

Quantificational contrastive topics with verum/falsum focus

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Abstract

The paper investigates a problem related to the distribution of quantificational determiners as contrastive topics in Hungarian sentences containing a verum/falsum focus. It is argued that the reason why certain sentences with the above structure turn out to be ill-formed is that their intended truth-conditional interpretations are in contradiction with the presuppositions introduced by the contrastive topic. Although this strategy is essentially the same as that proposed by Büring, D., 2003, On d-trees, beans, and B-accent, *Linguistics and Philosophy* 26, 511-545, it is shown that the well- or ill-formedness of the relevant Hungarian examples does not follow without extra assumptions from the way Büring defines the presuppositions of contrastive topics, and therefore an alternative definition is put forth.

Keywords

contrastive topic, verum focus, falsum focus, quantifier, scope

1 Introduction

This paper investigates the interpretation of a constituent type normally situated on the left periphery of the sentence: quantificational DPs containing bare numeral determiners and modified numeral determiners like *more than n* or *less than n* that are pronounced with a ‘contrastive’, rising tone. The aim of the paper is to show that the investigation of the interpretations of sentences where such *contrastive topics* are followed by a verum or falsum focus can contribute in important ways to the study of the left periphery, since they provide a testing ground for theories aiming to account for the semantics/pragmatics of contrastive topics. The predictions of two such theories will be explored in the paper, primarily with the help of Hungarian data. The first theory is the one proposed by Büring (2003), according to which declaratives with contrastive topics presuppose the existence of a *strategy*, roughly, a (possibly implicit) preceding discourse with a main question and a subquestion. The second theory (also discussed in Gyuris, in press a, b), assumes that a contrastive topic introduces the presupposition that there is a function that maps the set of alternatives to the contrastive topic denotation onto the set of alternatives to the denotation of the focus of the same sentence.

In the examples to follow, the rising tone on a word will be indicated with a forward slash, ‘/’. We will assume that the first constituent of the so-called *predicate part* of the sentence (i.e. the part following the topic(s), cf. É. Kiss 2002), which serves as the *semantic focus*, is obligatorily stressed, and is pronounced with a falling tone (cf. Kálmán et al. 1986 and Kálmán et al. 1989), and mark it with a backslash, ‘\’. Regarding syntactic labeling, we follow É. Kiss’s (2002) relevant proposals, with one exception: the maximal projection that contains the constituent with the rise, which occupies one of the [Spec,TopP] positions of the sentence according to É. Kiss, will be placed into the specifier position of a CTopP projection, to be differentiated from ordinary topics.¹ In É. Kiss’s framework, the following

¹ Regarding the syntactic position of the contrastive topic, there are two dominant views in the literature, both proposed by Katalin É. Kiss. According to É. Kiss (1987), the contrastive topics are placed into a left dislocated position, which explains why they license resumptive pronouns, why they are much less sensitive

positions can host the predicate-initial constituent: [Spec,DistP], the position for distributive quantifiers; [Spec,FP], the position for preverbal exhaustive (identificational) focus; the head of [Spec,NegP], dominating [Spec,FP] or the VP, expressing focus negation and verb negation, respectively; [Spec,AspP], the place for verbal modifiers; and the AspP head, the place of the verb in affirmative sentences. Example (1) below illustrates the last option. In the English translations, the fall-rise pitch accent (Bolinger's 1958 B-accent, cf. section 2.1 below) characteristic of the contrastive topic (cf. Büring 2003) is indicated with a forward slash in front of the accented syllable, which is also marked with capital letters, and the falling pitch accent on the focus (Bolinger's A-accent) with a backslash.

- (1) [CTopP /HAT diák [AspP \ELjött az előadásra.]]
 six student VM.came the talk.SUBL
 '/SIX students \DID attend the talk.'

Other things being equal, verbs in predicate-initial position, like the one in (1) above, can either receive a *contrastive* (or identificational) *focus* reading, where the interpretation of the verb is contrasted with one or more of its alternatives, or a *verum focus* (or polarity focus) reading, which contrasts the meaning of the whole sentence with its negation. To avoid misunderstanding, we will use verbs in the examples below for which the contrastive focus reading is less likely. The next example shows a variant of (1), where the verum focus is replaced by a falsum focus, that is, focus on the negative polarity of the sentence:

to islands than ordinary topics are, and why they are not always acceptable in subordinate clauses, particularly, relative clauses. According to É. Kiss (2002), contrastive topics are situated in one of the [Spec,TopP] positions, which explains why they can follow ordinary topics in the sentence, as pointed out by Alberti and Medve (2000). The choice between the two proposals is immaterial to the concerns of the paper, we follow the more recent one because we assume this is the one the reader is more familiar with.

- (2) [CTopP /*HAT* *diák* [NegP \NEM [VP *jött el az előadásra.*]]]
 six student not came VM the talk.SUBL
 ‘/SIX students \DIDN’T attend the talk.’

Note that we do not consider all instances of a negative particle occupying [Spec,NegP] an instance of falsum focus, only those where the negative particle is obligatorily stressed. For example, in (3) below, the sentence-initial DP occupies the [Spec,DistP] position, but the negative particle does not obligatorily receive stress, which indicates that it marks predicate negation:

- (3) [DistP *Legalább hat diák* [NegP *nem* [VP *jött el az előadásra.*]]]
 at.least six student not came VM the talk.SUBL
 ‘There are at least six students who did not attend the talk.’

The next example differs from (1) only in that the contrastive topic is a complex determiner of the *more than n* type. This, however, is enough to turn the sentence ill-formed:

- (4) * [CTopP /*HATnál több diák* [AspP \ELjött az előadásra.]]
 six.ADESS more student VM.came the talk.SUBL
 *‘More than /SIX students \DID attend the talk.’²

One way to account for the unacceptability of (4) would be to say that it is due to syntactic criteria, for example, to a prohibition for complex determiners to serve as contrastive topics in a sentence. The latter explanation, however, is strongly contradicted by the fact that the following sentences, where the same DP occupies [Spec,CTopP], are well-formed. In (5) below, the predicate-initial constituent is a negative particle expressing falsum focus, in (6) it is an adverb in [Spec,FP], and in (7), crucially, a verum focus:

² Note the difference between the stress patterns of the Hungarian and the English examples: whereas the main stress of a complex determiner in Hungarian falls on its left edge, in English it falls on its right edge.

- (5) [CTopP /HATnál több diák [NegP \NEM [VP jött el az előadásra.]]]
 six.ADESS more student not came VM the talk.SUBL
 ‘More than /SIX students \DIDN’T attend the talk.’
- (6) [CTopP /HATnál több diák [FP \TEGnap [VP jött el az előadásra.]]]
 six.ADESS more student yesterday came VM the talk.SUBL
 ‘More than /SIX students attended the talk \YESterday.’
- (7) [CTopP /HATnál több diák [AspP \JÁTszotta a játékot.]]
 six.ADESS more student played the game.ACC
 ‘More than /SIX students \DID play this game (together/*individually).’³

The following variant of (1) shows that the DP *hatnál több diák* ‘more than six students’ legitimately appears in postverbal position as well:

- (8) [AspP \ELjött hatnál több diák az előadásra.]
 VM.came six.ADESS more student the talk.SUBL
 ‘There were more than six students who attended the talk.’

(9) illustrates that contrastive topic DPs with complex determiners of the *fewer than n* type are equally unacceptable in the construction type represented by (4):

- (9) * [CTopP /HATnál kevesebb diák [AspP \ELjött az előadásra.]]
 six.ADESS fewer student VM.came the talk.SUBL
 * ‘Fewer than /SIX students \DID attend the talk.’

³ As the glosses show, among the two theoretically possible readings, only the collective reading is available for (7). We will return to the discussion of this example in section 4.3 below.

