
Focus Particles and Extraction

An Experimental Investigation of German and English Focus
Particles in Constructions with Leftward Association

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Abbreviations

AC	added constituent
AIC	Akaike Information Criterion
AM	autosegmental-metrical
asso	association type
AwF	association with focus
C	complementizer
CG	common ground
CI	Conventional Implicature
complex	complexity
CP	complementizer phrase
CQ	current question
DP	determiner phrase
EVAL	evaluative
EXCL	exclusive
F	focus
FM	Formal Movement
FP	focus particle
GToBI	German Tones and Break Indices
H	high tone
ID	identical material
InfS	information structure
IP	intonational phrase
ip	intermediate phrase
ITC	Inverse Trace Conversion
L	low tone
LeA	leftward association
LF	Logical Form
LMEM	Linear Mixed Effect Model
MP	modal particle
NP	noun phrase
NSR	Nuclear Stress Rule

OP	operator
PF	phonological form
PLA	Principle of Lexical Association
PP	prepositional phrase
PrtP	particle phrase
QFC	Quasi/Free/Conventional
QUD	question under discussion
RiA	rightward association
SD	standard deviation
SM	scalar model
Spec	specifier
S-structure	surface-structure
SVO	subject-verb-object
TC	Trace Conversion
ToBI	Tones and Break Indices
type	particle type
V2	verb-second
VP	verb phrase
vp	Versuchsperson ('test subject')
wo	word order

1 Introduction

Focus particles (FPs) like *only*, *even*, and *also* have gained a lot of attention in the linguistic literature and have been analyzed from different angles: there are semantic, syntactic, pragmatic, information structural, language acquisition, and processing accounts dealing with FPs, which shows that these small words can contribute greatly to our understanding of human languages and communication. They are frequently used function words, which can be used in a variety of ways. Together with their interaction with focus, they have a great influence on the meaning of a sentence. Sudhoff (2010) provides the formal definition of FPs in (1.1).

- (1.1) A focus particle is an uninflectional function word that shows a high positional variability and is related to one or more focused elements in the sentence, which determine its meaning contribution.

(Sudhoff 2010: 7)

The high positional variability of FPs is illustrated by the English word game in Figure 1.1.

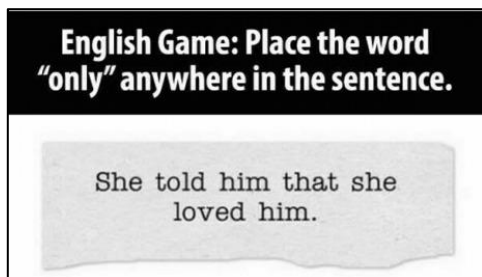


Figure 1.1: English game (https://funixx.files.wordpress.com/2015/04/ady86rn_460s_v2.jpg; last access: October 16th, 2017)

The result of this game is shown in (1.2): it is possible to insert the particle in any position of the sentence.

- (1.2) (Only) she (only) told (only) him (only) that (only) she (only) loved (only) him (only).

The particle is related to the focused constituent of an utterance, which is marked by pitch accent in English and German. Depending on the position, the particle can associate with different constituents of the sentence, which changes the meaning of the utterance and also the intonation. Jacobs (1983: 4) points out that this confusing variability (“verwirrende Vari-

abilität”) of FPs with respect to possible sentence positions, functions, and their meaning contribution is the reason why these particles have been of great interest in the linguistic literature. A similar observation is made by Bayer (1996):

“[Constructions with focus particles] have presented a challenge to linguistic theory for as long as the field of formal linguistics exists. The intricacies of these elements stem from the fact that they merge syntactic, semantic and phonological properties in such a way that all three components make almost equal contributions in accounting for the observed patterns.”

(Bayer 1996: 9)

We will see that Bayer’s observation also applies to the observed patterns with respect to the topic of this dissertation, namely leftward association (LeA) of the English FPs *only* and *even* and the corresponding German particles *nur* (‘only’) and *sogar* (‘even’). In the following, I will present my central research question and outline my proposal.

1.1 Research question and proposal

The English and German FPs I concentrate on, namely *only/nur*, and *even/sogar*, usually precede and c-command the focused constituent of the sentence, i.e, rightward association (RiA) is the preferred word order. The central research question addressed in this dissertation is given in (1.3).

(1.3) Central research question:

How strong is the c-command relation between focus sensitive particles and their associated focus? Is their relation fixed or are there factors which can license LeA?

The construction under consideration has the four important characteristics which are listed in (1.4).

(1.4) Characteristics of the construction under investigation:

- (i) The focused constituent precedes the particle.
- (ii) The focused constituent is the only element of the clause which receives a pitch accent and is narrowly focused.
- (iii) There is material between the focused constituent and the FP.
- (iv) There is material following the FP.

The sentences in (1.5) are examples of this construction. The focused element *Sam* is the only element of the utterance which receives a pitch accent, indicated by the use of capital letters. *SAM* occupies the sentence-initial position and precedes the FP. The modal auxiliary *will* occupies a position between the focus and the FP. Moreover, there is material which follows the FP, namely the verb phrase (VP) *eat chocolate*.

- (1.5) a. SAM will only eat chocolate.
b. SAM will even eat chocolate.

The question is whether this construction is possible such that its interpretation corresponds to the meaning of the sentence *Only/Even SAM will eat chocolate* in which the particle precedes the focus.

It has been claimed in the literature that LeA of *only* as in (1.5a) is not possible, while LeA of *even* as in (1.5b) is (e.g., Jackendoff (1975 [1972])). It is controversial whether a similar contrast also exists between the German particles *nur* and *sogar*. The approaches in the literature face the problem that the examples which contain LeA of the English and German FPs *only/nur* and *even/sogar* are usually constructed, and the judgments of the examples are provided by the authors themselves. In order to shed further light on this topic, I provide experimental evidence and also examples which I collected from German everyday spoken language. One of the examples from spontaneous speech is given in (1.06). It was produced by a three-year-old girl who angrily told an adult at a playground that he is not allowed to sit on the seesaw. The particle *nur* associates with the leftward focused element *KINDER* ('children'), which is contrasted with *Erwachsene* ('adults').

- (1.06) KINDER dürfen da nur drauf sitzen. Erwachsene machen das kaputt.
Children can there only on sit. Adults make this broken
'Only children are allowed to sit on this. Adults break it.'

An important observation is that the girl who uttered the sentence in (1.06) used emphatic speech to express her emotional involvement. The analysis of the authentic data from everyday language will show that in all the examples, the speakers express speaker attitude. This finding leads to my central claim that certain factors can license LeA of the particles I concentrate on and that speaker evaluation belongs to these factors. I conducted seven German and five English acceptability studies which support my claim and examine the role of context, prosody, and speaker evaluation.

From the authentic examples and the results of my acceptability studies, I will propose a processing account that can explain the data. In this account, I will apply the cognitive notion of salience to my findings. Salient elements in a sentence stand out in comparison to other elements and are thus cognitively prominent and the center of attention (e.g., Cowles et al. 2007). I will argue in this dissertation that LeA is easier to process for the parser if the leftward focus associate of the FP is especially salient. For this reason, factors which increase the salience of the focus associate license LeA.

In the following, I will give an introduction to FPs in general and to the topics of the different chapters. The ordering in this introduction reflects the structure of this dissertation.

1.2 Structure of this dissertation

Chapter 2 provides the basic theoretical background for the phenomenon investigated in this dissertation. It starts with the information structural notion of *focus*, which is introduced in **Chapter 2.1**. The terms *focus(ing) particle* and *focus sensitive particle* already reveal that focus plays a major role in constructions with FPs. Roughly speaking, *focus* refers to new information in an utterance. In languages like English and German, the focused material is usually highlighted by means of pitch accent in spoken language.

The example in (1.7a) is ambiguous. The different interpretations illustrated in (1.7b) to (1.7e) depend on the placement of focus. The focused constituents are written in capital letters.¹

- (1.7) a. Sam likes dark chocolate.
b. Sam likes DARK CHOCOLATE.
c. Sam likes DARK chocolate.
d. SAM likes dark chocolate.
e. Sam LIKES dark chocolate.

The sentence in (1.7b) with focus on the noun phrase (NP) *dark chocolate* is a felicitous answer to the question *What does Sam like?* In (1.7c), the adjective *dark* is focused, which makes this sentence a felicitous answer to the question *What kind of chocolate does Sam*

¹ There are different conventions in the literature to mark the focus of an utterance. For this thesis, I adopt the convention of writing the whole focused constituent in capital letters. Other conventions are, for example, to write the syllable with the nuclear pitch accent in capital letters (e.g., WINter), to mark the accented syllable with a grave accent on the vowel (e.g., wínter), or to put the focused constituent in square brackets followed by a subscripted F (e.g., [winter]_F). In examples taken from the literature, I adopt the convention used in the original example.

like? In (1.7d), *Sam* is focused. This sentence is a felicitous answer to a question asking about the subject as in *Who likes dark chocolate?* The sentence in (1.7e) is, for example, felicitous in a contrastive context in which someone claims that Sam hates dark chocolate, and someone corrects this claim by uttering (1.7e). A more detailed introduction to the notion of focus is provided in **Chapter 2.1**.

The examples in (1.7b) to (1.7e) show that prosody can disambiguate the sentence in (1.7a), as the focused constituent receives the main pitch accent. **Chapter 2.2** scrutinizes this relationship between focus and prosody in more detail. In this section, I introduce so-called autosegmental-metrical (AM) theories (Ladd 1996) which provide tools for analyzing and transcribing intonation patterns. A widely adopted theory to English intonation is ToBI (Tones and Break Indices) (Silverman et al. 1992). The corresponding German theory is GToBI (German Tones and Break Indices) (Grice et al. 1996). As the focused constituent of an utterance is prosodically marked by pitch accent in spoken English and German, I mainly focus on the analysis of pitch accents within these theories. The introduction to AM theories serves as a background for my German perception study which is presented in Chapter 4.1.4. I adopted GToBI for transcribing the intonation patterns of the auditory stimuli.

Another topic I introduce in Chapter 2.2 is *focus projection* (e.g., Selkirk 1995). This term refers to the phenomenon that the focused constituent can contain more elements than just the one carrying the main pitch accent.

The topic of **Chapter 2.3** is *association with focus* (AwF). This term denotes the close relation between the FP and its associated focus, which determines the meaning of the utterance (e.g., Jackendoff 1975; Rooth 1985, 1992, 2016). The examples in (1.8) demonstrate the interaction between FPs and the focus. The FP *only* excludes alternatives to the associated constituent.

- (1.8) a. Sam only likes DARK CHOCOLATE, he does not like any other kind of candy.
b. Sam only likes DARK chocolate, he does not like WHITE chocolate.
c. Sam only LIKES dark chocolate, he does not LOVE it.

Not all linguists agree that FPs associate with focus or are focus sensitive in the sense that focus sensitivity is part of their semantics. Some theories assume that AwF is a purely contextual effect. Chapter 2.3 introduces different approaches to AwF.

Chapter 2.4 is concerned with the three major subclasses of FPs which are distinguished by the particles' semantics, namely restrictive, scalar, and additive particles.² **Chapter 2.4.1** is about restrictive or exclusive particles like *only*, *exclusively*, and *merely* in English and *nur*, *bloß*, and *allein* in German. These FPs quantify over a set of focus alternatives and exclude certain alternatives in a given context (e.g., Rooth 1985, 1992; Sudhoff 2010). In (1.9), the noun *chocolate* is the associated focus of the exclusive particle *only*. The particle excludes other alternatives from a set of breakfast items, for instance, toast, eggs, and fruit. The meaning of the sentence can be paraphrased with 'Sam ate nothing but chocolate for breakfast'.

(1.9) Sam only ate CHOCOLATE for breakfast.

Particles like *only* and *nur* can also have a scalar, evaluative use by which the speaker expresses that something is considered 'little' or 'bad' (Hole 2015). The distinction between scalar and non-scalar uses of *only* and *nur* is of great importance in the experimental studies of this dissertation.

Chapter 2.4.2 concentrates on characteristics of scalar particles like *even* and *sogar*. An example with *even* is given in (1.10).

(1.10) Sam even ate CHOCOLATE for breakfast.

The scalar particle arranges alternatives on a scale of likelihood and indicates that the speaker considers the contextually-relevant alternative to be unexpected. In (1.10), it is surprising for the speaker that Sam ate chocolate for breakfast. The scalar FP also has an additive meaning component which implies that Sam ate other things besides chocolate. Therefore, scalar particles are also called scalar-additive particles (e.g., König 1991).

Additive or inclusive particles like *also* and *too* in English and *auch*, *ebenfalls*, and *ebenso* in German form another subclass of FPs, which is the topic of **Chapter 2.4.3**. They also quantify over a set of alternatives, but in contrast to exclusive particles, they specify which alternatives are to be included in a certain context (e.g., Sudhoff 2010). In (1.11), the additive particle *also* is used to express that Sam ate chocolate and also other contextually salient alternatives.

² There are also FPs which do not belong to these three classes, for instance, *especially* and *usually*. However, they are not considered in the present study.

(1.11) Sam also ate CHOCOLATE for breakfast.

In contrast to exclusive and scalar particles, certain additive particles can easily associate with leftward material. Moreover, they can receive the main pitch accent in this construction. This is illustrated in (1.12).

(1.12) SAM ate chocolate for breakfast, TOO.

In two of my German acceptability studies, I included the additive particle *auch* in order to compare LeA of *nur* and *sogar* with LeA of *auch*.

The readers which are already familiar with the basic concepts introduced in Chapter 2 are welcome to skip the chapter and move on to **Chapter 3** which concentrates on LeA of the FPs under investigation. **Chapter 3.1** provides a detailed summary of the observations in the literature on LeA of English and German FPs, focusing on *only*, *even*, *nur*, and *sogar*. **Chapter 3.2** presents the German examples that I collected from spontaneous speech which contain LeA of *nur* and *sogar* (see example (1.6)). As mentioned above, the analysis of these examples suggests that a licensing factor for LeA is the use of speaker attitude and emphasis. In this chapter, I present theories concerned with the notion of emphasis and theories which claim that certain marked word orders yield an emphatic interpretation. The question arises whether LeA belongs to these marked words orders whose emphatic effect is encoded in the grammar. I will argue that LeA does not belong to these emphatic syntactic constructions. Instead, I will propose that FPs can be inserted into such an emphatic construction and in order to be felicitous, the particle has to support the evaluative meaning of the structure.

The hypotheses I develop in Chapter 3 were tested in the German and English acceptability studies. These studies are presented in **Chapters 4 and 5**. The goal of these studies was to examine how acceptable structures with LeA are and whether there are certain factors which improve their acceptability. Both the German and the English FPs under consideration were tested in object topicalization structures and in structures with subject association. Moreover, the German experiments investigated the role of scalar meaning and emphasis, and the English experiments examined the role of context.

In **Chapter 6**, I discuss the findings of this dissertation and present an account for the data which combines information structure, pragmatics, and processing.

Chapter 7 provides the conclusion and outlines possible studies for future research which can strengthen the account I propose in this dissertation.

To put it in a nutshell, this dissertation contributes to the research on LeA of the FPs *only*, *even*, *nur*, and *sogar* by providing experimental evidence. To my knowledge, this topic has not been investigated experimentally before, and it is the first study which takes into account examples of LeA of *nur* and *sogar* from spontaneous speech. The results of my investigation lead to the question why certain factors license LeA of the particles which I examined. In order to answer this question, I will propose a processing account based on the cognitive notion of salience.

2 Focus Particles: Theoretical Background

In this chapter, I introduce basic notions and theoretical approaches which are relevant in the investigation of constructions containing FPs. The research questions I concentrate on in this chapter are listed in (2.1).

- (2.1) a. What is focus and how is it related to prosody?
b. What kind of approaches can be found in the literature regarding FPs and association with focus? How do FPs usually behave?
c. What are the characteristics of exclusive, scalar, and additive particles?

Chapter 2.1, introduces the term *focus* which plays a central role regarding FPs, as these particles interact with the focused constituent of the clause. Chapter 2.2 gives an overview of the relation between focus and prosody and presents tools for analyzing intonation contours that become important in the German perception study (Chapter 4.1.4). Chapters 2.1 and 2.2 are thus related to the research question in (2.1a). Chapter 2.3 addresses the research question in (2.1b) and introduces theories concerning AwF. Chapter 2.4 relates to the question in (2.1c). Chapter 2.4.1 is concerned with the meaning components of exclusive particles like *only*, Chapter 2.4.2 is concerned with scalar particles like *even*, and Chapter 2.4.3 is concerned with additive particles like *too*. Chapter 2.5 provides a summary of this chapter.

2.1 Focus

Focus belongs to the central notions of information structure which “regulate the flow of information” (Winkler 2012: 71) in discourse.³ The term *information structure* (InfS) was coined by Halliday (1967) who suggests that “[a]ny text in spoken English is organized into what may be called ‘information units’” (Halliday 1967: 200). An information unit can contain *given* or *new* information. New information is focal and in contrast to given information cannot be retrieved from discourse.⁴ Chafe (1976) introduced the influential and often cited

³ See, e.g., Erteschik-Shir (2007), Schwabe and Winkler (2007), Krifka (2008), Féry and Krifka (2008), Krifka and Musan (2012), Hartmann and Winkler (2013), Féry and Ishihara (2016) for overviews of information structural notions.

⁴ See Rochemont (2016) for a comprehensive overview of various accounts dealing with *givenness* and for a differentiation of *givenness* from other information structural notions.

concept of *information packaging*. In communication, information is transferred and packaged by updating the so-called *Common Ground* (CG) which refers to the information that is shared by the speakers (cf. Stalnaker 1974). Chafe (1987: 22) distinguishes three levels of information and defines them cognitively: *given* information refers to information that is “already active”, *accessible* information is “previously semi-active” information, and *new* information is information that was “previously inactive”. From a cognitive perspective, InfS facilitates information processing by relating to the informational needs of the interlocutors (Zimmermann & Onéa 2011).

The term *focus* plays a role in syntax, semantics, pragmatics, and phonology and has been defined in various ways (see J. Hartmann & Winkler 2013 and references therein). It is often used to refer to highlighted constituents in a clause which are newly introduced or important in the discourse (cf. K. Hartmann 2008). In languages like English and German, focused elements are typically highlighted by carrying the main pitch accent (e.g., Schwabe & Winkler 2007; Féry & Krifka 2008; see Chapter 2.2 for an introduction to prosodic terms related to focus). According to Jackendoff’s (1975: 16) working definition, focus refers to “the information in the sentence that is assumed by the speaker not to be shared by him and the hearer.” He contrasts focus with presupposition, which is “the information in the sentence that is assumed by the speaker to be shared by him and the hearer” (Jackendoff 1975: 16).⁵ Erteschik-Shir (1973, 1997, 2007) defines focus pragmatically as the constituent of a sentence to which the speaker wants to direct the hearer’s attention.

Many definitions of focus are based on Rooth’s theory of *alternative semantics* (Rooth 1985, 1992, 2016). An example is given in (2.2). The sentence “Leipniz_F discovered calculus” (Rooth 2016: 26) in (2.2a) has the *ordinary semantic value* given in (2.2b) which is the proposition **discover(l, c)** and the *focus semantic value* or *alternative semantic value* in (2.2c), namely “the alternative set which is the set of propositions of the form ‘y discovered calculus’” (Rooth 2016: 27).

- (2.2) a. Leipniz_F discovered calculus
 b. $[[[\text{Leipniz}_F \text{ discovered calculus}]]]^\circ = \mathbf{discover(l, c)}$
 c. $[[[\text{Leipniz}_F \text{ discovered calculus}]]]^f = \{p \mid \exists y. y \in D_e \wedge p = \mathbf{discover}(y, c)\}$
 $= \{\mathbf{discover}(y, c) \mid y \in D_e\}$
 (Rooth 2016: 27)

⁵ In more recent accounts, presuppositions are “regarded as conditions that the context, or the Common Ground, must meet in order to be updated with the sentence” (Sæbø 2016: 128). See Sæbø (2016) for an overview of the notion of presupposition and its relation to InfS.

Krifka's (2008) definition of focus in (2.3) belongs to the definitions which are based on alternative semantics.

- (2.3) Focus indicates the presence of alternatives that are relevant for the interpretation of linguistic expressions.
(Krifka 2008: 247)

An example is given in (2.4). Here, α is the focused constituent *blue* which picks out one element of the set of alternatives A. The deaccented part *He painted it* is the so-called background of the clause which is discourse-given by the *wh*-question in brackets.

- (2.4) (Which color did Peter paint his bicycle?) He painted it [blue]_F.
 $\alpha = \text{blue}$, $A = \{\text{blue, red, green, pink ...}\}$
(K. Hartmann 2008: 390)

The example in (2.4) shows that *wh*-questions can be used as an immediate context to determine the focus of a clause. Depending on the context, different constituents of a sentence are the focus. In (2.5a), alternatives to *book* are relevant for the interpretation, i.e., *book* is the focus which provides the missing information to the *wh*-phrase *what*; in (2.5b) alternatives to *Peter* are relevant in the given context which contains the *wh*-phrase *who*.

- (2.5) a. What did Peter buy? Peter bought an interesting BOOK.
b. Who bought an interesting book? PETER bought an interesting book.
(J. Hartmann & Winkler 2013: 2)

In a question like *What happened?*, the complete answer [*Peter bought an interesting BOOK*] is the focus domain, although the pitch accent only falls on *book* (J. Hartmann & Winkler 2013: 2). Therefore, the focus does not always correspond to the accented element in a clause. The element of the focus constituent with the main accent is the *focus exponent*, in this case *book*. In narrow focus, the focus exponent corresponds to the focus domain; in cases containing wide focus “the focus feature projects to the focus exponent” (Schwabe & Winkler 2007: 13). The phenomenon of *focus projection* is further discussed in section 2.2.3.

Different types of focus are distinguished in the great amount of literature on focus. In the following, I will adopt definitions provided in K. Hartmann (2008). *New information focus* is distinguished from *contrastive focus*. The sentences in (2.4) and (2.5) above are examples of new information focus, i.e., the focus α provides new information which is

added to the CG, and the alternative set A is implicit. Contrastive focus occurs when “ α juxtaposes an element of A to one or more explicitly mentioned elements of A with the same syntactic category and from the same lexical field” (K. Hartmann 2008: 390). Hartmann further distinguishes between three subtypes of contrastive focus which are illustrated in (2.6). (2.6a) contains *corrective focus*, i.e., the focused element *blue* replaces the previously mentioned element *red*, which belongs to the same alternative set of different colors. In (2.6b), the focus is *selective*, i.e., it is selected from the explicitly mentioned alternatives in the previous context. (2.6c) is an example of *parallel focus*, as *red* and *blue* are introduced in parallel structures.

- (2.6) a. (Peter painted his bicycle red.) No, he painted it [blue]_F.
 b. (Did Peter paint his bicycle red or blue?) He painted it [blue]_F.
 c. Paul painted his bicycle [red]_F, and Peter painted his bicycle [blue]_F.
 (K. Hartmann 2008: 391)

K. Hartmann (2008) does not distinguish new information focus and contrastive focus categorially and assumes that different types of focus are induced by context. Differences in, for example, pitch accent involve “paralinguistic [factors] like emphasis and noteworthiness” (K. Hartmann 2008: 391). She thus follows the *Uniformity Approach* according to which the two focus types should not be differentiated grammatically. This view contrasts with the *Asymmetry Approach* which assumes a categorial distinction between the two focus types due to prosodic, semantic, pragmatic, and syntactic differences (see K. Hartmann 2008: 392–399 for a discussion of the two approaches and for references).

