

Volker Gast (Friedrich-Schiller-University of Jena)
volker.gast@uni-jena.de

At least, wenigstens and company:

Negated universal quantification and the typology of focus quantifiers

1 Introduction¹

1.1 Objectives and overview

This chapter pursues two main goals: first, it intends to establish a framework of classification for the language-particular and crosslinguistic analysis of elements like Engl. *only, also, even* etc., i.e. a typology of elements expressing ‘quantification over domains of alternatives’, here called ‘focus quantifiers’. Second, it aims at extending the range of parameters of variation used for the classification of the elements under investigation in most comparative work so far (e.g. König 1991), in particular with respect to the type of quantification expressed. The focus is on English and German, but the typology is intended to have broad crosslinguistic applicability. Given the restricted range of data considered, the programmatic nature of the study should be obvious, however.

Following some terminological remarks in Section 1.2, Section 2 introduces some basic concepts for the representation and interpretation of focus quantifiers. In Section 3, a framework for the semantic classification of focus quantifiers is proposed. It is based on three parameters: (i) the type of quantification expressed, (ii) the discourse pragmatics status of the material contained in the scope of a given operator, and (iii) the presence or absence of an ordering relation structuring the sets of alternatives. In Section 4, I aim to show that there is a type of focus quantifier that expresses negated universal quantification over the domain of focus alternatives. Hole (2004, 2006) has argued that such expressions exist in Mandarin Chinese, and I argue that English *at least*, in specific uses, can be analyzed as an expression of this type as well. In Section

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5, a parallel analysis is proposed for the German particles *wenigstens*, *immerhin* and *zumindest*, and some more specific parameters of classification are identified. Section 6 addresses the relationship between negated universal focus quantifiers and scalar additive operators like *even*, which can be analyzed as indicating universal quantification over the domain of alternative values. Section 7 contains some concluding remarks.

1.2 Terminological remarks

In using the term ‘focus quantifier’ I refer to a *family of scope-bearing elements that express quantification over the domain of alternative propositions contrasting with the proposition contained in their scope*. The most typical representatives of this class are focus particles like *only* (cf. Horn 1969, 1992, 1996; Atlas 1991, 1996), *too* (cf. Reis & Rosengren 1997, Krifka 1999, Gast 2006a) and *even* (cf. Karttunen & Karttunen 1979, Giannakidou 2007, Gast & van der Auwera 2011). Comprehensive studies dealing with the entire family of such expressions have been provided by Jacobs (1983) and König (1991), but most recent work has concentrated on specific types of operators.

In addition to focus particles the notion ‘focus quantifier’ subsumes other elements with a similar semantics, but with different morphological properties. For example, Finnish has two affixes *-kin* and *-kaan* that are basically equivalent to the English focus particles *too* and *either*, respectively. Relevant examples are given in (1). Like *also* and *too*, these suffixes are ‘focus quantifiers’, but they are not ‘focus particles’ – they are ‘affixal’ or ‘bound’ focus quantifiers.

(1) Finnish *-kin* ‘too’, *-kaan* ‘either’ (König 1991: 18)

a. *minä-kin olen hankkinut auto-n.*

I-too I.have got car-ACC

‘I, too, have got a car.’

b. *olen hankkinut auto-n-kin*

I.have got car-ACC-too

‘I have got a CAR, too.’

c. *en ole hankkinut auto-a-kaan*

NEG.1SG have got car-PART-either

‘I haven’t got a CAR, either.’

d. *minä-kään en ole hankkinut auto-a*

I-either NEG.1SG have got car-PART

‘Neither have I got a car.’

The existence of affixal focus quantifiers is not a peculiarity of Finnish, and similar elements can be found in many other languages as well. An example from Japanese is given in (2) (see Gast 2008 for more examples).

(2) Japanese *-mo* ‘too’ (König 1991: 18)

Taroo-mo sakana-o tabemasu

Taroo-too fish-ACC eats

‘Taro, too, eats fish.’

A third (morphological) type of focus quantifier is represented by expressions like English *as well*, *let alone* and *in particular*, German *geschweige denn* (‘let alone’), Spanish *aunque sea* and *por lo menos* (‘at least’), etc. These expressions are made up of two or more phonological words. It therefore seems appropriate to call them ‘multiword’ or ‘composite’ focus quantifiers. Such composite focus quantifiers may be ‘discontinuous’, like French *ne ... que* ‘only’. Relevant operators are also found in Arabic (*mā ... ʔillā* ‘not ... but’, i.e. ‘only’, cf. (3)) and Hebrew (*lo ... ʔela* ‘only’, cf. (4)).

(3) Arabic *mā ... ʔillā* (Fischer & Jastrow 1996: 390)

mā yuḥibbu ʔillā nafsahu
 NEG he.loves but REFL.ACC.3SG
 ‘He loves only himself.’

(4) Hebrew *lo ... éla* (Glinert 1989: 251)

hem lo hisigu éla heskem Helki
 they not reached but agreement partial
 ‘They only reached a partial agreement.’

Note that composite focus quantifiers may consist of lexical as well as affixal material. In the Australian (Pama-Nyungan) language Gurindji, “[t]o give a less ambiguous *too* interpretation [...], it is common to attach *-rningan* to the presupposed part, and another suffix *-payin* ~ *-wayin* to the non-presupposed part, or focus” (McConvell 1983: 8). This is illustrated in (5).

(5) Gurindji (McConvell 1983: 8)

pantawurru-wayin ngu-rna pa-ni-rningan
 back-including AUX.1SG.SBJ hit-PST-add
 ‘I hit it on the back, too.’

Defining focus quantifiers in semantic terms – as expressions quantifying over sets of alternatives – puts us in a position to investigate correlations between the morphological, syntactic and semantic properties of the members of this category. For example, it has been observed that additive focus particles are more prone to follow their focus than exclusive ones (König 1991: 20). However, a preliminary survey of the morphological and syntactic properties of focus quantifiers from a broader sample of languages (cf. Gast 2008) suggests that such generalizations need to be relativized to the morphological properties of the operators in question. For instance, affixal focus quantifiers seem to be typically suffixes rather than prefixes, irrespective of their function. At the present state of knowledge, we cannot make any safe generalizations concerning correlations between the form and function of focus quantifiers in general. Such generalizations require not only a morphological but also a semantic typology of

focus quantifiers. The present study is intended to make a contribution to the development of such a typology.

