit verschiedenen Materialien, Balken und Betonmischmaschinen. Der Bauleiter erzählt:
Wilhelm hat einen Sack/eine Betonmischmaschine getragen.
- Item 15.* Der Bauer ist im Hof. Dort gibt es Kühe, Schweine, Hunde, Hühner und natürlich Ratten. Die Bäuerin beobachtet:
Der Bauer hat ein Huhn/eine Feldratte gefüttert.
- Item 16.* Auf dem Sofa liegen Unterhemden, Hosen, Socken, Unterhosen und Gürtel. Onkel Martin holt das Bügeleisen. Tante Lisa lacht:
Onkel Martin hat ein Hemd/einen Gürtel gebügelt.
- Item 17.* Karin hatte gestern eine Party. Beim Einkaufen hat sie Blätterteig, Tomaten, Gurken, Salat, Fleisch, Fisch, einen Kraken und Kartoffeln besorgt. Sandra erinnert sich:
Karin hat einen Salat/einen Krakensalat zubereitet.
- Item 18.* Die Gäste kommen in einer halben Stunde. Hans ist allein in der Küche. Da gibt es Gurken, Tomaten, Kartoffeln, Auberginen, Besteck, Servietten, Geschirrtücher. Anja sagt am Telefon:
Hans hat eine Tomate/einen Geschirrtuch geschnitten.
- Item 19.* Im Kleingarten gibt es Rosen, Sonnenblumen, Rosenstöcke und einen Lattenzaun. Der Anstreicher kam gestern. Danach bemerkte Olaf:
Der Anstreicher hat eine Latte/eine Sonnenblume gestrichen.
- Item 20.* Der Förster geht mit der Motorsäge in den Wald. Dort gibt es Bäume, Büsche, Brücken. Ein Wanderer erzählt:
Der Förster hat einen Baum/einen Brückenpfeiler gefällt.
- Item 21.* In der Buchhandlung gibt es einige Bücherschränke und Bücherstützen mit Büchern, Zeitschriften und Tageszeitungen. Ein neuer Verkäufer ist seit heute eingestellt. Der Buchhändler sagt am Ende des Tages:
Der Verkäufer hat eine Tageszeitung/eine Bücherstütze verkauft.

- Item 22.* Kerstin ist dabei, für den Urlaub einzupacken. Sie ist gerade im Badezimmer, wo man Zahnbürsten, Zahnpasta, Handtücher, Puderdosen, Handtuchhalter und Rasierschaum findet. Ihre Mutter sagt:
Kerstin hat eine Zahnbürste/einen Handtuchhalter eingepackt.
- Item 23.* In der Eröffnungsfeier des Lebensmittelgeschäfts werden verschiedene Spirituosen zum Probieren angeboten: Rotweine, Weißweine, Sekt, Dirndlbrand, Zwetschgenwasser und Schlehengeist. Peter war dabei; seine Freundin erzählt:
Peter hat einen Rotwein/einen Dirndlbrand probiert.
- Item 24.* Erik hat Lackfarbe gekauft. Im Wohnzimmer gibt es Regale, Schränke, Stühle und Zimmerpflanzen. Seine Tochter erzählt:
Papa hat ein Regal/eine Zimmerpflanze lackiert.

Table 1. Exclusion of alternatives in question-answer pairs

QUESTION	ANSWER	German		Spanish		Greek		Hungarian	
		mean	SE	mean	SE	mean	SE	mean	SE
all focus	SVO	5.15	.38	4.68	.49	4.41	.28	3.47	.46
	OVS	4.07	.34	4.14	.47	4.39	.29	3.01	.34
	pseudocleft	2.93	.26	2.99	.34	3.61	.43	2.04	.36
O-focus	SVO	3.68	.41	3.79	.41	3.75	.41	2.69	.35
	OVS	3.28	.28	3.99	.41	3.59	.37	3.08	.33
	pseudocleft	2.26	.26	2.85	.43	2.59	.45	2.09	.25
pseudocleft	SVO	2.82	.32	4.08	.38	3.41	.41	2.50	.32
	OVS	2.58	.27	3.59	.39	3.47	.43	2.58	.32
	pseudocleft	2.36	.31	2.91	.39	2.64	.51	2.32	.35