Krifka (2008) distinguishes between pragmatic and semantic uses of focus. In contrast to semantic uses of focus, pragmatic uses do not immediately affect the truth-conditions but “relate to the common communicative goals of the participants, the CG management” (Krifka 2008: 249). They indicate how the communication and the updating of the CG should develop. According to Krifka, identifying new information focus by means of explicit or implicit questions as in (2.4) and (2.5) belongs to the pragmatic use, as the question indicates the “communicative goal of the questioner” (Krifka 2008: 250). The different subtypes of contrastive focus also belong to the pragmatic use of focus. For example, corrective focus as in (2.6a) relates to information of the immediately preceding discourse, which thus belongs to the CG and expresses that “among the alternatives the ordinary meaning is the only one that holds” (Krifka 2008: 52).

Semantic uses of focus have truth-conditional effects and thus relate to the factual information of the CG content. According to Krifka (2008), FPs like *only* belong to the semantic uses of focus, as they influence the truth conditions of a clause by associating with focus (see section 2.3. for an introduction and a discussion of AwF). In a sentence like *Only JOHN did his homework*, the exclusive particle expresses that John is the only alternative for which the proposition is true. However, some focus sensitive particles do not have truth-conditional effects and rather seem to relate to CG management and thus to pragmatic uses of focus. This holds for additive particles like *also* which indicate that “the item in focus had been expressed before or is part of the CG” (Krifka 2008: 253) (see Chapter 2.6 for more information on the meaning of additive particles). The distinction between pragmatic and semantic uses of focus does not seem to be clear-cut.

As focus is usually marked by pitch accent in languages like English and German, the next section examines the relationship between focus and prosody and introduces basic notions of prosodic analyses. These notions are relevant for the experimental investigation of this thesis, especially for the perception study presented in Chapter 4.1.4.

2.2 Focus and prosody

Following Lehiste (1970), the term *prosody* is often used to refer to *suprasegmental* aspects of phonology including “syllable structure, intonation, and reflexes of prosodic structure, which are acoustically reflected in fundamental frequency, duration and intensity” (Wagner & Watson 2010: 907). Many analyses concerning the prosody of various languages are based on the influential dissertation of Pierrehumbert (1980). Pierrehumbert and colleagues further developed the theory (e.g., Beckman & Pierrehumbert 1986; Hirschberg & Pierrehumbert 1986) which resulted in the “standard for labeling English prosody” called ToBI (Tones and Break Indices) (Silverman et al. 1992). Ladd (1996: 42) calls this approach to prosody the *autosegmental-metrical (AM) theory*.⁶

In the following, I will introduce those aspects of AM theory which are relevant for the current study. Section 2.2.1 provides an overview of the prosodic notions that play a role in analyzing the intonation of sentences produced in spoken language and that are important for AM approaches to prosody. Section 2.2.2 introduces the German AM approach GToBI,

⁶ See Ladd (1996, 2008) for a detailed overview and for modifications of AM theory and ToBI.

a system for transcribing German intonation that I will adopt for my perception study. Section 2.2.3 investigates the relationship between focus and pitch accent and the phenomenon of focus projection.

2.2.1 Autosegmental-metrical approaches to prosody

A relevant notion of intonation which is also closely related to focus is *stress*. Pierrehumbert and Hirschberg (1990: 273–274) define stress as “the rhythmic pattern or relative prominence of syllables in an utterance.” Stressed syllables are usually produced longer and also louder than non-stressed ones. The terms *word stress* or *lexical stress* refer to the stressed syllable within a word whose position is determined by lexical stress rules. Stress within a phrase (*phrasal stress*) and stress within a sentence (*sentence stress*) are determined by InfS (cf. Pierrehumbert & Hirschberg 1990). In (2.7), the default main stress falls on *vitamins*.

(2.7) Legumes are a good source of VITAMINS.

(Pierrehumbert & Hirschberg 1990: 272)

In a context like (2.8), the main stress falls on the contrastively focused word *good* while *vitamins* is already given in the discourse.

(2.8) A: Legumes are a pretty poor source of vitamins.

B: No. Legumes are a GOOD source of vitamins.

(Pierrehumbert & Hirschberg 1990: 272)

Another important notion of prosodic analysis is *tune* which refers to “the abstract source of fundamental frequency patterns” (Pierrehumbert & Hirschberg 1990). The contour of the fundamental frequency (f_0) of an utterance is shaped by low (L) and high (H) tones, which are divided into three types of tones: *pitch accents*, *phrase accents*, and *boundary tones*. I elaborate on these types of tones in the following.

According to Pierrehumbert and Hirschberg (1990), the function of *pitch accents* is to mark certain words as prominent. They distinguish the six pitch accents presented in (2.9). The tones associated with a stressed syllable are marked with an asterisk ‘*’.

- (2.9) a. H*: High accent: the intonation contour shows a peak on the stressed syllable.
 b. L*: Low accent: the intonation contour shows a valley with an f_0 minimum on the stressed syllable.
 c. L*+H: Rising accent: the low accented syllable with a valley-contour is followed by a peak on the next syllable.
 d. L+H*: Rising accent: the low tone is followed by a steep rise to a high peak associated with the accented syllable.
 e. H*+L: Falling accent: the peak with a high pitch accent is followed by a low tone signaling a downstep to the next H-tone.
 f. H+L*: Falling accent: the peak of a high tone is followed by a low accent.

(cf. Pierrehumbert & Hirschberg 1990)

Pierrehumbert and Hirschberg (1990) investigate the meaning of particular tunes chosen by the speaker in the discourse. The pitch accents H*, L+H*, H*+L which contain a high accent mark expressions which are new in discourse and which the speaker wants to add to the CG. Baumann and Grice (2006: 1655) share this view by coming to the conclusion that “[...] the higher the pitch on a lexically stressed syllable, the newer (or more newsworthy, in case of contrastive but active items) the discourse referent.” Expressions marked by a pitch accent containing L* (L*+H, H+L*) are not intended to be added to the CG, for instance, because the expression is already part of the interlocutor’s mutual beliefs, or the speaker is uncertain about its appropriateness (cf. Pierrehumbert & Hirschberg 1990: 301).

In the ToBI analysis of Silverman et al. (1992), the bitonal H*+L accent is deleted. This accent was used by Pierrehumbert (1980) to signal a downstep to the next H-tone. In later ToBI notation, downstep is indicated by an exclamation mark preceding the respective tone. Thus, in cases where an H* has a lower peak height than the preceding H* within the same intonational phrase, this intonation pattern is notated as H*...!H* instead of H*+L...H* (see also Ladd 1996: 91). Additionally, Silverman et al. (1992) added H+!H* to their inventory of pitch accents.

An utterance is divided into an *intonational phrase* (IP) which is the largest intonational unit and consists of one or more *intermediate phrases* (e.g., Beckman & Pierrehumbert 1986; Pierrehumbert & Hirschberg 1990). An intermediate phrase (ip) contains one or more of the pitch accents in (2.9) and ends in one of the *phrase* or *accent tones* H- or L-, which mark intermediate phrase boundaries.⁷ IPs end in one of the *boundary tones*

⁷ In some conventions, phrase tones are notated as H or L, for example, in Pierrehumbert and Hirschberg (1990).

H% or L%. The low boundary tone L% is, for example, used at the end of declarative clauses. The high boundary tone H% occurs, for instance, at the end of yes-no questions. The most prominent accent of an IP is called the *nuclear accent*, which is usually the last accent of an IP and “tends to be pragmatically the most important accent in the phrase, often signaling the main focus of the sentence” (Bauman & Grice 2006: 1638).

According to Beaver and Clark (2008: 12), the sentence *This book is even sold at Wal-Mart* can be pronounced with one ip which ends in a boundary tone and thus forms a complete IP as in (2.10a) or with two ips as in (2.10b) which together form an IP. Phrases are indicated by square brackets. In (2.10b), the subject *this book* is pronounced as a separate ip which ends in the low phrase tone L-. The rest of the utterance *is even sold at Wal-Mart* also forms a phrase. As the sentences in (2.10) are declarative clauses, they end in an L% boundary tone which is preceded by the phrase tone L-.

(2.10) a. This book is even sold at Wal-Mart
[H* H* L-L%]

b. This book is even sold at Wal-Mart
[H* L-] [H* L-L%]

(Beaver & Clark 2008: 12)

The associated focus of *even*, namely *Wal-Mart*, is marked with the nuclear high pitch accent H*. In general, focused elements are often marked by an H* accent. However, there is no one-to-one mapping of pitch accent type to focus. Other accents like L+H* are also possible (cf. Beaver & Clark 2008: 12).

Since I will explore the intonation of German FP-structures in a perception study (Chapter 4.1.4), the following section gives an introduction to the German AM theory GToBI, which is based on the English ToBI analysis.

2.2.2 GToBI

As in English, there are various AM theories dealing with German intonation (e.g., Wunderlich 1988; Uhmann 1991; Féry 1993).⁸ GToBI was developed by Grice et al. (1996) and modified over time. In the following, I will introduce the GToBI version discussed in Grice et al. (2005), which I will adopt for the perception study presented in Chapter 4.1.4.

⁸ See Grice et al. (2005) for an overview.

GToBI differentiates six pitch accents, including the simple tones H* and L* and the complex bitonal ones L+H*, L*+H, H+L*, H+!H*. As in recent versions of ToBI, there is no H*+L accent. Moreover, the three intermediate phrase tones L-, H-, and !H- are distinguished. In recent versions of GToBI, the notation of boundary tones was modified. When an ip boundary tone is followed by an IP boundary tone of the same pitch level, the second tone is omitted. Instead of the original notation H-L%, the notation H-% is used, and instead of L-L%, the notation L-% is used (cf. Grice et al. 2005: 68). This is a modification to earlier versions of GToBI, which I will not adopt. Instead, I will use the original notation for my perception study in Chapter 4.1.4.

In the following, I will present a selection of frequent German nuclear contours annotated with the recent GToBI version, which contain pitch contours similar to the utterances used in my perception study (see Grice et al. 2005 for additional frequent nuclear contours). The examples are taken from the GToBI website of Grice et al. (2017a), which is steadily updated. Recordings of the examples are provided on the webpages.

Example (2.11) shows a dialogue between the two speakers A and B.

- (2.11) A: Wie ist der Sommer in Mali?
 ‘How is the summer in Mali?’
 B: Nicht warm genug.
 ‘Not warm enough.’

(Grice et al. 2017b)⁹

The intonation contour of B’s answer is shown in Figure 2.1 and contains the common nuclear pitch contour H* L-(L)%. The focused word *warm* is marked by a high pitch accent H*, followed by a low boundary tone.

⁹ I added English translations to all the examples taken from the webpage <http://www.gtobi.uni-koeln.de> in this chapter. The members of the team behind this GToBI webpage are: Martine Grice, Stefan Baumann, Simon Ritter, and Christine Röhr.

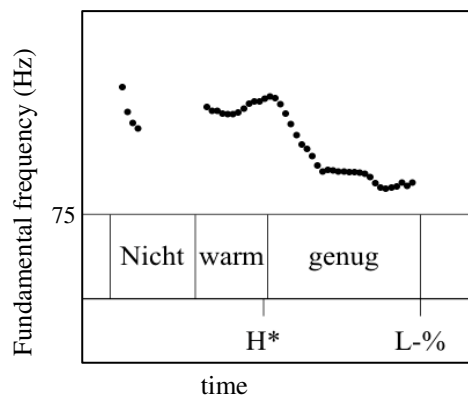


Figure 2.1: F₀-contour of the utterance *Nicht warm genug*. ('Not warm enough') as an answer to the question *How is the summer in Mali?*
(adapted from http://www.gtobi.uni-koeln.de/gm_nk_hstern_lprozent.html)

In example (2.12), speaker B provides a contrastive answer to speaker A's question.

(2.12) A: Wollen sie bei Frau Meier leihen?
'Do they want to borrow from Mrs. Meier?'

B: Nein, sie wollen bei Frau Müller leihen.
'No, they want to borrow from Mrs. Müller.'

(Grice et al. 2017c)

Figure 2.2 illustrates the intonation contour of B's answer containing the frequent nuclear contour L+H* L-(L)%. The contrastively focused element *Müller* is marked by a rising L+H* pitch accent which is followed by a low boundary tone.

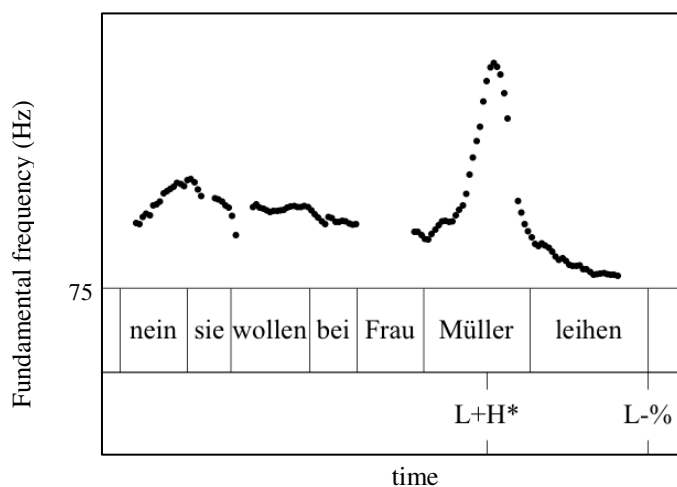


Figure 2.2: F₀-contour of the contrastive answer *Nein, sie wollen bei Frau Müller leihen*. ('No, they want to borrow from Mrs. Müller.')

In the auditory stimuli of the perception study presented in Chapter 4.1.4, the associated foci of the particles *nur*, *sogar*, and *auch* were produced with an L+H* pitch accent, followed by deaccented material ending in an L-(L)% boundary tone (with the exception of the sentences containing stressed *auch* whose intonation is determined by the so called bridge contour (see Chapter 2.4.3). An example for such an item is *Nein, sie hat nur PAPAYAS eingekauft* ('No, she only bought PAPA-YAS') with an L+H* accent on the focused element *papayas* followed by the L-L% boundary tone (see Chapter 4.1.4, page 152 for the intonation contour of this item). The items were preceded by a yes-no question whose intonation is described in the following.

Figure 2.3 shows the nuclear contour L* L-H% of the yes-no question *Scheint bei euch die Sonne?* ('Does the sun shine at your place?') (Grice et al. 2017d).

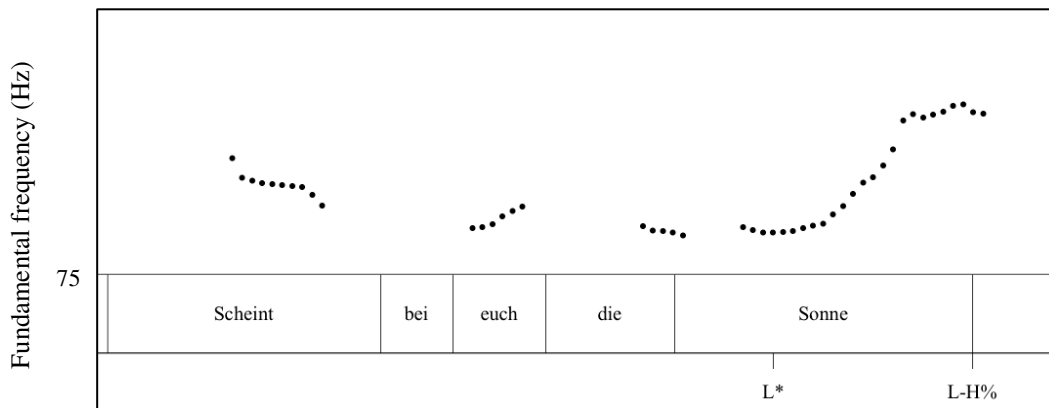


Figure 2.3: F₀-contour of the question *Scheint bei euch die Sonne?* ('Does the sun shine at your place?') (adapted from http://www.gtobi.uni-koeln.de/gm_nk_lstern_lhprozent.html)

As mentioned above, the items of the perception study presented in Chapter 4.1.4 consist of question-answer pairs. The yes-no questions were produced with a pitch contour similar to the contour in Figure 2.3. An example for such a question is *Hat Julia mehrere Fruchtsorten für den Nachtsch eingekauft?* ('Did Julia buy several kinds of fruits for dessert?') with an L* accent on *Fruchtsorten* followed by the rising L-H% boundary tone. Moreover, there was an H* accent on the quantifier *mehrere* ('several') (see Chapter 4.1.4, page 151).

Another common nuclear contour for yes-no questions is L* H-^H% which contains a steep rise after the accented low syllable. The symbol '^' indicates an upstep, i.e., the last syllable is marked by an extra high tone. This contour was, however, not used in my perception study.

The following section deals with the relationship between focus and pitch accent and the observation that the focused constituent can comprise more than just the word carrying the pitch accent, a phenomenon referred to as *focus projection*. We will see that this phenomenon can also occur in constructions containing FPs.

2.2.3 Focus projection

The phenomenon of *focus projection* is illustrated in example (2.13) by means of the sentence *Mary bought a book about bats*. This sentence is ambiguous, as it allows for different interpretations depending on which constituents are in focus. In all five sentences, *bats* is the element which carries the main pitch accent. However, in the examples (b) to (e), not only *bats* is focused but larger phrases including *bats* are F-marked, i.e., marked for focus. The different F-markings are felicitous in different contexts, illustrated by the *wh*-questions provided in brackets below the respective sentences (Selkirk 1995).

- (2.13) (a) Mary bought a book about [BATS]_F.
(What did Mary buy a book about?)
(b) Mary bought a book [about BATS]_F.
(What kind of book did Mary buy?)
(c) Mary bought [a book about BATS]_F.
(What did Mary buy?)
(d) Mary [bought a book about BATS]_F.
(What did Mary do?)
(e) [Mary bought a book about BATS]_F.
(What's been happening?)

(Selkirk 1995: 554)

In the following, I will shortly introduce three theories of focus projection.¹⁰ Firstly, I will outline the influential syntactic approach of Selkirk (1984, 1995). Secondly, I will introduce the theory of Schwarzschild (1999) who criticizes Selkirk's approach, and thirdly, I will summarize Beaver and Clark's (2008) theory, which is based on Schwarzschild (1999).

Selkirk (1995) observes that the *Nuclear Stress Rule* (NSR) proposed by Chomsky and Halle (1968) can account for the data in (2.13). According to the NSR, the primary

¹⁰ The reader is referred to Winkler (1996), De Kuthy and Meurers (2012), and Arregi (2016) for comprehensive overviews of focus projection theories.

stress is assigned to the rightmost stressed constituent. However, Selkirk (1995: 555) points out that this rule cannot “predict the right location of pitch accent within a focused constituent” in many cases. In Selkirk’s theory of focus projection, the principles provided in (2.14) and (2.15) govern the process of F-marking. The principle in (2.15) is based on Selkirk’s (1984) principle of focus projection and the refined version of Rochemont (1986).¹¹

(2.14) *Basic Focus Rule*

An accented word is F-marked.

(Selkirk 1995: 555)

(2.15) *Focus Projection* (Selkirk 1984; Rochemont 1986)

- (a) F-marking of the head of a phrase licenses the F-marking of the phrase.
- (b) F-marking of an internal argument of a head licenses the F-marking of the head.
- (c) F-marking of the antecedent of a trace left by NP- or *wh*-movement licenses the F-marking of the trace.

(Selkirk 1995: 561)

Applying this theory to the example in (2.13b) results in the analysis given in (2.16). The noun *bats* is accented and thus F-marked according to the Basic Focus Rule in (2.14). The focus feature projects to higher nodes in the tree according to the principles in (2.15). The F-marking of the noun *bats* projects to the whole noun phrase (NP) *bats*. F-marking of the NP then projects to the preposition *about*, as the NP is the internal argument of the preposition. The F-marking of the preposition then licenses the F-marking of the whole prepositional phrase (PP), as *about* is the head of this PP (cf. Selkirk 1995: 555).

(2.16) Mary bought a book _{FOC}[[*about*]_F [[*BATS*]_F]_F]_{FOC}.

(Selkirk 1995: 555)

The principles in (2.15) indicate that focus projection is “sensitive to argument structure and to the head-phrase relation” (Schwarzschild 1999: 144).¹² Selkirk proposes that F-marked constituents which do not correspond to the accented focused word are new in discourse, and the constituents which are not F-marked are given in the discourse. The focused element carrying the main accent can be either given or new.

¹¹ Selkirk’s (1984, 1995) and Rochemont’s (1986) accounts belong to bottom-up approaches of focus projection, i.e., the pitch accented element receives the focus feature which is projected to higher nodes in the structure tree. Top-down approaches, on the other hand, assume that the focus feature is attached to the highest node and then percolates down the tree (cf. Winkler 1996 for an overview of different approaches).

¹² Other argument-structure-based accounts of focus projection include, for example, Schmerling (1976), Gussenhoven (1984), and Rochemont (1986).

Schwarzschild (1999) criticizes Selkirk's approach, as it cannot, for example, account for F-marking in cases where the focus falls on a word which is not a head and also not an argument of the head. Selkirk's approach predicts that the only possibility in these cases is a narrow focus on this word, which is not necessarily the case (see Schwarzschild 1999 for a detailed discussion). Therefore, Schwarzschild proposes a theory without percolation of the F-feature in the syntactic structure and bases his approach on the notion of *givenness*. An expression is *given* if it is entailed by the preceding discourse. In this approach, F-marking is determined by the constraints provided in (2.17) and (2.18).

(2.17) *GIVENness*

If a constituent is not F-marked, it must be GIVEN.

(Schwarzschild 1999: 155)

(2.18) *AVOIDF*

F-mark as little as possible without violating Givenness.

(Schwarzschild 1999: 156)

Beaver and Clark (2008) propose a theory of focus projection which is based on Schwarzschild (1999). They argue that Schwarzschild's theory cannot account for various cases of focus sensitivity. An example is given in (2.19). In (2.19b), *only* is accented. This is predicted by Schwarzschild's (1999) theory, as *only* is not entailed by the prior context in (2.19a). However, *semantics* is the focus associate of *only* and is accented, although it is given by the preceding discourse. This accenting is not predicted in Schwarzschild's account.

(2.19) a. Brady taught semantics last year.

b. In fact, he ONLY taught SEMANTICS last year.

(Beaver & Clark 2008: 22)

Beaver and Clark (2008) can account for this data in their theory of focus projection. They argue that speakers draw attention to certain expressions by accenting them. Beaver and Clark use the term *activation* to refer to "the amount of attention being paid to a particular concept or discourse referent" (Beaver & Clark 2008: 22). Elements which are *Given* in the discourse are *activated*. However, if the speaker wants to make a *Given* element more prominent, for example, by contrasting it to other elements, (s)he can further increase the activation by accenting it. This accounts for the example in (2.19b), in which the given element

semantics is accented. F-marked constituents are the expressions that are *insufficiently activated* and that speakers want to highlight. These expressions can be newly introduced to the discourse (*New activation*) or expressions for which the speaker wants to indicate the presence of alternatives (*Alternative activation*). In constructions containing FPs like *only* or *even*, *Alternative activation* applies, as these particles indicate the presence of alternatives (see Chapter 2.3.1).

In summary, the information status of words in the discourse is important for the distribution of accented and deaccented material in an utterance and for determining which elements belong to the sentence focus. I follow Beaver and Clark (2008) in assuming that speakers use the accenting of certain expressions to draw attention to them and that F-marked constituents are those which the speaker wants to highlight in the discourse. These constituents can be either discourse new or discourse given elements to whom the speaker wants to draw more attention. Context is thus a crucial factor in determining F-marking.