2 Representing the meaning of focus quantifiers

I assume that sentences with focus quantifiers denote pairs of propositional meanings. One member of such pairs is provided by the denotation of the material contained in the scope of the relevant operator. Adopting a term that is commonly used in focus semantics (and that dates back to the Middle Ages, according to Horn 1996: 1), I call this part of the sentence (as well as the proposition denoted by it) the PREJACENT. The other member of the pair is constituted by a quantificational statement, which I call the ANNEX. Consider the example in (6):

(6) Only John_F attended the meeting.

The prejacent of (6) is simply the (proposition denoted by the) sentence without *only* (*John_F attended the meeting*). I will use a superscript ‘PJ’ prefixed to a constituent *S* to identify the prejacent of *S* (i.e. ^{PJ}*S* is the prejacent of *S* and $\llbracket^{\text{PJ}}S\rrbracket$ its denotation). The annex of (6) is the quantificational contribution made by the focus quantifier *only*, in this case: ‘No one other than John attended the meeting’. Note that the notions ‘prejacent’ and ‘annex’ do not entail anything as to the discourse pragmatic status of the relevant components. We will see below that both components may be either presupposed or asserted.

For a representation of the meaning of focus quantifiers I will use Rooth’s (1985, 1992, 1996) framework of ‘two-dimensional’ semantics. Rooth distinguishes two interpretation functions, the ‘ordinary semantic value’ of a sentence (basically, its denotation irrespective of matters of information structure), and the ‘focus semantic value’ (‘p-set’ in Rooth 1985). The focus semantic value corresponds to a set of propositions in which the focused material is replaced with some appropriate contextually salient alternative. Note that the ordinary semantic value of a sentence is also contained in the focus semantic value, i.e. the alternative expressions substituting for the focus need not be different from the latter.

Both interpretation functions are symbolized using the common double brackets, and they are differentiated by superscripts: the ordinary semantic value is marked with a

superscript ‘o’, and the focus semantic value carries a superscript ‘f’. This is shown in (7).

- (7) a. $\llbracket \alpha \rrbracket^o$ ordinary semantic value of α
 b. $\llbracket \alpha \rrbracket^f$ focus semantic value α

Rooth’s focus semantic value can be used to describe the meaning of *only*-sentences. The annex of (6) can be represented as shown in (8). It is the set of worlds w such that there is no proposition π from the focus semantic value of the prejacent of (6) such that π is not the ordinary semantic value of the prejacent of (6), and w is in π .

(8) annex of (6)

$$\{w \mid \neg \exists \pi \in \llbracket \text{Pj}(6) \rrbracket^f : \pi \neq \llbracket \text{Pj}(6) \rrbracket^o \wedge w \in \pi\}$$

For the sake of simplicity, I will define an additional interpretation function, which I call the ‘focus complement’. The focus complement is the complement of the ordinary semantic value, relative to the focus semantic value. It is represented by a superscript ‘fc’ on the double brackets symbolizing the interpretation function. A definition of the focus complement is provided in (9). We can now represent the annex of (6) as shown in (10).

(9) $\llbracket \alpha \rrbracket^{fc} := \llbracket \alpha \rrbracket^f \setminus \llbracket \alpha \rrbracket^o (= \{\pi \in \llbracket \alpha \rrbracket^f \mid \pi \neq \llbracket \alpha \rrbracket^o\})$

(10) annex of (6)

$$\{w \mid \neg \exists \pi \in \llbracket \text{Pj}(6) \rrbracket^{fc} : w \in \pi\}$$

As will be seen, all types of focus quantifiers dealt with in this study can be analyzed with reference to the focus complement as defined in (9), with differences in interpretation resulting from the type of quantification used in the restrictor of the relevant proposition, as well as some more specific parameters concerning properties of the sets of alternatives in question (e.g. the presence vs. absence of an ordering relation).

3 Parameters of semantic classification

3.1 Exclusive vs. additive focus quantifiers

Having established some basic terminology, we can now proceed to consider the parameters that we need to classify focus quantifiers semantically. The first parameter concerns the type of quantification expressed. A distinction between *exclusive* and

additive operators is commonly made in research on focus particles (cf. König 1991, Gast 2006b). This distinction can also be applied to other morphological types of focus quantifiers. In the case of exclusive focus quantifiers like *only*, no proposition from the focus complement is true, i.e. these particles express NEGATED EXISTENTIAL QUANTIFICATION over the domain of alternative values. This is what is represented in (8) and (10) above. Additive particles, by contrast, indicate that *some* proposition from the set of alternative propositions *is* true; in other words, they express EXISTENTIAL QUANTIFICATION over the domain of alternative values. This is shown in (11):

(11) John attended the meeting, too.

$$\text{annex: } \{w \mid \exists \pi \in \llbracket \text{PJ}(11) \rrbracket^{\text{fc}} : w \in \pi\}$$

The distinction between exclusive and additive focus quantifiers is clearly one of the most central parameters of classification in the area of investigation. However, following Hole (2004, 2006), I argue in Section 4 that the parameter ‘existential vs. negated existential quantification’ can only cover part of the semantic variation found in this domain, and that (negated) universal quantification needs to be taken into account as well.

3.2 Assertive vs. non-assertive focus quantifiers

Obviously, the type of quantification expressed is not the only difference between *only* and *too*. The relevant sentences also differ in terms of the discourse pragmatic status of their meaning components (prejacent and annex). I follow Horn (1992, 1996) (contra Atlas 1991, 1993) in assuming that the annex of *only*-sentences is asserted, while the prejacent is presupposed. This is shown in (12) and (13), using clause-external negation as a diagnostic for a presuppositional status.

(12) Only John_F attended the meeting.

- a. pres.: $\llbracket \text{John attended the meeting} \rrbracket^{\circ}$ (prejacent)
 b. ass.: $\{w \mid \neg \exists \pi \in \llbracket \text{PJ}(12) \rrbracket^{\text{fc}} : w \in \pi\}$ (annex)

(13) It is not true that only John_F attended the meeting.