Table 2. Exclusion of alternatives and predictability

PREDICTABILITY (of the object)	STRUCTURE	German		Spanish		Greek		Hungarian	
		mean	SE	mean	SE	mean	SE	mean	SE
predictable	SVO	3.11	.24	4.99	.42	4.61	.34	3.96	.39
	OVS	4.26	.28	3.93	.42	3.56	.45	2.88	.24
	pseudocleft	5.50	.25	3.03	.41	2.92	.49	2.32	.26
non-predictable	SVO	2.65	.31	5.35	.42	5.43	.34	3.89	.37
	OVS	3.01	.37	4.76	.42	4.15	.45	3.17	.42
	pseudocleft	5.22	.29	3.14	.41	3.46	.49	2.57	.34

Figure 1. Exclusion of alternatives in question-answer pairs

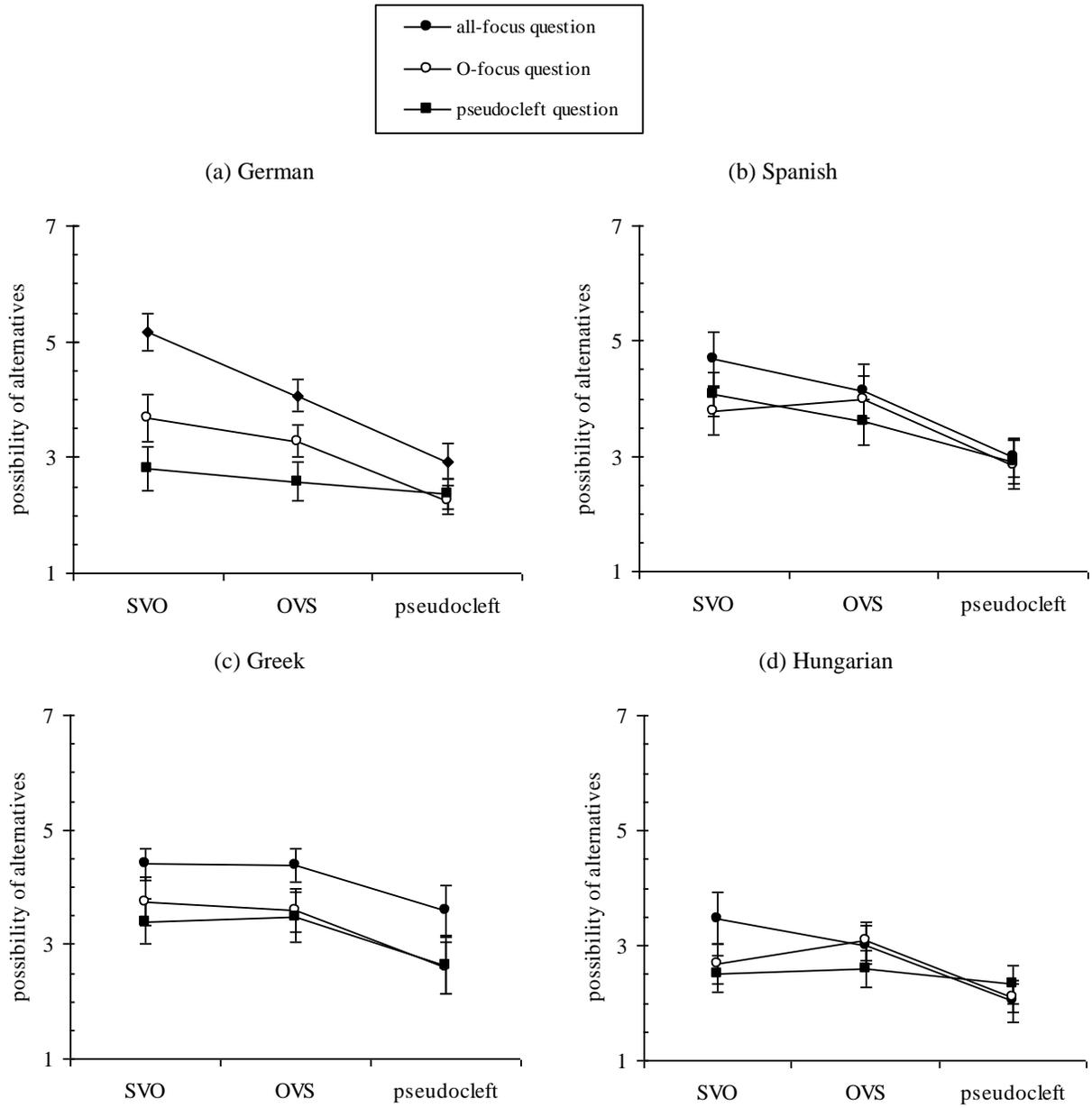


Figure 2. Exclusion of alternatives and predictability