As illustrated by the example in (2.19), F-marking and focus projection also play a role in constructions containing an FP which associates with the focus constituent of the utterance. The associated constituent can correspond to the element carrying the nuclear pitch accent or to larger constituents which contain that element. Thus the ambiguity of focus projection also occurs in sentences containing FPs. This is illustrated in example (2.20). The accented element is *Peter*. In the interpretation ‘Luise showed the police a picture of Peter and nobody else’, the associated focus of the particle *nur* corresponds to the accented element *Peter*. However, there is also an interpretation in which the associated focus comprises not only the accented element but the whole phrase [*ein Bild von Péter*]. This interpretation can be paraphrased as ‘Luise showed the police a picture of Peter and nothing else’.

- (2.20) Luise zeigte der Polizei nur ein Bild von Péter.
Luise showed the police only a picture of Peter
 ‘Luise only showed a picture of Peter to the police.’

(Jacobs 1983: 17)¹³

¹³ I added glosses and translations to the examples taken from Jacobs (1983), as the original is in German.

In the next section 2.3, I will return to this ambiguity problem on page 27 and show that Jacobs (1983) solves it by means of context. The following section 2.3 introduces approaches to *association with focus*, i.e., the idea that focus particles associate with the F-marked constituent of the utterance.

2.3 Association with focus

The term *association with focus* (AwF) goes back to Jackendoff (1975) and describes the close relation between FPs and the focus constituent of a sentence, the focus associate.¹⁴ FPs semantically associate with different parts of a sentence, depending on their position within the sentence and on focus placement. The interpretation of sentences containing an FP changes when different constituents are focused. This is illustrated in the often-cited example of Rooth (1985), which is shown in (2.21). In (2.21a), the associated focus of *only* is *Bill*, and therefore the sentence corresponds to the meaning ‘John introduced nobody but Bill to Sue’. In (2.21b), *only* associates with *Sue* which leads to the interpretation ‘John introduced Bill to nobody but Sue’. The sentences in (2.21a) and (2.21b) are true in different contexts. The interaction of the FP with the focus-background structure thus effects the truth-conditions of the utterance. Due to their close interaction with focus, FPs are also called *focus sensitive operators*.

- (2.21) a. John only introduced [Bill]_F to Sue.
b. John only introduced Bill to [Sue]_F. (Rooth 1985: 29)

There are various approaches to AwF. These approaches can be roughly divided into approaches which assume that AwF is (i) part of the lexical meaning of FPs, (ii) a contextual phenomenon, and (iii) either part of the particle’s semantics or a contextual phenomenon, depending on the specific FP. I assume that AwF is part of the semantics of the particles under investigation, namely *nur/only* and *sogar/even*, as their meaning is determined by their interaction with the focused constituent. However, context is necessary to determine

¹⁴ The focus of this section lies on semantic and pragmatic theories of AwF. There are also syntactic approaches, which assume that the focused constituent moves to a position adjacent to the FP at Logical Form (LF) (cf. Drubig 1994 and references therein). Syntactic approaches have been criticized, as these covert movement operations violate island constraints. However, Drubig (1994) proposes that in these cases, the whole island containing the focused constituent undergoes covert movement, an idea which is taken up by Krifka (2006). See Mursell (2016) for a recent syntactic approach to AwF.

the focus associate of the particle, especially in constructions with LeA, as rightward association (RiA) is the preferred word order of these particles. In my studies, context thus plays an important role in determining the associated focus.

In this Chapter, I will introduce the most prominent theories of AwF. Chapter 2.3.1 concentrates on the two main semantic theories of AwF, namely Alternative Semantics approaches developed by Rooth (1985) and Structured Meanings Approaches (e.g., Jacobs 1983; von Stechow 1991; Krifka 1992).¹⁵ Chapter 2.3.2 gives an introduction to question-based approaches to AwF.

2.3.1 Structured Meanings and Alternative Semantics

In Structured Meanings, the meaning of an utterance containing a focused constituent is divided into a background part α and a focus part β , yielding the structured meaning pair $\langle \alpha, \beta \rangle$. Applying the background part to the focus part provides the ordinary semantic representation of the sentence $\alpha(\beta)$. FPs operate on these structured meanings. Krifka (1992) provides the semantic representation of *only* in (2.22); the symbol \approx expresses comparability. The meaning can be paraphrased as “the background representation applies to the focus representation, and [...] the background representation applies to no other entity that is comparable with the focus representation” (Krifka 1992: 19).

$$(2.22) \text{ only}(\langle \alpha, \beta \rangle): \leftrightarrow \alpha(\beta) \ \& \ \forall X[X \approx \beta \ \& \ \alpha(X) \rightarrow X = \beta],$$

where X is a variable of the type of β . (Krifka 1992: 19)

For the sentence in (2.21b), in which *Sue* is the focus of the sentence, we get the semantic representation in (2.23), i.e., no one but *Sue* (s) was introduced by *John* (j) to *Bill* (b):

$$(2.23) \text{ introd}(j, s, b) \ \& \ \forall x[x \approx s \ \& \ \text{introd}(j, x, b) \rightarrow x = s] \quad (\text{Krifka 1992: 19})$$

In Structured Meanings accounts, the FP “has direct access to the meaning of the focus and the meaning of the background” (Sudhoff 2010: 46). In Alternative Semantics, the particle does not have direct access to focus and background but takes the ordinary semantic value and the focus semantic value as its arguments. For the sentences in (2.21), Rooth (1992: 78) provides the analysis in (2.24) along the lines of Rooth (1985). P is a property of the set of

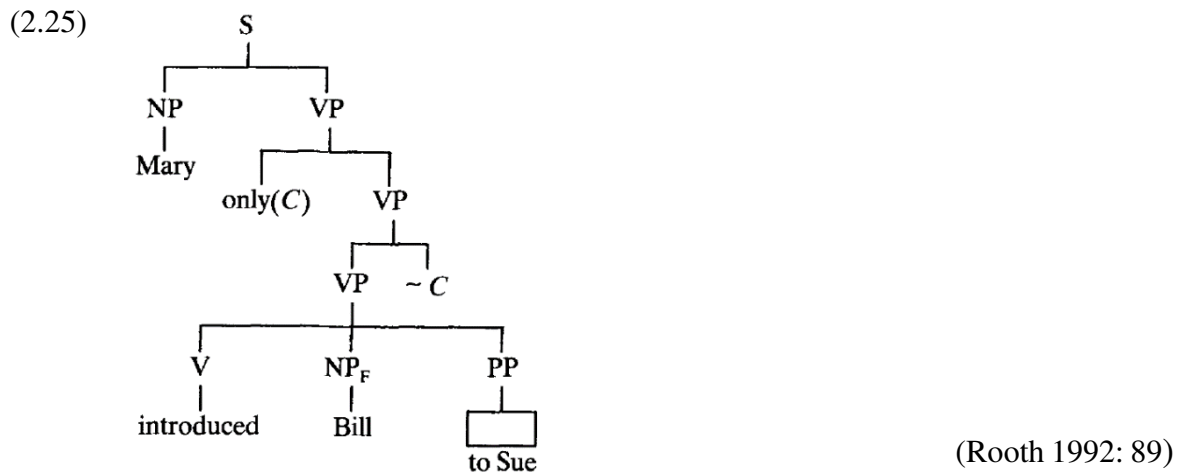
¹⁵ See Krifka (2006), Beaver and Clark (2008: Chapter 4), and Sudhoff (2010: Chapter 3) for comparisons of Alternative Semantics and Structured Meanings.

properties C which is identified by the focus. The particle *only* quantifies over the set of properties C .

$$(2.24) \quad \forall P[P \in C \wedge P(\mathbf{m}) \rightarrow P = \lambda x[\text{introduce}(x, \mathbf{b}, \mathbf{s})]]$$

In the analysis of the sentence in (2.21a), C is “the set of properties of the form ‘introducing y to Sue’ [and (2.21a)] can be rendered as: if [John] has a property of the form ‘introducing y to Sue’, it is the property ‘introducing Bill to Sue’” (Rooth 1992: 78). In the analysis of the sentence in (2.21b), the value of C is a set of properties corresponding to the structure ‘introducing Bill to z ’. *John* has the property ‘introducing Bill to Sue’ and all the other alternatives in the set of properties C are excluded.

Rooth (1992) modifies his semantic theory of focus association of 1985 by introducing the operator \sim for focus interpretation which can account for various focus effects. According to this pragmatic theory, *only* is not a focus sensitive operator itself but interacts with the focus evaluating operator \sim . The interpretation of the sentence in (2.21a) is illustrated in (2.25). *Only*(C) represents the domain of quantification; the set of properties C corresponds to ‘introducing y to Sue’. As the value of the free variable C does not have to be determined by focus alone, C “is to be fixed pragmatically” (Rooth 1992: 90).



Rooth (1992: 107) argues that semantic theories of AwF like the theory he proposed in 1985 are ‘weak’ theories, as focus effects are tied to the semantics of specific words or construction-specific rules. He considers theories of AwF in which the domain of quantification is fixed pragmatically and which “[predict] that focus effects should always be optional” to be ‘strong theories’ (Rooth 1992: 108). Theories which suggest that AwF “is obligatory in certain constructions” and optional in others are called ‘intermediate’ theories (Rooth 1992:

112). In the following, I will present a selection of prominent weak, strong, and intermediate theories of AwF. In this dissertation, I adopt the view of theories which assume that AwF is part of the lexical semantics of the particles under investigation in this thesis. This view is shared by weak theories and intermediate theories. In contrast to weak theories, intermediate theories assume only for certain FPs that AwF is part of the particle's semantics, while they assume for other particles that AwF is fixed pragmatically.

Many theories of AwF are weak theories in Rooth's (1992) terms which consider particles like *only* to be focus sensitive operators. Jacobs (1986: 104) assumes that "[a] focus (background) in a sentence always is the focus (background) of some linguistic element in the sentence" which he calls *focus inducer*. According to his theory, FPs are *overt focus inducers* and the focused constituent in sentences with FPs is a *bound focus*. The focus of sentences without an FP is called *free focus* (Jacobs 1986: 106). Jacobs notes that the bound focus of a particle can comprise more than the accented material of a sentence. This relates to the phenomenon of focus projection discussed in Chapter 2.2.3. Jacobs (1983) applies tests in order to determine the associated focus induced by the particles *nur*, *sogar*, and *auch*. This test involves putting the sentence with an FP in a specific context. Jacobs does not apply the question-answer test usually used in order to determine focus, as the focus of a negation or FP can be part of given information (Jacobs 1983: 20).

In order to determine the associated focus of *nur* in example (2.26), Jacobs (1983) gives the contexts in (2.27) to (2.29). In (2.27), the context specifies that alternatives to *Peter* are relevant and that *Peter* is the bound focus of *nur*.

- (2.26) Luise zeigte der Polizei nur ein Bild von Peter.
Luise showed the police only a picture of Peter
 'Luise only showed a picture of Peter to the police.'

(Jacobs 1983: 17)¹⁶

- (2.27) Luise zeigte der Polizei nicht ein Bild von Willi, Hérbert oder dem Búndeskanzler,
 nein, Luise zeigte der Polizei nur ein Bild von Péter.
 'Luise did not show a picture of Willi, Hérbert, or the chancellor to the police, no,
 Luise only showed a picture of Péter to the police.'

(Jacobs 1983: 17)¹⁷

¹⁶ I added glosses and translations to all the examples taken from Jacobs (1983), as the original is in German.

¹⁷ Jacobs (1983) marks focused elements with an acute accent on the vowel of the stressed syllable.

The context in (2.28) specifies that alternatives to *a picture of Peter* play a role, i.e., the whole phrase *a picture of Peter* is the focus associate of *nur*.

(2.28) Luise zeigte der Polizei nicht den Tátort oder die Mórdwaffen, nein, Luise zeigte der Polizei nur ein Bild von Péter.

‘Luise did not show the crime scene or the murder weapon to the police, no Luise only showed a picture of Péter to the police.’

(Jacobs 1983: 17)

The context in (2.29) specifies that alternatives to *picture* are important for the interpretation of the sentence.

(2.29) Luise zeigte der Polizei nicht den Flúchtweg von Peter oder sein Verstéck, nein, Luise zeigte der Polizei nur ein BÍld von Peter.

‘Luise did not show Peter’s escape way to the police or his hiding place, no, Luise only showed a pícture of Peter to the police.’

(Jacobs 1983: 18)

These examples also illustrate the function of the exclusive or restrictive particle *nur*, namely to exclude alternatives that are of the same type as the focused constituent (see Chapter 2.4.1 for more information on the meaning and function of exclusive particles). In the contexts which help to determine the focus associate, the alternatives which are excluded are explicitly mentioned.

According to Jacobs, contexts that determine the focus associate of *auch* should contain explicit alternatives that are included by the additive particle. In the context of (2.31), the focus in (2.30) is *grüne Banánen*, although the main pitch accent is only on *Banánen*.

(2.30) Sie mag auch grüne Banánen.

She likes also green bananas

‘She also likes green banánas.’

(Jacobs 1983: 18)

(2.31) Gerda mag ^ˈÁpfel, Gúrken und Tomáten, und sie mag auch grüne Banánen.

‘Gerda likes ápples, cúcumbers, and tomátoes, and she also likes green banánas.’

(Jacobs 1983: 18)

In a context which provides the information that Gerda likes everything that is green, for example, green apples, green cucumbers, and green tomatoes, the associated focus of *auch* in (2.30) would only be *Banánen* and thus correspond to the focus exponent.

A similar test can be applied to the scalar particle *sogar*, which has the function to include alternatives and additionally to arrange the alternatives in a ranking order (Jacobs 1983; see section 2.4.2 for more information on scalar particles). The context in (2.33) provides alternatives which indicate that the focus associate of *sogar* in (2.32) is the phrase *ein Háus vermacht* ('bequeathed a house'). The main pitch accent falls on *Háus*.

(2.32) Er hat ihr sogar ein Háus vermacht.
He has her even a house bequeathed
 'He even bequeathed her a hóuse.'

(Jacobs 1983: 19)

(2.33) Peter hat Gerda sein Áuto geliehen und einen Pélzmantel geschenkt, ja er hat ihr sogar ein Háus vermacht.

'Peter lent Gerda his cár and gave her a fur coat, yes he even bequeathed her a hóuse.'

(Jacobs 1983: 19)

In a context in which *vermacht* ('bequeathed') is given, *ein Haus* ('a house') is the focus associate of *sogar*.

In Jacobs' examples provided above, the FPs *nur*, *sogar*, and *auch* associate with the focused material. Theories like the one by Rooth (1985), Jacobs (1983, 1986) and others (e.g., Altmann 1976b; König 1991; Bayer 1996) assume that the focused constituent in a sentence containing an FP is always the focus associate of the FP and that FPs determine the focus-background structure of an utterance. This view has been subject to criticism by theories which do not assume that focus association is part of the particles' semantics. These theories can be considered to be 'strong theories' in Rooth's (1992) sense.

Vallduví (1993) points out that FPs like *only* do not always associate with the focus constituent of a sentence. This is illustrated in the *it*-cleft example in (2.34). *Only* is positioned within the non-clefted part, and its partner *rice* is not focused.¹⁸ *Only* does not associate with the leftward material *John* which is the focus of the sentence.

¹⁸ Vallduví (1993) calls the focus associate of *only* '*only*'s partner' and rejects the terms 'scope' and 'focus' for the associated constituent, as these terms can be misleading.

(2.34) It's JOHN who eats only rice. (Vallduví 1993: 173)

However, Vallduví (1993: 177) acknowledges that although FPs like *only* do not necessarily have to associate with focus, “it is also obvious that there is a large number of cases – a vast majority one should say – in which *only*'s partner is the intonationally prominent element and indeed seems to be the focus of the sentence.” According to his account, AwF is a contextual phenomenon and not part of the FP's semantics. In most cases, the particle's associate is newly introduced in the discourse and therefore is the focus of the sentence. In cases like (2.34), the particle's associate, which is nonfocal, has been introduced into the discourse at an earlier point and therefore was focused in the previous discourse.

Klein (2012) rejects the concept of AwF as well. He claims that sentences containing such particles underlie the usual information structural rules which determine the focus structure and intonation of an utterance. Reis and Rosengreen (1997) also propose a theory without AwF and ascribe focus effects to contextual factors (see Chapter 2.4.3 for Klein's (2012) and Reis and Rosengren's (1997) analyses of the additive particle *auch* and their argumentations against AwF).

The next section is about question-based approaches to AwF which also provide pragmatic explanations for focus effects. The question-based approaches are relevant for this dissertation, as the items of most of my acceptability studies consist of question-answer pairs. There are strong and intermediate question-based theories of AwF. I will follow the intermediate question-based approach to AwF developed by Beaver and Clark (2008).

2.3.2 Question-based approaches to focus-sensitivity

The basic idea of question-based approaches to discourse and InfS is that discourse is structured according to explicit or implicit questions (e.g., von Stutterheim & Klein 1989; Roberts 1996, 2012; Büring 2003; Simons et al. 2010; Beaver et al. 2017; Benz & Jasinskaja 2017). In many works, the explicit or implicit question is called the *question under discussion* (QUD) (Roberts 1996). In coherent discourse, each sentence provides a partial or complete answer to the QUD or raises a new subquestion related to that QUD. According to the definition of Simons et al. (2010: 316), “[t]he QUD is a semantic question (i.e., a set of alternative propositions) which corresponds to the current discourse topic.”

In the following, I will summarize the main ideas of Roberts' (1996, 2012) QUD approach and then outline Beaver and Clark's (2008) theory, which is based on Roberts (1996).

In Roberts' (1996, 2012) theory, the participants of a conversation pursue *conversational goals* with the main goal to agree on an answer to the overall Big Question "What is the way things are?" (Roberts 2012: 5). In order to achieve this goal, the interlocutors pursue subgoals which are related to each other and to the main question. Answers to questions, which are called *assertions*, and also further questions which help to answer the QUD are *moves* of the interlocutors to achieve the goal.

In this QUD approach, InfS is defined as "the set of moves in the discourse, both questions and answers, explicit and implicit (pragmatically retrieved), along with various functions and relations on them [...]" (Roberts 2012:13). Old information is the information which is given by the QUD and new information is the information which the QUD asks for (Roberts 2012: 31). Roberts adopts Hamblin's (1973) semantic theory on questions in which a question determines a set of alternatives. An assertion chooses among the alternative propositions raised by the QUD. The assertions on which the interlocutors agree become part of the CG. The moves of the interlocutors should be *relevant* to the QUD. Roberts' definition of *Relevance* is given in (2.35).

(2.35) A move m is *Relevant* to the question under discussion q [...] iff m either introduces a partial answer to q (m is an assertion) or is part of a strategy to answer q (m is a question).

(Roberts 2012: 21)

Another important notion of QUD-approaches is *question-answer congruence* for which Roberts provides the definition in (2.36). According to this definition, the focal alternatives of the question and the focal alternatives of the move should be the same.

(2.36) Move β is congruent to a question $?(\alpha)$ iff its focal alternatives $\| \beta \|$ are the q -alternatives determined by $?(\alpha)$, i.e., iff $\| \beta \| = q\text{-alt} (\alpha)$.

(Roberts 2012: 31)

Question-answer congruence determines the prosodic focus, which presupposes "that the current goal of the discourse is to choose among the alternatives in $\| \beta \|$ " (Roberts 2012: 32). This is covered by the principle in (2.37).

(2.37) *Presupposition of prosodic focus in an utterance * β* :¹⁹

β is congruent to the question under discussion at the time of utterance.

(Roberts 2012: 32)

Similar to Vallduví (1993), Roberts does not assume that FPs are focus sensitive, i.e., that focus sensitivity is part of the particles' meaning, as not only prosodic focus but also contextual factors are necessary for determining the FP's domain. According to Roberts, the principles in (2.35), (2.36), and (2.37) are enough to determine the domain of an FP (cf. Roberts 2012: 46).

Beaver and Clark's (2003, 2008) theory on focus association is based on Rooth's (1985, 1992) alternative semantics and on Hamblin's (1973) and Roberts' (1996) question-based approaches. They summarize the ongoing debate on AwF and focus sensitivity as in (2.38).

(2.38) Is focus sensitivity

- a. lexically encoded as part of the meaning of expressions which have been identified as focus sensitive, *or*
- b. an epiphenomenon resulting from independent pragmatic forces which make sure presuppositions are satisfied and texts are coherent?

(Beaver & Clark 2008: 41)

Usually, theories argue either for (2.38a) or for (2.38b). In contrast to these theories which try to provide a uniform theory of focus and focus association, Beaver and Clark argue that focus sensitivity is a heterogeneous phenomenon and cannot be explained by a single mechanism. Depending on the particle, either (2.38a) or (2.38b) applies. Therefore, their theory is an intermediate theory of AwF in Rooth's (1992) terms. An important notion of their theory is the *Current Question* (CQ) which is the most recent question that the interlocutors want to answer. They propose the Current Question Rule which is provided in (2.39).

(2.39) **Current Question Rule:** The Current Question must contain at least one true alternative, and contain multiple alternatives which are not resolved as true or false in the common ground.

(Beaver & Clark 2008: 36)

Beaver and Clark (2008) develop the Quasi/Free/Conventional (QFC) Model of focus association. In *quasi* and *free* association of focus, focus sensitivity is a contextual phenomenon

¹⁹ '** β* ' means that β can be interrogative or assertional.

- (2.42) a. People who [GROW]_F rice generally only [EAT]_F it.
 (cannot mean ‘people who grow rice eat nothing but rice’)
 b. People who [GROW]_F rice generally always [EAT]_F it.
 (can mean ‘whenever people who grow rice eat, they eat rice’)
 (Beaver & Clark 2008: 153)

Beaver and Clark (2003, 2008) discuss various phenomena which reveal differences between the focus sensitive particles *only* and *always* and provide evidence for the claim that *only* conventionally associates with focus while *always* does not. One phenomenon they discuss is the different behavior of *only* and *always* with respect to extraction of the focused material. I elaborate on this part of their theory in Chapter 3.1.1.

Particles which exhibit conventional association with focus depend on focus, i.e., their focus sensitivity is lexically encoded as described in (2.38a). According to Beaver and Clark, exclusive particles like *only*, scalar additives like *even*, and additives like *also* conventionally associate with focus. The function of these particles is “to comment on alternative answers to the Current Question” (Beaver & Clark 2008: 70). As the focused constituent answers the CQ, these particles are focus sensitive (see Chapter 2.4 for further information and analyses of exclusive, scalar, and additive particles which are under investigation in this dissertation).

In contrast to Beaver and Clark (2008), Beaver et al. (2017) argue that FPs like *only* do not associate with focus but with the QUD. In a sentence like (2.21) *John only introduced [Bill]_F to Sue*, the QUD is a subset of the focus alternative propositions of the form ‘John introduced X to Sue’. The particle *only* quantifies over these alternative propositions and thus takes the QUD as an argument. According to this approach, “operators [like *only*] yield truth conditions in a way that is highly context sensitive precisely because they associate with the QUD, and the QUD varies from one context to the next” (Beaver et al. 2017: 270).

Beck (2016) combines Rooth’s (1992) analysis of focus association involving the alternative sensitive operator \sim with Beaver and Clark’s (2008) question-based theory. This yields the analysis of *only* in (2.43a) which is applied to the sentence *Sandy only feeds FIDO_F Nutrapup* in (2.43b). The particle *only* quantifies over the QUD which is identical to the focus anaphor C.

