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# (Non-)exhaustivity in focus partitioning across languages

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We present novel experimental evidence on the availability and the status of exhaustivity inferences with focus partitioning in German, English, and Hungarian. Results suggest that German and English focus-background clefts and Hungarian focus share important properties, (É. Kiss 1998, 1999; Szabolcsi 1994; Percus 1997; Onea & Beaver 2009). Those constructions are anaphoric devices triggering an existence presupposition. EXH-inferences are not obligatory in such constructions in English, German, or Hungarian, against some previous literature (Percus 1997; Büring & Križ 2013; É. Kiss 1998), but in line with pragmatic analyses of EXH-inferences in clefts (Horn 1981, 2016; Pollard & Yasavul 2016). The cross-linguistic differences in the distribution of EXH-inferences are attributed to properties of the Hungarian number marking system.

**Keywords:** clefts, definite pseudoclefts, Hungarian focus, exhaustivity, experimental evidence, semantics-pragmatics interface

## 1. Focus partitioning: A cross-linguistically unified discourse phenomenon

Well-studied examples of focus partitioning constructions include the English and German focus-background cleft (1) (Horn 1981; Percus 1997; Velleman et al. 2012; Büring & Križ 2013, i.a.), and the Hungarian preverbal focus construction (2) (Szabolcsi 1981, 1994; Kenesei 1986, 2006; É. Kiss 1987, 1998, 1999; Brody 1990; Onea & Beaver 2009; Horváth 2010, i.a.) (CAPs = focus accenting).

- (1) a. *It is MAX who mixed a cocktail.*  
b. *Es ist MAX, der einen Cocktail gemischt hat.*  
    ‘It is MAX who a cocktail mixed has’

- (2) *Mari PÉTERT hívta fel.*  
    Mari PÉTER-ACC called PRT  
    ‘It was Peter that Mari called up.’

[É. Kiss 1998: 256]

A common assumption – articulated in Szabolcsi (1981) and É. Kiss (1998, 1999) – is that the two construction types share important interpretive properties, irrespective of their different morphosyntactic realization, e.g., existence presuppositions ( $\exists$ ) and exhaustivity (EXH) inferences (e.g., Horn 1981; Percus 1997; Kenesei 1986; Szabolcsi 1994).

The interpretive similarities raise the question of what focus partitioning constructions share across languages. Do they constitute a natural class at the level of discourse-structure, with the same (discourse) semantic properties and identical pragmatic effects? And if so, do they also share the same (underlying) morphosyntax, for instance, in the form of a structural position FocP (Brody 1990; É. Kiss 1998)? The second question has been answered affirmatively for Hungarian focus and English clefts in É. Kiss (1998) and for Russian and English clefts in Reeve (2012). In this paper, we will focus instead on the semantic and pragmatic properties of focus-background partitioning across languages. We argue that focus partitioning is a universal structural device for (optionally) expressing information-structural partitioning, but languages may differ in their choice of structural building blocks (Zimmermann 2016). This is stated as H1, with the semantic corollary (3).

H1: Focus partitioning structures form a unified discourse-semantic class of (possibly) structurally heterogeneous constructions.

(3) Focus partitioning exhibits parallel interpretive effects across languages.

H1 predicts focus partitioning structures to behave on a par across languages regarding  $\exists$ - and EXH-inferences. Conversely, systematic cross-linguistic differences in the availability of those inferences would constitute evidence against H1.

This paper reports on the results of a controlled cross-linguistic experimental study of EXH-inferences in focus partitioning in an incremental information retrieval paradigm. The experimental results suggest that EXH-inferences with focus partitioning are indeed parallel across languages. Moreover, our results pertain to the theoretical debate on the nature of EXH-inferences. The latter are commonly taken as a semantic property of focus partitioning; see, e.g., Percus (1997), Krifka (2008), Büring & Križ (2013) on clefts and Szabolcsi (1981, 1994), É. Kiss (1998), i.a., on Hungarian focus. An opposing view is found in Horn (1981, 2016), Wedgwood et al. (2006), and Onea & Beaver (2009), who all analyze EXH-inferences with focus partitioning as optional pragmatic implicatures. In line with pragmatic analyses, our results suggest that EXH-inferences are neither obligatory with focus-background clefts nor with Hungarian preverbal focus.

To explain our findings, we analyze focus partitioning structures as anaphoric devices with specific discourse-semantic use conditions, which are identical across languages, following ideas in Horn (1981, 2016), Delin (1992), Onea &

Beaver (2009), Velleman et al. (2012), Pollard & Yasavul (2016), De Vaugh-Geiss et al. (2017). We claim that such constructions semantically encode an  $\exists$ -inference, often explicitly marked by means of givenness or anaphoricity markers (de-accenting, demonstratives, definites, relative markers, etc.). The EXH-inference, by contrast, is not semantically coded, but can be systematically derived from the  $\exists$ -inference and preceding context depending on how the existential presupposition is resolved. In particular, the presence or absence of EXH-inferences is tied to the QUD or to the nature of the (accommodated) discourse antecedent, which can be indefinite or definite/maximal. Crucially, in our account, the EXH-inference does not involve exhaustifying over focus alternatives, as suggested, e.g., by Velleman et al. (2012).

Section 2 of the paper gives a short overview over the cross-linguistically variable morphosyntax of focus partitioning structures and their invariable discourse anaphoricity, modelled as an  $\exists$ -inference. Section 3 explains the experimental setup and the logic behind the experiments. Section 4 reports on the results for German and English clefts and introduces our analysis of EXH-inferencing. Section 5 reports on the results for Hungarian preverbal focus, concentrating on similarities and differences to our findings for German and English clefts. We argue that gradual differences in the availability of EXH-inferences with Hungarian preverbal focus follow from differences in the number marking system of Hungarian. Section 6 concludes with an outlook on the importance of background/anaphoricity marking in the analysis of focus-background partitioning.

## 2. Focus partitioning: Morphosyntax and interpretation

Focus partitioning constructions across languages make use of different morphological building blocks, such as pronouns, demonstratives, copulas, relative clauses, focus markers, and different syntactic configurations: some focus partitions involve bi-clausal structures, whereas others involve focus fronting, and some languages require the focus to be in a peripheral clausal position, whereas other make use of a designated focus position. According to É. Kiss (1998: 259), even the seemingly unified strategy of cleft formation in English involves different derivational histories for clefts using the complementizer *that* or a *wh*-pronoun.

At least three common strategies for the expression of focus-background partitioning can be identified. Next to focus-background clefts, as in (1a–1b) and (4a) for French, there are demonstrative *èto*-clefts in Slavic languages (e.g., Junghanns 1997; Kimmelman 2009; Reeve 2012), as in (5a) for Russian, and syntactic focus left dislocation, such as in Hungarian preverbal focus (2) and Akan left-peripheral focus (6a).