As opposed to (4), which has a well-formed variant containing a falsum focus, illustrated in (5), (9) cannot be saved by replacing the verum focus with a falsum focus, as the following example shows:

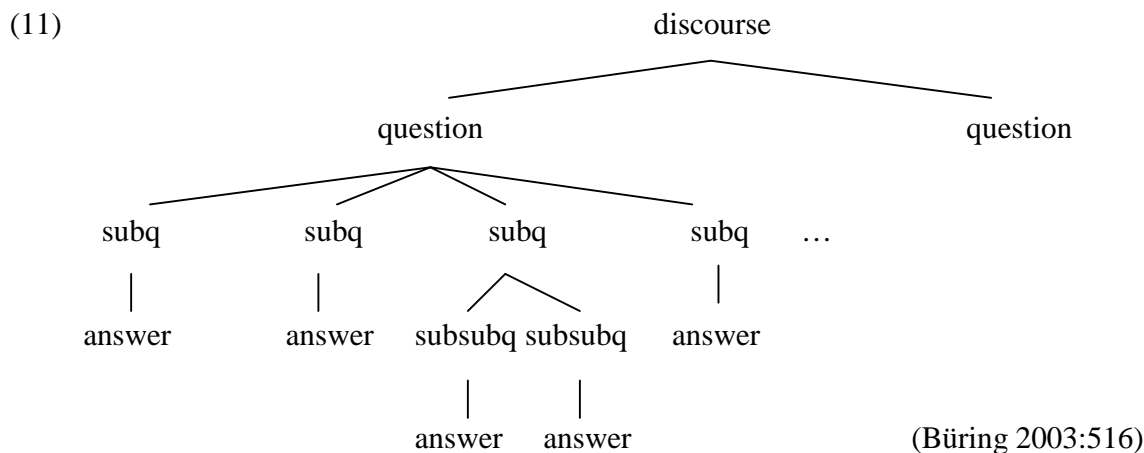
- (10) *_{[CTOPP /HATnál kevesebb diák [NegP \NEM [VP jött el az előadásra.]]]}
six.ADESS fewer student not came VM the talk.SUBL
* ‘Fewer than /SIX students \DIDN’T attend the talk.’

One recent proposal in the literature that puts forth a semantic/pragmatic account of why particular readings of syntactically well-formed sentences with contrastive topics are unacceptable is Büring (2003). In section 2 we outline the claims of the above approach, consider how it would account for (4) above, and conclude that this theory cannot be extended in any predictable way to explain the lack of interpretation for the latter sentence and its analogues. Section 3 summarizes our views on the truth-conditions of the Hungarian examples under consideration. In section 4 we consider the consequences of adopting an alternative strategy, according to which declaratives with contrastive topics presuppose a function mapping the set of alternatives of the contrastive topic denotation onto the set of alternatives of the semantic focus and show how it could account for the (un)grammaticality of the examples listed above. Section 5 summarizes the results of the paper.

2 An account in the spirit of Büring (2003)

2.1 Contrastive topics presuppose ‘strategies’

Büring (2003) argues that the presence of a contrastive topic in a sentence, marked in English with a fall-rise accent, indicates that the sentence is part of a discourse with a particular structure. Büring analyzes the hierarchical structure of discourses by mapping them onto representational devices called d(iscourse)-trees. (11) shows how d-trees are structured:



According to Büring (2003), well-formed d-trees have to satisfy, among other things, two constraints. The first one is the constraint of *informativity*, which is captured by him as follows: ‘Don’t say known things, don’t ask for known things’. The second one is the constraint of *relevance*, which means that a question should not be abandoned before it is sufficiently resolved, thus, for a move (question or answer) to be relevant, it should answer or at least address the question that is under discussion at the time of its utterance (the question already asked but not yet answered), i.e. the question immediately dominating the move in the d-tree.⁴

Büring claims that the presence of a contrastive topic in an utterance indicates or presupposes a *strategy*, i.e. that the move the utterance is mapped onto in a d-tree is dominated both by a main question and by one of the latter’s subquestions.⁵ (The mapping between discourses and d-trees is not one-to-one, though: there can be moves in d-trees that are not associated with utterances, because the corresponding utterances are left implicit in the discourse.) Büring (2003) proposes a mechanism with the help of which, given a particular utterance with a contrastive topic, all the moves in the d-tree that the utterance is mapped onto can be established. According to this, the question immediately dominating a

⁴ Büring (2003) ignores discourses where declaratives are preceded by declaratives.

⁵ Büring’s (2003) theory is inspired by Jackendoff (1972), who observes that two declarative sentences in which the place of the fall-rise accent (Bolinger’s 1958 B-accent) and that of the falling accent (Bolinger’s A-accent) are exchanged, must answer different *wh*-questions.

declarative with a contrastive topic in a d-tree, as well as its sister-questions, are drawn from the set of questions constituting the CT-value of the latter declarative. CT-values are generated as follows:

(12) *CT-value formation*

Step 1: Replace the focus with a *wh*-word and front the latter, if focus marks the finite verb or negation, front the finite verb instead.

Step 2: Form a set of questions from the result of step 1 by replacing the contrastive topic with some alternative to it.

(Büring 2003: 519)

(13a) shows the result of applying the above algorithm to the example in (13), whereas (13b) formally represents the resulting set of question meanings:

(13) *FRED_{CT} ate the BEANS_F*⁶.

a. CT-value formation:

step 1: What did Fred eat?

step 2: What did Fred eat?

What did Mary eat?

What did ... eat?

b. $\|FRED_{CT} \text{ ate the } BEANS_F\|^{ct} = \{ \{x \text{ ate } y \mid y \in D_e \} \mid x \in D_e \}$

(Büring 2003: 519)

Thus, Büring's theory predicts that the declarative in (13) is immediately dominated in any possible d-tree by one question in the set shown in (13b), some elements of which are listed in (13a). The fact that (13) is dominated exactly by the question *What did Fred eat?* and not by any other one in the set is predicted (i) by the tacit assumption that one and the same sentence cannot be mapped onto two different moves of the same discourse tree, and (ii) by the *principle of highest attachment* (Büring 2003: 534), according to which, if M is a complete answer to a question Q, Q immediately dominates M. As (13) is a complete

⁶ In the examples cited from Büring (2003) the original notation has been retained.

answer to the question *What did Fred eat?*, the former must be dominated by the latter in the discourse tree, but, as a result, (13) cannot be dominated immediately by any other question in the same discourse tree.

Büring (2003) argues that the lack of particular readings for declaratives with a contrastive topic can be attributed to the fact that these readings contradict the presuppositions introduced by the contrastive topic, namely, that the move the declarative is mapped onto in a discourse tree is dominated both by a main question and by one of the latter's subquestions. Since the missing readings can all be analyzed as not only providing a complete answer to a subquestion in the CT-value of the sentence but a complete answer to the main question as well, the assumption that the relevant declarative sentences are indeed dominated by two questions in any possible d-tree is contradicted. Let us see how this strategy accounts for the fact that the following sentence cannot have an interpretation:

(14) #*ALL_{CT} the abstracts DID_F get accepted.*

(Büring 2003:533)

Büring (2003) argues that in any d-tree that satisfies the requirements of d-tree formation, the above sentence (repeated as (15A)) is dominated by (15Q) and by one of its subquestions, shown in (15SQ):

(15)Q: *How many (of the 74) abstracts got accepted?*

SQ: *Did all the abstracts get accepted?*

A: #*(Yes,) ALL_{CT} the abstracts DID_F get accepted.*

(Büring 2003:533)

Since (15A) provides a complete answer to both (15Q) and (15SQ), the presuppositions introduced by the contrastive topic cannot be satisfied (the sentence cannot be part of a 'strategy'), and thus the sentence fails to have an interpretation. The lack of one of the two

theoretically possible readings of (16), paraphrased below as reading i), is accounted for in the same manner:⁷

(16) *ALL_{CT} the abstracts DIDN'T_F get accepted.*

- i. # All the abstracts are such that they did not get accepted.
- ii. It is not the case that all the abstracts got accepted.

(Büring 2003:533)

Büring (2003:533) claims that in any relevant d-tree, (16) would be dominated by (15Q) and (15SQ) as well. Since its i) reading provides a complete answer not only to (15SQ) but also to (15Q), the presuppositions introduced by the contrastive topic are not satisfied, therefore the reading proves to be unavailable. The ii) reading does not provide a complete answer to (15Q), therefore it is predicted to be available, which indeed corresponds to the facts.

Having reviewed Büring's (2003) claims about the conditions determining whether a particular interpretation is available for a declarative with a contrastive topic, in the next section we turn to the issue of whether above theory could be extended to account for the Hungarian examples under consideration.

2.2 Deriving the d-trees for sentences containing a verum/falsum focus

In order to be able to explain the contrasts observed with respect to (1)–(2) and (4)–(5) above in Büring's (2003) framework, one has to define a procedure for mapping these sentences onto d-trees. In what follows, we will provide a proof that there is no way to map

⁷ There are sentences with a similar structure but a different quantifier, e.g. *TWO thirds of the politicians are NOT corrupt* (Büring 1997), which have two readings differing from each other with respect to the relative scopes of the quantifier and the negation.

(4) onto a d-tree observing the principles outlined in Büring (2003) in such a manner that its ill-formedness is predicted in this theory.

Before proceeding in this direction, note that my terminology differs in one respect from Büring's. Whereas his use of the '#' in front of certain examples indicates that he considers the latter syntactically well-formed and deficient only from a semantic point of view, I will mark the examples that native speakers find unacceptable with an asterisk, '*'. With this choice, I want to stay neutral as to whether the source of the unacceptability is syntactic or semantic/pragmatic. Nevertheless, I will argue for an explanation of the latter kind.