- (2.43) a. $[[\text{only}_{B\&C}]] = \lambda C:C=QUD.\lambda p.\lambda w.\forall q[q\in C\&q(w)=1 \rightarrow q=p]$
 b. $[\text{only}_{B\&C} C [\sim C [{}_S \text{Sandy feeds FIDO}_F \text{nutrapup}]]]$
 (Beck 2016: 233)

Although Beck shows that Rooth's (1992) analysis can be combined with a question-based theory, she adopts Rooth's (1992) account for the remainder of her paper and leaves the question whether the analysis in (2.43) "can capture all the differences that Beaver and Clark observe between *only* and *always*" for future research (Beck 2016: 233).

In summary, there are various approaches to AwF. While it is uncontroversial that particles like *only* and *even* interact with the focus structure of an utterance in many cases, it is controversial whether AwF is part of the particle's semantics or whether focus association is a pragmatic, contextual effect. In the construction with LeA of FPs investigated in this dissertation, the particles *only/nur* and *even/sogar* always relate to a focused constituent and I will call this relation AwF, i.e., the particle associates with the focused constituent. However, AwF is a context-dependent phenomenon and context is necessary to determine which constituent the associated focus is. In most of the experiments presented in Chapters 4 and 5, context is provided in form of questions. Therefore, question-answer congruence plays a major role in determining the associated constituent of the particle.

The next section provides more detailed information on the FPs which are investigated in this dissertation.

2.4 Exclusive, scalar, and additive particles

FPs are divided into three major subclasses, namely exclusive or restrictive particles, scalar particles, and additive or inclusive particles. This section introduces the specific characteristics of these three subclasses. In this dissertation, I focus on the exclusive particles *only* and *nur* and the scalar particles *even* and *sogar*. As I also test the additive particle *auch* in some of the German studies, section 2.4.3 introduces the characteristics of additive in comparison to exclusive and scalar particles.

2.4.1 Exclusive particles

The previous section has shown that many theories of AwF are mainly concerned with the FP *only*, which is the most frequent exclusive particle (Beaver & Clark 2008: 68). An established view is that exclusive or restrictive particles exclude elements from a contextually given set of alternatives and identify the alternatives for which the proposition is true in the

respective context. König (1991) provides the example in (2.44a) and the meaning components of *only* in (2.44b) and (2.44c). (2.44b) shows that the sentence with *only* presupposes the content of the sentence without the particle.²⁰ The underlying presupposed proposition is also called the *prejacent* (Beaver & Clark 2008: 68). (2.44c) contains the entailment that the proposition is not true for other alternatives.

- (2.44) a. Only JOHN came.
 b. John came (presupposition)
 c. $\neg (\exists x) [x \neq \text{John} \ \& \ \text{came} (x)]$ (entailment)

(König 1991: 98)

An important observation is that the interpretation of sentences with particles like *only* often involves a contextual ranking order. Altmann (1976b) distinguishes between quantificational and scalar uses of exclusives.²¹ The quantificational use corresponds to the meaning components in (2.44): the particle puts the focus associate in a quantificational relation to other constituents of the same type. The quantificational function is to exclude other alternatives of the contextually relevant set. In the scalar use, the focus associate is evaluated in relation to other constituents of the same type by means of a ranking order. The example in (2.45) can be interpreted with the quantificational meaning ‘Mary plays the flute and no other instrument’. A possible scalar interpretation is that the speaker considers playing the flute not to be special in contrast to playing other instruments.

- (2.45) Mary only plays the FLUTE.

The distinction between scalar and non-scalar uses of exclusive particles will be essential for the experimental investigation of this dissertation. As will be shown, LeA of the German exclusive *nur* improves if the scalar meaning component of the particle is prominent.

It is controversial whether the quantificational and scalar uses correspond to two different meanings of the particle, as suggested, for instance, by Altmann (1976b), or whether there is one basic meaning and the different uses are context-dependent. I will adopt the

²⁰ The status of the underlying proposition without the particle has been under debate. There are theories which do not analyze it as a presupposition but, for example, as a conventional implicature, a generalized conversational implicature, or as an assertion (see Sudhoff 2010: 48 ff. for an overview of different analyses).

²¹ According to Altmann (1976b: 107), the German exclusives *nur*, *bloß*, *lediglich*, and *allein* can receive a quantificational or scalar interpretation, while the exclusives *allein*, *einzig*, and *ausschließlich* can only be used quantificationally. König (1991: 106) claims that the English exclusives *only*, *merely*, *solely*, *but*, *alone*, *just*, and *simply* can be used in a scalar and non-scalar interpretation, while *exclusively* and *purely* can only be used quantificationally.

second view in this dissertation, namely that particles like *nur* have one basic meaning and context determines whether the quantificational or the scalar meaning component is more prominent.

Jacobs (1983) also belongs to the proponents of the second view. He calls the quantificational use of *nur* ‘wertfrei’ (‘non-evaluative’, ‘non-judgmental’) and the scalar use ‘wertend’ (‘evaluative’). The non-evaluative use can also refer to a scale but all the alternatives have the same value on this scale. The evaluative interpretation is caused by a context-dependent scale and not by assuming two different meanings of *nur*. Structures which contain *nur* and which can be non-evaluative or evaluative are not ambiguous but indeterminate or vague, and context clarifies whether the sentence has a non-evaluative or an evaluative interpretation (Jacobs 1983: 170–171).

König (1991: 100) follows Jacobs’ view “that the meaning of *only* and its counterparts is indeterminate or vague with respect to the ordering parameter [...]”²² König observes that in a lot of cases, *only* excludes alternatives which are higher on the contextually determined scale. However, there are also cases in which *only* excludes alternatives which rank lower. An example for this is given in (2.46).

(2.46) Only a RADICAL change will save our economy.

(König 1991: 101)

Lerner and Zimmermann (1981) also propose that there is one basic meaning of *nur* that leads to the intended interpretation, complemented by context. The three components of the basic meaning are provided in (2.47). The basic meaning contains both the quantitative meaning component in (2.47b) and the scalar evaluative component in (2.47c).

- (2.47) a. The content of the sentence without the particle.
 b. The uniqueness of the item to which *nur* relates.
 c. The evaluation or judgment about the quantity of the set that contains the relevant item.

(based on Lerner & Zimmermann 1981: 15)²³

Lerner and Zimmermann observe that there is a context for every sentence in which *nur* is interpreted quantificationally which leads to a scalar interpretation. Example (2.49) provides

²² Bayer (1996) also agrees with Jacobs (1983) in assuming that *only* has a single meaning and the discourse provides the information whether *only* is used in a scalar or non-scalar interpretation.

²³ The original is in German. I added glosses and translations to their examples cited in this chapter.

the quantificational interpretation of the example in (2.48); example (2.50) provides the scalar interpretation. (2.49a) and (2.50a) contain the sentence without the particle. The scalar interpretation paraphrased in (2.50b) suggests that the value of the focused constituent is low on the contextually relevant scale.

(2.48) Nur Hans war da.
 ‘Only Hans was there’

(Lerner & Zimmermann 1981: 7)

(2.49) Quantificational interpretation:

a. Hans war da.

‘Hans was there.’

b. Niemand außer Hans war da.

‘Nobody but Hans was there.’

(Lerner & Zimmermann 1981: 7)

(2.50) Scalar interpretation:

a. Hans war da.

‘Hans was there.’

b. Der Wert von Hans rangiert nicht hoch auf einer Skala, die Leute nach ihrer Wichtigkeit ordnet.

‘The value of Hans is not high on a scale that ranges people according to their importance.’

(Lerner & Zimmermann 1981: 8)

Lerner and Zimmermann claim that the quantificational interpretation is also present in sentences in which the scalar interpretation is prominent. This is illustrated by means of the example in (2.51). (2.52a) contains the prejacent, (2.52b) provides the quantificational, and (2.52c) provides the scalar interpretation which is the natural interpretation of (2.51).

(2.51) John only owns five dollars.

(2.52) a. John owns five dollars.

b. John owns not more than five dollars.

c. Five dollars is not much.

(based on Lerner & Zimmermann 1981: 11)

The scalar interpretation reflects what the speaker considers to be a high or low value on a scale. Thus, evaluation is subjective. Moreover, a certain value can be low in one context and high in another.

Not all theories agree that the quantificational interpretation is always present in the scalar use. Bayer (1996) claims that while the example in (2.53) can have a scalar and non-scalar interpretation, the example in (2.54), in which *nur* immediately precedes the focused element, exclusively has a scalar interpretation. The quantificational interpretation that is possible in (2.53) can be paraphrased with ‘out of everything that could have happened to him, Heinz got away with nothing but a slight injury’ (Bayer 1996: 70). The scalar interpretation which can be applied to (2.53) and according to Bayer is the only possible interpretation for (2.54) says that ‘Heinz got away with an injury that was less serious than most other injuries he could have possibly suffered’ (Bayer 1996: 70).

(2.53) Heinz ist nur mit einer LEICHTEN Verletzung davongekommen
Heinz is only with a slight injury away-got
 ‘Heinz only got away with a slight injury.’

(2.54) Heinz ist mit einer nur LEICHTEN Verletzung davongekommen.
 (Bayer 1996: 70)

Similar to Lerner and Zimmermann (1981), Hole (2015: 52 f.) identifies three meaning components of ‘only’ words, which are given in (2.55). The first component in (2.55a) is the entailment that other contextually relevant alternatives are false, the second one in (2.55b) is the presupposed prejacent, and the last one in (2.55c) is the scalar evaluative component.

(2.55) Components of meaning systematically occurring in sentences with ‘only’ words.

A sentence with an ‘only’ word ...

- (a) entails the falsity of all contextually relevant non-trivial alternative propositions (EXCL);
- (b) presupposes its prejacent;
- (c) may presuppose the evaluation of the EXCL entailment as little/bad/little and bad [...].

(Hole 2015: 52)

In contrast to Lerner and Zimmermann’s analysis, the evaluative meaning component is not always present according to Hole (2015). Hole divides the evaluative meaning into the two

uses ‘little’ (EVAL_{LITTLE}) and ‘bad’ (EVAL_{BAD}). The sentence “Paul aß nur Kekse” (‘Paul only ate cookies_F’)” (Hole 2015: 52) has the three evaluative readings in (2.56a) to (2.56c) and the non-scalar reading in (2.56d). According to Hole, these readings cover all the different uses of utterances containing *only*.

- (2.56) a. ‘That Paul ate no more than cookies is considered little.’
 b. ‘That Paul ate no more than cookies is considered bad.’
 c. ‘That Paul ate no more than cookies is considered little and bad.’
 d. ‘Paul ate no more than cookies.’ (neutral non-evaluative)

(Hole 2015: 51)

In Hole’s syntactic account, *only* interacts with different operators that occupy different positions in the syntactic structure. This interaction yields the meaning of the utterance containing an exclusive like *only* or *nur*. Hole thus assumes different syntactic representations for the different interpretations in (2.56). The exclusive operator EXCL in the verbal domain provides the neutral non-evaluative meaning component. In the evaluative cases, Hole (2015: 44) assumes a “silent functional structure in the C/I which contributes [the] evaluative component of meaning.” This functional structure contains the EVAL_{LITTLE} head which is a C category and the EVAL_{BAD} head which is an I category.

Löbner (1990) claims that the traditional terms *quantificational* and *scalar* are misleading, as the quantificational use of exclusives also involves a scale. He paraphrases the quantificational interpretation of exclusives with ‘not more than’ and the scalar interpretation with ‘nothing better/higher than’ (Löbner 1990: 168). He suggests to call the quantitative use *autonomous* or *semantic* and the scalar use *context related* or *pragmatic*, as the scalar interpretation is more dependent on context (cf. Löbner 1990: 187). Löbner introduces the *sondern-auch test* for the quantificational use of *nur*: if the negated version of the sentence containing *nur* can be continued with *sondern auch* (‘but also’), *nur* is used quantificationally. In (2.57), I applied this test to the example in (2.48).

- (2.57) Not only Hans was there but also Barbara.

However, as (2.50) above shows, the sentence in (2.48) can also have a scalar interpretation. Therefore, the *sondern-auch test* cannot exclude that there is also a scalar interpretation of (2.48), but it shows that the quantificational interpretation is prominent. In example (2.58), the scalar interpretation is prominent, as the numeral *zwei* (‘two’) is focused which is inherently scalar. The particle *nur* excludes higher numeric values.

- (2.58) Wir haben nur ZWEI Kartoffeln
We have only two potatoes
 ‘We only have two potatoes.’

(Löbner 1990: 178)²⁴

That the scalar interpretation is prominent in this example is confirmed by the *sondern-auch test*, as the sentence ‘We not only have TWO potatoes but also three’ is marked (cf. Löbner 1990: 178). If the whole phrase *zwei Kartoffeln* (‘two potatoes’) is focused, the *sondern-auch test* reveals that the quantificational interpretation is also present: ‘We not only have [two potatoes]_F but also [some bread]_F’ (cf. Löbner 1990: 178).

Löbner observes that the scalar interpretation of exclusives does not necessarily have a negative, pejorative meaning. An example with a positive evaluation is given in (2.59).

- (2.59) Fortunately, we only have one week left until summer vacation.

Similar to Löbner (1990), Riester (2006) observes that the quantificational use also involves a scale. He puts forward a unified account of *only* and claims that “only is always scalar” and that “[t]he different meanings of only-sentences are due to different scales associated with the focused element” (Riester 2006: 67). For the quantificational reading, he assumes an all-properties scale. An individual is represented as “the set of all its properties” (Riester 2006: 67). The particle *only* excludes those sets of properties which are ranked higher than the set of properties of the focused constituents. For the scalar reading, he assumes a one-dimensional scale. In contrast to the quantificational reading, not the whole set of all properties of individuals is compared but only a contextually relevant subset of the properties. Riester’s final semantic representation of the unified meaning of *only* is shown in (2.60). He adopts the Structured Meanings approach for his analysis. *Only* is applied to the structured meaning pair which comprises the background part *B* and the focus part *F*. The context parameter *C* specifies how the alternative set is ordered and limited and thus accounts for the difference between different readings of *only*.

- (2.60) $\text{only}(\langle B, F \rangle, C)$
 $= \{w \in W \mid (B(w)) (F(w)) \wedge \neg \exists v[(B(v)) (F(v)) \wedge [B(v)]^C \subset [B(w)]^C]\}$
 (Riester 2006: 72)

²⁴ I added glosses and capital letters to this example.

Beaver and Clark also argue in their question-based account on AwF that exclusives like *only* are always scalar and define a scale as “a salient partial ordering of propositions from weaker to stronger” (Beaver & Clark 2008: 69). (2.62) contains the partially ordered set of alternatives for the example in (2.61), which are ranked according to “importance of job” (Grubic 2015: 21). Being a PhD student is the weakest alternative of this given set.

(2.61) Amy is only a *PhD student*.

(2.62) Amy is a professor

|
Amy is a PostDoc
|
Amy is a PhD student

(Grubic 2015: 21)

Beaver and Clark (2008) point out that the function of exclusives “is partly MIRATIVE, to say that the true answer to the CQ is surprisingly weak, and control the flow of discourse by resetting expectations about the answer” (Beaver & Clark 2008: 250).²⁵ The term *mira-tivity* stems from DeLancey (1997). It is speaker-related and refers to a grammatical category which expresses surprise and unexpectedness, i.e., the speaker considers something to be surprising or unexpected. Beaver and Clark claim that (2.63) exhaustively describes the lexical meaning of exclusive particles.

(2.63) **Discourse function:** *To make a comment on the Current Question [...], a comment which weakens a salient or natural expectation. To achieve this function, the preja-cent must be weaker than the expected answer to the CQ on a salient scale.*

Presupposition: *The strongest true alternatives in the CQ are **at least** as strong as the preja-cent.*

Descriptive Content: *The strongest true alternatives in the CQ are **at most** as strong as the preja-cent.*

(Beaver & Clark 2008: 251)

An example is provided in (2.64). The sentence in (2.64a) provides an answer to the CQ in (2.64b).

²⁵ It has been already observed by Horn (1969: 101) that there are uses of *only* which involve “the notion of expectation rather than the mere exclusion [...]”

- (2.64) a. Jim only invited [Mary and Sam]_F.
 b. Who did Jim invite?

(Beaver & Clark 2008: 254)

If the question in b. is asked “purely for information” (Beaver & Clark 2008: 254), the scale is a standard entailment. This corresponds to what has been analyzed as a quantificational or non-scalar use. In this context, the identity of the people who are invited is relevant. The use of *only* in (2.64a) expresses the speaker’s believe that more people might have been expected to be invited like, for example, Sam, Mary, Peter, and Paul. The presupposition is “Jim invited X, with X = {Sam, Mary}” (Beaver & Clark 2008: 256). In a context in which the speakers in (2.64) expect that many people are invited and are rather concerned with the number of invited people than with their identities, the presupposition does not correspond to the prejacent but to ‘Jim invited a large group, or a small group (possibly as small as cardinality 2) including Mary and Sam’ (Beaver & Clark 2008: 257). In both contexts, the entailment is that Jim invited nobody but Mary and Sam.

That sentences containing *only* express that an expectation was not fulfilled is shown by the naturally occurring web example in (2.65). Here, the expectation is explicitly stated, and the clause containing *only* expresses that this expectation was not fulfilled, i.e., that a single room with two beds is weaker than the expected suite.

- (2.65) I really expected a suite but only got a single room with 2 beds.

(Beaver & Clark 2008: 252)

The assumption that sentences with *only* express that the answer is weaker than expected is supported by Beaver et al. (2017). They provide the example in (2.66) as evidence for the claim that *only* has a mirative function. The sentence with *fifty* is marked, as eating fifty donuts on one day is not surprisingly little.²⁶

- (2.66) David only ate (a) two/(b) #fifty donuts today.

(Beaver et al. 2017: 271)

Zeevat (2009) also pursues the idea that *only* is mirative and argues that this is its main function: “The semantic contribution of *only* is only low quantity mirativity: less than expected” (Zeevat 2009: 124). The exhaustive interpretation of sentences containing *only* is

²⁶ Susanne Winkler (p.c.) noted that *only* can be used in this sentence if the speaker uses irony.

due to the focused element which is considered to provide an exhaustive answer to the question. The exhaustive interpretation of the focused element is forced by *only* and the use of *only* expresses that the exhaustive answer of the focused element is less than expected. This theory thus belongs to the accounts which do not need the concept of AwF. An example is given in (2.67).

- (2.67) A. Who showed up?
B. Only John.

(Zeevat 2009: 124)

An exhaustive answer to A's question would also just be 'John.' without *only*. *Only* is therefore not used to express exhaustivity but to express that fewer people than expected showed up.

In summary, most theories, regardless of whether they assume an ambiguity for the different uses of exclusives, vagueness, or always a scalar meaning, acknowledge that different uses can be observed. Riester (2006), for example, who proposes that *only* is always scalar, assumes different scales for the different uses. In this dissertation, I distinguish between quantificational (non-scalar/non-evaluative) and scalar (evaluative) uses of exclusives. I adopt the different uses of 'only' words from Hole (2015) illustrated in (2.56) and repeated in (2.69). The different uses refer to the example in (2.68).

- (2.68) Paul only ate cookies.

- (2.69) a. 'That Paul ate no more than cookies is considered little.'
b. 'That Paul ate no more than cookies is considered bad.'
c. 'That Paul ate no more than cookies is considered little and bad.'
d. 'Paul ate no more than cookies.' (neutral non-evaluative)

(Hole 2015: 51)

The structures under investigation in my experimental studies are similar to the example in (2.68) in that both scalar and non-scalar readings are available, but context specifies which reading is more prominent in a certain context. Chapter 4.3.1 presents an experimental study which finds differences between sentences with LeA of *nur* in which the scalar meaning is more prominent and sentences in which the non-scalar meaning is more prominent. The target sentences in which the scalar reading is prominent contain numerals. Many examples in the literature which illustrate the scalar evaluative meaning contain numerals, as they

involve a salient numeric scale and no contextual explanation for the scale is needed (see the examples in (2.51), (2.58), (2.66)).

The next section concentrates on scalar particles like *even* and *sogar*. The sentences in (2.70) illustrate the difference between *even* and scalar *only*, as they relate to opposite values on the same scale.

- (2.70) a. Even a MEDIOCRE performance will please the boss.
b. Only an EXCELLENT performance will please the boss.

(König 1991: 59)

2.4.2 Scalar particles

An example containing the scalar particle *even* is given in (2.71). Karttunen and Peters (1979) provide the three meaning components in (2.72) for this example. (2.72a) is the meaning component of the sentence without the particle. Karttunen and Peters analyze (2.72b) and (2.72c) as conventional implicatures of (2.71). The conventional implicature (CI) in (2.72c) provides the ordering scale for the focus alternatives according to likelihood.

(2.71) Even Bill likes Mary.

- (2.72) a. Bill likes Mary.
b. Other people besides Bill like Mary.
c. Of the people under consideration, Bill is the least likely to like Mary.

(Karttunen & Peters 1979: 12)

According to König (1981), the proposition without *even* as in (2.72a) is the truth-conditional part of the sentence which is not affected by the particle. Theories on *even* generally agree that the particle *even* does not have truth-conditional effects on the utterance. The sentence in (2.72b) expresses the additive meaning component of *even*. Due to this meaning component, scalar particles like *even* are also called ‘scalar additive particles’ (König 1991: 68). König (1991) claims that the additive meaning component should be analyzed as a presupposition and only the evaluative component in (2.72c) should be analyzed as a CI. CIs “cannot be cancelled but are real instances of a non-truth-conditional part of sentence meaning” (König 1981: 113).²⁷ There are also accounts which analyze both meaning components as presuppositions. Iatridou and Tatevosov (2016: 296), for example, refer to the

²⁷ The term *conventional implicature* stems from Grice (1975).

meaning component expressed in (2.72b) as ‘the additive presupposition’ and to the meaning component expressed in (2.72c) as ‘the scalar presupposition’.

It is under debate whether the scale involved in sentences with scalar particles is determined by the particle itself or by context. In Karttunen and Peters’ analysis in (2.72c), the ordering on the scale of likelihood is partly determined by the particle. König (1991) points out that examples like the one in (2.73) speak against an analysis in which *even* assigns its focus associate the least likely value on a scale. The clause containing *even* does not express that the focus associate *armagnac* is ranked lower on the scale of unlikely beverages that George would drink than the other drinks. Rather, “a list of beverages that includes armagnac in addition to four others is contrasted with a list that only includes the other four” (König 1991: 71).²⁸

(2.73) George drank a little wine, a little brandy, a little calvados, and even a little armagnac.
(König 1991: 71)

Jacobs (1983) also belongs to the proponents of the view that the scale is context-dependent. He discusses the meaning of *sogar* by means of the example in (2.74). In contrast to the same sentence without *sogar*, the sentence expresses that the event of Peter coming is noteworthy in the context in which the sentence is uttered. Moreover, his coming is more noteworthy than the coming of other people. Therefore, *Peter* is assigned a high value on the contextually induced scale which is applied to ‘x comes’. Jacobs calls ‘x comes’ the scaling dimension (“Skalierungsdimension”) which is determined by the linguistic environment, whereas the evaluation criterion is provided by context and by factual knowledge.

(2.74) *Sogar* Peter kommt.
‘Even Peter comes.’
(Jacobs 1983: 144)

The meaning of the sentence in (2.74) also involves the presupposition of the additive meaning component of *sogar*, namely that also other people besides Peter came. There are also cases in which the additive meaning component is canceled as in (2.75).²⁹ In this case, it

²⁸ See Kay (1990) for a similar analysis of the example.

²⁹ It is under debate whether the additive meaning component is always present in sentences with *even* or not (see Iatridou & Tatevosv 2016 for a short review of this debate and for references).

follows from the implicature that Peter is not smaller or bigger than one meter and ninety centimeters.

(2.75) Peter is sogar einen Meter neunzig groß.

‘Peter is even 1.90 meters tall.’