- (4) a. *C'est MARC<sub>FOC</sub> [qui a préparé un cocktail]<sub>BG</sub>.*  
 It's Marc who has prepared a cocktail  
 b. PRON/DEM COP XP<sub>FOC</sub> [CP<sub>REL</sub> ...]<sub>BG</sub>  
 [French, Destruel & De Veough-Geiss 2019: 1]
- (5) a. *Èto [BORIS vypil vodku].*  
 DEM Boris drank vodka  
 'It was BORIS who drank the vodka.'  
 b. DEM [XP<sub>FOC</sub> ...]  
 [Russian, Reeve 2012: 13]
- (6) a. *ɔbaai no na me huu noi.*  
 woman DEF FOC I saw her  
 b. [XP<sub>FOC,i</sub>] FOC [... PRON<sub>i</sub> ...]  
 [Akan, Saah 1994: 102]

Despite their morphosyntactic differences, the three construction types share a number of important properties. First, their central purpose is to separate the focus constituent from the background, typically expressing given or otherwise accessible information. This division facilitates processing and information update, which makes it a (near) universal feature of natural languages.

Second, focus partitioning structures come with an existence presupposition, which is computed over the backgrounded property (Rooth 1996) and leads to discourse-anaphoric interpretation (Geurts & van der Sandt 2004), and they are not licensed out of the blue (Delin 1992; De Veough-Geiss et al. 2017). (7) and (8) illustrate two standard diagnostics for existence presuppositions in clefts. (7) shows that clefts do not license negative quantifiers in focus position. This is because the asserted meaning of the cleft (*nobody won*) would contradict the presupposition  $\exists z[won'(z)]$ . As shown by the contrast between the infelicitous cleft in (8A) and the felicitous canonical structure in (8A') (Rooth 1996), clefts are illicit in contexts suggesting that nobody has the backgrounded property in question:

- (7) Q: *Who won the football pool this week?*  
 A: #*It's NOBODY who won it.*
- (8) Q: *Did anyone win the football pool this week?*  
 A: #*Probably not, because it's unlikely that it's MARY who won it, and she's the only person who ever wins.*  
 A': *Probably not, because it's unlikely that MARY won it, and she's the only person who ever wins.*

Third, many scholars take EXH-inferences to be a cross-linguistic semantic characteristic of focus partitioning. In order to derive EXH-inferences from such diverse surface structures, É. Kiss (1998) postulates a designated focus projection with an interpretable feature [+exhaustive] in the underlying syntax. However, our experiments indicate that the EXH-inference may not be a cross-linguistically

robust, systematic interpretive feature of focus. If the EXH-inference is pragmatic in nature, it need not be coded in the syntax of clefts or other focus partitioning structures. Instead, we will suggest that the EXH inference should be derived from the  $\exists$ -inference in certain cases.

### 3. Testing for EXH-inferences in an incremental information retrieval paradigm

#### 3.1 Experimental set-up

We carried out two behavioral experiments each on the availability of the EXH-inference with focus partitioning structures in German, English, and Hungarian (total of six experiments). The experiments were conducted in an incremental information retrieval paradigm. Exp. I was a verification task and tested for the existence and the status (in terms of the distinction between at-issue vs. not-at-issue inferences; cf. Simons et al. 2010; Tonhauser et al. 2013; Destruel et al. 2015; De Vaugh-Geiss et al. 2015) of the EXH-inference. Exp. II was a falsification task and tested for whether the EXH-inference is semantically coded or not. The two experiments yield information about the source of the EXH-inference as semantic (conventionally-coded) or pragmatic (non-conventionally-coded), and about its robustness or systematicity within and across speakers and trials. The experiments had two measures: *Early Response* [continue vs. judgment] and *Late Response* [ $\pm$ EXH-inference in Exp. I and  $\pm$ CAN(onical)-inference in Exp. II]. The factor ‘sentence type’ had four levels, as illustrated in (9) for German:

- |     |    |                                                              |                   |
|-----|----|--------------------------------------------------------------|-------------------|
| (9) | a. | <i>Es ist MAX\, der einen Cocktail gemischt hat.</i>         | CLEFT             |
|     |    | ‘It is MAX who mixed a cocktail.’                            |                   |
|     | b. | <i>Derjenige, der einen Cocktail gemischt hat, ist MAX\.</i> | DEF.PSE(udocleft) |
|     |    | ‘The one that mixed a cocktail is MAX.’                      |                   |
|     | c. | <i>Nur MAX\ hat einen Cocktail gemischt.</i>                 | EXCL(usive)       |
|     |    | ‘Only MAX mixed a cocktail.’                                 |                   |
|     | d. | <i>MAX\ hat einen Cocktail gemischt.</i>                     | prosodic FOCUS    |
|     |    | ‘MAX mixed a cocktail.’                                      |                   |

We controlled information structure with auditory stimuli with a falling nuclear pitch accent (\) on the focus constituent and de-accenting on the remainder of the clause. The exhaustification domain was controlled for by making reference to the same four individuals (four roommates) across all conditions and trials.<sup>1</sup>

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1. Participants’ behavior in the exclusive control condition (see below) clearly shows that the exhaustification domain indeed consisted of this group of four individuals.

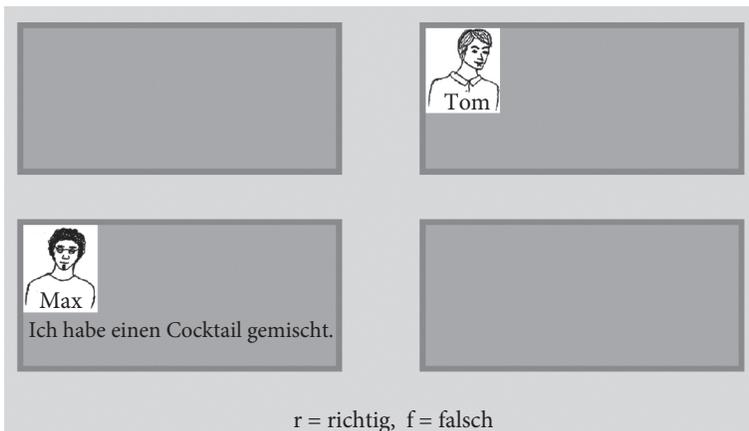
Finally, the experiments aimed at an explicit comparison of the interpretation of focus clefts and definite pseudoclefts, which have been claimed to share the same underlying syntax and interpretation (Percus 1997; see also Büring & Križ 2013). Thereby, we assumed, following the literature, that definite pseudoclefts are semantically exhaustive. The conditions *EXCL(usive)* and *Focus* were included as control conditions to check for the reliability of participants.