As illustrated above with respect to (14) and (16), Büring's (2003) analysis does intend to cover English sentences in which the contrastive topic accent falls on a quantificational determiner, and the focus accent on the verb or on the negative particle. Further examples are shown in (17A1) and (17A2), which are assumed by Büring to be dominated by (15Q), repeated in (17Q), as well, and, among the latter's subquestions, by (17SQ1) and (17SQ2), respectively:

(17)Q: *How many (of the 74) abstracts got accepted?*

SQ1: *Did any abstracts get accepted?*

A1: *(Yes,) SOME_{CT} abstracts DID_F get accepted.*

SQ2: *Did most abstracts get accepted?*

A2: *(Yes,) MOST_{CT} abstracts DID_F get accepted.*

(Büring 2003:533)

Büring (2003) claims that the set of questions that constitutes the CT-values of both of (17A1) and (17A2) is equivalent to the following one:

(18) $\| (17A1) \|^{ct} = \| (17A2) \|^{ct} = \{ \{ Q \text{ abstracts got accepted} \} \mid Q \in D_{\langle et, \langle et, t \rangle \rangle} \} \approx \text{Did } X \text{ abstracts get accepted?}^8$

(Büring 2003:533)

This means that the questions dominating (17A1) and (17A2) as well as the latter's sister-questions should be elements of set of questions defined in (18).

Note, however, an underspecification in (18), which undermines the success of the approach in explaining the relevant examples. If the string *Q abstracts got accepted* is supposed to represent a proposition, this proposition can be of two types. On the one hand, it can be a proposition expressing *existence*, that is, 'There are Q abstracts (possibly among others) that got accepted'. On the other hand, it can be a proposition expressing *identification*, that is, 'The number of abstracts that got accepted equals Q'. Parallel interpretations are to be observed for the relevant questions in (18) as well. The question *Did X abstracts get accepted?* can be interpreted as asking whether there are X abstracts (possibly among others) that got accepted, to be referred to as the *existence-reading/interpretation* of the question, or as asking whether the number of accepted abstracts is X, to be referred to as the *identificational reading/interpretation*. In English, the two readings of questions of the form *Did X abstracts get accepted?* differ in the place of the accent: on the identificational reading, the strongest accent falls on the determiner, on the existence reading, it falls on the auxiliary. In Hungarian, the two types of readings are expressed with the help of different structures. The two possible Hungarian translations of the English question *Did more than six abstracts get accepted?* are shown below:

⁸ In (18) an obvious typo concerning the type of D has been corrected. Note that Büring (2003) represents polar questions by singleton sets (Büring 2003: 533, fn. 15). In a theory where questions denote the set of their possible answers (cf. Hamblin 1973), the CT-value for (17A1, A2) would be as in (i):

(i) $\{ \{ f(Q \text{ abstracts got accepted}) \mid f \in \{ \lambda p.p, \lambda p.\neg p \} \}, Q \in D_{\langle et, \langle et, t \rangle \rangle} \} \approx \text{Did } X \text{ abstract get accepted?}$

(19) [_{FP} *Több, mint hat absztraktot* [_{VP} *fogadtak el*]]?
 more than six abstract.ACC accepted.3PL VM
 ‘Was the number of abstracts that got accepted more than six?’

(20) [_{DistP} *Több, mint hat absztraktot* [_{AspP} *elfogadtak*]]?
 more than six abstract.ACC VM.accepted.3PL
 ‘Were there more than six abstracts that got accepted?’

Note that the two kinds of interpretations characterized above are mixed even in the dialogues shown in (15) and (17) above: (17A1) and (17SQ1) must receive an existence-interpretation (required due to the presence of *any* in the question), whereas (17A2) and (17SQ2), as well as (15A) and (15SQ) must get an identificational reading.

On the basis of these considerations, I believe that if we want to use Büring’s (2003) theory to account for the uninterpretability of a sentence like (4) above or that of their English equivalents, as in (21), we need to decide which of the two possible interpretations would be intended for them.

(21) #*More than SIX_{CT} students DID_F attend the talk.*

The reason why such a decision is necessary is that it can influence whether the intended interpretations of the sentences under consideration should or should not be regarded as complete answers to the corresponding main question, which is assumed by Büring to be a *How many*-question. We will consider the consequences of the two possible choices separately.

Let us first assume that the intended interpretation for Hungarian declarative sentences having the structure and prosodic pattern as in [_{CTopP}/Det NP] [_{AspP} \V (XP*)]⁹, on the verum focus reading of the verb (represented by (1), (4), or (7) above) is the *identificational reading*, which is to be captured schematically as ‘The number of NPs that

⁹ As usual, XP* stands for possible *lists* of constituents.

V (XP*) equals Det'. Then the intended interpretation for their variants with falsum focus, with the structure [CTopP/Det NP] [NegP \Neg.Particle V (XP*)] (represented by (2) and (5)) is 'The number of NPs that V (XP*) does not equal Det'. The questions dominating such nodes in a d-tree are *yes/no*-questions of the form *Does the number of NPs that V (XP*) equal Det?* The conjunction of the complete answers to questions of the above form is equivalent to the complete answer to a question of the following form: *How many NP V (XP*)?* This means that, in an intuitive sense, the *yes/no* questions described above are subquestions of the latter *How many*-question.

In Büring's theory, as described above, a declarative that contains a determiner with the contrastive topic accent followed by a verum or falsum focus is predicted to have an interpretation whenever it does not provide a complete answer to the corresponding *How many*-question. Thus, in order to be able to judge whether (4) can be accounted for on the basis of these assumptions, one has to decide whether or not a sentence expressing the proposition 'The number of NP that V (XP*) equals more than six' (the intended meaning of (4) according to the assumption made above) provides a complete answer to the question *How many NP V (XP*)?* An exchange of the relevant form is shown in (22):

(22) Q: *How many students attended the talk?*

A: *More than six students attended the talk.*

Let us assume that (22A) does not provide a complete answer to (22Q), since there is a more precise way to answer the latter questions, namely, by using a DP with a bare numeral determiner (e.g. *seven*) instead of the complex determiner. This assumption leads to a contradiction, however, since it predicts that (4) and (21) should be interpretable, given that they would not provide a complete answer to the relevant *How many*-question, either.

If we assume, on the contrary, that a sentence expressing the proposition 'The number of NP that V (XP*) equals more than six', does provide a complete answer to the corresponding *How many*-question, it follows that the declarative in (1), repeated below in (23), should also provide a complete answer to the question *How many students attended*

the talk? The reason is that, on the above assumptions, the intended interpretation of (23) would be the following: ‘The number of students that attended the talk equals six.’

(23) [CTopP /HAT diák [AspP \ELjött az előadásra.]]
 six student VM.came the talk.SUBL
 ‘/SIX students DID\ attend the talk.’

(23), however, is not ill-formed, which shows that the supposition that Hungarian declaratives having the structure and prosodic pattern as in [CTopP/Det NP] [AspP\V (XP*)] and [CTopP/Det NP] [NegP\Neg.Particle V (XP*)] must receive an identificational reading is mistaken.

Let us therefore consider the second option referred to above, namely, that sentences having the structure [CTopP/Det NP] [AspP\V (XP*)], as in (1) and (4), express the proposition ‘There aren’t Det NPs that V (XP*)’, whereas sentences of the form [CTopP/Det NP] [NegP\Neg.Particle V (XP*)] express the proposition ‘There are not Det NPs that V (XP*)’. On this assumption, the well-formedness of (23) follows from Büring’s theory, since from the truth of a sentence expressing that there were six students who attended the talk it does not yet follow what the exact number of students is who attended the talk.

What is not predicted by the above account, however, is why (4), repeated in (24), is deficient:

(24) *[CTopP /HATnál több diák [AspP \ELjött az előadásra.]]
 six.ADESS more student VM.came the talk.SUBL
 *‘More than /SIX students DID\ attend the talk.’

If (24) expresses the proposition that there exists more than six students that attended the talk, then it does not entail what the exact number of students is who attended the talk, and, therefore, does not entail a complete answer to the corresponding *How many*-question, and

is thus expected to be well-formed. This shows that Büring's (2003) theory cannot be extended in an obvious manner to account for sentences like the one in (4)=(24)).

Before turning to an alternative explanation for the asymmetry between (1)–(2) and (4)–(5), in the next section we briefly summarize our findings about the truth-conditional meaning of the examples under consideration and suggest a way of deriving these compositionally.