(Jacobs 1983: 158)

Jacobs (1983) points out that the evaluation criteria according to which scalar particles are ranked are highly context-dependent, and a specific criterion should not be incorporated in the particles’ semantics. Sentences with *sogar* often involve a scale of likelihood but they do not have to. He argues that in example (2.76), the scale is the quantity of soup portions that were eaten.

(2.76) Daß diese Erbsensuppe großen Anklang fand, sieht man daran, wieviele Teller die Kinder davon aßen: Petra aß zwei Teller, Markus aß drei Teller, und Carmen, unser kleiner Vielfraß, schaffte sogar vier Teller.

‘That this pea soup was popular can be seen by the amount of plates the kids ate: Petra ate two plates, Markus ate three plates, and Carmen, our little glutton, even ate four plates.’

(Jacobs 1983: 130)

As Carmen is characterized with the expression “unser kleiner Vielfraß” (‘our little glutton’), it is not surprising and considered to be unlikely that she would eat a lot of soup.

According to Jacobs, the context not only assigns a value on a certain scale to the scaling dimension but also an upper and a lower threshold which determine what is considered to be a low or a high value on a scale. He provides the examples in (2.77) for demonstration.

(2.77) a. Peter trug bei dem Unfall sogar eine Kopfverletzung davon.

‘Peter even received a head injury in the accident.’

b. Peter trug bei dem Unfall nur eine Kopfverletzung davon.

‘Peter only received a head injury in the accident.’

(Jacobs 1983: 135)

The sentence in (2.77a) expresses that a head injury is considered to range high in comparison to what could have happened to Peter in the accident, i.e., the upper threshold on the scale is reached or exceeded. In (2.77b), the particle *only* in the relevant context expresses

that the head injury is considered to range low on a scale of possible injuries Peter could have received, i.e., it does not exceed the threshold which is considered to be low.³⁰

The upper threshold does not have to be identical to the highest value on the scale and the lower threshold does not have to be identical to the lowest value on the scale. This is shown in (2.78). Both the head injury and the little scratch at the hand do not exceed the lower limit value, but the little scratch ranges even lower on the scale than the head injury.

(2.78) Peter only received a head injury in the accident and Gerd even only received a little scratch on the hand.

(Jacobs 1983: 136)

Kay (1990) analyzes the meaning of the scalar operator *even* in a scalar model. A scalar model contains “a set of propositions which are part of the shared background of speaker and hearer at the time of utterance” (Kay 1990: 77). An utterance containing the particle *even* indicates that a certain proposition is more informative, i.e., a stronger argument, than another proposition which is already in the CG of the speaker and the hearer in the specific context. The expression ‘more informative’ is related to the notion *informativeness* of Grice (1975) and defined as in (2.79).

(2.79) Given a scalar model SM containing two distinct propositions *p* and *q*, *p* is **more informative** than *q* iff *p* entails *q*.

(Kay 1990: 66)

(2.79) indicates that entailment relations play a major role in this scalar model. An example is given in (2.80).

- (2.80) Can John jump six feet?
- a. [Yes (and)] he can (even) jump seven feet.
 - b. [Yes (and)] he can (*even) jump five feet.

(Kay 1990: 68)

The sentence in (2.80a) is a possible answer to the question with and without *even* whereas the sentence in (2.80b) is only a possible answer without the particle. The answer in (2.80a) is more informative than the proposition provided by the context, as it entails that John can jump six feet and adds that he can jump seven feet. Thus, the use of *even* is felicitous in this

³⁰ This interpretation requires that the head injury is a slight injury, for example, a laceration on the forehead. Severe head injuries do not range low on a scale of possible injuries.

sentence. Answering the question with ‘yes’ already entails that John can also jump heights lower than six feet. Therefore, the clause containing *even* in (2.80b) is less informative than the context proposition which makes the use of the particle infelicitous.

According to Kay, the meaning of *even* is similar to the meaning of *plus* in sentences in which “*even* occurs in a final conjunct [...]” (Kay 1990: 74). This is illustrated by the sentences in (2.81). In both cases the fact that they are paying Mary’s way out to visit the Department is not considered to be more extreme than the fact that she got a full fellowship from the State U. However, both facts taken together are considered to be more extreme than just the first one.

- (2.81) a. Mary got a full fellowship from State U. and they’re even paying her way out to visit the Department.
b. Mary got a full fellowship from State U. plus they’re paying her way out to visit the Department.

(Kay 1990: 74)

In example (2.82), the first proposition that the whole family showed up already entails that the family member aunt Irma showed up and thus it looks as if the proposition with *even* is not more informative than the first proposition.

- (2.82) The whole family showed up for Christmas, even aunt Irma.

(Kay 1990: 80)

Kay argues that in a scalar model, the clause containing *even* in (2.82) still entails the first proposition. This is because aunt Irma in this context is in comparison to the other family members “the element [...] located farthest from the origin in the scalar model in which the sentence is interpreted” (Kay 1990: 80). So if aunt Irma showed up for Christmas, all the other members of the family also showed up. In this case, the entailment is “based on **scalar** properties of the interpretive context” (Kay 1990: 82).

Kay compares his analysis of *even* with previous theories. He criticizes theories like the one of Karttunen and Peters (1979) which assume that sentences with *even* express the violation of an expectation. He provides the example in (2.83) in which *even* is felicitous in a context in which no expectation is violated which is indicated by the phrase “as everyone expected”.

- (2.83) Everyone is remarking on Mary's improvement. Last week she beat the number ten player and this week, as everyone expected, she even beat the number three player.
(Kay 1990: 84)

Kay's analysis can account for this example, as beating the number three player is a stronger proposition than beating the number ten player. Kay also refers to Karttunen and Peters' (1979) example *Even Bill likes Mary* provided in (2.71). He rejects that (2.72c), repeated in (2.84) is a CI of this sentence, as this inference "does not arise [...] in all contexts" (Kay 1990: 84).

- (2.84) Of the people under consideration, Bill is the least likely to like Mary.

Kay also argues against the view that sentences with *even* express that something is 'least likely', i.e., on the lowest point of a contextually given scale. The use of *even* in (2.85) is not only felicitous if Alceste is the least likely visitor but also if he is, for instance, the second least likely visitor.

- (2.85) Even Alceste came to the party.
(Kay 1990: 89)

In contrast to Kay's (1990) analysis of *even*, expectations of the interlocutors and the expression of surprise still play a major role in more recent accounts of scalar particles. Beaver and Clark (2008) discuss the focus sensitivity of *even* by means of the example given in (2.86). A possible interpretation of the sentence in (2.86a) in which *Wal-Mart* is focused is that Wal-Mart is not the only place where this book is sold and that it is considered to be unexpected that Wal-Mart belongs to the places which sell this book. With focus on the verb *sold* in (2.86b), the speaker can express surprisal about the fact that this book is not only stocked but also sold at Wal-Mart.

- (2.86) a. This book is even sold at WAL-Mart.
b. This book is even SOLD at Wal-Mart.
(Beaver & Clark 2008: 1)

Different pronunciations thus lead to different interpretations of the sentence and to different contexts in which the sentence can be used felicitously. The sentence in (2.86a) can be used in a context like (2.87a) while this is not a possible context for (2.86b) as illustrated in (2.87c).

- (2.87) a. This book is sold on Amazon.
b. So what? This book is even sold at WAL-Mart.
c. #So what? This book is even SOLD at Wal-Mart.

(Beaver & Clark 2008: 2)

Beaver and Clark (2008: 1) also suggest that different ways to pronounce sentences with *even* “convey different emotions, e.g. excitement, disappointment, anger [and] sarcasm or even horror.”

Beaver and Clark compare *even* to *only* and suggest that these particles are pragmatic antonyms due to their opposite pragmatic functions. While the function of exclusives like *only* is “to comment on an overly strong expectation regarding the answer to the Current Question, the function of a scalar additive is to comment on an overly weak expectation” (Beaver & Clark 2008: 71). Grubic (2015) summarizes Beaver and Clark’s assumptions about the meaning of scalar additives as in (2.88), analogous to Beaver and Clark’s analysis of the meaning of exclusives in (2.63).

- (2.88) **Discourse function:** *To make a comment on the Current Question (CQ), a comment which indicates that a salient or natural expectation was exceeded. To achieve this function, the prejacent must be stronger than the expected answer to the CQ on a salient scale.*

Presupposition: *The strongest true alternatives in the CQ are at most as strong as the prejacent.*

Descriptive Content: *The prejacent is a true answer to the CQ.*

(Grubic 2015: 22)

In contrast to *only*, *even* does not have truth-conditional effects. Beaver and Clark explain this difference in terms of the particles’ different pragmatic functions. *Only* is downward oriented, as it expresses that certain alternatives have to be excluded and thus are not true in the respective context, contrary to what might have been expected. *Even*, on the other hand, is upward oriented, as it adds more information and does not deny the truth of the propositions that are already salient in discourse.

Similar to Beaver and Clark, Zeevat (2009) also defines the functions of both *even* and *only* in terms of expectations and mirativity and calls them mirative markers (see Chapter 2.4.1 for his analysis of *only*). *Even* expresses “surprise at a large size of quantity”, i.e., that something is “more than expected” (Zeevat 2009: 121). The particle thus adds information which is true contrary to expectations. In the sentence in (2.89), the presupposed expectation

is that Bill is not in Paris unlike others. The use of *even* expresses that Bill is in Paris contrary to this presupposed expectation.

(2.89) Even Bill is in Paris.

(Zeevat 2009: 122)

Beaver et al. (2017: 271) opine a similar view in stating that *even* has the rhetorical function to express that “something is surprisingly much” in relation to the expectation of the interlocutors. Moreover, the function of the particle’s additive meaning component is to mark parallelism.

In summary, scalar particles like *even* and *sogar*, unlike exclusives, do not have truth-conditional effects and have a scalar meaning component and an additive one. The scalar meaning component often involves a scale of likelihood, i.e., sentences containing a scalar particle express that the speaker considers something to be unexpected or surprising. As Jacobs (1983) observes, the evaluation criteria are highly context dependent.

The experimental investigation of Chapters 4 and 5 is concerned with constructions with narrow focus on the associated constituent of the particle, similar to the example in (2.89). The items with *even* express that the speaker considers something to be unexpected or surprising. An example item is *She [Julia] even bought PAPAYAS*. In the given context, the speaker considers it unexpected that Julia bought papayas for dessert.³¹

The next section is about additive particles like *also* and *auch*. König (1991) argues that scalar additive particles like *even* can be analyzed as hyponyms of additive particles like *also*. This relation is illustrated in (2.90).

(2.90) Even FRED came to the meeting |= FRED also came to the meeting.

(König 1991: 59)

³¹ There are uses of *even* which are not relevant in my studies. An example for a use which I do not consider is what Iatridou and Tatevosov (2016: 329) call ‘Question Focusing *even*’ in which the entire question is in focus. An example is given in (i).

(i) A: Let’s meet at Oleana’s for dinner. Is that OK?

B: Where is that even?

(Iatridou & Tatevosov 2016: 298)

In Iatridou and Tatevosov’s analysis, the scale in these cases consists of a set of questions ordered according to likelihood. The question with *even* is the most unlikely question to ask, as the answer “would be most likely to know” (Iatridou & Tatevosov 2016: 329)

Another phenomenon not relevant in this dissertation is the negation of *even* (see Collins 2016 for a recent account). In German, *not even* is translated into *nicht einmal*, an expression which does not contain *sogar* (e.g., König 1991: 74).

Jacobs (1983: 149) also notes similarities between *sogar* and *auch* and claims that the version with *sogar* and the version with *auch* of the sentence in (2.91) basically have the same meaning.

- (2.91) {Sogar/Auch} ein Arbeitstier wie Peter muss einmal ausruhen.
Even/Also a workaholic like Peter should sometimes relax
 ‘Even a workaholic like Peter should relax sometimes.’

(Jacobs 1983: 149)

However, additive particles also have peculiarities which distinguish them from scalar additives and are part of the following section.

2.4.3 Additive particles

The English particles *also*, *too*, and *as well* and the German particles *auch* and *ebenso* belong to the group of additive or inclusive particles. These particles quantify over a set of alternatives and indicate which alternatives are included in a certain context. Some examples are given in (2.92).

- (2.92) a. Also on the agenda is a paper on POLLUTION.
 b. We bought SOME WINE, as well/too.
 c. John also met MARY.

(König 1991: 62)

König (1991) provides the following three meaning components of sentences containing an additive particle:

- (2.93) a. also ($\lambda x(\alpha), \beta$)
 b. $\alpha(\beta)$ (entailment)
 c. $(\exists y) [\lambda x(\alpha)(y) \ \& \ (y = \beta) \ \& \ \alpha(y)]$ (presupposition)

(König 1991: 62)

In this analysis, the prejacent, i.e., the sentence without the additive particle, is entailed (see (2.93b)). In example (2.92c), for example, the entailment is ‘John met Mary’. The additive presupposition in (2.93c) expresses that the proposition also applies to one or more other alternatives which are considered in the respective context. In (2.92c), this meaning component indicates that John met other people besides Mary. The examples in (2.94) illustrate

similarities in meaning between additive particles and the coordinating conjunction *and* which also expresses parallelism.

- (2.94) a. Fred came and George came.
b. Fred came and George came, too.
c. Fred came and George did, too.

(König 1991: 66)

In their scalar use, additive particles like *auch* have a meaning similar to the scalar particle *sogar*. This is illustrated in example (2.95) (see also the example in (2.91)). In its scalar use, *auch* is translated into *even* in English, which supports the similarity in meaning between scalar *auch* and scalar particles like *sogar*.

- (2.95) Auch RIESEN haben klein angefangen.
'Even giants started from small beginnings.'

(König 1991: 63)

König does not assume that *auch* is ambiguous with respect to a scalar use involving an ordering and a non-scalar use. Instead, contextual factors and “the specification of the focus” (König 1991: 64) determine whether a scalar or non-scalar use applies in the discourse.

According to Jacobs (1983), there is also a scale of alternatives in the quantificational use of *auch* and the quantification is contextually restricted. In a sentence like *Auch Peter kommt* ('Also Peter comes'), it is important that the scale involves alternatives which are relevant in a certain context (cf. Jacobs 1983: 148). If the contextually relevant alternatives include, for instance, Peter, Mary, and John, the sentence is infelicitous if Mary and John do not come, even if other people besides Peter come which do not belong to the alternatives under consideration. Jacobs assumes that the evaluative meaning of *auch* expressed in (2.95) only applies in certain contexts. The evaluative meaning can be added to the quantificational use of *auch* by context.

Beaver and Clark (2008) analyze additive particles in their question-based approach. Like exclusive and scalar particles, additives belong to the group of particles which conventionally associate with focus, as they comment on the CQ. Additives “mark that the Current Question has already been partially answered, with the additional requirement that the pre-existing partial answer is not entailed by the prejacent” (Beaver & Clark 2008: 73). Grubic's (2015) summary of Beaver and Clark's assumptions about the meaning of additives is provided in (2.96).

(2.96) **Discourse function:** *To mark that a previous answer to the Current Question (CQ) must be extended, i.e., that the previous answer was not the strongest true answer to the CQ.*

Presupposition: *There is a previous true answer to the CQ in the immediate context which is logically independent from the prejacent.*

Descriptive Content: *The prejacent is a true answer to the CQ.*

(Grubic 2015: 22)

Beaver and Clark illustrate the meaning of additives by means of the example in (2.97).

(2.97) Tonight [Sam]_F is having dinner in New York, too.

(Beaver & Clark 2008: 73)

This sentence is an answer to the question *Who is having dinner in New York tonight?* (Beaver & Clark 2008: 73) and indicates that a partial answer to this question is already salient in the discourse, for example, *Tonight [Paula]_F is having dinner in New York*. The additional requirement that the pre-existing partial answer is not entailed by the prejacent is illustrated in (2.98). It is odd to utter *Sam and Jane are happy*, as it entails the preceding sentence *Sam is happy*.

(2.98) Sam is happy. #[Sam and Jane]_F are happy.

(Beaver & Clark 2008: 73)

A peculiarity of additive particles like *auch* is that they can precede or follow their associated constituent and some additives like *too* even obligatorily follow their associated constituent as in (2.94b, c) and (2.97). Restrictive and scalar particles, on the other hand, preferably precede their focus. This holds for “a wide variety of languages” (König 1991: 20).³² Moreover, the additive particle itself often carries the main pitch accent in these constructions. In the following, I will focus on the German additive particle *auch*.³³ As illustrated in (2.99), *auch* is stressed and can associate with the leftward constituent *Peter*. This construction does not work with the restrictive particle *nur* or the scalar particle *sogar*.

(2.99) Peter hat die Ausstellung {*auch*/**nur*/**sogar*} besucht.

Peter has the exhibition also/only/even visited

‘Peter visited the exhibition, too.’

(Krifka 1999: 112)

³² See also Krifka (1999) for cross-linguistic data.

³³ See Erlewine (2014b: 142–147) for an account of structures with LeA of *also*.

In structures like (2.99), stressed *auch* with the associated constituent to its left and unstressed *auch* with the associated constituent to its right (as in *Auch Peter hat die Ausstellung besucht*) are in complementary distribution and equally acceptable. If the particle precedes the associated constituent, the associated constituent bears the nuclear accent; if the associated constituent precedes the particle, the particle bears the nuclear accent (cf. Reis & Rosengren 1997).

The complementary distribution of stressed and unstressed *auch* leads Reis and Rosengren (1997) to conclude that they are versions of the same *auch* and their prosodic differences are caused by independent focus principles. Reis and Rosengren argue against the assumption that the division of a proposition *p* containing *auch* into a focus part (which they call *added constituent* (AC)) and a background part (which they call *identical material* (ID)) is caused by the focus structure of the utterance, “in other words that *Auch* operates on the set of alternatives supplied by the focus structure of *p*” (Reis & Rosengren 1997: 275). They argue that this is a plausible assumption when just looking at instances of unstressed *auch*, but it is not plausible when looking at stressed *auch*, as there is narrow focus on the particle itself in these cases. Thus, the division into AC and ID is determined by means of contextual factors, more specifically “by comparing the AUCH clause with the proposition *q* it is added to” (Reis & Rosengren 1997: 275). Focus on *auch* signals that the AC is in a position to the left of the particle and that there is either no material or background material to its right. *Auch* is thus the last element in the structure which can be focused, and this is why it receives the nuclear accent. Therefore, Reis and Rosengren suggest that particles like *auch* should not be called *focus particles* but *scope particles*.

Reis and Rosengren also compare the structure with stressed *auch* to structures with LeA containing *nur* and *sogar*. They provide the example given in (2.100).

- (2.100) PEter hat {nur/sogar/*auch} ein Buch verfaßt.
Peter has {only/even/also} a book written
 ‘{Only/even} Peter wrote a book.’

(Reis & Rosengren 1997: 250)

The particles *nur* and *sogar* are unstressed in this construction, whereas this structure is not possible with unstressed *auch*. In contrast to structures with LeA of stressed *auch*, structures with LeA of (unstressed) *nur* and *sogar* are restricted. Reis and Rosengren assume that structures with LeA of *nur* and *sogar* as in (2.100) can be explained by a movement account,

i.e., the associated constituent is moved to the sentence-initial position and retains the nuclear accent. They suggest that LeA of *nur* and *sogar* is a marked construction, as extraction from DPs (determiner phrases) generally leads to a decline in acceptability (see Chapter 3.1 for further analyses of LeA with *nur* and *sogar*). According to Reis and Rosengren, a movement account is not an option for structures with stressed *auch*, one reason being that the associated constituent in structures like (2.101) is base-generated.³⁴

(2.101) weil ja Peter es ihm AUCH zeigen wollte.
 because yes [MP]³⁵ Peter it him also show wanted
 ‘because Peter wanted to show it to him, too.’

(Reis & Rosengren 1997: 249)

Similar to Reis and Rosengren (1997), Klein (2012) also argues that particles like *auch* which can be stressed themselves and apparently have their scope to the left provide evidence against the view that such particles associate with focus. Therefore, he rejects the notion *focus particles*, as well. According to his analysis, the function of these particles is to indicate which elements in the utterance provide given information or new information. In structures in which the elements following *auch* provide contextually given information and are thus deaccented, *auch* is the last element which is not deaccented. This gives rise to the impression that *auch* is highlighted and thus focused. This effect results from the integration of the utterance containing *auch* into the flow of discourse. While Reis and Rosengren (1997) assume that the additive meaning component of *auch* is an important aspect of the particle’s semantics, Klein ascribes the additive effect to the integration of the sentence into the discourse: the particle expresses that the new information in the utterance is compatible with information provided earlier in the context. This leads to the additive effect.

Another line of theories assume that stressed *auch* has an associated constituent and that this constituent is to be analyzed as a contrastive topic.³⁶ Krifka’s (1999) *Contrastive Topic Hypothesis* given in (2.102) covers this idea.

³⁴ See Reis and Rosengren (1997: 249–250) for further reasons.

³⁵ The abbreviation MP stands for modal particle.

³⁶ See Féry (2010) for arguments against such an analysis. She argues that stressed *auch* can occur in constructions in which it does not take scope over a contrastive topic. In her analysis, she distinguishes between *auch* as an FP in constructions with RiA and stressed *auch* as a free focus without association.

(2.102) **Contrastive Topic Hypothesis:**

The associated constituent of stressed postposed additive particles is the contrastive topic of the clause in which they occur.

(Krifka 1999: 113)

According to Krifka (2008: 267), a contrastive topic consists of “an aboutness topic that contains a focus, which is doing what focus always does, namely indicating an alternative.” In (2.103), B’s answer contains the contrastive topic *my sister*, which receives a rising accent. It indicates that there is more information following, as the information on the sister does not provide an exhaustive answer to A’s question. *My sister* is then contrasted with *my brother* in the following clause.

(2.103) A: What do your siblings do?

B: [My [SISter]_{Focus}]_{Topic} [studies MEDicine]_{Focus}, and [my [BROther]_{Focus}]_{Topic} is [working on a FREIGHT ship]_{Focus}.

(Krifka 2008: 268)

Example (2.104) shows that the stress pattern in constructions with *auch* also consists of a rising accent and a falling sentence accent and is similar to the stress pattern in clauses like (2.103) which contain a contrastive topic. This stress pattern is called *bridge contour* or *hat contour*.³⁷

(2.104) [I know that Pia visited the exhibition. But what did Peter do?]

Péter hat die Ausstellung àuch besucht.

‘Péter visited the exhibition, tòò.’

(Krifka 1999: 113)

The intonation of a bridge contour with a rising accent on the contrastive topic and a falling sentence accent on the focused element is illustrated in Figure 2.4 taken from Sudhoff (2010: 174). Sudhoff conducted production studies which confirmed that the bridge contour intonation is used for constructions with stressed *auch* in most cases. An L*+H accent was used in more than 80% on the associated constituent and a falling accent H*+L (H* L- in GToBI notation) was frequently used on *auch*.³⁸ However, Sudhoff’s studies also revealed that “there was no one-to-one correspondence between a constituent’s status of being associated

³⁷ See Steube (2001) for an account on the grammar and pragmatics of *hat contours*.

³⁸ Sudhoff (2010) adopts GToBI for pitch accent annotation, but modifies it in some respects, for example, by using “H*L” instead of “H* L-” for representing “a high accent and a low boundary tone” (Sudhoff 2010: 30).

with stressed *auch* and a certain pitch accent type [...]” (Sudhoff 2010: 227). Other accent types, for example, L+H*, were also frequently used on the associated constituent.