The participants saw the target sentences together with a visual display consisting of four covered boxes on a computer screen in a lab. The participants' task was to successively uncover boxes with the computer mouse and to judge the sentence as true or false as soon as sufficient information was available.

The experiments were programmed such that crucial information for determining whether a target sentence was true in Exp. I on its canonical interpretation (no EXH-inference) or false in Exp. II on an exhaustive interpretation always showed in the second box uncovered, irrespective of which particular box was targeted with the mouse. The information in Box 1 was always orthogonal to the question at hand, and the information in Box 3 and Box 4 made the target sentence either true or false on the remaining meaning component (canonical or exhaustive).

Consider the evaluation of the cleft sentence in (10) in Exp. I (verification) after uncovering the second box (Figure 1).

- (10) *Es ist MAX, der einen Cocktail gemischt hat.*  
'It is Max that mixed a cocktail.'



**Figure 1.** Verification, 2nd box matches canonical inference (Max says: 'I mixed a cocktail')

The logic of the verification experiment is as follows. Consider the canonical inference  $p$  of (10), that Max mixed a cocktail, and the EXH-inference  $q$ , that nobody

else mixed a cocktail. In Figure 1,  $p$  is verified in Box 2, leaving two possibilities: If only  $p$  is relevant for assessing the truth of (10), as is the case in the focus control condition, participants should give a true judgment at Box 2 (*Early Response*) and start with the next trial. However, if both  $p$  and  $q$  are truth-relevant, as is the case in the exclusive condition with *only*, participants should continue to Boxes 3 and 4 in order to check for the validity of the EXH-inference (*Late Response*). While the predictions are clear for the two control conditions, Exp. I aimed at investigating the effect of clefts and definite pseudoclefts.

In the falsification experiment (Exp. II), the reverse situation obtains: the information shown in Box 2 was sufficient for falsifying the EXH-inference  $q$ , if present. Consider again Figure 2, but with a critical difference: in Exp. II, Box 2 depicted someone other than Max saying that he mixed a cocktail. Consequently, the backgrounded property in question is attributed to a different individual than the subject of (10). The logic of Exp. II is as follows. After uncovering Box 2, participants have two options. If only the canonical inference  $p$  (but not the EXH-inference  $q$ ) is relevant for assessing the truth of the target sentence, as in the *Focus* condition, participants should continue to Boxes 3/4 to check for the validity of the CAN(onical)-inference (*Late Response*), namely, that Max indeed mixed a cocktail [+CAN]; note that in half the trials the canonical meaning was violated [-CAN] and Max did something other than mix a cocktail at Box 3/4 (see Table 1). By contrast, if both  $p$  and in particular  $q$ , are truth-relevant, as in the *EXCL* condition, participants should judge the sentence as false at Box 2 and start with the next trial (*Early Response*). Again, the predictions are clear for the control conditions, whereas the main interest lies in clefts and pseudoclefts.

Table 1 gives a schematic overview of the experimental set-up for Exp. I and Exp. II summing up the conditions obtaining in each box for a trial with target stimulus (10).

Table 1. Overview conditions

	<u>Exp. I (verifier)</u>	<u>Exp. II (falsifier)</u>
<i>Box 1</i>	<b>orthogonal</b> Jens: 'I opened a bottle.'	
<i>Box 2</i> ( <i>Early Response</i> )	<b>canonical verified</b> Max: 'I mixed a cocktail.'	<b>exhaustivity falsified</b> Ben: 'I mixed a cocktail.'
<i>Box 3/Box 4</i> ( <i>Late Response</i> )	[+EXH] <b>exhaustivity supported</b> Tom/Ben: 'I fetched a straw.' [-EXH] <b>exhaustivity violated</b> Tom/Ben: 'I mixed a cocktail.'	[+CAN] <b>canonical supported</b> Max: 'I mixed a cocktail.' [-CAN] <b>canonical violated</b> Max: 'I fetched a straw.'

### 3.2 Theoretical accounts and predictions for clefts and definite pseudoclefts

As indicated in Section 1, there are different theoretical analyses of clefts that differ vastly in empirical predictions when it comes to the robustness of the EXH-inference with clefts and Hungarian preverbal focus as well as to the parallels with definite pseudoclefts. The available accounts sub-divide into three classes: (i) pragmatic analyses as in, e.g., Horn (1981, 2016) for clefts and Wedgwood et al. (2006) and Onea & Beaver (2009) for Hungarian preverbal focus; (ii) semantic analyses treating clefts and definite descriptions alike (Percus 1997; Büring & Križ 2013); (iii) semantic analyses treating clefts as expressing a not-at-issue maximality inference, which is unconnected to definite descriptions (Velleman et al. 2012).

On Horn's (1981) pragmatic account, the use of the structurally marked cleft *It is a that BGs*, with the existence presupposition (11a) and the canonical meaning BG(a), triggers the pragmatic EXH-inference as a generalized conversational implicature (11b):

- (11) a.  $\exists z[\text{BG}(z)]$   
 b.  $\forall x [x \neq a] \rightarrow \neg \text{BG}(x)$

The pragmatic account does not predict EXH-inferences to be consistent, robust, or systematic across speakers and trials. Moreover, clefts should behave differently from definite pseudoclefts, which – as definites – are commonly taken to trigger a maximality presupposition.<sup>2</sup>

On the semantic definite account in Percus (1997), clefts derive syntactically from definite pseudoclefts; cf. (12). The two construction types trigger a uniqueness/maximality presupposition (13a–13b). The EXH-inference follows from the identificational semantics of (13a) in combination with the maximality presupposition of discourse referent *z*.<sup>3</sup>

- (12) [*The one/s who mixed a cocktail*] is MAX.  
 $\Rightarrow$  It is MAX that mixed a cocktail.

- (13) a.  $\iota z. [z \text{ mixed a cocktail}] = \text{Max}$ ;  
 b. defined iff there is a maximal *z*, such that *z* mixed a cocktail.

Parallel analyses of Hungarian focus constructions as presupposition triggers are found in Kenesei (1986) and Szabolcsi (1994). This analysis of focus partitioning

2. But see Heim (1982) and subsequent work for alternative familiarity-based analyses of definite descriptions that do not rely on uniqueness/maximality as part of their meaning.

3. We gloss over known issues the  $\iota$ -operator encounters with pluralities and assume for expository purposes that  $\iota$  incorporates maximality instead of strict uniqueness; cf. Szabolcsi (1994).

structures as covert definites predicts the EXH-inference of clefts to be robust and systematic. Moreover, it predicts clefts to be semantically parallel to definite pseudoclefts; see also Büring & Križ (2013).