3 A note on truth conditions

It was concluded above that declarative sentences containing a verum/falsum focus and a quantity-indicating contrastive topic can only have an existence-reading, in other words, they must express that there exist as many elements in the extension of the NP subconstituent of the DP in [Spec,CTopP] having the property determined by the predicate part of the sentence as specified by the determiner of the DP (possibly among others). Using the terminology on plurals introduced by Link (1983), this is equivalent to saying that the sentence-type under consideration expresses that there is a sum individual with as many atomic parts as specified by the contrastive topic determiner that has the property expressed by the predicate (possibly among others). Thus, (1), repeated above as (23), expresses that there is a sum of six students that attended the talk. Analogously, its variant with a falsum focus in (2), repeated in (25), denies the existence of a sum of the above kind:

(25) [CTopP /HAT diák [NegP \NEM [VP jött el az előadásra.]]]
 six student not came VM the talk.SUBL
 ‘/SIX students \DIDN’T attend the talk.’

In a similar way, the variant of (25) that contains the determiner *more than six*, as in (5) above, repeated here as (26), has to be interpreted as stating that there is no sum of students with more than six atomic parts that attended the talk:

- (26) [_{CTopP} /*HATnál több diák* [_{NegP} \NEM [_{VP} *jött el az előadásra.*]]]
 six.ADESS more student not came VM the talk.SUBL
 ‘More than /SIX students \DIDN’T attend the talk.’

It is then expected that the variant of (26) with a verum focus, as in (4), repeated above as (24), would have to mean, if it were acceptable, that there is a sum of students with more than six atomic parts that attended the talk. This means that the (intended) interpretations of (23)–(26) are to be represented as in (27a-d), respectively. In these formulae, x is a variable over sums, and $\#(x)$ stands for the number of atomic parts of x :

- (27) a. $\exists x(\text{STUDENT}(x) \wedge \#(x) = 6 \wedge \text{ATTEND}(x, \text{TALK})) =$
 $= \exists x(\text{STUDENT}(x) \wedge \#(x) \in \{6\} \wedge \text{ATTEND}(x, \text{TALK}))$
 b. $\exists x(\text{STUDENT}(x) \wedge \#(x) > 6 \wedge \text{ATTEND}(x, \text{TALK})) =$
 $= \exists x(\text{STUDENT}(x) \wedge \#(x) \in \{7, 8, \dots\} \wedge \text{ATTEND}(x, \text{TALK}))$
 c. $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) = 6 \wedge \text{ATTEND}(x, \text{TALK})) =$
 $= \neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in \{6\} \wedge \text{ATTEND}(x, \text{TALK}))$
 d. $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) > 6 \wedge \text{ATTEND}(x, \text{TALK})) =$
 $= \neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in \{7, 8, \dots\} \wedge \text{ATTEND}(x, \text{TALK}))$

In order to be able to derive these interpretations compositionally, one has to determine the denotations of the three main (syntactic) components of the sentences under consideration: the denotation of the verum/falsum focus, that of the DP in [_{Spec,CTopP}], and that of the predicate part of the sentence (from which the verum/falsum focus has been removed). The rest of this section will be devoted to this issue. Although some of the suggestions to be made about the interpretations of the constituent types listed above will deviate in certain respects from previous well-known proposals in the literature, for reasons to be discussed below, this does not influence the applicability of the criteria to be presented in section 4 for determining whether a sentence with a contrastive topic is to be considered interpretable or not.

Let us first consider the contribution of the DP in [Spec,CTopP] to the meaning of the whole sentence. Although it would be reasonable to assume that this constituent is responsible for introducing a (sum) individual referent into the discourse, about which the rest of the sentence makes a predication, similarly to the way the semantic role of DPs in the topic position ([Spec,TopP] according to É.Kiss 2002) has been described in Szabolcsi (1997), this approach would require that all DPs in [Spec,CTopP] had the same function, which runs into difficulties in the face of examples like the following one:

- (28) [_{CTopP} /*HATnál kevesebb könyvet* [_{FP} \János [_{VP} *olvasott el.*]]]
 six.ADESS fewer book.ACC János read VM
 ‘Fewer than /SIX books were read by \JOHN.’

Given that (28) is true in a situation where John did not read any books at all, DPs in [Spec,CTopP] with quantity-indicating determiners cannot be said to introduce a set or sum referent into the discourse. Rather, their role seems to describe a property, which holds of a sum if it has the property denoted by the NP subconstituent of the DP and has as many atomic parts as specified by the determiner.¹⁰ This means that the interpretation of DPs in [Spec,CTopP] is best described in terms of the so-called *adjectival theory*, advocated for particular DPs by Verkuyl (1981), and Link (1987, 1991, 1998). Link (1998: 70) formulates the idea as follows: “[t]he numerals ‘1’, ‘2’, ‘3’, ..., are adjective-like modifiers that pick out all those i-sums in an NP-extension which have the indicated number of atoms.” (29a) shows how the denotation of the DP in the [Spec,CTopP] of (23) is to be captured in terms of the adjectival approach¹¹, (29b) illustrates the traditional way of representing denotation of the noun as a property of sums, and (29c) the denotation that has to be postulated for the determiner to get (29a) back from the denotations of the latter two constituents by functional application:

¹⁰ The view that DPs in [Spec,CTopP] denote a property has already been advocated by É. Kiss (2000) and É. Kiss and Gyuris (2003).

¹¹ For a critique of the classical adjectival approach to the interpretation of DPs, cf. Verkuyl and van der Does (1996).

- (29) a. $\| [\text{Spec, CTopP} / \text{HAT} \textit{diák}] \| = \lambda x. \text{STUDENT}(x) \wedge \#(x) = 6$
 b. $\| \textit{diák} \| = \lambda z. \text{STUDENT}(z)$
 c. $\| / \text{HAT} \| = \lambda Q \lambda x. Q(x) \wedge \#(x) = 6$

On the analogy of (29a, c), the denotation of the DP in [Spec,CTopP] in (26) and that of the determiner itself is to be represented as (30a,b)¹²:

- (30) a. $\| [\text{Spec, CTopP} / \text{HATnál} \textit{több diák}] \| = \lambda x. \text{STUDENT}(x) \wedge \#(x) > 6$
 b. $\| / \text{HATnál} \textit{több} \| = \lambda Q \lambda x. Q(x) \wedge \#(x) > 6$

Let us now consider the denotations of the predicate parts of the sentences in (1) (= (23)), (2) (= (25)) and (5) (= (26)). The need for parallelism between the denotations of constituents that intuitively have the same semantic role requires that the denotation of the predicate parts of these sentences from which the verum/falsum focus has been subtracted should be of the same semantic type as the denotation of the predicate part of (28) from which the lexical focus in [Spec,FP] has been subtracted, that is, the type of a VP-denotation. Given the traditional assumption according to which VPs denote properties of (sum) individuals, we propose that the denotation of the VPs of (1) (= (23)), (2) (= (25)) and (5) (= (26)) is as follows:

- (31) $\| [\text{VP} \textit{jött el az előadásra}] \| = \lambda x. \text{ATTENDED}(x, \text{TALK})$

¹² Note that the property denoted by the DP *hat diák* 'six students' according to (29a) is equivalent to the property of sums that are formed from the *minimal witness sets* of the DP, and the denotation of the DP *hatnál több diák* 'more than six students' according to (30a) is equivalent to the property of the sums of elements of the *witness sets* of the DP. The distinction seems to be in accordance with the claim made by Szabolcsi (1997) that DPs with bare numeral determiners introduce the elements of a minimal witness set of the DP into the discourse, whereas modified numeral determiners (of the monotone increasing type) can only introduce a corresponding witness set.

Parallelism also requires that the meaning of the predicate part of (1) (=23)) from which the verum focus has been subtracted should be equivalent to the meaning of the predicate part of (2) (=25)) from which the falsum focus has been subtracted.¹³ For this reason, we will assume that the focal stress on the verb in (1) (=23)) and in similar examples is a marker of the presence of an operator VERUM, which is adjoined to the AspP node, as illustrated in (32), and that the denotation of the embedded AspP in the latter is equivalent to (31).

(32) [_{CTopP} /HAT diák [_{AspP} VERUM [_{AspP} *eljött az előadásra.*]]]
 six student VM.came the talk.SUBL
 ‘/SIX students DID\ attend the talk.’

If the denotations of the CTopP and of the embedded AspP of (32) are as shown in (30)-(31) above, VERUM has to contribute to the truth conditions to get at (27a) as the denotation of the whole of (32) and cannot “simply” be regarded an illocutionary predicate or operator, as proposed by Höhle (1991-92). We propose therefore that VERUM is responsible for combining the properties denoted by the DP in [Spec,CTopP] and the AspP into a proposition-meaning and for simultaneously introducing existential quantification over sums that possess the property denoted by the latter DP. This means that the denotation of VERUM is as shown in (33a), and the denotation of the falsum focus, analogously, as shown in (33b):

(33) a. $\| \text{VERUM} \| = \lambda R \lambda P. \exists y (R(y) \wedge P(y))$
 b. $\| \text{NEM} \| = \lambda R \lambda P. \neg \exists y (R(y) \wedge P(y))$

In spite of running in the face of traditional wisdom about the interpretation of the verum focus, the strategy behind (33a-b) has several advantages from the point of view of the set of data considered here, including the fact that it easily predicts the contrast between

¹³ We will assume that the pre- vs. postverbal position of the verbal prefix does not have any influence on the truth-conditions of the sentence.