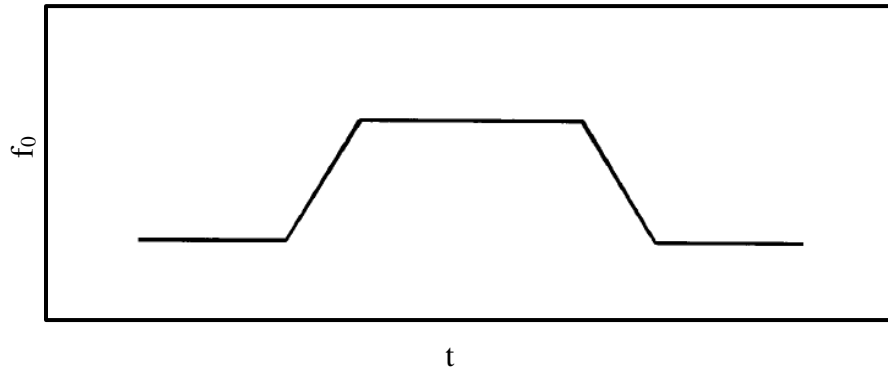


Figure 2.4: Schematic illustration of an f_0 -contour typical of the so-called *bridge contour* intonation. (Sudhoff 2010: 174, Figure 6.1)

It has been observed that the associated constituent of stressed *auch* can be phonologically empty as in the imperative construction in (2.105). In these cases, the intonation pattern does not correspond to the bridge contour.

(2.105) *Komm bitte àuch!*
‘Come please, too!’

(Krifka 1999: 117)

According to Krifka, the associated constituent of the particle is in this case the addressee. Moreover, Krifka assumes that the contrastive topic does not necessarily have to be prosodically marked in constructions with stressed *auch*, as the associated constituent can be determined by contextual factors. This assumption is supported by a corpus study of Sudhoff (2010) who analyzed the intonation of 225 constructions with stressed *auch* produced in movies and TV series. The analysis of the corpus data revealed that prosodic marking of the associated constituent is optional if the associated constituent is a pronoun.

Krifka (1999) applies a question-based account to his theory and suggests that a contrastive topic signals that the utterance provides a partial answer to the question meaning, as there are other alternative answers which also partially answer the question. This function is compatible with the meaning of additive particles. Without an additive, an utterance containing a contrastive topic expresses that the different partial answers have different properties. Utterances containing a contrastive topic and an additive express that the partial an-

swers have the same property. Exclusive particles like *nur* cannot be used in this construction, as they are not compatible with the function of contrastive topics to express a partial answer. The construction is also impossible with *sogar*.³⁹ Krifka claims that this is because *sogar* cannot be focused. This view is supported by the observation that stressed *auch* can only be used quantificationally, while *auch* in its scalar meaning cannot be focused.⁴⁰ This is illustrated in the following example. In (2.106a), the scalar interpretation of *auch* is prominent which is supported by the English translation using *even*. In (2.106b), the use of stressed *auch* leads to a quantificational interpretation of the sentence.

- (2.106) a. Auch der schnellste Computer kann diese Aufgabe nicht lösen.
 ‘Even the fastest computer cannot solve this task.’
 b. Der schnellste Computer kann diese Aufgabe auch nicht lösen.
 ‘The fastest computer cannot solve this task, either.’

(Krifka 1999: 112)

Sudhoff (2010) picks up Krifka’s explanation for why *sogar* cannot occur in constructions like (2.106b) and asks the question why *sogar* cannot be focused. Sudhoff compares scalar particles to epistemic sentence adverbials like *überraschenderweise* (‘surprisingly’) which in contrast to verificational sentence adverbials like *tatsächlich* (‘in fact’) cannot be focused. Sudhoff refers to Lang (1979) who suggests that epistemic sentence adverbials also cannot be focused, as “they express non-propositional meaning: they express an attitude of the speaker, which is not part of the denotation of the respective sentence” (Sudhoff 2010: 118). Sudhoff applies this argumentation to the scalar particle *sogar* which expresses the non-propositional meaning that the speaker considers something to be surprising or unexpected. Due to this speaker attitude, *sogar* cannot be stressed and thus cannot occur in contrastive topic constructions, in contrast to stressed *auch*. This also explains why *auch* cannot be stressed in a scalar use as in (2.106a). If stressed, the particle cannot express speaker attitude, as illustrated in (2.106b).

Sudhoff (2010) follows Krifka’s (1999) assumption that the associated constituent of stressed *auch* is a contrastive topic. He proposes a movement account for this construction in which the associated constituent is base-generated in the focus domain c-commanded by the particle. As the associated constituent is a contrastive topic, it has to move to the left and

³⁹ As *auch* in contrast to *nur* and *sogar* can associate with a contrastive topic to its left, Grubic and Zimmermann (2011) suggest that stressed *auch* exhibits free association in Beaver and Clark’s (2008) terms.

⁴⁰ This has already been noted by Altmann (1976b).

leaves a focused trace in its base position. This analysis, which makes a unified syntactic account of stressed and unstressed *auch* possible, is shown in (2.107).⁴¹

- (2.107) /Felix_{i,[+CF]} hat_j Maja_k sicher [VP,_[+F] AUCH [VP t_{i,[+CF]} t_k geküsst_[-F] t_j]].
Felix *aux_p* *Maja* *certainly* *also* *kissed*
 (Sudhoff 2010: 116)

In summary, additive particles do not have truth-conditional effects, similar to scalar particles, are used to express that the proposition which is provided by the discourse is also true for at least one other alternative. In contrast to exclusive and scalar particles, additive particles like *auch* frequently occur in constructions in which they follow their associated constituent and in which they receive the main pitch accent of the utterance.

In this dissertation, I focus on constructions with LeA of *nur/only* and *sogar/even*. As mentioned above, these particles cannot be stressed in these constructions and thus behave differently from *auch*. Structures with LeA of stressed *auch* only serve as a comparison structure in some of the studies presented in Chapter 4, as structures in which *auch* follows its associated constituent are common and natural in both spoken and written language. This construction shows that in principle it is possible for an FP to follow its associated constituent.

2.5 Summary

This chapter has provided the theoretical background information which is relevant for the analysis and discussion of the FP constructions under consideration in this dissertation. As it is generally accepted that FPs interact with the focused constituent of the utterance, sections 2.1 and 2.2 have addressed the question in (2.1a) “What is focus and how is it related to prosody?” by giving an introduction to the information structural notion of *focus* and its relation to prosody. In section 2.1, we saw that focus evokes alternatives “that are relevant for the interpretation of linguistic expressions” (Krifka 2008: 247). Moreover, there are different types of focus, namely *new information focus*, which is the material newly introduced in the discourse and added to the CG, and *contrastive focus* which is used to contrast certain alternatives with each other. From a pragmatic perspective, speakers focus expressions in

⁴¹ See Sudhoff (2010: Chapter 4.5.3) for a discussion of several possible arguments against his movement account and his evidence which shows that these counter-arguments are not tenable.

order to draw attention to them (e.g., Ertshik-Shir 1997, Beaver & Clark 2008). In languages like English and German, this is achieved by highlighting the focused element by means of pitch accent which marks the associated word as prominent.

Section 2.2 investigated the close relationship between pitch accent and focus and started out by giving an introduction to prosody and to autosegmental-metrical (AM) theories which provide a tool for analyzing and transcribing the intonation of spoken utterances. Chapter 2.2.2 gave an overview of the German AM theory GToBI which I adopt for my perception study in Chapter 4.1.4. This study is an acceptability judgment study with auditory stimuli that examines the role of prosody on the acceptability of constructions containing LeA. We have seen that focused elements which introduce new information are often marked by an H* pitch accent, while contrastively focused elements are often marked by an L+H* pitch accent. However, there is no one-to-one mapping of pitch accent type and focus type.

Chapter 2.2.3 gave a short introduction to theories of focus projection, which refers to the observation that the focus can comprise more than just the element associated with the main pitch accent. This also holds for FP constructions, in which the associated constituent of the particle often corresponds to the narrowly focused element carrying the primary pitch accent, but it can also contain bigger constituents which include the accented item. An important conclusion is that context plays a major role in determining the information status of the words contained in an utterance, i.e., which elements belong to the focus and which elements belong to the backgrounded and deaccented part of the utterance.

Chapter 2.3 investigated the questions in (2.1b): “What kind of approaches can be found in the literature regarding FPs and association with focus?” and “How do FPs usually behave?” Concerning the latter question, the examples in section 2.3 illustrate that FPs usually precede the focused constituent with which they are associated.⁴² Concerning the former question, the overview in this section has shown that there are theories which propose that AwF is part of the particle’s semantics, while other theories propose that AwF is solely a contextual phenomenon.

⁴² The central syntactic issue of this dissertation is whether specific German and English FPs always have to occupy a position which precedes and thus c-commands the associated constituent of the FP, or whether they can also follow the associated constituent under certain conditions. The studies of this dissertation are not designed to contribute to the ongoing debate in the literature on how FPs should be analyzed syntactically. There are two approaches which dominate the discussion (see Sudhoff 2010: Chapter 4 for a detailed overview and discussion of the different accounts). One approach analyses FPs as adverbials which modify verbal projections (e.g., Jacobs 1983; Büring & Hartmann 2001). Proponents of the second approach propose that FPs can adjoin to any kind of phrase (XP) (e.g., Bayer 1996, 2018; Reis & Rosengren 1997).

The theories concerned with AwF thus center around the questions in (2.38), repeated here in (2.108).

(2.108) Is focus sensitivity

- a. lexically encoded as part of the meaning of expressions which have been identified as focus sensitive, *or*
- b. an epiphenomenon resulting from independent pragmatic forces which make sure presuppositions are satisfied and texts are coherent?

(Beaver & Clark 2008: 41)

Most theories decide for one of the two options. Beaver and Clark (2008), on the other hand, argue that both options are true, depending on the particle under consideration. Whereas particles like *only*, *even*, and *also* conventionally associate with focus, which means that their focus sensitivity is part of their lexical meaning, particles like *always* do not show conventional association, as their meaning is not dependent on focus. I assume that AwF is part of the meaning of the FPs under consideration, and that context is important for determining the focus associate of the particle.

Chapter 2.4 provided further insights into exclusive, scalar, and additive particles and thus relates to the question in (2.1c) “What are the characteristics of exclusive, scalar, and additive particles?” An observation which is crucial for the experimental investigation of this study is that exclusive particles like *only* and *nur* have a quantificational, non-scalar meaning component which involves the exclusion of alternatives, and a scalar meaning component. The scalar meaning component expresses that the speaker evaluates the alternatives on a scale, i.e., the speaker considers the alternative under consideration to be little or bad in comparison to certain other alternatives (Hole 2015). This evaluative component is also analyzed as expressing mirativity in the sense that the speaker considers something to be unexpectedly little (e.g., Beaver et al. 2017). Scalar particles like *even* and *sogar* always involve speaker evaluation, and the scale on which the alternatives are arranged is often considered to be a scale of likelihood, i.e., sentences with scalar particles usually express that something is surprising or unexpected. Therefore, these particles also have a mirative function. Regarding additive particles, the vital aspect is that LeA is a frequently occurring construction with these particles, as they can follow their associated constituent. In this case, the German particle *auch* is stressed. This is a construction which is not possible with *nur* and *sogar*.

The question which is central for the rest of this study is whether LeA is generally unacceptable with exclusive and scalar particles. What we have seen in this chapter is that these particles usually precede their associated focus which contains the element carrying the main pitch accent. This observation is supported by Krifka (2008: 254, emphasis added) who points out that “[o]ne important fact about focus-sensitive operators is that they have to be in a position in which they can scope over their focus.” He provides the example given in (2.109) which is ambiguous in that there are several options concerning which elements are the associated focus of the particle *only*. The associated focus could just be the direct object *Mary* or just the indirect object *Sue*, but it could also be the whole verb phrase (VP) *introduced Mary to Sue*. This example thus illustrates again focus ambiguity and the phenomenon of focus projection. However, Krifka (2008) points out that the subject *John* cannot be the associated focus of *only*, as it is not c-commanded by the particle. According to this analysis, LeA is impossible.

(2.109) John only introduced Mary to Sue.

(Krifka 2008: 254)

The next section takes a closer look at LeA of exclusive and scalar particles by summarizing the observations made in the literature regarding LeA of certain FPs and by analyzing examples from German everyday language. A major conclusion will be that the scalar meaning component of the particles and speaker evaluation play a crucial role in the LeA of exclusive and scalar additive particles.

3 Leftward Association of Focus Particles

The intent of this chapter is to gain insights into constructions with LeA of the FPs under consideration. These insights are central for my dissertation, as they result in the hypotheses for my experimental investigation. Together with the theoretical background of Chapter 2, they thus lay the foundation for the experimental studies of Chapters 4 and 5. The research questions addressed in this chapter are listed in (3.1).

- (3.1) a. What kind of approaches can be found in the literature regarding LeA of FPs?
b. How are constructions with LeA used in everyday language?
c. What role do speaker evaluation and emphasis play?

Chapter 3.1 offers an overview of observations in the literature regarding LeA of FPs and therefore provides an answer to the question in (3.1a). The focus lies on English and German FPs and on observations concerning structures in which there is material between the FP and its leftward associated constituent and also material following the particle, as this is the construction under investigation in this dissertation.⁴³ We will see that most of the observations on English constructions containing LeA come to the conclusion that LeA of *only* is impossible. The accounts which also look at *even* observe that in contrast to LeA of *only*, LeA of *even* is possible. This is important for my English acceptability judgment studies of Chapter 5, as I expect my studies to reflect the judgments I found in the literature.

The claims in previous work on LeA of German FPs do not concur, and it is impossible to develop clear hypotheses for my German studies from these claims. In Chapter 3.2, I will therefore look at German examples with LeA of *nur* and *sogar* which I collected from everyday language. Chapter 3.2 thus addresses the question in (3.1b) in order to develop the hypotheses for my German studies. My analysis of the authentic data will show that all the examples containing LeA of *nur* involve speaker evaluation and emphatic speech. This will lead to the investigation of the question in (3.1c) whether speaker evaluation and emphasis can license this construction. In order to give a first answer to this question, I will introduce theories about emphasis and expressive meaning in section 3.2.2 and apply these notions to

⁴³ Some of the examples from the literature discussed in this chapter contain structures in which the particle is right-adjacent to its associated constituent (e.g., *SAM only ate chocolate for breakfast*). This is not the structure under consideration in this dissertation. However, this related structure can also provide valuable insights into LeA.

the authentic examples. The analysis of the authentic examples will result in the hypotheses in (3.2), which will be motivated step by step in this chapter.

- (3.2) a. RiA is the preferred word order of *nur* and *sogar*.
b. The scalar meaning component of *sogar* licenses LeA of this particle. LeA of *sogar* is better than LeA of non-scalar *nur*.
c. LeA of scalar *nur* is better than LeA of non-scalar *nur*.
d. Special emphasis improves LeA of *nur*.

My central claim is that speaker evaluation can license LeA. I will therefore argue that LeA of *sogar* is better than LeA of non-scalar *nur*, as *sogar* is always scalar and thus expresses speaker evaluation (3.2b). Moreover, I claim that LeA of *nur* is better in contexts in which the scalar meaning component of *nur* is prominent than in contexts in which the non-scalar meaning is prominent (3.2c). Furthermore, I will argue that special emphasis in terms of expressive meaning and speaker attitude can improve LeA of *nur* (3.2d).

3.1 State of the art

This section contains a detailed overview of observations and theories dealing with LeA of English and German exclusive and scalar particles and thus addresses the question in (3.1a) above. To my knowledge, this is the first comprehensive overview of the construction under investigation. Table 3.1 (see pages 67–68) summarizes the central observations in the literature. These observations will be discussed below in more detail in the order in which they are listed in the table.

In table 3.1, *XP-FP* stands for LeA of a certain particle, i.e., XP is the associated constituent of the respective FP which is in a position to the left of the particle. It is important that the judgments refer to structures in which there is material between the particle and its associated focus and not to structures in which the particle is right-adjacent to the focused element. The four columns with headings corresponding to the structure *XP-FP* show whether LeA of the specific particle is considered to be possible (✓), impossible (X), or marked (–). If the structure is considered to be marked, I added the authors' judgments (either one question mark or two question marks) in brackets. The grey boxes indicate that no information is provided about this aspect.

Reference	XP-only	XP-even	XP-nur	XP-sogar	Analysis
Jackendoff (1975)	X	✓ (but not in topicalization)			Particles differ in their structural constraints with respect to focus association.
Taglicht (1984)	X				
Tancredi (1990)	X				Principle of Lexical Association
Hoeksema & Zwarts (1991)	X	✓	X (also in Dutch)	✓ (also in Dutch)	Semantic account is needed.
Beaver & Clark (2003, 2008)	X if focus associate is in higher clause		X if focus associate is in higher clause		Difference between particles which are focus functional (e.g., <i>only</i>) and particles which are not focus functional (e.g., <i>always</i>).
Rochemont (to appear)	X in topicalization				Suggests a processing account for the difference between XP- <i>only</i> in topicalization and in focus fronting but does not provide a detailed analysis.
	✓ in focus fronting				
Erlewine (2014a, b)	X	✓	✓	✓	The grammar allows structures with LeA of FPs; The semantics of the particles determines whether LeA is possible. Different reconstruction mechanisms for English and German (and also Dutch).

Reference	XP-only	XP-even	XP-nur	XP-sogar	Analysis
			if focus in prefield if focus not in pre-field	if focus in prefield if focus not in prefield	
Jacobs (1983)			✓ if focus in prefield	✓ if focus in prefield	
Jäger & Wagner (2003)			– (??) if focus not in pre-field	– (??) if focus not in prefield	
Abraham (2005)	X	✓	X	– (??)	FPs must c-command the focus. LeA might be possible in spoken language.
Altmann (1976a)			✓	✓	The associate of the FP receives contrastive accentuation and is moved to the sentence-initial position.
Primus (1992)			✓	✓	The particle c-commands the trace of the focus associate.
Bayer (1999)	X	✓	✓	✓	V2-property of German could play a role.
Krifka (1999)			✓	✓	In German, all particles can follow their focus, as the focused constituent can undergo movement to the sentence-initial position.
Barbiers (1995)			✓ (in Dutch)		The particle c-commands the trace of the focus associate.

Table 3.1: Summary of observations on structures with LeA in the literature. X = not possible, ✓ = possible, – = marked.

As illustrated in Table 3.1, it is generally agreed that the English exclusive particle *only* cannot associate with leftward material, i.e. XP-*only* is considered to be impossible. I expect my English acceptability studies to reflect this assumption from the literature. Chapter 3.1 summarizes the observations regarding LeA of *only* by starting with Jackendoff (1975), who introduced the puzzle that *only* cannot associate to its left while *even* can. The observation that LeA of *only* is impossible led to the *Principle of Lexical Association* (PLA) proposed by Tancredi (1990), which was adopted in later work, for example, by Beaver and Clark (2003, 2008). Chapter 3.1.2 presents the first principled proposal put forward by Erlewine (2014a, b) to solve the puzzle of why *even* can associate to its left while *only* cannot.

Chapters 3.1.3 and 3.1.4 are concerned with theories that mainly deal with German FPs. Table 3.1 shows that there are papers which assume that LeA of *nur* is impossible while LeA of *sogar* is possible or at least better than LeA of *nur*. These assumptions are summarized in Chapter 3.1.3. Chapter 3.1.4 focuses on the papers which assume that LeA of both *nur* and *sogar* is possible.

Chapter 3.1.5 presents Barbiers' (1995) observations on the LeA behavior of Dutch FPs.

3.1.1 LeA of *only* is impossible

Jackendoff (1975) is said to be the first who observed that the scalar particle *even* can associate with leftward material while the exclusive particle *only* cannot. He suggests that AwF underlies specific structural constraints and assumes that FPs can only associate with elements that are within their *range*. Jackendoff defines the range of *even* as in (3.3):

(3.3) (Range of *even*)

If *even* is directly dominated by a node X, X and all nodes dominated by X are in the range of *even*.⁴⁴

(Jackendoff 1975: 249)

The sentence *John even gave his daughter a new bicycle* (Jackendoff 1975: 248) has different interpretations, depending on which element in the range of *even* is focused. The different possibilities are given in (3.4). Jackendoff assumes that the particle is attached to S,

⁴⁴ The notion of *dominance* is defined as follows: "Node A dominates node B if and only if A is higher up in the tree than B and if you can trace a line from A to B going only downwards." (Carnie 2007: 106)

which is the highest node of the clause in a syntactic tree. Therefore, all elements are within the range of *even* and can be the focus of the sentence.

- (3.4) a. JOHN even gave his daughter a new bicycle.
b. John even gave his DAUGHTER a new bicycle.
c. John even gave HIS daughter a new bicycle.
d. John even gave his daughter a NEW bicycle.
e. John even gave his daughter a new BICYCLE.
f. John even GAVE his daughter a new bicycle.

(Jackendoff 1975: 248)

Example (3.5) shows that the sentence in (3.4a), in which the subject *John* is the associated focus of the particle, is not possible if *even* is substituted with the particles *only* or *just*. The sentences in (3.4b) to (3.4f), on the other hand, are possible with these particles.

- (3.5) *JOHN {only/just} gave his daughter a new bicycle. (cf. Jackendoff 1975: 250)

The definition of the range of *only* and *just*, which is given in (3.6), thus specifies that these particles can only associate with elements to their right:

- (3.6) (Range of *only* and *just*)

If *only* or *just* is dominated by a node X, X and all nodes dominated by X and to the right of *only* or *just* are in the range of *only* or *just*.

(Jackendoff 1975: 250)

Jackendoff's definition of the range of *only* and *just* excludes LeA of these particles. LeA of *even*, on the other hand, is possible as in (3.4a). However, the examples in (3.7) show that LeA of *even* is restricted. Jackendoff assumes that in a structure with several auxiliaries as in (3.7a), the first auxiliary is dominated by S while the other auxiliaries are dominated by VP. The subject is only within the range of *even* if *even* is dominated by S and is thus in a position preceding the second auxiliary *have*. If *even* follows the second auxiliary and is therefore dominated by VP, it cannot associate with the subject (Jackendoff 1975: 250–251). The examples in (3.7b) and (3.7c) illustrate that both *even* and *only* cannot associate with topicalized constituents. However, the definition of the range of *even* does not exclude these cases.

- (3.7) a. JOHN (even) will (even) have (*even) given his daughter a new bicycle.
 b. *In the GARDEN Max {even/only} reads comic books.
 c. *MAX I {even/only} hate to bother.
- (Jackendoff 1975: 251)

Jackendoff proposes two possible syntactic accounts for this data. One possibility is to extend the definition of the range of *even* as illustrated in (3.8): this definition specifies that LeA is only possible with the subject and that subject association is only possible if *even* is dominated by S.

- (3.8) (Range of *even*)
 If *even* is dominated by a node X, the range of *even* includes X and all nodes dominated by X to the right of *even*, plus the subject if X is an S.
- (Jackendoff 1975: 251)

Another possibility is to apply Chomsky-adjunction, which is shown in (3.9). The topicalized material is “adjoined to a new S node introduced by the original S” (Jackendoff 1975: 252). The range of *even* is then limited to the lower S.

- (3.9) [_Sin the garden [_SMax even reads comic books]_S]_S (Jackendoff 1975: 252)

Jackendoff notes that in Yiddish dialects, the examples in (3.7b, c) are possible with the particle *even*. In this dialect, the definition of the range of *even* in (3.3) does not have to be extended to the definition in (3.8). The account with Chomsky-adjunction must assume for Yiddish that the higher S-node is within the range of *even* (cf. Jackendoff 1975: 252, footnote 5).

In summary, Jackendoff suggests that *only* and *even* underlie different syntactic constraints which account for their different behavior with respect to LeA. However, the definitions of the range of these particles only describe which structures are possible for each particle. Jackendoff does not explain why *only* and *even* underlie different syntactic constraints.