Finally, the semantic analysis of Velleman et al. (2012) treats focus clefts as the semantic counterpart of exclusive operators, with the (not-)at-issue status of the MIN- and MAX-meaning components exchanged. With clefts, the MIN-inference (*John mixed a cocktail*) is at-issue (14i), whereas the MAX-inference (*Nobody other than John mixed a cocktail*) is not-at-issue (14ii). The opposite holds for sentences with exclusive *only* (Beaver & Clark 2008).

(14) *It is JOHN who mixed a cocktail.*

- i. at-issue:  $\text{MIN}_{\text{QUD}}$  ( $\lambda s$ . John mixed a cocktail in  $s$ )
- ii. not-at-issue:  $\text{MAX}_{\text{QUD}}$  ( $\lambda s$ . Nobody other than John mixed a cocktail in  $s$ )

The MIN/MAX-analysis accounts for the fact that clefts are focus-sensitive and discourse-anaphoric: they provide a maximally informative answer to the current question (because of the MAX-operator). The analysis also predicts the EXH-inference of clefts to be robust and systematic, as long as the QUD does not change. In contrast to the semantic definite analysis, though, it makes no predictions concerning a parallel interpretation of clefts and definite pseudoclefts. Table 2 summarizes the predictions of the three major theoretical approaches to cleft exhaustivity, with ‘strength’ as short-hand for robustness and systematicity of the EXH-inference across experiments, speakers, and trials.

**Table 2.** Predictions of major theoretical approaches to cleft exhaustivity.

	$\pm$ parallel cleft & def. pseudocleft	$\pm$ strength
(a) <i>pragmatic</i>	–	–
(b) <i>semantic definite</i>	+	+
(c) <i>semantic MIN/MAX</i>	$\pm$	+

### 3.3 Procedure

The experiments were conducted in a lab with 32 participants included in the analysis for each experiment after exclusion of a small number of participants for not being native speakers of the respective language or erratic behavior on exclusive controls (German Exp. I: 8 male, 24 female, mean age 25.4, range 20–48; German Exp. II: 12 male, 20 female, mean age 27.8, range 19–52; Hungarian Exp. I: 9 male, 23 female, mean age 24.2, range 19–40; Hungarian Exp. II: 9 male, 23 female, mean age 30.03, range 19–55; inclusion criteria for English participants, all students at the University of Texas at Austin, were that they were native speakers of American English between the ages of 18 and 50).

After an introduction to the four roommates constituting the discourse domain, three practice trials were followed by 64 experimental trials. All stimuli were presented auditorily. There were 32 target sentences, corresponding to 8 lexicalizations per sentences type, and 32 fillers. Given language-specific differences, lexicalizations in the stimuli sometimes differed across languages. The targets were distributed over four lists in a Latin square design, yielding a total number of 1024 data points per experiment. All target sentences contained a transitive verb as well as a proper name in subject position and an unspecified indefinite in object position (the latter to prevent unwanted interactions with definiteness). After listening to the stimulus, participants began uncovering the pictures in the boxes until giving a truth-value judgment, after which the next trial started. In order to prevent participants from uncovering all the pictures in one go, there was a built-in time delay of 2000 ms before a new box could be revealed. Participants were free to choose in which order the boxes were uncovered, but the experiments were programmed such that the picture content was presented in the same order irrespective of individual participants' choices.<sup>4</sup>

The experiments delivered two dependent measures: the *Early Response* (continue vs. judgment) on seeing Box 2, and the *Late Response* in Box 3 or Box 4 on encountering the relevant information for deciding on whether the EXH- (Exp. I) or the CAN- (Exp. II) inferences hold (i.e., the final truth-value judgment when participants had chosen to continue at Box 2). Same as for the control items, the late measure served as a sanity check for making sure that participants read and understood the sentences correctly. We found that participants were highly consistent on the late response: if they decided to continue at Box 2, they judged the trial true or false as expected based on the still missing piece of information. For this reason, we will disregard late responses in the following.

## 4. EXH-inference in German and English clefts: Results and analysis

### 4.1 Results: A first look

Sample target sentences for the German experiments were shown in (9), repeated below:

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4. The procedure and the design of the German experiment are discussed in more detail in De Veough-Geiss et al. (2017, 2018). The procedure reported there is the same for English and Hungarian here.

- (15) a. *Es ist MAX, der einen Cocktail gemischt hat.* CLEFT  
 b. *Derjenige, der einen Cocktail gemischt hat, ist MAX.* DEF.PSE  
 c. *Nur MAX hat einen Cocktail gemischt.* EXCL  
 d. *MAX hat einen Cocktail gemischt.* FOCUS

Averaging over speakers, we obtained the early response patterns shown in Figure 2, in which the proportions of judgments made at Box 2 are shown graphically (corresponding to ‘true’ in Exp. I and ‘false’ in Exp. II).<sup>5</sup>

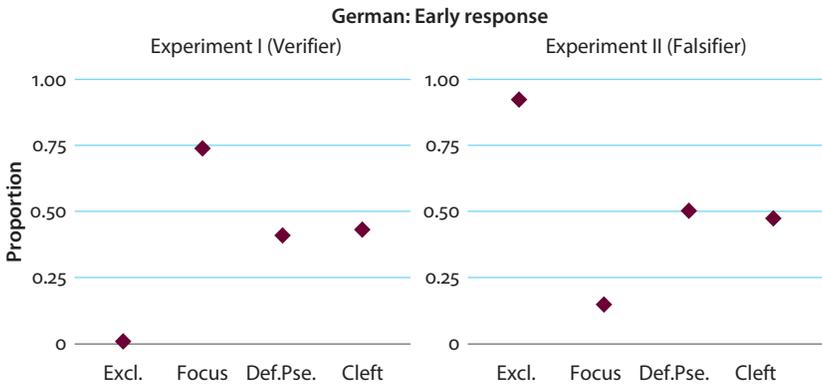


Figure 2. German early responses at Box 2 per sentence type (Exp. I: ‘true’, Exp. II: ‘false’)

Both experiments showed little difference between clefts and definite pseudoclefts in the judgments at Box 2 (Exp. I: Clefts 43% vs. Def.Pse. 41% ‘true’ judgments; Exp. II: Clefts 47% vs. Def.Pse. 50% ‘false’ judgments), in line with the semantic definite analysis. Moreover, in the verifying experiment, the exclusive condition almost always elicited ‘continue’ responses (Exp. I: 1% ‘true’ judgments) and the focus condition generally elicited ‘true’ judgments (Exp. I: 74%), in line with expectations on these control conditions. Conversely, in the falsifying experiment, the exclusive condition generally elicited ‘false’ judgments (Exp. II: 92%) and the focus condition ‘continue’ responses (Exp. II: 15% ‘false’ judgments), again as expected. What is unexpected, though, is the midway exhaustive behavior of both clefts and pseudoclefts, which is unaccounted for on any of the three approaches mentioned above.