- a. pres.: $\llbracket \text{John attended the meeting} \rrbracket^{\circ}$ (prejacent)
 b. ass.: $\{w \mid \neg[\neg \exists \pi \in \llbracket \text{PJ}(13) \rrbracket^{\text{fc}} : w \in \pi]\}$ (annex)
 $\equiv \{w \mid \exists \pi \in \llbracket \text{PJ}(13) \rrbracket^{\text{fc}} : w \in \pi\}$

In sentences with *too*, it is the annex that is presupposed.

(14) John attended the meeting, *too*.

- a. pres.: $\{w \mid \exists \pi \in \llbracket \text{PJ}(14) \rrbracket^{\text{fc}} : w \in \pi\}$
 b. ass.: $\llbracket \text{John attended the meeting} \rrbracket^0$

(15) It is not true that John attended the meeting, *too*.

- a. pres.: $\{w \mid \exists \pi \in \llbracket \text{PJ}(15) \rrbracket^{\text{fc}} : w \in \pi\}$
 b. ass.: $\llbracket \text{John did not attend the meeting} \rrbracket^0$

Compare (16) and (17). Both sentences are associated with existential quantification over the domain of alternatives, but in different ways. The annex is presupposed in (16) while it is asserted in (17). The two sentences consequently have (basically) identical truth conditions, but they are appropriate under different contextual conditions:

(16) John attended the meeting, *too*.

- pres.: $\{w \mid \exists \pi \in \llbracket \text{PJ}(16) \rrbracket^{\text{fc}} : w \in \pi\}$

(17) Not only John attended the meeting.

- ass.: $\{w \mid \exists \pi \in \llbracket \text{PJ}(17) \rrbracket^{\text{fc}} : w \in \pi\}$

The parameter of classification established in this section will be captured by the property of being ‘assertive’ or ‘non-assertive’. If the annex is asserted (as in the case of *only*), the relevant focus quantifier will be called ‘assertive’. If the annex is presupposed, the focus quantifier will be called ‘non-assertive’. This is summarized in Table 1.

| | ASSERTIVE | NON-ASSERTIVE |
|-----------|-------------|---------------|
| PREJACENT | presupposed | asserted |
| ANNEX | asserted | presupposed |
| example | <i>only</i> | <i>too</i> |

Table 1: Assertive and non-assertive focus quantifiers

Note that it is an interesting question to what extent the parameters ‘exclusive vs. additive’ and ‘assertive vs. non-assertive’ are orthogonal. Exclusive focus quantifiers of European languages seem to be invariably non-assertive, and additive ones are apparently always non-assertive. More crosslinguistic research is needed to determine

whether this restriction is typical of European languages, or whether it is a universal property of focus quantifiers.

3.3 Scalar vs. non-scalar focus quantifiers

The third important parameter of classification concerns the sets of alternatives under discussion, i.e. the sets over which a focus quantifier quantifies. These sets may be either ordered or unordered (cf. Fauconnier 1975, Jacobs 1983 on linguistic scales in general). Accordingly, we can distinguish between ‘scalar’ and ‘non-scalar’ focus quantifiers. Obviously, this aspect of interpretation relates to properties of contexts, but given that focus quantifiers impose compatibility requirements on their environments, it is necessary to regard this parameter as pertaining to the semantics of focus quantifiers proper. Scales are sometimes assumed to be presupposed or conventionally implicated. I would not like to take a stance on this question, but it seems to me that scalar contexts are a prerequisite, rather than a consequence, of the use of scalar focus quantifier, so the most appropriate way of dealing with this question is probably to regard the requirement of scalar contexts as a type of selectional restriction.

The difference between scalar and non-scalar focus quantifiers can be illustrated using the contrast between *even* and *too*: both particles are additive, but only *even* requires a scale to interact with. Relevant examples are given in (18) and (19).

(18) The chancellor was there, too.

(19) Even the chancellor was there.

(18) merely requires that some proposition π from the focus complement of its prejacent be true. The focus semantic value of this example is shown in (20).

(20) unordered focus semantic value

$$\llbracket^{PJ}(18)\rrbracket^f = \{ \text{‘The chancellor was there’}, \text{‘The secretary was there’}, \text{‘The vice-chancellor was there’} \dots \}$$

(19) necessitates a context in which the set of alternatives is ordered, i.e. it forms a scale. Traditionally, *even* is taken to interact with scales of likelihood (e.g. Karttunen & Karttunen 1977, Karttunen & Peters 1979), but there are instances of *even* that are not covered by this analysis (see Gast & van der Auwera 2011 for recent discussion). (19) interacts with a scale of the type shown in (21).

(21) ordered focus semantic value

$\llbracket^{PJ}(19)\rrbracket^f = \langle \text{'The chancellor was there'}, \text{'The vice-chancellor was there'}, \text{'The secretary was there'} \rangle$

We can distinguish two major types of scales, context-invariant (semantic) ones, and context-sensitive (pragmatic) ones. The most prominent type of semantic scale is ordered by the entailment relation ('scale of informativeness'). Pragmatic scales may be ordered by contextual parameters such as the 'argumentative value' of a proposition (cf. Ducrot 1980) or a specific type of speaker evaluation (cf. Section 4.2), among other types of relations. While the number of pragmatic scales is probably, theoretically speaking, infinite, the various types of scales appear to be metonymically related to one another. Given that a comprehensive classification of pragmatic scales is beyond the scope of this study, we will only deal with those scales that are required by the specific operators under consideration.

3.4 Preliminary summary

In this section, I have established three parameters of classification that can be used to characterize and classify focus quantifiers: First, focus quantifiers indicate either existential or negated existential quantification (*too* vs. *only*). Second, they are either assertive (*only*) or non-assertive (*too*). And third, they are either scalar (*even*) or non-scalar (*too*), with scalar operators differing with respect to the exact type of scale that they require. These parameters can be used to represent the meaning of the focus quantifiers discussed above as shown in (22). The three semantic parameters are here represented by binary features. Underspecification is allowed. In particular, *only* may interact with both scalar and non-scalar contexts and is thus classified as $[\pm \text{SCAL}]$. The specific type of scale required by a given operator could be determined by distinguishing sub-classes of $[+ \text{SCAL}]$ -operators, e.g. $[+ \text{SCAL} [+ \text{SEM}]]$ for operators that interact with (semantic) scales of informativeness.