Taglicht (1984) also observes that LeA is impossible in constructions containing *only*. In contrast to Jackendoff (1975), he compares LeA of *only* to LeA of *also* and not to LeA of *even*. Taglicht observes that the sentence *John has also phoned Mary* is ambiguous, i.e., the associated focus of the additive particle *also* can be the subject *John* as in (3.10a) or the VP *phoned Mary* as in (3.10b). In Taglicht’s examples, the associated focus is underlined.

- (3.10) a. John has also phoned Mary
b. John has also phoned Mary

(Taglicht 1984: 77)

Taglicht points out that in contrast to *also*, *only* cannot associate with the subject if there is an auxiliary between the subject and the particle, i.e., the sentence in (3.10a) is not possible with *only*. Taglicht notes that this was, however, possible in earlier variants of English and provides the example (3.11) from 1721. Here, *only* associates with *eldest*.

- (3.11) The eldest son shalt only inherit his father. (Taglicht 1984: 97, fn. 35)

Taglicht does, however, not provide an explanation for the behavior of modern English *only* and earlier English *only* with respect to LeA. Bayer (1999: 58–59) shortly discusses Taglicht’s example. He assumes that LeA of German *nur* is not restricted and suggests that V2-languages (verb-second languages) like German and earlier variants of English might allow LeA of exclusive particles due to their V2-property.

Taglicht claims that *only* can associate to its left in modern English if it is immediately adjacent to the subject as in (3.12a). For this example, Taglicht provides the syntactic structure given in (3.12b), in which the pronoun and the particle form a constituent.

- (3.12) a. They only have complained
b. [They only] [complained]

(Taglicht 1984: 77)

Tancredi’s (1990) assumptions do not coincide with Taglicht’s judgments on the examples in (3.12). Taglicht claims that there are no structures in which *only* can follow its associated focus. As a consequence, he proposes the widely adopted *Principle of Lexical Association* (PLA) given in (3.13).

(3.13) **Principle of Lexical Association (PLA):**

An operator like *only* must be associated with a lexical constituent in its c-command domain.

(Tancredi 1990: 30)

He shows that the PLA applies at Logical Form (LF) as illustrated in the examples in (3.14) and (3.15). While the sentence in (3.14) only has one reading, namely ‘There is a group of (possibly many) men that you saw, and I saw only one member of that group’ (Tancredi 1990: 29), it has the three possible LF representations given in (3.15).

(3.14) I saw only one man you did _ . (Tancredi 1990: 29)

(3.15) a. [one man you did (only see *t*) [I only saw *t*]]

b. [one man you did (see *t*) [I only saw *t*]]

c. [only one man you did (see *t*) [I saw *t*]]

(Tancredi 1990: 29)

The representation in (3.15a) yields the incorrect reading ‘One man *x* such that you only saw *x*, I only saw *x*’ (Tancredi 1990: 29), i.e., both the speaker and the listener only saw one man and it was the same man. The PLA accounts for the infelicity of the LF in (3.15a), as *only* does not c-command a lexical associated constituent in this representation. The same holds for (3.15b) which is also excluded by the PLA, because *only* does not c-command its associated focus. The only grammatical representation is therefore (3.15c). In this LF representation, *only* c-commands the associated lexical constituent, as it raises with the quantified expression *one man you did*. The PLA thus gives us the correct LF representation for (3.14) and excludes ungrammatical representations.

The examples in (3.16) provide evidence for the assumption that the PLA also applies at S(urface)-structure.

(3.16) a. i. JOHN only seems *t* to be happy. ii. It only seems that JOHN is happy.

b. i. JOHN, I only saw *t*. ii. I only saw JOHN.

c. i. WHO do you only like *t*? ii. You only like WHO?

(Tancredi 1990: 31)

In all three (i) examples, *only* cannot associate with the raised NP, although the trace of the NP is in its c-command domain. The examples in (ii) show that *only* can associate with the overt NPs which occupy the same positions as the traces in the (i) sentences. The PLA accounts for this data: the associated focus of *only* must be a lexical constituent in the particle’s c-command domain. Therefore, *only* cannot associate with the trace of its associated constituent.⁴⁵ Tancredi (1990: 1, footnote 1) shortly mentions Jackendoff’s (1975) observation

⁴⁵ Aoun and Li (1993) adopt Tancredi’s PLA and provide examples which show that the PLA also applies to Mandarin Chinese, both at S-structure and at LF. The examples in (i) show that in both English and Chinese, the exclusive particle cannot associate with the topicalized object, i.e., the sentences cannot mean ‘He likes nobody but Mary/Mali’.

(i) a. *Mary_i, he only likes *x*_i.

b. *Mali_i, ta zhi xihuan *x*_i.

Mali he only like (Aoun & Li 1993: 206)

that *even* in contrast to *only* can associate with the subject to its left and states that he “will ignore this complication [...]”

In contrast to Tancredi (1990), **Hoeksema and Zwarts (1991)** discuss the difference between *only* and *even* with respect to LeA in more detail. They provide the English example in (3.17) and additionally the Dutch and German examples in (3.18) and (3.19).

- (3.17) a. The POPE has even permitted this practice.
b. *The POPE has only permitted this practice.

- (3.18) a. De PAUS heeft zelfs dit gebruik toegestaan.
b. *De PAUS heeft alleen dit gebruik toegestaan.

- (3.19) a. Der PAPST hat sogar diesen Brauch erlaubt.
b. *Der PAPST hat nur diesen Brauch erlaubt.

(Hoeksema & Zwarts 1991: 54)

The authors claim that the difference between *only* and *even* in (3.17) cannot “reflect accidental lexical idiosyncrasies of these two items” (Hoeksema & Zwarts 1991: 54), as the same pattern can be observed in the Dutch and German versions of the sentences.

Hoeksema and Zwarts propose a distinction between a phrasal use of FPs and a sentential use. In the phrasal use, the scope of the particle is restricted by the focused phrase. This is shown in (3.20). The sentence is only acceptable if the associated focus is *John*.

- (3.20) a. Even JOHN likes Bill.
b. *Even John LIKES Bill.
c. *Even John likes BILL.

(Hoeksema & Zwarts 1991: 55)

The examples in (3.21) and (3.22) show that sentential scope of *even* is clause-bound, i.e., the sentence in (3.21a) corresponds to (3.21b), but (3.22a) does not correspond to (3.22b), as the subject *Dieter* and the particle *even* are in different clauses.

- (3.21) a. DIETER has even left East Germany. ⇔
b. Even Dieter has left East Germany.

- (3.22) a. DIETER thought I'd even leave. ⇏
b. Even Dieter thought I'd leave.

(Hoeksema & Zwarts 1991: 55)

The authors claim that the “variation in scopal behavior is not random, but rather stable across the three languages English, German and Dutch” (Hoeksema & Zwarts 1991: 56) and that a semantic account which considers the different meanings of the particles is needed. However, they do not provide such an account themselves.

Beaver and Clark (2003, 2008) also discuss cross-linguistic data which shows that exclusive particles cannot associate leftwards. They compare the focus sensitive operators *only* and *always* and their corresponding particles in other languages.

Beaver and Clark adopt Tancredi’s (1990) PLA and claim that this principle applies to focus sensitive operators like *only* but not to operators like *always*. According to their theory, operators like *only* are focus functional and therefore focus sensitive. Particles are only focus sensitive if they comment on “alternative answers to the Current Question” (Beaver & Clark 2008: 70; see Chapter 2.3.2 for a summary of Beaver and Clark’s theory on AwF). In contrast, operators like *always* which are not dependent on focus do not have to c-command their associated focus. They argue that this distinction between *only* and *always* is supported by the observation that *always* can associate with extracted material while *only* cannot.⁴⁶ In a footnote, Beaver and Clark (2008: 160) mention Jackendoff’s (1975) observation that *even* can associate with extracted material while *only* cannot. However, they leave this contrast for further investigation.

It is important for their extraction data that the particle “takes scope under an embedding verb like *said*” (Beaver & Clark 2008: 162) so that the particle and the associated focus are not within the same syntactic scope or binding domain. The examples in (3.23) and (3.24) only differ with respect to the particles and show that sentences with *only* and *always* can have the same interpretations. The sentences are ambiguous and two of the possible readings are given in a. and b. respectively. If *Kim’s tank* is focused and associated with the focus sensitive operator, we get the meaning in a. If *clownfish* is the highlighted material, we get the meaning in b.

- (3.23) I said that I always stock Kim’s tank with clownfish.
a. ‘I said I stock Kim’s and no other tank with clownfish.’
b. ‘I said I stock Kim’s tank with clownfish and nothing else.’

⁴⁶ Beaver and Clark (2003, 2008) also discuss other phenomena which reveal differences between the interpretations of sentences with *always* and *only*, for example, association with elided material, association with presuppositions, and monotonicity effects. These phenomena will not be discussed here.

- (3.24) I said that I only stock Kim's tank with clownfish.
 a. 'I said I stock Kim's and no other tank with clownfish.'
 b. 'I said I stock Kim's tank with clownfish and nothing else.'
 (Beaver & Clark 2003: 344)

In (3.25) and (3.26), Kim's tank has been extracted from the bare relative. In (3.25), *always* can still associate with the extracted material *the tank* which leads to the meaning paraphrased in (3.25a). *Always* can also associate with *clownfish*, which is expressed by the paraphrase in (3.25b). The same extraction in the sentence with *only* leads, however, to the loss of the meaning in (3.26a). In the extraction examples provided by Beaver and Clark (2003, 2008), the extracted focus is boxed and the particle is underlined.

- (3.25) Kim's is the tank I said I always stock with clownfish.'
 a. 'I said I stock Kim's and no other tank with clownfish.'
 b. 'I said I stock Kim's tank with clownfish and nothing else.'

- (3.26) Kim's is the tank I said I only stock with clownfish.'
 a. *'I said I stock Kim's and no other tank with clownfish.'
 b. 'I said I stock Kim's tank with clownfish and nothing else.'
 (cf. Beaver & Clark 2003: 345)

The examples indicate that in contrast to *always*, *only* cannot associate with extracted material. Beaver and Clark conducted a small questionnaire study which confirmed their judgments. However, they do not present this study in more detail (cf. Beaver & Clark 2003: 344).

Beaver and Clark (2008) provide examples of other constructions with leftward extraction. In the following, I concentrate on their evidence from structures with topicalization as in (3.27) and structures with *wh*-relatives as in (3.28) and (3.29). In (3.27a), *always* can associate with the topicalized element *Fishsticks* while *only* cannot (3.27b).

- (3.27) a. Fishsticks, I believe Kim always buys.
 a'. 'I believe that Kim buys fishsticks and nothing else.'
 b. Fishsticks, I believe Kim only buys.
 b'. *'I believe that Kim buys fishsticks and nothing else.'
 (Beaver & Clark 2008: 165)

This example is relevant for my studies, as I tested LeA of *only* and *even* in topicalization structures. However, the examples in (3.27) contain topic fronting, while the items of my

studies contain focus fronting. In topic fronting, there are two intonation units which are separated by means of a comma, i.e., there is a pitch accent on *fishsticks* in the sentences in (3.27), and there is another pitch accent on *buys* at the end of the sentence. The accent on *buys* strengthens *only*'s strong preference to associate with rightward material (see also Rochemont 2018).

Let us look at the examples in (3.28) and (3.29), which contain a *wh*-relative. Again, *always* can associate with the extracted material *the guy*, and thus the reading in (3.28a) is possible, while *only* cannot, and thus the reading in (3.29a) is impossible.

- (3.28) Kim is the guy who Sandy says she always gives chocolate.
 a. 'Kim is the guy such that Sandy says she gives him and nobody else chocolate.'
 b. 'Kim is the guy such that Sandy says she gives him chocolate and nothing else.'
- (3.29) Kim is the guy who Sandy says she only gives chocolate.
 a. *'Kim is the guy such that Sandy says she gives him and nobody else chocolate.'
 b. 'Kim is the guy such that Sandy says she gives him chocolate and nothing else.'
 (Beaver and Clark 2003: 346-347)⁴⁷

In addition to their own constructed examples, Beaver and Clark examined 50 corpus examples containing *which*-relatives and the particle *only*. They did not find a single example in which the FP associates with the extracted material. In contrast, they found a naturally occurring example in the British National Corpus in which the particle *always* associates with the extracted focus. This example is shown in (3.30) which – according to Beaver and Clark (2008: 164) – has the reading “Whenever Angel was playing in a match, he wore Pedro’s helmet.”

- (3.30) Besides these photographs were Pedro’s polo helmet, which now had a map of the Malvinas stamped on the front (**which Angel always wore in matches**), and a jar of earth [...]
 (Beaver & Clark 2008: 164)

Beaver and Clark argue that semantic accounts of focus sensitivity like the one provided by Krifka (1992) and also pragmatic accounts like the one provided by Roberts (1996) both fail to account for the extraction data. Semantic accounts which suggest that traces are

⁴⁷ Some native speakers of English told me that the sentences in (3.28) and (3.29) might improve by inserting the preposition *to* at the end of the sentence as in *Kim is the guy who Sandy says she always gives chocolate to*.

marked for focus and are c-commanded by the focus sensitive operator must assume that *always* and *only* associate with extracted material. Semantic accounts which suggest that traces are not marked for focus must assume that neither *always* nor *only* can associate with extracted material (cf. Beaver & Clark 2003: 346). Pragmatic, question-based accounts (e.g., Roberts 1996) also incorrectly predict that the example in (3.29) with the reading in (3.29a) is a felicitous answer to the explicit or implicit QUD in (3.31a). A possible set of alternatives which is introduced by the QUD is given in (3.31b).

- (3.31) a. ‘Who does Sandy give chocolates?’
 b. {Sandy gives Morgan chocolates, Sandy gives Lee chocolates, Sandy gives Kim chocolates}

(Beaver & Clark 2008: 171)

Beaver and Clark claim that their account can explain the extraction data. The particle *only* is focus functional and thus the PLA applies to this particle. The authors assume that traces are not focus-marked. Therefore, *only* cannot associate with the gap and an interpretation of a sentence in which *only* associates with extracted material is ruled out. In (3.29), the particle *only* can only associate with material that follows the particle, for instance with *chocolate* as in (3.29b) but not with the extracted focus *the guy* as in (3.29a). While the possible readings of sentences containing *only* are reduced, sentences containing *always* have more readings available, as *always* does not conventionally associate with focus. The domain restriction of *always* is resolved pragmatically by means of context and an interpretation which involves association with extracted material is not blocked by the syntactic construction (cf. Beaver & Clark 2003: 355-357).

Beaver and Clark (2008) show that the difference between *always* and *only* also holds for other languages like Dutch, Swedish, Spanish and Italian. German examples are given in (3.32) and (3.33). In (3.32), *immer* (‘always’) can either associate with the *wh*-word *was* (‘what’) or with *seiner Mutter* (‘his mother’). In (3.33), *nur* cannot associate with *was* and has to associate with the rightward material *seiner Mutter*.

- (3.32) Was glaubst du, daß Hans immer seiner Mutter gegeben hat?
What believe you that Hans always his mother gave have
 c. ‘What was the thing such that you believe that Hans gave always that thing to his mother?’
 d. ‘What do you believe that Hans always gave his mother but nobody else?’

- (3.33) Was glaubst du, daß Hans nur seiner Mutter gegeben hat?
What believe you that Hans only his mother gave have
- c. *‘What was the thing such that you believe that Hans gave only that thing to his mother?’
- e. ‘What do you believe that Hans only gave his mother but nobody else?’
 (Beaver & Clark 2008: 175)

Beaver and Clark (2008) also discuss possible counter-examples from the German literature, which show that *nur* can associate with extracted material to its left. They refer to the examples given in (3.34) and (3.35).

- (3.34) Peter KÜSSTE_i Maria nur t_i.
Peter kissed Maria only
 ‘Peter only KISSED Maria.’
 (Büiring & Hartmann 2001: 241)⁴⁸

- (3.35) Peter_i hat nur/auch/sogar t_i die Ausstellung besucht.
Peter has only/also/even the exhibition visited
 ‘Peter has only/also/even visited the exhibition’
 (Krifka 1999: 112)⁴⁹

Beaver and Clark (2008) do not consider these examples to be counter-evidence to their claim, as the extracted focus and the particle *nur* are within the same clause and thus within the “syntactic scope or the same binding domain of the focus sensitive expression” (Beaver & Clark 2008: 175, fn. 14). In the examples in which exclusive particles cannot associate to their left, the particle associates with an extracted element that has been moved to a higher clause. It is, however, unclear how Beaver and Clark judge English structures in which *only* associates with an element to its left that is within the same clause. As they adopt the PLA, they must assume that LeA of exclusives is unacceptable in any construction in which the particle does not c-command its associated focus. In my view, their explanation for the German data in (3.34) and (3.35) is not in line with the PLA and these examples indeed provide counter-evidence to their claim.

Another potential counter-example comes from Dutch. According to Barbiers (1995), the FP *pas* (‘just’) can associate with extracted material as shown in (3.36).

⁴⁸ I added the translation to this example.

⁴⁹ I added glosses and the translation to this example.

- (3.36) TWEE boeken_i denk ik dat Jan pas t_i heeft gekocht
Two books think I that John just has bought
 ‘I think that John has bought just two books.’

(Barbiers 1995: 68)

Beaver and Clark (2008) point out that this does not hold for other Dutch FPs. The exclusive particle *alleen mar* (‘only’), for example, cannot associate with extracted material (Beaver & Clark 2008: 176). They suggest that *pas* is not an exclusive particle in structures like (3.36) and that it generally combines with quantities and measures out events. This would then lead to free association of the particle. This observation points to the same direction as the claim pursued in this dissertation that a scalar interpretation of exclusive particles can license LeA. Stefan Sudhoff (p.c.) brought to my attention that LeA in Dutch should work with scalar particles like *zelfs* (‘even’) and *maar* (‘only’), whereas it should not be possible with purely exclusive particles like *alleen* (‘only’) and *alleen mar* (‘only’). This further strengthens the role of scalar meaning. However, I will leave the Dutch data for future research.

Beaver and Clark conclude that focus sensitivity is lexically encoded when it comes to FPs like *only* which must c-command their associated focus, whereas the focus sensitivity of operators like *always* results from the dependency on context; these operators do not have to c-command the focused material. Therefore, the focus sensitivity of different operators is explained by different mechanisms. They suggest that other exclusive particles like *exclusively*, *just*, and *merely* show the same behavior as *only* and that adverbs like *usually* and *sometimes* show the same behavior as *always* (Beaver & Clark 2003: 358). Beaver and Clark (2003) point out that it is difficult to determine whether focus sensitive particles like *even* and *also* are focus functional and thus conventionally associate with focus, as they differ from *only* and *always* in that “focus apparently determines discourse function rather than truth conditions” (Beaver & Clark 2003: 359). Nevertheless, Beaver and Clark (2008: 78) suggest that scalar additives and non-scalar additives belong to the group of focus sensitive expressions with conventional association like exclusives. However, if it is true that *even* can associate with extracted material, as has been proposed in the literature, we would expect *even* to pattern with *always* and it should not conventionally associate with focus. Therefore, extraction might not be a reliable test to determine whether a particle is focus functional or not. Beaver and Clark (2008: 283) admit that “extraction effects do not appear to be a reliable diagnostic outside the exclusive/quantificational adverbs contrast [...]”

Rochemont (2018) discusses some examples with LeA of *only* based on Beaver and Clark (2008). The example in (3.37a), which is based on Beaver and Clark's (2008) example in (3.27) above, involves topicalization, more specifically topic fronting, and therefore has two pitch accents, one on the topicalized element *fishsticks* and one on the verb *eats*. In this case, *only* cannot associate with *fishsticks*. Rochemont claims that Beaver and Clark's account faces the problem that LeA of *only* becomes more acceptable, "[...] if not perfect" (Rochemont 2018: 280), in constructions with focus preposing as in (3.37b). In this construction, only the fronted element *fishsticks* receives a pitch accent, whereas the rest of the sentence is deaccented (see Chapter 5.1 for a comparison between topic fronting and focus fronting without FPs).

- (3.37) a. *FISHSTICKS, I believe Kim only EATS.
 b. FISHSTICKS I believe Kim only eats.

(Rochemont 2018: 279–280)

Rochemont provides another example in (3.38). In the given context, there is corrective focus on *John* in (3.38a) and the rest of the sentence is deaccented. According to Rochemont, this sentence with focus fronting is more acceptable than the version with topic fronting in (3.38b), which contains two intonation units and two accented elements.

- (3.38) a. {A: Bill only likes Mary. B: That's not true! ...} JOHN Bill only likes.
 b. #JOHN, Bill only LIKES.

(Rochemont 2018: 280)

Rochemont does not provide an analysis for the contrast between focus and topic fronting. However, he suggests that a processing account could explain the difference. In constructions with topic fronting, the prosodic prominence on the element following the particle might cause confusion regarding the correct focus associate. This is in line with the processing account I will propose in Chapter 6.3. I claim that constructions with LeA are easier to process if the leftward focus associate is as prominent as possible.

It is unclear how Rochemont judges examples in which *only* associates with a subject to its left. In these cases, the subject is usually the only element with prosodic prominence in the sentence. Due to this similarity to object focus fronting, I expect Rochemont to give similar judgments to subject association. Like Beaver and Clark, Rochemont does not discuss LeA of *even*.

The following section 3.1.2 introduces Erlewine's (2014a, b) semantic proposal for solving the puzzle introduced by Jackendoff (1975) that *even* can associate with leftward material while *only* cannot.

3.1.2 Erlewine (2014a, b): a solution to the puzzle that XP-*even* is better than XP-*only*

Jackendoff's (1975) observation that *even* can associate with leftward material while *only* cannot has been noted in some works dealing with focus association. However, most of them only address this problem briefly and then decide to ignore it or to leave it for future research, as it is not the focus of their work (e.g., Tancredi 1990; Bayer 1999; Beaver & Clark 2008; Rochemont 2018).⁵⁰

Erlewine (2014a, b) offers the first principled theory which can explain the difference between *only* and *even* with respect to LeA. Note that he calls LeA *backwards association*. I will outline his theory and the necessary background assumptions in the following.

Erlewine adopts the *Copy Theory of movement* (Chomsky 1993). According to this theory, syntactic movement is an operation by which a copy of the target is moved to a different position within the structure and the lower copy of the target in the original position is unpronounced. In structures like (3.39a), *even* associates with the lower copy within its c-command domain and not with the higher copy in the sentence initial position. The corresponding construction with *only* in (3.39b) is impossible.

(3.39) a. \checkmark [Mary]_F, John even met [Mary]_F at the party.



b. *[Mary]_F, John only met [Mary]_F at the party.

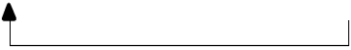


(Erlewine 2014b: 12)

⁵⁰ Another example of this is Kayne (1998), who provides the sentences in (ii), in which *even* can associate with the subject *John*. He notes that these constructions are not possible with *only*, but does not go into further detail.

(ii) a. John could even have done it.
b. John, they even consider intelligent. (Kayne 1998: 159)

The same analysis also applies to subject association as in (3.40). By adopting the VP-internal subject hypothesis, Erlewine assumes that the subject originates in the scope of the particle. While *even* can associate with the lower copy of the subject, *only* cannot.