Results for the English experiments are largely the same, as shown in Figure 3:

5. Note that occasional errors made at Box 2 (‘false’ for Exp. I or ‘true’ for Exp. II, against all logic) were removed from the analysis. Total erroneous judgments per language: German: 3; English: 4; Hungarian: 4.

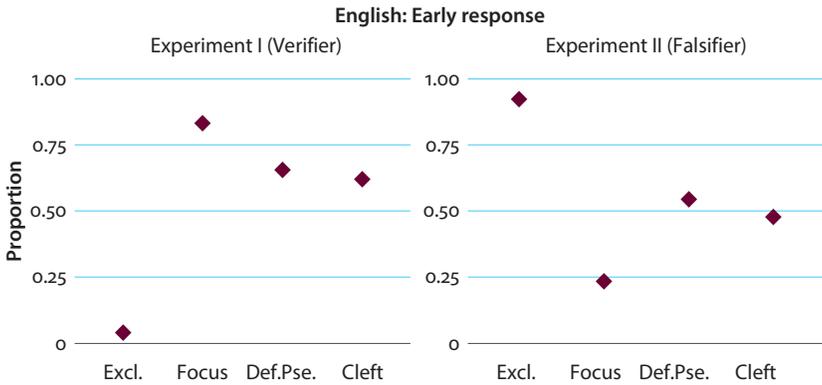


Figure 3. English early responses at Box 2 per sentence type (Exp. I: ‘true’, Exp. II: ‘false’)

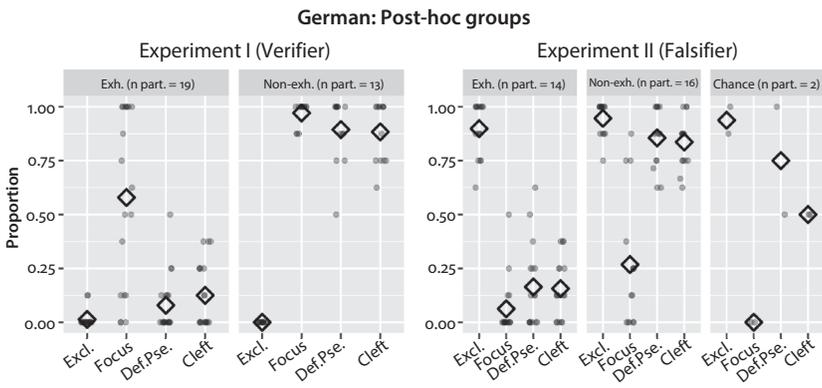
Clefts and pseudoclefts again patterned alike in verification (Exp. I: Clefts 62% vs. Def.Pse. 66% ‘true’ judgments) and falsification (Exp. II: Clefts 48% vs. Def. Pse. 55% ‘false’ judgments), and elicited midway exhaustive behavior. And again, under verification the exclusive condition almost always elicited ‘continue’ responses (Exp. I: 4% ‘true’ judgments) and the focus condition overall elicited ‘true’ judgments (Exp. I: 84%), whereas under falsification the exclusive condition almost always elicited ‘false’ judgments (Exp. II: 96%) and the focus condition generally elicited ‘continue’ responses (Exp. II: 23% ‘false’ judgments). Clefts and definite pseudoclefts in English appear to be, at least descriptively, somewhat less exhaustive than their German counterparts, a tendency we will return to below.

#### 4.2 Post-hoc analysis: Different sub-groups

A post-hoc analysis of the data reveals the observable midway exhaustivity with clefts and pseudoclefts to come about by averaging over two different participant groups. On closer scrutiny participants divide into two sub-groups, EXH and Non-EXH, where group membership is determined on the basis of participants’ interpretive behavior in terms of whether or not a truth-value judgment was made in the *cleft*-condition in German and English.<sup>6</sup> Note that members of the EXH-group chose to make a truth-value judgment 40% or less times at Box 2 in the verifying experiment (instead choosing to continue a majority of the time to check that exhaustivity holds) and, moreover, they judged the target sentences as ‘false’

6. Group membership was based on the number of truth-value judgments made at Box 2 (i.e., ‘true’ for Exp. I and ‘false’ for Exp. II) out of the total number of possible judgments per participant after data preparation. We refer the reader to De Veough-Geiss et al. (2018: 26) for details regarding German; the description there also applies to English.

60% or more times at Box 2 in the falsifying experiment (choosing not to continue a majority of the time, but rather make a judgment). Members in the Non-EXH group showed the opposite pattern. Note that participants who made truth-value judgments between 40–60% of the time were categorized as responding at chance. If the responses are sorted according to sub-group, a different picture emerges. As shown in Figure 4, members of the EXH-group treat clefts and pseudoclefts as more exhaustive, more or less like exclusives. Members of the Non-EXH group treat clefts and pseudoclefts as less exhaustive, more or less like prosodic focus. In short, one group shows the expected behavior on pragmatic analyses of EXH-inferences, whereas the other shows the expected behavior on semantic analyses of EXH-inferences in focus clefts.

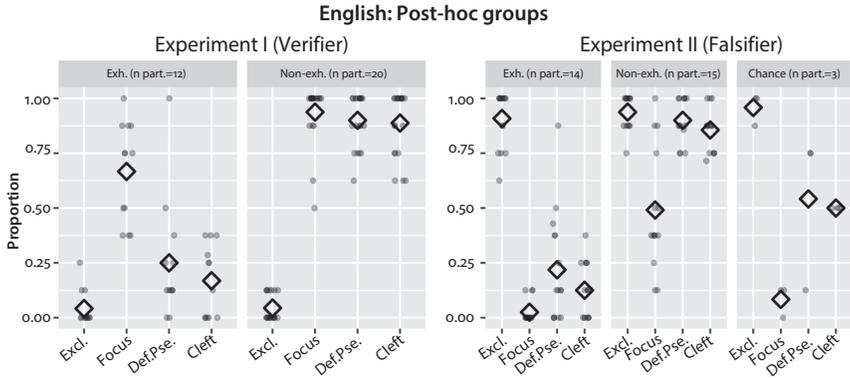


**Figure 4.** Split results German; large diamonds show proportions per sentence type, small jittered dots show proportions per participant

By and large the same results obtain for the English experiments, with the difference that the Non-EXH-group is larger than the EXH-group in the verifying Exp. I (20:12 as opposed to 13:19 in German). As a result, clefts and pseudoclefts come out as overall less exhaustive in the total results for Exp. I, as shown in Figure 5.