| (22) | QUANT | SCAL | ASS |
|-------------|------------------|---------------------|------------------|
| <i>only</i> | $[\neg \exists]$ | $[\pm \text{SCAL}]$ | $[+ \text{ASS}]$ |
| <i>too</i> | $[\exists]$ | $[- \text{SCAL}]$ | $[- \text{ASS}]$ |
| <i>even</i> | $[\exists]$ | $[+ \text{SCAL}]$ | $[- \text{ASS}]$ |

4 An extension: Negated universal focus quantifiers

4.1 Inspiration from Mandarin Chinese

So far, I have summarized common knowledge about the meaning of focus quantifiers. In what follows I present an extension of this typology, which has been inspired by work done by Daniel Hole on Mandarin Chinese. Hole (2004, 2006) has argued that Mandarin Chinese encodes all types of focus quantification from the square of opposition² (for a similar proposal on Japanese, see Oshima 2002). There is an element *cái* that is associated with negated existential quantification over the domain of alternative values (similar to English *only*), and there is a particle *yě* that is used in the context of existential quantification (similar to English *too*). Moreover, there are two operators that are used when universal or negated universal focus quantification is expressed: *dōu* for universal quantification (roughly, ‘even’),³ and *jiù* for negated universal quantification. This last element *jiù* is what I am interested in. For a felicitous use of *jiù* it is required that not all alternatives from the focus semantic value be true. The examples given in (23) and (24) illustrate the use of this item.

(23) Oūzhōu rén dāng zhōng, Ìdàlì rén jiù zhǎng-zhe hēi tóufa.
 Europe people among Italy people *jiù* grow-ASP black hair
 ‘Among Europeans, Italians (*jiù*) have black hair.’

(24) #Dōng-Yā rén dāng zhōng, Rìběn rén jiù zhǎng-zhe hēi tóufa.
 East-Asia people among Japanese people *jiù* grow-ASP black hair
 ‘Among the people from East Asia, the Japanese (*jiù*) have black hair.’

Hole (2004: 8)

Among the alternative propositions contrasting with (23) there are sentence meanings like ‘Swedes have black hair’, which is not (generally) true. *Jiù* is thus licensed. (24) contrasts with propositions like ‘The Chinese have black hair’ and ‘The Korean have black hair’, which are all (generally) true. This is why *jiù* cannot be used here. In what follows I aim to show that English and German have lexical items with a restriction similar to that of Mandarin *jiù*. In other words, I argue that there are ‘negated universal

² It should be noted, however, that the relevant operators are not themselves focus quantifiers, but reflexes of specific types of focus quantification. Hole operates with the notion of ‘focus-background agreement’.

³ On *even* as universal focus quantifier, cf. Section 6.

focus quantifiers’ in English and German. As a consequence, the typology presented in Section 3 can be extended, insofar as we can assume more parameter settings for the type of quantification expressed. We will consider English *at least* (Section 4.2) before turning to the German items *wenigstens*, *immerhin* and *zumindest* in Section 5.

4.2 *At least* as a negated universal focus quantifier

4.2.1 Three uses of *at least*

We can distinguish three uses of *at least* on the basis of both syntactic and semantic criteria. They are illustrated in (25)–(27). Kay (1992) calls these uses ‘scalar’, ‘evaluative’ and ‘rhetorical’. Given that these terms interfere with the classification of focus quantifiers proposed in this study,⁴ I will use the notions ‘predicational’ (for Kay’s ‘scalar’), ‘propositional’ (for Kay’s ‘evaluative’) and ‘illocutionary’ (for Kay’s ‘rhetorical’). The rationale of this choice of terminology will become clear later in this chapter.

(25) Mary received calls from at least three soldiers.

(‘predicational/scalar’)

(26) At least this one’s cooked.

(‘propositional/evaluative’)

(27) I see her every day, at least when I’m in town.

(‘illocutionary/rhetorical’)

Predicational *at least* is typically in construction with a quantifying noun phrase (as in (25)) and cancels the upper bounding scalar implicature usually associated with quantified propositions (see Krifka 1999 for a detailed analysis of this use). Kay (1992) speaks of ‘implicature suspension’. It can also be used in combination with propositions that do not contain any obviously quantifying component. All that is required is some scale. In (28), a scale is introduced by the contrast between the VPs *worry him* and *make him utterly distraught*.

(28) That’s going to at least worry him if not make him utterly distraught.

(Kay 1992: 311)

⁴ For example, the parameter ‘scalar’ is a general property of all uses of *at least*. Moreover, there are ‘non-evaluative’ counterparts of ‘evaluative’ *at least* in German (cf. Section 5), so a more general term is needed.

In the predicational use, *at least* stands in a relation of antonymy to *at most*. It is either a left sister of its focus with no special intonation marking (cf. (28)), or it occurs somewhere to the right of the focus, with parenthetical intonation, as in (29).

(29) He's going to be irritated, at least. (Kay 1992: 313)

Predicational *at least* cannot occur at a distance from its focus and always combines with maximal projections. This distinguishes it from the other two use types distinguished by Kay (1992) (as well as from its near equivalent [*at the (very) least*]; cf. Kay 1992: 314 for discussion). Consider (30).

(30) At least he's going to be irritated that I didn't call. (Kay 1992: 313)

As Kay (1992: 313) points out, “unless *he* receives special stress, indicating that it is the focus, the only possible interpretation is one requiring a different *at least*.” More specifically, a ‘distant focus’ reading of (30) corresponds to propositional *at least*.

Propositional *at least* indicates, in Kay's words, a “positive evaluation” and “a less than maximal degree ... hence, putting these two together, [...] a less than maximal degree of positive evaluation” (Kay 1992: 315). Sometimes, a negation of the maximal value on the relevant scale can be found in the immediate discourse environment, as in (31).

(31) If people do not want to vote for him, at least they should stay uncommitted.
(König et al. 1991: 246)

Illocutionary *at least* is hard to tell apart from propositional *at least* in syntactic terms (cf. Kay 1992: 321–22). However, there are relatively robust semantic diagnostics distinguishing the two uses. Most importantly, illocutionary *at least* does not require a scale of positive evaluation. This is illustrated by the pair of examples in (32) (from Kay 1992: 312). While (32)a sounds natural, (32)b does not, as it appears to imply a positive attitude held by the speaker towards his own ruin.