(28) and (32) above. Given the assumptions discussed above, the denotations of (1)=(23), (2)=(25) and (5)=(26) can be generated compositionally by applying the denotation of the verum/falsum focus to the denotation of the rest of the predicate part (VP or AspP), and then to the denotation of the DP in [Spec,CTopP], as illustrated in (34)–(36):

$$\begin{aligned}
 (34) \quad & \| \text{VERUM} \| (\| [_{\text{AspP}} \text{eljött az előadásra}] \|) (\| /HAT \| (\| \text{diák} \|)) = \\
 & = \lambda R \lambda P. \exists y (R(y) \wedge P(y)) (\lambda x. \text{ATTENDED}(x, \text{TALK})) (\lambda Q \lambda x. Q(x) \wedge \\
 & \quad \wedge \#(x) = 6 (\lambda z. \text{STUDENT}(z))) = \\
 & = \exists y (\text{ATTENDED}(y, \text{TALK}) \wedge \#(y) = 6 \wedge \text{STUDENT}(y))
 \end{aligned}$$

$$\begin{aligned}
 (35) \quad & \| \backslash NEM \| (\| [_{\text{VP}} \text{jött el az előadásra}] \| (\| /HAT \| (\| \text{diák} \|))) = \\
 & = \lambda R \lambda P. \neg \exists y (R(y) \wedge P(y)) (\lambda x. \text{ATTENDED}(x, \text{TALK})) (\lambda Q \lambda x. Q(x) \wedge \\
 & \quad \wedge \#(x) = 6 (\lambda z. \text{STUDENT}(z))) = \\
 & = \neg \exists x (\text{ATTENDED}(x, \text{TALK}) \wedge \#(x) = 6 \wedge \text{STUDENT}(x))
 \end{aligned}$$

$$\begin{aligned}
 (36) \quad & \| \backslash NEM \| (\| [_{\text{VP}} \text{jött el az előadásra}] \| (\| /HATnál több \| (\| \text{diák} \|))) = \\
 & = \lambda R \lambda P. \neg \exists y (R(y) \wedge P(y)) (\lambda x. \text{ATTENDED}(x, \text{TALK})) (\lambda Q \lambda x. Q(x) \wedge \\
 & \quad \wedge \#(x) > 6 (\lambda z. \text{STUDENT}(z))) = \\
 & = \neg \exists x (\text{ATTENDED}(x, \text{TALK}) \wedge \#(x) > 6 \wedge \text{STUDENT}(x))
 \end{aligned}$$

Note that the preceding discussion already explains why (9) above, repeated here as (37), and other sentences with the same structure, where monotone decreasing or non-monotonic determiners play the role of the contrastive topic, should be considered ungrammatical:

$$\begin{aligned}
 (37) \quad & * [_{\text{CTopP}} /HATnál \text{ kevesebb diák } [_{\text{AspP}} \backslash \text{ELjött az előadásra.}]] \\
 & \quad \text{six.ADESS fewer student VM.came the talk.SUBL} \\
 & * \text{'Fewer than /SIX students \backslash DID attend the talk.'}
 \end{aligned}$$

In section 2.2 we established that the only possible strategy for interpreting declaratives where a DP (consisting of a Det and a NP) in [Spec,CTopP] is followed by a verum or falsum focus is to say that they state that there exists or does not exist as many individuals having the property denoted by the NP that has the property denoted by the VP as specified by Det. This means, in other words, that declaratives having the structure described above serve the purpose of introducing an individual or a set into the discourse, which can be referred to by a subsequent anaphoric expression. If DPs with monotone decreasing and non-monotonic determiners were able to occupy the [Spec,CTopP] position of these sentences, then they would also contribute to introducing a discourse referent. This, however, leads to a contradiction, because these determiners can never introduce a discourse referent (cf. Szabolcsi 1997). This is identical to saying that there is an incompatibility between the denotation of monotone increasing and non-monotonic quantity-indicating determiners and the denotation of the verum focus.

This ends the description of one possible way to obtain the truth conditions of (23)–(26) above compositionally and its consequences. The next section will present the outlines of a new approach to how the contrast between the well-formed examples (1) (= (23)), (2) (= (25)) and (5) (= (26)) and the ill-formed example (4) (= (24)) could be explained.

4 Towards an alternative account

The alternative approach we are going to propose follows the one put forth by Büring (2003) in that it attributes the lack of interpretations for (and, consequently, the ill-formedness of) particular sentences containing a contrastive topic to the fact that the presuppositions that are associated with contrastive topics in general are in contradiction with the intended truth-conditions of these sentences. What distinguishes the account from that of Büring's is the way the presuppositions evoked by contrastive topics are defined. In section 4.1, we introduce this new definition, and then in 4.2 we apply it to the Hungarian data discussed above. 4.3 shows how the approach can be extended to a wider range of phenomena.

4.1 A new approach to defining the presuppositions introduced by contrastive topics

It has often been observed in the literature that the use of a declarative sentence that contains a contrastive topic indicates that the speaker is providing only part of the information that could be considered relevant at the particular point of the conversation, and that it evokes a set of alternatives to the contrastive topic denotation, about which the hearer also expects information after hearing the sentence (e.g., Szabolcsi 1980, 1981, Büring 1997, Kadmon 2001).

I agree with Büring's (2003) general approach that the effects described above are due to the presuppositions of contrastive topics, but, given that his theory cannot explain why (4) (=24) is ill-formed, I prefer to define these presuppositions in a different manner. The method I want to propose here relies on a comparison between the forms and interpretations of a declarative sentence that contains the contrastive topic and sentences that express analogous statements about denotations of alternatives of the latter. It is a crucial observation in this connection that contrastive topics do not appear in all-focussed ('out of the blue'-) sentences,¹⁴ but only in those where a subconstituent of the sentence is focused, that is, which are felicitous answers to polarity or constituent questions, but not to *What happened?*-questions. It is a generally accepted view that a sentence S with a constituent-focus implicates that no sentence resulting from the replacement of the focused constituent by one whose denotation is an alternative of the denotation of the latter (where the set of alternatives may be contextually restricted) can be true simultaneously with S. This means, in other words, that in each situation there is only one way to complete the background part of a sentence from elements of the set of alternatives to the focus to obtain a true sentence. Thus, given a sentence S with a constituent focus, another sentence that contains a constituent denoting an alternative of the denotation of the focus of S and is true simultaneously with S can only be obtained if the background of S is also altered somehow. In the face of the latter facts, the function of a contrastive topic in a sentence S can be seen

¹⁴ Cf. Kálmán et al. (1986) and Kálmán et al. (1989).

as marking the part of the background that is to be altered if one wants to get a new sentence containing an alternative of the focus that can be true at the same time as S.¹⁵

The claims made above are strongly supported by observations by Eckardt (2002) and van Hoof (2003: 519), according to whom declaratives that contain constituents with the rising contrastive topic accent often appear in a list having a parallel structure. In these lists, the denotations of the contrastive topics are taken from the same domain, as are the denotations of the constituents that bear a falling, focus accent, but the rest of the sentences remains the same. A particular constituent pronounced with the falling accent can occur several times in such a list, but one pronounced with the rising accent cannot, as the contrast between the following sentences shows:

(38)a. **Die /MÄNNER haben ein \REZITATIV geprobt, und die*
the men have a recitative rehearsed and the
/MÄNNER (haben) eine \ARIE (geprobt).
men (have) an aria (rehearsed)
‘The MEN have rehearsed a RECITATIVE and the MEN (have rehearsed) an
ARIA.’ (van Hoof 2003: 521, ex. (8a))

b. *Die /MÄNNER haben ein \REZITATIV geprobt, und die*
the men have a recitative rehearsed and the
/FRAUEN (haben) \AUCH ein Rezitativ geprobt.
women (have) also an recitative rehearsed
‘The MEN have rehearsed a RECITATIVE and the WOMEN have rehearsed a
recitative, TOO.’ (van Hoof 2003: 521, ex. (8b))

I believe that the data in (38) and the observations described above can be captured best by saying that a sentence S containing a contrastive topic presupposes that there is a

¹⁵ This idea was captured by Jackendoff (1972) by saying that the constituent bearing the B accent in English behaves as an independent variable and the one with the A accent as a dependent variable.

function f that maps the set of alternatives to the denotation of the contrastive topic (that includes the denotation of the contrastive topic itself as well, cf. Rooth 1985) into the set of alternatives to the denotation of the focus (that includes the denotation of the focus itself as well). An element α in the first set is mapped by f onto an element β in the second one if the proposition obtained by replacing α and β in the proposition denoted by S for the denotations of the contrastive topic and the focus, respectively, is true. This means, naturally, that the denotation of the contrastive topic of S is mapped by f onto the denotation of the focus of S . The requirement that there must be at least one alternative of the contrastive topic denotation such that information about it is not entailed by S is taken care of by requiring that for each element α in the domain of f there be at least one other element α' such that the value assigned to α' is not determined by the value assigned to α .