### 4.3 Accommodating discourse antecedents (Pollard & Yasavul 2016)

Compared to the predictions of the different types of accounts discussed in Table 2, our experiments delivered unexpected results. We found that clefts are indeed parallel to definite pseudoclefts, as predicted by the semantic definite analysis. Contrasting with this analysis, however, the EXH-inference was neither robust nor systematic in either of the two constructions, suggesting a pragmatic approach. In sum, our findings are incompatible with any existing account.



**Figure 5.** Split results English; large diamonds show proportions per sentence type; small jittered dots show proportions per participant

In order to account for the observations, we postulate that the group-specific variation in the interpretation of clefts and definite pseudoclefts follows from the discourse-anaphoric nature of the two constructions. Recall from Section 2 that clefts are anaphoric in triggering an  $\exists$ -presupposition on the preceding context, same as definite pseudoclefts. As a result, both constructions are not easily licensed in out-of-the-blue utterances. Compare the infelicitous (16a–16b) with the felicitous focus clause in (16c):

- (16) a. *#Hey, listen! It was the president that I shook hands with yesterday!*  
 b. *#Hey listen! The one I shook hands with yesterday was the president!*  
 c. *Hey listen! I shook hands with the president yesterday.*

For concreteness, we adopt the proposal from Pollard & Yasavul (2016), who argue that EXH-inferences in focus clefts are optional and follow from their discourse anaphoricity. The cleft in (16a) triggers the presupposition in (17), to be satisfied by a suitable discourse antecedent in the preceding context.

- (17)  $\exists x[\text{speaker\_shook\_hands\_with}'(x)]$

However, target sentences in the experiments were presented without a preceding context, so participants had two options available for accommodating suitable discourse antecedents (Pollard & Yasavul 2016): First, they could accommodate a discourse antecedent that is maximal (unique) with respect to the background property, as sketched in (18a). In a question-based discourse analysis (Roberts 2012; Beaver & Clark 2008), the corresponding QUD would be an identification question (18b). The discourse referent  $z$  can be modelled with the Russellian  $\iota$ -operator, and the meaning of the EXH-interpreted cleft is shown in (18c).

- (18) Option I: Maximal antecedent (DEF)  $\Rightarrow$  EXH
- a. There's a maximal  $z$  that danced. It's Carla that danced.
  - b. QUD: Who's the (maximal)  $z$  that danced?/Who danced?
  - c.  $\iota z[\text{danced}(z)] = \text{carla}$

Alternatively, participants could accommodate an indefinite (non-maximal) antecedent, as in (19a). The corresponding QUD would be an open complement question (19b), as suggested by Onea (2016) under the label *potential questions*, licensed by indefinite antecedents.<sup>7</sup> The discourse referent can be modelled with the help of a choice function. The meaning of the non-exhaustive cleft is shown in (19c).

- (19) Option II: Non-maximal antecedent (INDEF)  $\Rightarrow$  non-EXH
- a. Somebody danced. It's Carla that danced.
  - b. QUD: Who was it? / Who danced?
  - c.  $f_{CH}(\text{danced}) = \text{carla}$

In sum, the EXH or non-EXH interpretation of German clefts follows from the anaphoric nature of clefts, together with different strategies for accommodating suitable antecedents. The two semantic objects  $\iota z[\text{danced}(z)]$  and  $f_{CH}(\text{danced})$  stand for two possible discourse antecedents that participants can accommodate in the absence of context. The two objects may be modelled as possible referents for the cleft pronoun *it/es*, if this pronoun is referential; see Reeve (2012). Depending on whether participants choose a definite/maximal or an indefinite discourse antecedent, clefts will get an EXH- or a Non-EXH-reading. The EXH-inference in clefts is a pragmatic inference (Horn 1981), but it has nothing to do with exhaustification of focus alternatives or with scalar implicatures computed over focus alternatives, pace De Veugh-Geiss et al. (2015). Indeed, the MAX-accommodation strategy behind the EXH-inference may be what Horn (1981) had in mind with his generalized conversational implicature, which was tied to the existence presupposition of focus clefts (11a–11b); see also Onea (2019) for discussion of this point.

The analysis proposed for focus clefts carries over to definite pseudoclefts involving the morphologically complex determiner *der/die/das-jen-ige* 'the-demonstr-adj' in German and *the one* in English as in (20), thereby accounting for the parallel behavior of the two construction types.

- (20) *Diejenige, die getanzt hat, war Carla.*  
'The one that danced was Carla.'

---

7. Pollard & Yasavul (2016) do not explicitly discuss this part, but we see no reason to give up the intuition from Velleman et al. (2012) and others that focus partitioning is a general answering device to the QUD.

These inherently anaphoric DPs denote familiarity definites in the sense of Schwarz (2009): they refer to the unique/maximal previously mentioned individual  $z$  with backgrounded property  $P$ :

$$(21) \quad [[\text{der/die/das-jen}_i\text{-ige}]]^g = \lambda P.\iota x.[P(x) \wedge x = g(i)]$$

Familiarity definites do not refer to the globally unique/maximal individual with property  $P$ , but rather to the unique salient individual in a given context. In the case of accommodation to non-maximal antecedents, the unique salient individual is the discourse referent introduced by a preceding indefinite expression (Heim 1982; Kamp & Reyle 1993). In sum, the parallel behavior of focus clefts and definite pseudoclefts does not follow from the presence of a Russellian definiteness operator (Percus 1997; Büring & Križ 2013), but rather from their anaphoric nature as familiarity definites. Familiarity is compatible with EXH- and Non-EXH-readings alike.

## 5. Hungarian preverbal focus: Results and analysis

In order to compare the interpretive behavior of focus clefts regarding the EXH-inference with that of preverbal focus constructions in Hungarian, we also conducted the above two experiments on Hungarian. The four different stimuli types are shown in (22). Sentences (22a–22b) are the closest Hungarian counterparts to focus clefts and definite pseudoclefts, respectively. What sets Hungarian apart is that there is no plain prosodic alternative to structural focusing in Hungarian, only preverbal focus as in (22d). Consequently, there is no real control structure with a clearly non-exhaustive interpretation.

- (22) a. *Tamás az, aki felvett egy pulóvert.*  
 Tamas that REL on.put a pullover  
 ‘Tamás is the one that put on a pullover.’ (biclausal) *CLEFT*
- b. *Az, aki felvett egy pulóvert, az Tamás.*  
 that REL on.put a pullover that Tamás  
 ‘The one that put on a pullover is Tamás.’ *DEF.PSE*
- c. *Csak Tamás vett fel egy pulóvert.*  
 ‘Only Tamás put on a pullover.’ *EXCLUSIVE*
- d. *Tamás vett fel egy pulóvert.*  
 ‘Tamás put on a pullover.’ (preverbal) *FOCUS*

Figure 6 shows the results for the verification and falsification experiments.