(32) a. She's going to ruin me, at least she has threatened to. (illocutionary)
b. At least she has threatened to ruin me. (propositional)

The following discussion starts with propositional *at least* in Section 4.2.2, as this element is syntactically and semantically most similar to other (prominent) members of the family of focus quantifiers (like *also* and *even*). Section 4.2.3 deals with

illocutionary *at least*, which can be regarded as a systematic metonymical extension of propositional *at least*. Section 4.2.4 returns to predicational *at least*, focusing on the relation of this use to the other two use types. The overall aim of this section is to illustrate that *at least* can be analyzed as a focus quantifier that introduces an annex which expresses negated universal quantification over the domain of alternative values.

4.2.2 Propositional *at least* as a negated universal focus quantifier

Propositional *at least* can be classified as shown in (33). It expresses negated universal quantification (like Mand. *jiù*), it requires pragmatic (more precisely, speaker-evaluative) scales to interact with, and it is non-assertive (like Engl. *too*). For comparison, the feature specifications of other English focus quantifiers are repeated in (33) (cf. (22)).

| (33) | QUANT | SCAL | ASS |
|---------------------------------|-------|----------|---------|
| <i>only</i> | [¬∃] | [± SCAL] | [+ ASS] |
| <i>too</i> | [∃] | [− SCAL] | [− ASS] |
| <i>even</i> | [∃] | [+ SCAL] | [− ASS] |
| <i>at least</i> (propositional) | [¬∀] | [+ SCAL] | [− ASS] |

Before considering these feature specifications individually, we should examine the very claim that *at least* is a focus quantifier. This assumption entails (a) that it is cross-categorical, and (b) that it interacts with foci, potentially at a distance. The examples in (34)–(38) illustrate that these requirements are met.

- (34) At least the OLD woman tried to help me (though the YOUNG woman didn't).
- (35) At least the old WOMAN tried to help me (though the old MAN didn't).
- (36) At least the old woman TRIED to help me (though she didn't SUCCEED).
- (37) At least the old woman tried to HELP me (though she didn't offer to DO IT IN MY STEAD).
- (38) At least the old woman tried to help ME (though she didn't help YOU).

According to the analysis proposed here, *at least* is appropriate in contexts in which it is presupposed that not all propositions from the focus complement of the relevant prejacent are true. In (39) the presupposition of 'non-maximality' is explicitly mentioned in the context.

- (39) a. He may not always meet all my needs, but ...
 b. ... at least he doesn't chase after other women ...
 c. ... or beat me up. (Frost 2002: 226)

The focus semantic value of (39)b is a scale of the type shown in (40), with a decrease of 'positive evaluation' from left to right.

- (40) $\llbracket^{PJ}(39)b\rrbracket^f = \langle \text{'He always meets all my needs'}, \text{'He does not chase after other women'}, \text{'He does not beat me up'} \rangle$

Note that what is ranked in (40) is not the propositions themselves, but their 'contextual implications' with respect to the question 'How good a husband is he?' (cf. Gast & van der Auwera 2011 on pragmatic scales based on contextual implications). 'He meets all my needs' licenses the inference 'He is the perfect husband', 'He does not chase after other women' suggests 'He is ok as a husband', and 'He does not beat me up' makes a very weak claim with regard to husband skills of the person in question.

In a next step, it needs to be shown that (39)b is infelicitous if all propositions in $\llbracket^{PJ}(39)b\rrbracket^f$ are true. This is the case if the strongest proposition is true, i.e. *He always meets all my needs*. (41) shows that propositional *at least* is inappropriate in this case.

- (41) #He always meets all my needs, and at least he does not chafe after other women.

In order to understand the status of the (presuppositional) quantification associated with *at least*, it is instructive to compare such sentences to the relevant counterparts containing either *too* or *even*, whose annex is likewise presuppositional. The parallelism between (42) and (43) shows that the most important aspect of meaning distinguishing *at least* from *too* and *even* is the type of quantification expressed.

- (42) a. Some band members were sober. Frank Sinatra was sober, too.
 b. Some band members were sober. Even Frank Sinatra was sober.
 (43) Not all band members were sober, but at least Frank Sinatra was sober.

According to the analysis put forward above, (39)b can be interpreted as shown in (44):

- (44) a. presupposed: $\{w \mid \neg \forall \pi \in \llbracket^{PJ}(39)b\rrbracket^{fc} : w \in \pi\}$
 b. asserted: $\llbracket \text{He doesn't chase after other women} \rrbracket^0$

4.2.3 Illocutionary *at least* as a negated universal focus quantifier

Kay (1992) distinguishes two subtypes of illocutionary ('rhetorical') *at least* (cf. also Lewis 2002 on this use type). The first type can be called 'epistemic', as *at least* makes reference to the degree of epistemic commitment made by the speaker. Consider the examples in (45).

- (45) a. Mary is at home, at least John's car is in the driveway.
 b. Mary is at home, at least I think so.
 c. Mary is at home, at least that's what Sue said. (Kay 1992: 318)

The alternatives contrasting with the examples in (45) are located at the level of utterance interpretation – hence, 'illocutionary' *at least*. They differ with respect to the category of evidentiality. Let us start with (45)a. The piece of information that 'John's car is in the driveway' is added to lend support to the utterance *Mary is at home* (cf. also Sweetser 1990, Hengeveld 1998 on this type of 'speech-act modifying' adverbial clause). The entire sentence can thus be paraphrased as in (46).

- (46) *I think that* Mary is at home [*because* [John's car is in the driveway]]_F.

The entities contrasting with (45)a./ (46) are sentences in which some other type of support is given for the utterance in question. Two relevant examples are given in (47).

- (47) a. *I think that* Mary is at home *because* [I saw her]_F.
 b. *I think that* Mary is at home *because* [I heard the dog barking]_F.

Propositions like those in (45)a and (47) can be ordered on a scale of 'epistemic commitment'. If the speaker saw Mary, s/he can be sure that Mary is at home. The fact that John's car is in the driveway is a weaker piece of evidence pointing to Mary's presence, but still relatively strong (if John is visiting, we assume Mary to be at home). Finally, the dog's barking provides only suggestive evidence. The focus semantic value associated with (45)a. is given in (48).