Note that if declaratives with contrastive topics presuppose functions of the kind described above, the ill-formedness of (38a), which would require that two values are assigned to the same argument of the presupposed function, is correctly accounted for. An additional piece of evidence for the main idea behind the above approach is the fact that one of the primary discourse functions of declaratives with contrastive topics is to provide answers to multiple constituent questions.¹⁶ According to Krifka (2001), multiple constituent questions expect an answer that is a function, a mapping from the domain of the first interrogative expression to that of the second. If multiple constituent questions expect functions as answers and declaratives with contrastive topics can provide partial answers to such questions, with the contrastive topic denotation falling into the domain of the first interrogative expression and the denotation of the focus into the domain of the second expression, these declaratives can be seen as specifying the value of one argument of the function that is expected as answer by the multiple question. In the latter case, it seems natural to take the function presupposed by the declarative to be equivalent to the function expected as answer by the corresponding multiple constituent question.

¹⁶ This property, actually, does not extend to sentences containing a *verum focus*.

In (39), the proposal made above about defining the presuppositions introduced by contrastive topics is summarized in a formal way:

(39) *Presupposition of declaratives containing contrastive topics:*¹⁷

Let S be a sentence containing a contrastive topic (CT) and a focus (F). Let R be the part of S from which CT and F have been removed. Let the meaning of S be represented as a relation between the meaning of F and of CT, that is, $\|S\| = \|R\|(\|F\|, \|CT\|)$. S then presupposes the following:

- a) there is a set $ALT(\|CT\|)$ of alternatives to $\|CT\|$ (which includes the denotation of CT);
- b) there is a set $ALT(\|F\|)$ of alternatives to $\|F\|$ (which includes the denotation of F);
- c) there is a function $f: ALT(\|CT\|) \rightarrow ALT(\|F\|)$ with the following properties:
 - i) for any $\alpha \in DOM(f)$, $f(\alpha)$ is equivalent to the element of $ALT(\|F\|)$ for which $\|R\|(f(\alpha), \alpha)$ is true, and
 - ii) for all $\alpha \in DOM(f)$ there is at least one $\alpha' \in DOM(f)$ such that the value of $f(\alpha)$ does not determine the value of $f(\alpha')$.

Given that we want to use the above definition to predict why native speakers judge certain sentences with contrastive topics ill-formed even without any contextual support, the set of alternatives to the denotations of the contrastive topic and focus constituents that are referred to in (39a-b) must be determinable independently of context. (39ci) specifies how an element of the domain of the presupposed function is mapped onto an element of the range, and ensures at the same time that the value assigned by it to $\|CT\|$ is equivalent to $\|F\|$. (39cii) formulates the criterion that, given a sentence with a contrastive topic, there must be a proposition expressing related information about an alternative of the denotation of the contrastive topic that is not entailed by the sentence itself. This condition thus does not prohibit that relevant information about the alternatives of the contrastive topic be

¹⁷ Sauerland (2005) puts forth a similar approach to capture the presuppositions introduced by contrastive topics, which the present proposal was formulated independently of.

entailed by the previous discourse, which is compatible with the fact that the contrastive topic legitimately appears in the second clause of (40B), even though the preceding discourse already entails the relevant information about the only possible alternative to the latter's denotation:¹⁸

(40) A: *What did Bill and John eat?*

B: *BILL_{CT} ate a SOUP_F and JOHN_{CT} ate a CARROT_F.*

Note, importantly, that (39cii) does not require that the alternative propositions evoked by contrastive topics be expressible with the help of sentences having a parallel structure as S in the natural language under consideration. The case studies to be presented in the next subsection will point to the importance of this condition.

As an illustration, consider how (39) explains the ill-formedness of the following sentence:

(41) *_[CTOP] /*MInden diák [DistP \MInden előadásra eljött.]*
 every student every talk.SUBL VM.came
 *_[EVERY] /Every student attended \Every talk.'

Suppose that the domain and the range of the function f that is presupposed by (41) each consist of all alternatives of the denotation of *minden* 'every' and that f is a function that maps an element α in its domain onto an element β in its range if the proposition ' α students attended β talks' is true. However, whenever $\alpha = \beta = \|\text{every}\|$, the truth of the proposition 'every student attended every talk' entails for each alternative α' of α what the value β' assigned to it by the function is, that is, how β' has to be chosen to make the proposition ' α' students attended β' talks' also true. The value is equivalent to the

¹⁸ For example, Büring's (1997) theory on the conditions licensing the appearance of contrastive topics in a discourse wrongly predicts that (40B) is uninterpretable, as pointed out by Krifka (1998:22-3) and Kadmon (2001:387).

denotation of *every* whenever the argument of the function is, for example, *more than two*, or *at least three*, etc., since if every student attended every talk, then it is also true that more than two or at least three students attended every talk (provided that the number of students is three or more). However, the value is equivalent to the denotation of *no* whenever the argument is equivalent to the denotation of *exactly two*, *fewer than three*, etc. since, if every student attended every talk, then, provided that the number of students is three or more, there are no talks which exactly two or fewer than five students attended.

The next section will illustrate how the method proposed above could be used to provide an explanation for the well- or ill-formedness of the Hungarian sentences under consideration.

4.2 Accounting for ill-formedness

The aim of this section is to show, given the definition of the presuppositions introduced by declaratives with contrastive topics in (39), how the well-formedness of examples like (1) (= (23)), (2) (= (25)) and (5) (= (26)) and the ill-formedness of (4) (= (24)) can be predicted, under the assumption that the denotations of the latter are as described in section 3 above.

Let us assume that sentences (1) (= (23)), (2) (= (25)) and (5) (= (26)) introduce presuppositions of the type described in (39). Given that the latter sentences all contain a verum or a falsum focus, whose denotations are alternatives to each other, the range of the function presupposed by them must be equivalent to the set in (42), which consists of the denotations of the verum and falsum focus, first illustrated in (33a,b) above:

$$(42) \quad \{\lambda R \lambda P. \exists y (R(y) \wedge P(y)), \lambda R \lambda P. \neg \exists y (R(y) \wedge P(y))\}$$

Let us now consider the domains of the relevant functions. Given (39), the domain of the function presupposed by (1) (= (23)), repeated here as (43), has to include the denotation of the contrastive topic determiner, shown in (29c) above, repeated here as (44):

(43) [_{CTOPP} /HAT diák [_{ASPP} \ELjött az előadásra.]]
 six student VM.came the talk.SUBL
 ‘/SIX students \DID come to the talk.’

(44) $\|/HAT\| = \lambda Q \lambda x. Q(x) \wedge \#(x) \in \{6\}$

Given that (43) is well-formed and interpretable, the domain of the function presupposed by it has to include, according to (39), an element α' whose value $f(\alpha')$ is not determined by the value assigned by the function to (44). This means, in other words, that the proposition denoted by (43), shown in (29a) above, repeated here as (45), must not be entailed by a proposition of the form in (46) on either possible choice of $f(\alpha')$:

(45) $\exists x (\text{STUDENT}(x) \wedge \#(x) \in \{6\} \wedge \text{ATTEND}(x, \text{TALK}))$

(46) $(f(\alpha')) (\lambda x. \text{ATTENDED}(x, \text{TALK})) (\alpha' (\text{STUDENT}(x)))$

It is not difficult to see that the above requirement can only be satisfied if α' is chosen to be a denotation of the following form:

(47) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in S$, where $S \subseteq \{7, 8, 9, \dots\}$

The formulae in (48a,b) are obtained as a result of substituting a denotation with the above properties for α' in (46) and the denotations of the verum and the falsum focus for $f(\alpha')$, respectively. Since neither of them are entailed by (45), the theory correctly predicts that (43) is grammatical and interpretable:

(48) a. $\exists x (\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{7, 8, 9, \dots\}$

b. $\neg \exists x (\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{7, 8, 9, \dots\}$

The well-formedness and interpretability of (2) (=25)), repeated here as (49), is predicted in an analogous way, provided that the domain of the function includes, in addition to (44), an element α' that satisfies the property described in (50):

(49) [_{CTopP} /HAT *diák* [_{NegP} \NEM *jött el az előadásra.*]]
 six student not came VM the talk.SUBL
 ‘/SIX students \DIDN’T come to the talk.’