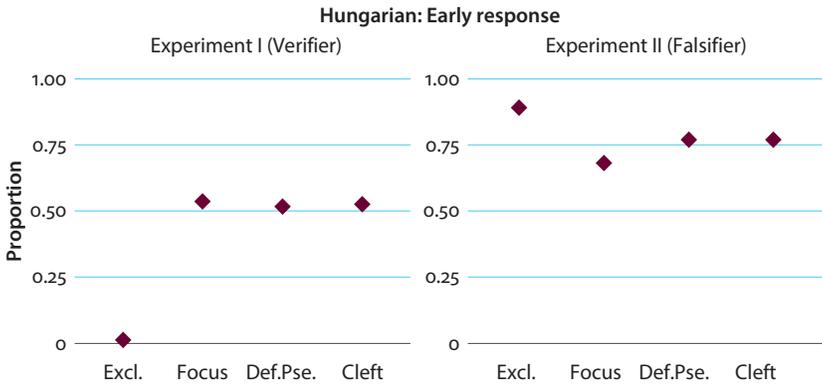
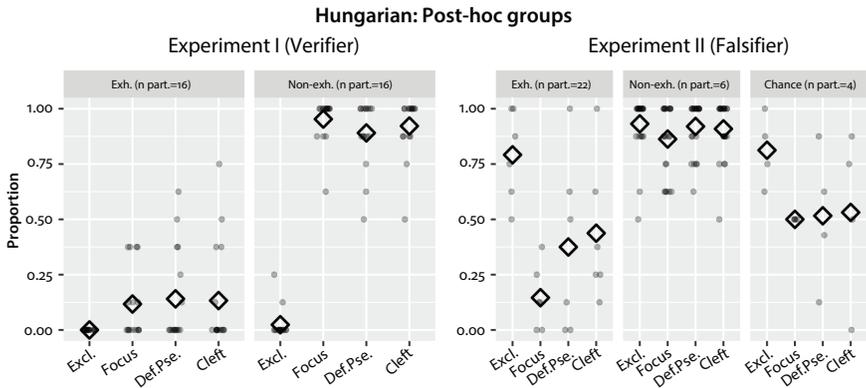


Figure 6. Hungarian early responses at Box 2 per sentence type (Exp. I: 'true', Exp. II: 'false')

The Hungarian results differ slightly from those observed for German and English. In particular, there is no clearly non-exhaustive structure eliciting a majority of 'true' judgments (Exp. I: preverbal Focus 54%, biclausal Cleft 53%, and Def.Pse. 52% 'true' judgments; Exclusives 1% 'true' judgments). Furthermore, the EXH-inference is quite robust with the preverbal focus construction under falsification, generally eliciting 'false' judgments (Exp. II: preverbal Focus 68% 'false' judgments; cf. biclausal Cleft 77%, Def.Pse. 77%, and Exclusive 89% 'false' judgments). At the same time, there are parallels: the results for the exclusive condition pattern with the English and German results, and the EXH-inference with preverbal focus is available to some extent, giving rise to midway exhaustivity under verification. In line with Szabolcsi (1994), among others, preverbal focus constructions differ systematically in interpretation from sentences with exclusives. At the same time, contrasting with previous literature (see specifically Horváth 2010) but in line with our findings for German and English clefts, the EXH-inference is neither systematic nor robust across participants and experiments. This is evidenced by the results for members of EXH- and Non-EXH-group, respectively. Under verification, in Figure 7, the two groups – for Hungarian determined by participant behavior in the preverbal focus condition – are of even size (16 EXH; 16 Non-EXH), showing that the EXH-inference is not mandatory with Hungarian preverbal focus, at least under verification.

Summing up, Hungarian is the only language of the three with no mirror results in the two experiments. There is a rather robust EXH-inference with focus, clefts, and definites under falsification, with the Non-EXH group being rather small (6 participants). Finally, whereas Hungarian preverbal focus behaves on a par with Hungarian bi-clausal clefts (as often postulated in cross-linguistic



**Figure 7.** Split results Hungarian; large diamonds show proportions per sentence type; small jittered dots show proportions per participant

comparison; see É. Kiss 1998), it behaves slightly different from its English and German counterparts.

This leaves us with three possibilities for explaining the more robust EXH-interpretation under falsification. First, the effect may be an experimental artifact. There was no clear Non-EXH-condition in the Hungarian experiments, so participants may develop a bias for EXH-interpretations; still, this would leave open why there is a difference between verification and falsification tasks. Second, Hungarian preverbal focus might be semantically exhaustive, but at the not-at-issue layer of meaning. As a result, exhaustivity may be readily ignored in the verification task (Non-EXH = 16), but rarely so in the falsification task (Non-EXH = 6) with a more salient EXH-inference. This line of reasoning would be compatible with standard analyses of Hungarian focus (e.g., Kenesei 1986; Szabolcsi 1994). What remains open, though, is how this analysis would generalize to definites and definite pseudoclefts.

While we currently lack evidence to reject these possibilities, we would like to entertain a third possibility by pushing for a unified pragmatic analysis of EXH-inferences in focus partitioning in German, English, and Hungarian. On this analysis, focus partitioning structures are not semantically exhaustive in any of the three languages, and the EXH-inference arises by pragmatic reasoning to a maximal (unique) discourse antecedent as before. The only difference lies in the fact that Hungarian speakers preferably accommodate to maximal discourse antecedents when encountering a context-free preverbal focus. Why? Hungarian focus constructions form default answers to *wh*-questions (Onea & Beaver 2009; Abrusán 2016), so speakers will try to accommodate a suitable singular QUD – or the corresponding maximal discourse antecedent. Hungarian differs from German and English in that *wh*-questions in the individual domain are morphologically

marked for SG *ki/mi* ‘who/what<sub>SG</sub>’ vs. PL *kik/mik* ‘who/what<sub>PL</sub>’. PL-marked *wh*-questions indicate that the backgrounded property holds of a plurality, whereas the SG variant is number-neutral in allowing both SG- and PL-answers. Related to this, the choice of a preverbal focus structure with a SG focus constituent in (23a, 24a) (or its cleft counterpart with SG *aki*) over the exclusive variant with *csak* ‘only’ in (23b, 24b) may trigger the accommodation of a SG *wh*-question with SG (= maximal) interpretation. As shown in Balogh (2009), the two focus-related structures have different answer potentials by imposing different felicity constraints on preceding questions. Whereas sentences with *csak* ‘only’ + focus are compatible with both SG and PL *wh*-questions (23b, 24b), its plain focus counterpart can only answer SG questions; see (23a) vs. (24a)