- (48) $\llbracket^{PJ}(45)a\rrbracket^f = \langle \text{'I think that Mary is at home because I saw her'}, \text{'I think that Mary is at home because John's car is in the driveway'}, \text{'I think that Mary is at home because I heard the dog barking'} \rangle$

At least in (45)a. expresses negated existential quantification over the (ordered) set given in (48). The sentence presupposes that not all utterances in $\llbracket(45)a\rrbracket^f$ are true. As

the set in (48) is ordered, this (basically) amounts to excluding the strongest proposition ('I think that Mary is at home because I saw her'). The same analysis can be applied to (45)c. Again, there are contrasting propositions of the form 'I think that Mary is at home because I saw her/...because I have some piece of evidence, etc.' And again, the strongest statement cannot be made (knowledge on the basis of one's own observations), but (at least) one of the weaker alternative proposition is asserted.

(45)b., finally, is similar to (45)a. and (45)c., but differs from these in that it is not a 'speech-act justifying afterthought' that is in focus, but the epistemic predicate itself. Contrasting propositions, therefore, have the form given in (49). *Think* is epistemically stronger than *suspect*, but it is weaker than *know*. The strongest form of evidentiality (knowledge) cannot be asserted (presupposition), but (at least) the *belief* is asserted to be true. The focus semantic value of (45)b. is given in (50).

(49) a. I *know* that Mary is at home.

b. I *suspect* that Mary is at home.

(50) $\llbracket^{PJ}(45)b\rrbracket^f = \langle \text{'I know that Mary is at home'}, \text{'I think that Mary is at home'}, \text{'I suspect that Mary is at home'} \rangle$

The second major type of illocutionary ('rhetorical') *at least* identified by Kay (1992) concerns the 'range of applicability' of a given proposition. A set of relevant examples is given in (51) (from Kay 1992: 318).

(51) Mary will help me, at least ...

a. ... if it doesn't rain.

b. ... for a short time.

c. ... to get started.

Kay (1992) subsumes the instances in (51) together with the epistemic cases under the category of 'rhetorical' (illocutionary) *at least* because they indicate 'rhetorical retreat'. While epistemic cases of illocutionary *at least* relativize an utterance with respect to the degree of commitment made by the speaker, the examples in (51) restrict the preceding sentence in some other (e.g. temporal, modal) way. These cases thus differ from the epistemic ones with respect to the relation ordering the set of alternatives, but the mechanism of interpretation is the same. The strongest statement from the set of alternative utterances is presupposed to be false, and some weaker statement is made.

(52) provides a representation of the focus semantic value of (51)a, and (53) gives the interpretation of that example.

(52) $\llbracket^{PJ}(51)a\rrbracket^f = \langle \text{‘Mary will help me under any circumstance’}, \text{‘Mary will help me if it doesn’t rain’}, \text{‘Mary will help me if it doesn’t rain and she is in a good mood’} \rangle$.

(53) a. presupposed: $\{w \mid \neg \forall \pi \in \llbracket^{PJ}(51)a\rrbracket^{fc} : w \in \pi\}$

b. asserted: $\llbracket^{PJ}(51)a\rrbracket^o$

4.2.4 Predicational *at least*

Predicational *at least* has been analyzed in great detail by Krifka (1999), and I do not wish to add to this analysis here. Instead, I want to consider how this use type relates to propositional and illocutionary *at least*. On the face of it, it seems to be incompatible with these readings, as is also noticed by Kay (1992), who discusses the examples in (54).

- (54) a. I got most of the answers right, at least. (ambiguous)
 b. I got most of the answers right, at least, and maybe all. (predicational)
 c. I got most of the answers right, at least, so I’m content. (propositional)

Kay (1992: 323) points out: “The Scalar [predicational] interpretation specifically leaves open the possibility that I got all the answers right, but the Evaluative [propositional] interpretation requires the conclusion that I did not get all of the answers right in order to satisfy the part of the semantics of the Evaluative [propositional] *at least* construction which specified a nonoptimal outcome ...”. To use a simpler example: *He ate at least two of the three apples* explicitly allows for the possibility that he ate all the apples, while *At least he ate two of the three apples* presupposes that he did not eat all of the apples.

Even though there is a clear semantic contrast between predicational and propositional *at least*, the aspect of non-maximality, which is a central characteristic of propositional *at least*, can also be recovered in predicational *at least*. In accordance with the Gricean maxims, *John ate at least two of the three apples* is appropriate when the speaker has evidence that two apples have been eaten by John, while not having any evidence concerning the third apple. In this sense, *John ate at least two apples* is a non-

maximal statement. While it does not trigger an implicature saying that ‘S has positive evidence that John did not eat three apples’ – as does the sentence *John ate two apples* – it is associated with the implicature ‘S has no positive evidence that John ate the third apple’. Put differently, *John ate at least two apples* evokes *John ate three apples* without however asserting it.

Given our general knowledge of historical processes in this domain, it seems likely that propositional *at least* emerged from the reanalysis of the implicature of non-maximality associated with predicational *at least* as a presupposition (or conventional implicature). Detailed diachronic studies are needed to see whether this scenario is supported by historical evidence.

5 Extensions and refinements: negated universal focus quantifiers in German

German has a richer inventory of negated universal focus quantifiers than English. There are at least three elements to which this term can be applied, i.e. *wenigstens*, *immerhin* and *zumindest*. *Jedenfalls* is also often listed among these expressions (e.g. by König et al. 1991: 246 and by Weydt 1979b), but given that the range of contexts where *jedenfalls* functions as a (near) equivalent of *at least* is rather restricted, this item is disregarded in the following discussion.

All expressions under consideration in this section can be classified as ‘non-assertive’, ‘scalar’ and ‘expressing negated universal quantification over the domain of alternative values’. They differ with respect to the specific type of scale that they interact with. Apart from differences in the ordering relations there are differences in the ‘structure’ of the scales. I argue in Section 5.2 that one operator – *immerhin* – requires ‘partitioned’ or scales, i.e. scales that are divided into two halves by a ‘threshold value’ (cf. Jacobs 1983 on the role of threshold values in scales).

Section 5.1 provides an overview of the distribution of *wenigstens*, *zumindest* and *immerhin*, before the problem of ‘partitioned scales’ is introduced in Section 5.2.

5.1 *Wenigstens*, *immerhin* and *zumindest*: Basic distribution

Wenigstens is a relatively close translational equivalent of *at least*. It has predicational, propositional and illocutionary uses, being most comfortable in its propositional function (cf. (55); see Kay 1992: 315 for discussion of a corresponding English

example). In a predicational use it is somewhat awkward or perhaps dialectal. The most natural choice in a context like (56) would be *mindestens*.