(50) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in S$, where $S \subseteq \{0, 1, 2, 3, 4, 5\}$

(51a,b) show the result of substituting in (46) a value with the property in (50) for α' and the denotations of the verum and the falsum focus for $f(\alpha')$, respectively:

(51) a. $\exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{0, 1, 2, 3, 4, 5\}$
 b. $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{0, 1, 2, 3, 4, 5\}$

Since no proposition of the type characterized in (51a,b) is entailed by the denotation of (49), formalized in (52), it correctly follows from the relevant assumptions that (49) is interpretable:

(52) $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in \{6\} \wedge \text{ATTEND}(x, \text{TALK}))$

Similarly, the well-formedness of (5) (=26)), repeated below as (53), is predicted if the domain of the function presupposed by it includes, in addition to the denotation of the contrastive topic determiner, shown again in (54), an element α' that satisfies the property described in (55):

(53) [_{CTopP} /HAT *nál több diák* [_{NegP} \NEM *jött el az előadásra.*]]
 six.ADESS more student not came VM the talk.SUBL
 ‘More than /SIX students \DIDN’T attend the talk.’

(54) $\| /HATn\acute{a}l\ t\ddot{o}bb \| = \lambda Q \lambda x. Q(x) \wedge \#(x) \in \{7, 8, 9, \dots\}$

(55) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in S$, where $S \subseteq \{0, 1, 2, 3, 4, 5, 6\}$

Given the above choice of α' , neither classes of propositions that result from the required substitutions in the place of $f(\alpha')$ in (46), shown in (57a,b), are entailed by the proposition denoted by (53), shown in (29d) above, repeated here as (56):

(56) $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{7, 8, 9, \dots\}$

(57) a. $\exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{0, 1, 2, 3, 4, 5, 6\}$

b. $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{0, 1, 2, 3, 4, 5, 6\}$

Note, crucially, that the above results were obtained without making any reference to how the propositions gained as a result of the relevant substitutions in (48), (51), (57) would be formulated in Hungarian. Let us now turn to question of how the ill-formed example (4)=(24)), repeated below, could be accounted for in this framework:

(58) *_[CTOPP] /HATn\acute{a}l t\ddot{o}bb di\acute{a}k [_{ASpP} \ELj\ddot{o}tt az el\ddot{o}ad\acute{a}sra.]]
 six.ADESS more student VM.came the talk.SUBL
 *‘More than /SIX students DID\ attend the talk.’

In order to explain the ill-formedness of (58) on the basis of the definition in (39), we have to show the following: if we assumed that this sentence is interpretable and denotes the proposition in (59), no matter which of the two possible replacements for $f(\alpha')$ in (46) would be chosen, there would be no way to replace α' with a legitimate alternative to the denotation of (54) to yield a proposition that is not entailed by (59):

(59) $\exists x(\text{STUDENT}(x) \wedge \#(x) \in \{7, 8, 9, \dots\} \wedge \text{ATTEND}(x, \text{TALK}))$

It is not difficult to see that the above condition is only satisfied if the alternative to the denotation of the determiner *more than six* that is to be substituted for α' in (46) has the following property:

$$(60) \quad \lambda Q \lambda x. Q(x) \wedge \#(x) \in S, \text{ where } S \subseteq \{1, 2, 3, 4, 5, 6\}$$

In the latter case, the truth of all propositions of the form in (61a) and the falsity of all propositions of the form in (61b) follow from the truth of the proposition in (59):

$$(61) \text{ a. } \exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK})), \text{ where } S \subseteq \{1, 2, 3, 4, 5, 6\}$$

$$\text{ b. } \neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK})), \text{ where } S \subseteq \{1, 2, 3, 4, 5, 6\}$$

Thus, we have found that the ill-formedness of (4)(=(58)) does follow in the framework proposed above, provided that we impose certain restrictions on how the relevant alternatives to the denotation of the contrastive topic determiner are chosen. Let us consider the motivation behind these restrictions in somewhat more detail.

We assumed above that if D is a quantity-indicating determiner, its denotation has the following general form:

$$(62) \quad \lambda Q \lambda x. Q(x) \wedge \#(x) \in S, \text{ where } S \subseteq$$

In the course of explaining why certain declarative sentences with such determiners as contrastive topics turn out to be well- or ill-formed, we had to assume that in the default case, the set of alternatives introduced by the relevant determiners is not equivalent to the set of all denotations of the same type as (62), but to a subset thereof, which obeys a further restriction: the sets referred to in the alternative denotations constitute a *cover* of the set of natural numbers \mathbf{N} . This means that the set of alternative denotations introduced by a quantity-indicating determiner has the formal property described below:

(63) $\{ \lambda Q \lambda x. Q(x) \wedge \#(x) \in S_i, S_i \subseteq \mathbf{N}, \cup S_i = \mathbf{N}, \text{ and } \forall S_i, S_j : S_i \cap S_j = \emptyset \}$

(63) aims to capture the intuition that after hearing sentences with quantity-indicating determiners like (1) (= (43)) or (2) (= (49)), speakers expect to hear information related to what more than six or fewer than six students did. Similarly, after hearing (5) (= (53)), they expect to hear information about other quantities of students, like six or fewer than six. This means, informally, that a quantity-indicating determiner D as contrastive topic evokes alternative quantities about which information is expected, which cannot be referred to by D.¹⁹

The claims made above about what set of alternatives are introduced by quantity-indicating determiners might appear to be in contradiction with the fact that example (6) above, repeated here as (64), can be followed by (65) in a discourse:

(64) [CT_{TopP} /HATnál több diák [FP \TEGnap [VP jött el az előadásra.]]]
 six.ADESS more student yesterday came VM the talk.SUBL
 ‘More than /SIX students attended the talk \YESterday.’

(65) [CT_{TopP} /NYOLCnál több diák [FP \MA [VP jött el az előadásra.]]]
 eight.ADESS more student today came VM the talk.SUBL
 ‘More than /EIGHT students attended the talk to\DAY.’

The fact that such a discourse is well-formed might suggest that the denotation of *more than six* can evoke a set of alternatives in particular contexts that includes the denotation of *more than eight*, a case that is not predicted on the basis of what was said above. However, given that the fact whether a sentence with a contrastive topic has an interpretation or not

¹⁹ Note that when calculating the presuppositions of quantity-indicating determiners as contrastive topics, we do not have to know what elements the set of alternative denotations introduced by the latter consists of exactly. The strategy outlined above only requires that there be at least one element in the latter set that satisfies the presuppositions in (39).

does not depend on what context it is used in, the set of alternatives introduced by constituents that can serve as contrastive topics must also be identifiable independently of any context. I believe that the method for determining the default alternatives to quantity-indicating determiners given above satisfies these requirements.

Having illustrated how the proposals made above about the presuppositions of declaratives with quantity-indicating determiners as contrastive topics can explain our core set of examples, in the next subsection we turn to two types of apparently problematic data.

4.3 Further illustrations

Consider the following sentence, which is ungrammatical in Hungarian, in spite of the fact that it contains a bare numeral determiner contrastive topic, followed by a verb focus, just like (2) (=49)) above:

- (66) *_[CT] /*EGY diák* [_{NegP} \NEM jött el az előadásra.]]
 one student not came VM the talk.SUBL
 * ‘/ONE student \DIDN’T attend the talk.’

I believe that the fact that structurally parallel sentences like (2) (=49)) and (66) contrast in acceptability is a further argument for preferring a semantic/pragmatic explanation instead of a syntactic one. Let us assume for a moment that (66) is acceptable, the denotation of its contrastive topic determiner is as shown in (67) and, on the analogy of the previous examples, it denotes the proposition formalized in (68):

- (67) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in \{1\}$
 (68) $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in \{1\} \wedge \text{ATTEND}(x, \text{TALK}))$

In this case, following the definition in (39), there would have to be an alternative to (67) satisfying the characterization in (69) such that the replacement of the latter for α' in (46),

repeated here as (70), and the replacement of the denotation of the verum and falsum focus for $f(\alpha')$ would yield a pair of propositions, neither of which are entailed by (68):

(69) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in S$, where $S \subseteq \{2, 3, 4, \dots\}$

(70) $(f(\alpha')) (\lambda x. \text{ATTENDED}(x, \text{TALK})) (\alpha'(\text{STUDENT}(x)))$

The pair of propositions that result from the replacements described above are shown in (71):

(71) a. $\exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{2, 3, 4, \dots\}$

b. $\neg \exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{2, 3, 4, \dots\}$

At this point, however, we have come to a contradiction, since any proposition that satisfies the characterization in (71b) is entailed by (68). Thus, we have an explanation why (66) is ill-formed in Hungarian: if it were grammatical, its truth conditions would be in contradiction with the presuppositions introduced by it due to the presence of a contrastive topic constituent.