- (23) Q: *Ki ment el Hágá-ba?*  
 who<sub>SG</sub> went VM Hague-ILL  
 ‘Who went to The Hague?’ [Balogh 2009: 108]
- a. *AMY ment el Hágába.* SG-expectation FOCUS  
 ‘Amy went to The Hague.’
- b. *Csak AMY ment el Hágába.* PL-expect. EXCL.  
 ‘Only Amy went to Hague.’
- (24) Q: *Kik mentek el Hágá-ba?*  
 who<sub>PL</sub> went-PL VM Hague-ILL  
 ‘Who went to The Hague?’
- a. *#AMY ment el Hágába.* SG-expectation FOCUS
- b. *Csak AMY ment el Hágába.* PL-expect. EXCLUSIVE

Here is a sketch of this type of the hearer’s answer-based pragmatic reasoning: (i) speaker used a focus/*aki*-structure; (ii) focus/*aki*-structures must answer SG *wh*-questions; (iii) SG *wh*-questions are in principle compatible with SG or PL expectations on the answer space, i.e., the discourse antecedent to accommodate; however, (iv) if the speaker wanted to make unambiguous reference to a question with PL expectation on the answer space, she could and should have done so by using the more explicit exclusive structure, which would presuppose a plural expectation, for the maximal/definite antecedent construal. Alternatively, she could use, e.g., a focus structure with the particle *többek között* ‘among others’ for an indefinite construal. With no such discourse particles (Beaver & Clark 2008), the hearer concludes that the preverbal focus structure constitutes the answer to a SG *wh*-question with a SG-expectation, *Who is the SG x with BG-property P?* Reconstructing this QUD amounts to the accommodation of a unique discourse antecedent by way of the maximal antecedent strategy, thereby triggering EXH-inferences.

Finally, judging from the quantitatively different speaker behavior in the verification and falsification tasks, it appears that in the verification task it is sufficient for many speakers that the accommodated maximal individual has the background property in Box 2, whereas others continue to check whether uniqueness/maximality is satisfied. In falsification, by contrast, uniqueness/maximality is violated in Box 2, leading the majority of speakers of the EXH-group to judge the sentence as ‘false’ due to presupposition failure. The few members of the Non-EXH-group, by contrast, make the utterance felicitous given the content of Box 2 by shifting the interpretation of the accommodated sg *wh*-question to a plural expectation. The accommodated indefinite antecedent is part of a plurality of individuals with the background property in question, resulting in the absence of an EXH-inference.

There are some open ends to this analysis. First, if our analysis is correct, plural preverbal focus in Hungarian should be about as (non-)exhaustive in our experimental setting as for German or English clefts. This should be tested in future research. Secondly, Hungarian definite constructions also exhibit higher exhaustivity alongside preverbal focus. This appears unexplained by our analysis. Notice, though, that a similar analysis can be produced for Hungarian definite pseudoclefts, which also have singular vs. plural marking on the relative pronoun (*ki/ki-k, aki/aki-k*).

## 6. Outlook: Anaphoricity vs. EXH-inferences in focus partitioning

We have reported on offline behavioral experiments that showed cross-linguistic parallels in the interpretation of focus partitioning structures, in spite of surface morphosyntactic differences. We argued that the parallels follow if focus partitioning structures instantiate a cross-linguistically unified construction type, which is defined by discourse-anaphoricity in the form of an  $\exists$ -presupposition on the preceding context. We also found that EXH-inferences on the focus domain were neither robust nor systematic in our experiments, which leads us to conclude that EXH-inferences are not semantically coded interpretive properties of focus partitioning across languages. Rather, focus partitioning structures are underspecified for exhaustivity, with the EXH-inference arising when a maximal discourse antecedent is established. It follows that the formal semantic analysis of clefts or Hungarian preverbal focus should not be based on an interpretive feature [+exhaustive], pace É. Kiss (1998) or Horváth (2010). Interestingly, our experiments found the robustness/strength of the EXH-inference with clefts and Hungarian focus to be somewhere midway between exclusives (entailment) and plain focus (conversational implicature), in agreement with most speakers’ pre-theoretical intuitions and with the divided theoretical landscape.

Another unifying feature of focus partitioning is that all focus partitioning structures feature formal markers of familiarity or givenness. In German and English clefts, these are the referential pronouns (*es/it*) and de-accenting (Schwarzschild 1999); and in definite pseudoclefts an overt definite marker. Moreover, there appears to be regular morphosyntactic marking of anaphoricity/familiarity even with Hungarian preverbal focus: there are recent claims that the obligatory verb movement with preverbal focus is indicative of backgrounding/familiarity (Onea 2007: 170; É. Kiss & Pintér 2014; É. Kiss 2015). In (25a) from Onea (2007), the second clause with verb movement anaphorically refers back to the previously introduced event, whereas (25b) without verb movement introduces a new event.

- (25) a. *Péter meg-sebesült. Tegnap sebesült meg Péter?*  
 Peter PRT.hurt yesterday hurt PRT Peter  
 ‘Peter got hurt. Did Peter get hurt YESTERDAY?’ e1 = e2
- b. *Péter meg-sebesült. Tegnap meg-sebesült Péter?*  
 Peter PRT.hurt yesterday PRT hurt Peter  
 ‘Peter got hurt. Did Peter get hurt YESTERDAY (too)?’ e1≠e2

The overall conclusion is that there has been too strong a focus on focus in the theoretical literature of clefts and preverbal focus, which often ignored backgrounding or anaphoricity effects, with the notable exception of Delin (1992). However, it seems that the information-structural category of the background plays at least as important a role in interpretation as focus.

This is in line with traditional insights from functional grammar (Sgall et al. 1986) and functionalist-cognitive approaches (Erteschik-Shir 1997), which assign an anaphoric backward-looking function to the category of background, whereas the focus domain constitutes the forward-looking at-issue core of the information conveyed. Our results are moreover in agreement with formal approaches to Hungarian focus, such as É. Kiss (2015) and É. Kiss & Pintér (2014: 5), which stress the importance of background: “In fact, the main motivation for the formation of a focus construction can be the need of indicating that the background is presupposed”; they are compatible with the possibility of independent *focus* and *background* marking in Ngamo (Grubic 2015), Fulani, and Hausa (Güldemann 2016); and they support Büring’s (2016) conceptual shift from focus-driven alternative semantics to background-based Unalternative Semantics.

To conclude: It is the *background* that matters for semantic interpretation of focus-background partitioning. Focus-background partitions are anaphoric devices with an existence presupposition. EXH-inferences may or may not arise, depending on how the existence presupposition is resolved.

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