(55) propositional *wenigstens*

Wenigstens konnten bei diesem Zugunglück einige_F Leute gerettet werden.
 at least could in this trainwreck some people saved be
 ‘At least in that trainwreck some_F people could be saved.’

(56) predicational *wenigstens/mindestens*

Er hat ?wenigstens/mindestens drei Äpfel gegessen.
 he has at.least three apples eaten
 ‘He ate at least three apples.’

Wenigstens also has illocutionary uses, though it is somewhat suboptimal vis-à-vis *zumindest*.

(57) Er wird kommen – wenigstens/zumindest sagt er das.
 he will come at.least says he that
 ‘He will come – at least he says so.’

Immerhin and *zumindest* exhibit identical values for the ‘major’ three parameters of classification, but unlike *wenigstens* they are not (necessarily) associated with scales of (positive) speaker evaluation. They are compatible with a broader range of pragmatic scales. This is illustrated by the contrast between (58).

(58) You shouldn’t say that the accident was no big deal.

| | | | |
|---|-------------|---|---|
| { | #Wenigstens | } | wurden bei diesem Zugunglück viele Leute getötet. |
| { | Immerhin | } | were in this trainwreck many people killed |
| { | Zumindest | } | were in this trainwreck many people killed |

‘After all many people were killed in that trainwreck.’

Zumindest is occasionally used in predicational function (cf. the attested example in (59)), but again, *mindestens* is a more natural choice here. As pointed out above, *zumindest* is commonly found in illocutionary contexts (cf. (57)).

(59) Dies hat zumindest drei Gründe: ...

this has at.least three reasons

‘There are at least three reasons for this ...’

[<http://forum.sexualaufklaerung.de/index.php?docid=710>, accessed on Feb 05, 2011]

Immerhin, finally, is only found in propositional function (cf. (60)a). It does not have predicational uses. For example, (60)a can only have a propositional reading, i.e. an interpretation of *immerhin drei Äpfel* as ‘three or more apples’ is not possible. (60)b shows that *immerhin* does not have an illocutionary use (cf. (60)b).

(60) a. Er hat immerhin drei Äpfel gegessen.

he has at.least three apples eaten

‘At least he ate three apples.’

b. #Maria ist zu Hause – immerhin steht Karls Auto vor ihrem Haus.

Mary is at.home at.least is her car in.front.ofher house

int.: ‘Mary is at home. At least her car is parked in front of her house.’

The distribution of the three German focus quantifiers under discussion is summarized in Table 1.

| | <i>wenigstens</i> | <i>zumindest</i> | <i>immerhin</i> |
|---------------|-------------------|------------------|-----------------|
| predicational | (√) | (√) | – |
| propositional | √ | √ | √ |
| illocutionary | √ | √ | – |

Table 1: Distribution of negated universal focus quantifiers in German

5.2 *Zumindest* and *immerhin*: Partitioning the scales

Zumindest and *immerhin* differ from both *at least* and *wenigstens* in not requiring a scale of positive speaker evaluation, i.e. they are compatible with a broader range of pragmatic scales. The question arises what distinguishes the two operators in those contexts where they are both licensed, i.e. in their propositional uses.

Weydt (1979a: 335) describes the function of *immerhin* as follows: “*Immerhin* serves to locate the assertion of the sentence which it is part of between two other ideas. These ideas, which are very often not explicitly expressed, are a) a high initial expectation, which is not satisfied, and b) a low expectation which follows the loss of the first expectation”. A similar analysis is given by König et al. (1991: 138f.).

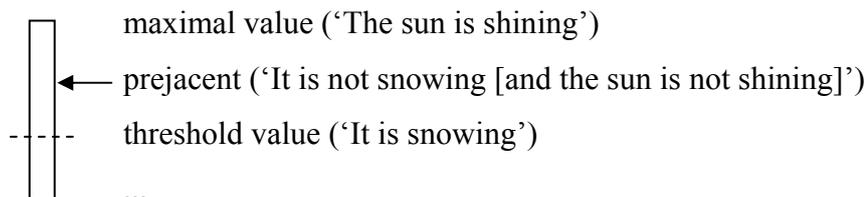
Weydt’s analysis can be translated into the present framework as follows: *Immerhin* is a negated universal focus quantifier – the strongest alternative from the relevant scale is excluded by presupposition. This corresponds to point a) of Weydt’s analysis. Point b) refers to the fact that some element of the relevant scale that ranks lower than the prejacent is expected or at least under discussion. In other words, there are two reference values on the scale with respect to which the prejacent is evaluated. The second, lower point of reference can be implemented as a ‘threshold value’ (cf. Jacobs 1983). The threshold value can be said to ‘partition’ the scale in question. Consider (61) (from König et al. 1991: 139) for illustration. Its focus semantic value is given in (62) (note that ‘It is not snowing’ implicates ‘The sun is not shining’ if the weather is under discussion).

(61) Immerhin schneit es nicht.
 at.least snows it not
 ‘At least it’s not snowing.’

(62) $\llbracket^{PJ}(61)\rrbracket^f = \langle \text{‘The sun is shining’}, \text{‘It is not snowing (and the sun is not shining)’}, \text{‘It’ is snowing} \rangle$

(61) presupposes that some proposition from the focus semantic value which is more positively evaluated than ‘It is not snowing’ is false – most likely, ‘The sun is shining’. However, the weather is not as bad as described in the more negatively evaluated proposition ‘It is snowing’. The prejacent ‘It is not snowing’ is thus located between a) the maximal value on the scale (‘The sun is shining’), and the lower threshold value (‘It is snowing’). This is illustrated in (63).

(63) partitioned scale interacting with *immerhin*



Given that *immerhin* locates a proposition in the upper half of a partitioned scale, the relevant sentences have a largely positive orientation. By contrast, in the use of *zumindest* the relativizing overtone typical of non-universal focus quantifiers prevails. I regard this as following from the fact that *zumindest* does not interact with partitioned scales and is thus located lower on the scale than the sole reference point, i.e. the maximal one.

If the difference between *immerhin* and *zumindest* pointed out in this section is correct, a typology of focus quantifiers should be able to distinguish between those operators that interact with ‘simple’ scales and those that require ‘partitioned’ ones.