A similar strategy can be applied to explain (10) above, repeated here as (72), whose counterpart with a verum focus (illustrated in (9)(=(37))) was discussed in section 3:

(72) *_[CTOP] /*HATnál kevesebb diák [NegP \NEM [VP jött el az előadásra.]]*
 six.ADESS fewer student not came VM the talk.SUBL

* 'Fewer than /SIX students \DIDN'T attend the talk.'

Again, we assume by indirect reasoning that the above sentence is well-formed and interpretable in Hungarian. In that case, the denotation of the contrastive topic determiner and of the whole sentence in (72) must be as in (73) and (74), respectively:

(73) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in \{0, 1, 2, 3, 4, 5\}$

(74) $\neg\exists x(\text{STUDENT}(x) \wedge \#(x) \in \{0, 1, 2, 3, 4, 5\} \wedge \text{ATTEND}(x, \text{TALK}))$

All alternatives to (73) that α' can be replaced for in (70) must then be of the following type:

(75) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in \{6, 7, 8, \dots\}$

In the latter case, the two types of propositions that are obtained as a result of replacing $f(\alpha')$ in (70) by the proposed denotations for the verum and the falsum focus, respectively, have the properties shown below:

- (76) a. $\exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{6, 7, 8, \dots\}$
b. $\neg\exists x(\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{ATTEND}(x, \text{TALK}))$, where $S \subseteq \{6, 7, 8, \dots\}$

The truth of any proposition of the form in (76b) and the falsity of any proposition of the form in (76a) follows from the truth of (74), since, assuming that the predicate has a distributive interpretation, if there are not any sums of students with five or fewer atomic parts that attended the talk then there cannot be any sum with six or more atomic parts, since the truth of the latter statement would have to entail the truth of the former one.

The intended presuppositions and the intended truth conditions of (72) are thus in contradiction, which explains why the above sentence is considered ill-formed in Hungarian.

In the foregoing discussion we have concentrated on sentences with distributive predicates. (7) above, repeated here as (77), shows that when the predicate of (4) (= (53)) is replaced for one that allows for collective interpretation (as well), the resulting sentence becomes acceptable on the collective reading of the predicate:

- (77) [_{CTopP} /HATnál több diák [_{AspP} \JÁTszotta a játékot.]]
 six.ADESS more student played the game.ACC
 ‘More than /SIX students \DID play this game (together/*individually).’

Note, importantly, that (77) is only acceptable in a context where it is not intended as a partial answer to the question asking how many students performed one particular playing event, but as a partial answer to the question how many students the groups consisted of that performed one of (possibly) several joint playing events. In the framework proposed above, (77) is accounted for in a straightforward way, provided that the denotation of its contrastive topic determiner is the same as in the examples with distributive predicates, already shown in (54), repeated here as (78), and the intended denotation of the sentence is the proposition formalized in (79), where x ranges over sum individuals, as above, and where the predicate PLAY is assumed to be a collective one²⁰:

- (78) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in \{7, 8, 9, \dots\}$
 (79) $\exists x (\text{STUDENT}(x) \wedge \#(x) \in \{7, 8, 9, \dots\} \wedge \text{PLAY}(x, \text{GAME}))$

Given the assumptions described above, there must be at least one alternative to the denotation of the contrastive topic determiner of the form in (80) such that the substitution of the latter for α' in (81) and the substitution of the denotation of the verum and the falsum focus for $f(\alpha')$ in the same formula result in a pair of propositions, shown in (82a,b), that are not entailed by (79).

- (80) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in S$, where $S \subseteq \{1, 2, 3, 4, 5, 6\}$
 (81) $(f(\alpha')) (\lambda x. \text{PLAYED}(x, \text{GAME})) (\alpha'(\text{STUDENT}(x)))$
 (82) a. $\exists x (\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{PLAY}(x, \text{GAME}))$, where $S \subseteq \{1, 2, 3, 4, 5, 6\}$
 b. $\neg \exists x (\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{PLAY}(x, \text{GAME}))$, where $S \subseteq \{1, 2, 3, 4, 5, 6\}$

²⁰ This means that if $\text{PLAY}(\alpha, \text{GAME})$ is true, it does not automatically follow for any part β of α that $\text{PLAY}(\beta, \text{GAME})$ is also true.

Thus, the fact that (77) is interpretable seems to fall out automatically from the framework proposed above. An analogous reasoning predicts that its counterpart in (83), where the contrastive topic determiner has been replaced for a monotone decreasing one, is equally well-formed:

- (83) [CT_{TOPP} /HATnál kevesebb diák [AspP \JÁTszotta a játékot.]]
 six.ADESS fewer student played the game.ACC
 ‘Fewer than /SIX students \DID play this game (together/*individually).’

The explanation goes as follows: the intended denotations of the contrastive topic of (83) and of the whole sentence are as shown in (84) and (85), respectively:

- (84) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in \{0, 1, 2, 3, 4, 5\}$
 (85) $\exists x (\text{STUDENT}(x) \wedge \#(x) \in \{0, 1, 2, 3, 4, 5\} \wedge \text{PLAY}(x, \text{GAME}))$

Then the replacement of α' in (81) with a value having the properties in (86) and the replacement of $f(\alpha')$ with the denotations of the verum and falsum focus result in the pair of propositions in (87), neither of which is entailed by (85).

- (86) $\lambda Q \lambda x. Q(x) \wedge \#(x) \in S$, where $S \subseteq \{6, 7, 8, \dots\}$
 (87) a. $\exists x (\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{PLAY}(x, \text{GAME}))$, where $S \subseteq \{6, 7, 8, \dots\}$
 b. $\neg \exists x (\text{STUDENT}(x) \wedge \#(x) \in S \wedge \text{PLAY}(x, \text{GAME}))$, where $S \subseteq \{6, 7, 8, \dots\}$

Note that whereas the result that (83) comes out as interpretable on this approach is a favourable one, since it corresponds to the facts, it calls the validity of the claim, made in section 3, according to which the denotation of monotone decreasing and non-monotonic determiners is incompatible with the denotation of the verum focus into question. I propose that the contradiction should be eliminated not by relaxing the validity of the above claim,

which would leave sentences like (9) unaccounted for, but by noticing that the DP in the [Spec,CTopP] of (83) is in fact a shorthand for the DP *egy hatnál kevesebb diákból álló csoport* ‘a group of fewer than six students’, which does not fall under the above restriction any more. Naturally, for the sake of symmetry, the same explanation could be extended to all relevant structures containing a collective predicate, including (77) as well.

5 Conclusion

In this paper we have proposed an account of some asymmetries regarding the acceptability of sentences containing quantity-indicating determiners as contrastive topics followed by verum/falsum focus in Hungarian. First we have shown Büring’s (2003) framework to be inadequate for handling the lack of interpretability of certain Hungarian sentences, attributing the difficulties to the way Büring defines the presuppositions of contrastive topics. Then we argued that the problematic data can be accounted for if declaratives with contrastive topics are taken to presuppose a function mapping the set of alternatives to the denotation of the contrastive topic onto the set of alternatives to the denotation of the operator VERUM that has the following property: the value assigned to the denotation of the contrastive topic does not entail what the value assigned to at least one of the other arguments is. The proposal was shown to be appropriate for explaining the contrast between the interpretation of sentences with bare versus modified numeral determiners with various monotonicity properties on the one hand, and between those containing modified numeral determiners followed by collective versus distributive predicates, on the other.

Acknowledgements

This research was supported by the Netherlands Organization for Scientific Research (NWO) under number 048.011.045 and the Hungarian Scientific Research Fund (OTKA) under number N 37276, in a grant entitled “Syntax, Semantics and Phonology of the Left Periphery”. I wish to thank Regine Eckardt, Cornelia Endriss, Gisbert Fanselow, Andreas Haida, Hans-Martin Gärtner, László Kálmán, Elke Kasimir, István Kenesei, Manfred Krifka, Ewald Lang, Anikó Lipták, Robert van Rooij, Kerstin Schwabe, Balázs Surányi, as

well as audiences in Amsterdam, Berlin, Budapest, Leiden, Lund, and Potsdam for discussions on the topic of the paper and for useful suggestions and to the two anonymous reviewers for comments and criticism. I wish to express my gratitude to the Alexander von Humboldt Foundation for providing me with a research grant to be able to work at the ZAS, Berlin in 2004/2005, where the first version of the present paper was written, and to Manfred Krifka for acting as my sponsor on that occasion.

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