6 *At least and even*

6.1 Convergence in nonveridical contexts

As is well known, there is an area of overlap between the expression of *at least*-meanings as discussed in this chapter on the one hand, and *even*-meanings (in downward entailing or non-veridical contexts) on the other (cf. Giannakidou 2007, Gast & van der Auwera 2011). A relevant example is provided by the Modern Greek particle *esto*, which has been described in great detail by Giannakidou (2007). *Esto* is regarded as a member of the family of Greek *even*-items by Giannakidou, but “in many cases it is paraphrasable by *at least*” (Giannakidou 2007: 44). It exhibits heavy distributional restrictions, being “bad in both positive and negative sentences, while improving in polarity environments that are not negative, but nonveridical” (Giannakidou 2007: 43). For example, *esto* is found in questions and conditionals, in combination with specific modals and subjunctive verbs and with habituais, among other contexts. An example of a polar question is provided in (64).

- (64) Tu exis milisi esto ke mia fora?
 to.him you.have talked even/at.least and one time
 ‘Did you talk to him even once?’
 (Giannakidou 2007: 66)

In contexts of the type illustrated in (64), scalar additive operators like *even* combine with minimal ‘local’ values (cf. Gast & van der Auwera 2011). Due to scale reversal, the relevant minimal values lead to maximal interpretations at the level of proposition or utterance interpretation (cf. also Krifka 1995 as well as other relevant literature on NPIs). Gast & van der Auwera (2011) call operators of this type ‘(non-negative) BENEATH-operators’. The quantifying expression (*esto ke*) *mia fora* in (64) denotes the type of minimal value that typically associates with BENEATH-operators. Such values give rise to a particularly weak proposition at the local level (‘You talked to him once’), and, in (64), to a question that is most likely to elicit a positive answer (‘Did you talk to him once?’). However, the question is negatively biased. By (rhetorically) implying that even this ‘weakest’ question can probably not be answered positively, the speaker thus issues the strongest possible ‘challenge’. Such asymmetries between ‘local’ and ‘global’ interpretations are characteristic and in fact a defining property of BENEATH-operators (cf. Gast & van der Auwera 2011).

The question arises how and why an expression of ‘non-maximality’ should have the effect of strengthening the utterance meaning in a way similar to that achieved by expressions of minimality. One obvious explanation is to assume that the relevant contexts only offer a binary choice, and that in this case ‘non-maximality’ and ‘minimality’ are equivalent. It seems to me, however, that the effect of non-maximality comes in at a different level of interpretation, and more indirectly. Questions such as (64) presuppose that there is consensus between the interlocutors that the number of occasions on which the addressee spoke to the person in question is very small. The alternatives under discussion are thus basically ‘A has talked to him, though very few times’ and ‘A has not talked to him at all’. In uttering (64), the speaker signals that s/he would consider a single conversation *something* – a non-maximal option, within the restricted range of possibilities, but *at least not nothing*. Choosing an expression of non-maximality can thus have the rhetorical effect of indicating very low expectations.

If this is right, the two readings converge on the fact that they are compatible with, and even enhance, a particularly strong utterance meaning. The use of a BENEATH-operator does so by virtue of emphasizing ‘minimality’ at a local level. The *at least*-element introduces a presupposition restricting the range of values under consideration to a minimum. In both cases, the effect is that of contributing to the strength of the ‘challenge’ associated with the question in (64).

6.2 *Even* as a universal focus quantifier

The relation between *at least* and *even* is also interesting from another perspective. So far, I have assumed that *even*, like *also*, expresses existential quantification and that it differs from *also* in requiring scalar contexts. A different possibility, entertained by Hole (2004) for Mandarin *dōu*, is to analyze *even* as expressing universal quantification over the domain of alternative values. This is possible if we assume that the sets of alternatives associated with *even* are pragmatically restricted. As is well known (e.g. Gast & van der Auwera 2011), *even* can also combine with foci that are semantically non-maximal (e.g. ... *some or even most of the students* ...), which seems to speak against regarding *even* as quantifying over the entire set of alternatives. Hole’s (2004) analysis thus requires a contextual restriction to a specific subset of theoretically possible alternatives, i.e. specific values (*all students*) are not even under consideration.

It goes without saying that Hole’s analysis is highly attractive from a theoretical point of view. It assigns one focus quantifier to each corner of the square of opposition: $\neg\exists$ (*cái*), \forall (*dōu*), $\neg\forall$ (*jiù*) and \exists (*yě*). According to the argument made in this study, a similar claim could be made for English. There is *only* ($\neg\exists$), *even* (\forall), *at least* ($\neg\forall$) and *also* (\exists). It should be borne in mind, however, that the English system is much less clearly structured than the Mandarin system (as analyzed by Hole 2004, 2006), as the operators vary in many respects beyond the type of quantification expressed. Most importantly, *at least* can only be used in combination with specific scales (of speaker evaluation) and thus has a much more restricted distribution than Mandarin *jiù*. In other words, the degree of ‘paradigmaticity’ of the system seems to be much more limited in English than in Mandarin Chinese.

7 Conclusions and outlook

I hope to have shown that a semantic parameterization of focus quantifiers provides a fruitful approach to the language-particular and crosslinguistic analysis of this family of expressions. Having identified three major parameters of classification – (i) the type of quantification, (ii) the discourse-pragmatic status of the preadjacent and annex, and (iii) the requirement of (specific types of) scales – I have argued that English and German, like Mandarin Chinese (according to Hole 2004), have focus quantifiers that express negated universal quantification over the domain of alternative values. A more fine-grained investigation of the German correlates of English *at least* has brought to light a number of further distinctions that a typology of focus quantifiers should take into account. Quite obviously, the consideration of other languages will lead to the discovery of yet other types of parameters. It is my impression that detailed crosslinguistic studies in this domain would provide intriguing insights into the ways in which grammars express ‘quantification over the unsaid’ – an important yet under-explored ‘strategy of quantification’.

Abbreviations

| | |
|------|------------|
| ACC | accusative |
| ADD | additive |
| AUX | auxiliary |
| ASP | aspect |
| NEG | negation |
| PART | partitive |
| PST | past tense |
| REFL | reflexive |
| SBJ | subject |
| SG | singular |

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