(3.40) [John]_F will [✓]*even*/**only* [_{VP} ____ give his daughter a new bicycle]
 (Erlewine 2014b: 82)

Erlewine claims that the difference between *only* and *even* in this configuration stems from the different semantics of the two particles, the relevant difference being that “*even* uses focus-alternatives to introduce a non-assertive inference, without affecting truth conditions of the utterance, while *only* uses focus alternatives to introduce new truth conditions” (Erlewine 2014b: 15). The different truth conditional effects are illustrated in (3.41) and (3.42) (see also Chapter 2.4 of this dissertation for semantic analyses of *only* and *even*). In (3.41), *only* presupposes the prejacent proposition, i.e., the meaning of the sentence without the FP and asserts the negation of alternatives to *Bill*, i.e., other focus alternatives are excluded by the particle.

(3.41) John *only* met [Bill]_F.
Presupposition: John met Bill.
Assertion: \neg (John met Mary) \wedge (John met Sue) \wedge ...
 (Erlewine 2014a: 130)

(3.42) illustrates that *even* projects its scalar inference. In this example, the scalar inference is that the prejacent *John met Bill* is less likely than the alternative *John met Mary*. Thus, *even* does not have an effect on the assertion which corresponds to the prejacent.

(3.42) John *even* met [Bill]_F.
 \rightsquigarrow inference: ((John met Bill) $<_{\text{likely}}$ (John met Mary)) \wedge
 ((John met Bill) $<_{\text{likely}}$ (John met Sue))
Assertion: John met Bill.
 (Erlewine 2014a: 130)

The examples in (3.43) to (3.46) illustrate the analysis of an example with LeA of *only* and show why this configuration is impossible.

- (3.43) *A [professor]_F will *only* come to the party.
- a. Narrow syntax: [A [professor]_F]_i FUT *only* [a [professor]_F]_i come to the party.
- b. LF after TC⁵¹: [A [professor]_F] λ_x FUT *only* [_{VP} [the [professor]_F *x*] come to the party]
- c. Alternatives(_{VP}) = $\left\{ \begin{array}{l} \boxed{\text{the professor } x \text{ will come to the party}} \\ \text{the student } x \text{ will come to the party} \end{array} \right\}$
- (based on Erlewine 2014a: 136 and Erlewine 2014b: 93)

[*only* _{VP}] asserts the negation of the focus alternatives which leads to the denotation given in (3.44). This is the interpretation of the lower copy of the moved DP. In this example, the only alternative given by the context is *student*.

- (3.44) [[*only* _{VP}]] = ¬ (the student *x* came to the party) (Erlewine 2014a: 136)

In the case of LeA of *only*, not only the lower copy within the scope of the particle is interpreted but also the moved copy in the sentence initial position. The negation of the focus alternatives is only the interpretation of the lower copy. The complete denotation for (3.43) is given in (3.45) which yields an uninterpretable construction, as “the quantifier ‘a professor’ requires that *x* be a professor, but the lower definite description, introduced by Trace Conversion, requires *x* be a student” (Erlewine 2014a: 137).

- (3.45) [[(3.43)]] = ∃*x* (*x* professor ∧ ¬ (the student *x* came to the party))

The presupposition predicted for a similar example is given in (3.46).

- (3.46) *A [student]_F will *only* come to the party.
 $\rightsquigarrow \forall x (x \text{ is a student in } w_0 \rightarrow x \text{ is a professor in } w_0)$ (Erlewine 2014b: 93)

Erlewine (2014b) shows that LeA of *only* either leads to a presupposition that cannot be fulfilled, to a contradiction, or to a tautology due to the conflicting requirements on the variables. This explains why sentences with LeA of *only* are judged to be ungrammatical.

⁵¹ TC stands for *Trace Conversion* by which the lower copy is altered into a definite description (Erlewine 2014b: 31).

(3.47) provides the corresponding example with *even*.

(3.47) A [professor]_F will *even* come to the party.

a. Narrow syntax: [A [professor]_F]_i FUT *even* [a [professor]_F]_i come to the party.

b. LF after TC: [A [professor]_F] λ_x FUT *even* [_{vP} [the [professor]_F *x*] come to the party]

c. Alternatives(_{vP}) = $\left\{ \begin{array}{l} \boxed{\text{the professor } x \text{ will come to the party}} \\ \text{the student } x \text{ will come to the party} \end{array} \right\}$

(based on Erlewine 2014a: 136)⁵²

The scalar inference in (3.48) and the assertion in (3.49) show the relevant difference to *only*: the particle *even* does not use focus alternatives to change the truth conditions of _{vP} but produces a scalar inference with these alternatives. The scalar inference does not compose with the above material *a professor*. *Only*, on the other hand, changes the truth conditions by using the focus alternatives and these truth conditions compose with the quantificational subject (cf. Erlewine 2014b: 104).

(3.48) Scalar inference of (3.51):

$\rightsquigarrow (\exists x. \text{the professor } x \text{ will come to the party}) <_{\text{likely}} (\exists x. \text{the student } x \text{ will come to the party})$

(cf. Erlewine 2014a: 135)

(3.49) $[[[3.51]]] = \exists x (x \text{ professor} \wedge \lambda x (\text{the professor } x \text{ will come to the party}) (x))$
 $= \exists x (x \text{ professor} \wedge x \text{ will come to the party})$

(cf. Erlewine 2014a: 136)

The crucial difference between *only* and *even* therefore is that *only* affects the truth conditions of the assertion while *even* does not. This difference plays an important role in their behavior with respect to LeA.

Erlewine (2014b) considers and then excludes several alternative proposals, for example, syntactic scope reconstruction. According to this analysis, the focus associate would be in the scope of the particle (or focus-sensitive operator (OP)) at LF. This is shown in (3.50).

⁵² I inserted the auxiliary *will* in this example. In Erlewine (2014a: 135), the example is “A professor only came to the party”; Erlewine (2014b: 101) provides the same example with *will*-future, but has a more complex analysis of this example for which more background assumptions are needed. I inserted *FUT* as in example (215) in Erlewine (2014a: 101).

(3.50) **Backwards association by syntactic reconstruction:**

a. PF: [DP Quantifier ... α_F ...] ... [Op [... _____]]

b. LF: ... [Op [... [DP Quantifier ... α_F ...] ...]] \Rightarrow OP associates with α
 (Erlewine 2014b: 13)

One of the problems of this analysis is that it cannot cover the difference between *only* and *even* with respect to LeA, as all focus-sensitive operators behave the same in this analysis. Thus, both *only* and *even* should be able to associate with leftward material under syntactic reconstruction (see Erlewine 2014b: 87 ff. for a discussion). We will see below, that Erlewine considers syntactic reconstruction to be a possible mechanism for German constructions containing LeA.

Erlewine's (2014b: 121) central claim is that the grammar in principle allows structures with LeA of FPs and the semantics of the specific particles determines whether these structures are interpretable. LeA is impossible for particles which use focus alternatives to compute truth conditions that compose with the higher copy of the focus associate. LeA is possible for particles which use "focus alternatives to introduce projective meaning" (Erlewine 2014b: 121) that does not affect the truth conditions.

Erlewine (2014b) also observes that LeA of *even* is not always possible. In (3.51), *protester* is the restrictor of the subject *every protester*, and *every* is the determiner. Erlewine claims that *even* can associate with the restrictor (3.51a) but not with the determiner (3.51b). Neither of these constructions are possible with *only*.

- (3.51) a. \checkmark Every [protester]_F was *even* arrested.
 b. *[Every]_F protester was *even* arrested.
 (Erlewine 2014b: 126)

However, Erlewine (2014b: 173) notes that *even* can associate with a leftward determiner if there is a modal auxiliary in the sentence as in (3.52a). For some speakers, LeA of *only* also improves with a modal as in (3.52b).

- (3.52) a. \checkmark [Every]_F student could *even* come.
 b. $\%$ [Some]_F proposals can/should *only* be accepted.
 (Erlewine 2014b: 173)

Erlewine (2014b) claims that these observations can be accounted for by Scope Economy which he adopts from Fox (1995). According to Scope Economy, the modal in (3.52a) leads “to an inverse scope reading ‘could > \forall ’” (Erlewine 2014b: 173) and the subject is interpreted outside of the scope of the particle.

Another example for a restriction on LeA of *even* is given in (3.53). In (3.53a), *even* can associate to its left with the restrictor of the *which*-phrase but it cannot associate with the entire *which*-phrase (3.53b).

- (3.53) a. \checkmark He told me [[which] [president]_F he *even* met ____].
 \rightsquigarrow it is unlikely for him to meet presidents, as opposed to other sorts of people.
 b. *He told me [[which president]_F he *even* met ____].
 \rightsquigarrow it is unlikely for him to meet the person that he met, as opposed to other people.
- (Erlewine 2014b: 140)

The examples in (3.54) show that *even* cannot associate with *who* if *who* has been moved to a position to its left.

- (3.54) a. *You’ll never guess [[who]_F I *even* met ____]
 Intended: You’ll never guess [who *x* is such that I met *x*]
 \rightsquigarrow it is unlikely for the speaker to meet *x*, as opposed to other people.
 b. \checkmark You *even* met [who]_F?
- (Erlewine 2014b: 141)

Erlewine (2014b: 166 ff.) claims that existing mechanisms like syntactic reconstruction, semantic reconstruction and PF (phonological form) movement cannot account for the observed association patterns of *even* and *only*. Thus, he proposes the new mechanism *Inverse Trace Conversion* (ITC), which can predict the observed patterns. In Trace Conversion (TC), the lower copy of movement is converted into a definite description and the higher copy is interpreted at LF. In ITC, the higher copy is converted into a plural definite description and the lower copy is interpreted at LF (Erlewine 2014b: 178). Erlewine shows that ITC correctly predicts that LeA of *only* in constructions like “Every [professor]_F will *only* come to the party” (Erlewine 2014b: 169) is uninterpretable. His analysis is illustrated in (3.55). The higher copy of *every professor* is converted into the plural definite description *the professors* and the variable *X* refers to a set of professors. The lower copy is interpreted by means of the negation of the focus alternatives and *X* refers to a set of students.

(3.55) ITC blocks *only* associating with F-marking in the restrictor [...]:

a. Narrow syntax: [every [professor]_F] *only* [[every [professor]_F] come...]

b. LF after Inverse Trace Conversion:

[the [professors]_F λX *only* [[every [[professor]_F in X]] came to the party]

⇔ [the **professors**] λX . ¬ [every [**student** in X] came to the party]

(Erlewine 2014b: 182)

ITC can also predict that *even* can associate with leftward material in the restrictor (see Erlewine 2014b: 182) and that backwards association with the determiner is possible with *only* and *even* in constructions with a modal auxiliary (see Erlewine 2014b: 183).

Erlewine (2014b) also looks at instances of LeA in German and Dutch. He provides Dutch examples like the one in (3.56) and German examples like the one in (3.57), which show that both exclusive and scalar particles are able to associate with leftward material in these languages.

(3.56) ✓ [TWEE boeken]_i denk ik dat Jan pas/maar ____i heeft gekocht.

[[Two]_F books] think I that John just/only has bought

‘TWO books, I think that John has bought just /only __.’

(Erlewine 2014b: 187, based on Barbiers 1995)

(3.57) [Jedes BUCH] hat der Hans *nur* gelesen... (ZEITSCHRIFTEN hat er keine
Every [book]_F has the Hans *only* read [magazines]_F has he none
gelesen.)

read

‘It was only every BOOK that Hans read. He didn’t read any MAGAZINES.’

(Erlewine 2014b: 188)

Erlewine (2014b) argues that ITC does not apply to German and Dutch and that instead syntactic reconstruction is a possible mechanism in these cases. He also argues that these languages are V2-languages and thus the movement types in (3.56) and (3.57) cannot be directly compared to English.

In summary, Erlewine proposes an explanation for the different association behavior of *only* and *even* with respect to leftward material and develops the new mechanism *Inverse Trace Conversion* which can predict the observed association patterns of the two particles.

His assumption that the grammar in principle allows constructions with backwards association of FPs and that the semantics of the respective particles determines whether this construction is interpretable is convincing. However, it is not intuitive that a sentence with LeA of *only* involves a presupposition which cannot be fulfilled, or leads to a tautology, or to a contradiction in contrast to the version of the sentence with RiA. In order to show that this should be the case, Erlewine needs a lot of stipulations like the process of converting the higher copy of the movement chain into a plural definite description.

Erlewine assumes that LeA of the German particle *nur* is possible and suggests that different mechanisms explain LeA of German particles in contrast to English particles. The following section 3.1.3 introduces accounts which assume that LeA of the German particle *nur* is a marked construction or impossible, similar to the assumptions on the corresponding English particle *only*.

3.1.3 LeA of *nur* is impossible or at least marked

In the following examples from the German literature, LeA of *nur* is judged to be unacceptable, however, to different degrees. As can also be seen in Table 3.1 (see pages 67–68), some authors assume that these constructions are impossible and assign them an asterisk (*), while other authors consider them to be marked but not completely impossible and assign them one or two question marks (° or ??). The different judgments in the literature make it difficult to make clear predictions for my German acceptability judgments studies in Chapter 4.

In Table, 3.1, **Jacobs (1983)** is the first who proposes a difference between *nur* and *sogar* with respect to LeA, but only in certain constructions. He assumes that structures in which the particle follows the focused element can only be described by insertion rules and not by transformational rules. In structures with post-positional *nur* as in (3.58), the particle is inserted into a position within the verb phrase which follows the focused element *Tóchter*.

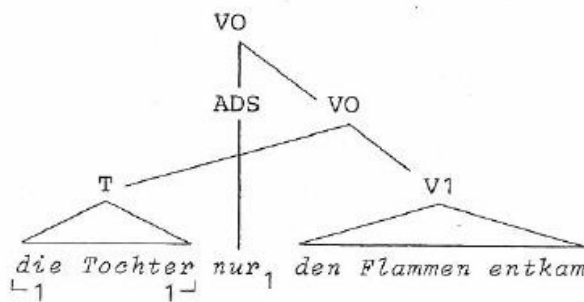
(3.58) Die Tóchter nur entkam den Flammen.

The daughter only escaped the flames

(Jacobs 1983: 95)

Under Jacobs' analysis, it is important that *die Tochter nur* does not form a constituent. The syntactic analysis of the sentence in (3.58) is given in (3.59).

(3.59)



(Jacobs 1983: 98)

Jacobs (1983: 98) sees a strength of this analysis in that the construction does not have to be treated as an exception to the rule that the focus has to be within the syntactic domain of the particle. However, he also discusses several problems of this analysis. One problem is that structures with post-positional *nur* as in (3.58) sound rather old-fashioned and that it is unclear what role language use plays in formal grammar. Another problem is that this structure does not work equally well with all particles. It is, for example, unacceptable with the additive particle *auch*. Jacobs suggests a feature which specifies for each particle whether it is possible in this structure or not. A third problem is that the structure is only acceptable in the so-called prefield, i.e., the sentence-initial position preceding the finite verb. Therefore, sentences like the one in (3.60) are unacceptable for most speakers. Jacobs judges this construction as acceptable if *Tóchter* receives a strong accentuation and if there is a pause after the particle. This is a strategy to force the dispreferred interpretation.

(3.60) Der Vater verriet der Tóchter nur das Geheimnis.
The father gave-away the_{DAT} daughter only the secret

(Jacobs 1983: 100)

Jacobs sees a solution to this problem in adding preference relations to the grammar (see Jacobs 1983: 101).

Jacobs also discusses structures in which the particle does not immediately follow the associated focus and, following Altmann (1976a), calls this construction “Distanzstellung”. In contrast to the structure with post-positioning, this structure is prevalent. An example with *nur* and *sogar* is given in (3.61). In this verb-second structure, the particle always follows the finite verb. Note that this construction differs from the construction of interest in this dissertation, as it does not contain material which follows the particles *nur/sogar*.

(3.61) Seine Mütter kommt morgen nur/sogar.
His mother will-come tomorrow only/even

(Jacobs 1983: 108)

Analogical to the structure in (3.59), the sentence in (3.61) is analyzed in such a way that it does not violate the rule that the focus has to be within the syntactic domain of the particle. A peculiarity is that with the particles *nur* and *sogar*, the focused constituent must be in the prefield. Therefore, the structure in (3.62) is not acceptable. This structure is, however, possible with stressed *auch* (see Chapter 2.4.3).

(3.62) Ich vermute, daß seine Mütter morgen ^{??}nur/[?]sogar/áuch kommt.
I suppose that his mother tomorrow only/even/also will-come

(Jacobs 1983: 108)

Interestingly, Jacobs notes a difference between *nur* and *sogar* in this structure, as he gives the sentence with *nur* two question marks and the sentence with *sogar* one question mark. However, he does not provide an explanation for this difference. Sudhoff (2010) discusses the examples in (3.61) and (3.62). Under his analysis, there is non-contrastive sentence focus in the cases with *nur* and *sogar*, which is possible in the prefield but unacceptable in the middlefield. In the sentence with stressed *auch*, on the other hand, the associated constituent is a contrastive topic, which can occur in the prefield or at the left edge of the middlefield (see Sudhoff 2010: 121 and Chapter 2.4.3 of this dissertation).

Jäger and Wagner (2003, ms.) base their observations concerning LeA of certain German FPs on Jacobs (1983), and discuss various violations of the frequent assumption that FPs have to precede the focus associate. They provide the example in (3.63), in which the subject is the only focused constituent due to the contrastive context and it seems that the particle *nur* associates with this subject. However, it is a marked construction, and the authors assign one question mark to this sentence. In Jäger and Wagner's examples, the associated focus of the particle is underlined.

(3.63) Hat jeder Maria ein Geschenk mitgebracht?
 'Did everyone give a present to Mary?'
[?]Péter_F hat nur Maria ein Geschenk mitgebracht.
Peter has only Mary a present brought

(Jäger & Wagner 2003: 16)⁵³

⁵³ I added glosses to this example. In example (3.64), Jäger and Wagner (2003) provide glosses themselves.

In contrast to Jacobs' (1983) examples above, the sentence in (3.63) is an example for the construction under investigation in this dissertation, since there is material between the focused element *Peter* and the particle *nur*, and there is also material following the particle. According to Jäger and Wagner, it is unclear whether the constituent occupying the sentence-initial position can be the single focus associate of the particle. They note that it is hard to create contexts for such constructions which ensure that the particle *only* associates with the subject and not with the entire sentence. This is an example for the problem of focus projection discussed in Chapter 2.2.3. The possibility of the particle associating with the entire sentence is shown in (3.64).

- (3.64) Péter hat nur Maria ein Geschenk mitgebracht_F.
Peter has only Mary a present brought

(Jäger & Wagner 2003: 17)

Jäger and Wagner's observation that it is difficult to create contexts for constructions with LeA is important for my experimental studies. In my studies, context plays a major role in assuring that participants assign the focus correctly and judge the intended interpretation of the target sentence. In the perception study (Chapter 4.1.4), the intonation of the auditory stimuli provided additional information about the correct focus assignment.

While Jäger and Wagner (2003) judge their example in (3.63) with one question mark, Abraham (2005) judges similar constructions to be completely unacceptable. I will present his observations in the following.

Abraham (2005) compares different FP constructions in English, Dutch, and German, and largely bases his examples and observations on Hoeksema and Zwarts (1991) (see Chapter 3.1.1). Abraham notes that the standard unmarked word order of the FP and the focused element is adjacency, while non-adjacency with intervening material between the particle and the focused element is marked or unacceptable. He provides the English examples in (3.65) and the corresponding German sentences in (3.66) with LeA of the respective FPs.

- (3.65) a. The POPE has even permitted this practice.
 b. *The POPE has only permitted this practice.
- (3.66) a. ??Der PAPST hat diese Verhütung sogar erlaubt.
 b. *Der PAPST hat diese Verhütung nur erlaubt.

(Abraham 2005: 593)

Although these examples are very similar to the ones provided by Hoeksema and Zwarts (1991) (see examples (3.17) and (3.19)), his judgments for the German sentences differ slightly from the judgments provided by Hoeksema and Zwarts, and he claims that in contrast to *even*, *sogar* is not completely acceptable in this construction. In (3.65), *even* can associate with the leftward subject while *only* cannot. In (3.66), LeA of both particles is highly marked. However, LeA of *sogar* in (3.66a) should be more acceptable than LeA of *nur*. In order to explain this difference between English and German, he sees the need to identify the exact similarities between the German and English lexemes and to analyze how the semantics of the particles grammaticalized over time (Abraham 2005: 593–594). Abraham provides further examples with *sogar*, which are shown in (3.67) and (3.68).

(3.67) a. *Sogar SCHALK hat die DDR verlassen.*
Even SCHALK has the German Democratic Republic left

b. *??SCHALK hat sogar die DDR verlassen.*
SCHALK has even the GDR left

(3.68) a. **SCHALK glaubte [die Mauer würde sogar fallen].*
SCHALK believed [the wall would even fall]

b. *Sogar SCHALK glaubte [die Mauer würde fallen].*
Even SCHALK believed [the wall would fall]

(Abraham 2005: 595, glosses added)

According to Abraham, the examples in (3.67) show that *sogar* must c-command the focused element and that sentences become unacceptable if the focused element leaves the c-command domain. The example in (3.68), which is similar to the example (3.22) given by Hoeksema and Zwarts (1991) indicates that *sogar* cannot associate with the subject that is in the higher clause. Abraham concludes that FPs have to c-command their associated focus and that the scope of the particles is limited to the nominal constituents which are in their c-command domain. However, he admits that there might be examples in spoken language which do not adhere to the c-command relation and that sentences like the one in (3.67b) should be possible in spoken language with clear accentuation. He claims that in such cases, the parser only has the easy task to reconstruct the focused element as the associated focus of the particle (Abraham 2005: 595–596). We will see that my perception study (Chapter 4.1.4) supports this claim.

Section 3.1.4 contains accounts which, in contrast to the observations presented in this section, assume that LeA of *nur* is acceptable. I will start with the early observations of Altmann (1976a).

3.1.4 LeA of *nur* is possible

Altmann (1976a) scrutinizes constructions with *nur*, *auch*, and *sogar* like the ones in (3.69) in which the contrastively focused element is topicalized and the particle follows the finite verb. He claims that constructions like the ones in (3.69) demonstrate the interdependency of syntax, semantics, and pragmatics.

- (3.69) a. Ein HAUPTschalter war in Wirklichkeit nur durchgebrannt.
A main-switch was in reality only burnt-through
- b. ZWERGE haben auch klein angefangen.
Midgets have also small started
- c. JOHANNA hat mich heute sogar begrüßt.
Johanna has me today even greeted

(Altmann 1976a: 233)⁵⁴

Altmann calls instances in which an element with contrastive accentuation is moved to the sentence-initial position “unechte Topikalisierung” (Altmann 1976a: 235), which can be roughly translated with ‘pseudo-topicalization’. ‘Real topicalization’, on the other hand, involves movement of an unstressed constituent to the front of the sentence. Topicalization structures with an FP belong to the group of pseudo-topicalization. According to Altmann, there are three types of topicalization in structures with an FP. Firstly, the particle and the contrastively stressed element can move together to the sentence-initial position as in (3.70).

- (3.70) a. Nur/sogar/auch der MENSCH interessiert mich.
Only/even/also the human-being interests me
- b. Nur/sogar/auch HINRICHTUNG kann man das nennen.
Only/even/also execution can one that call

(Altmann 1976a: 236)

⁵⁴ I added glosses and translations to the examples of Altmann (1976a) cited in this chapter. Altmann marks focused words with spaces between each letter, e.g. H a u p t s c h a l t e r in (3.69a). I replaced this marking of focus with capital letters.

Secondly, the particle can immediately follow the topicalized constituent as in (3.71). This construction is often acceptable with *nur*, seldom acceptable with *sogar*, and almost never with *auch*. Moreover, Altmann notes that in this construction, the scalar meaning of *nur* is more prominent than the quantificational meaning.

- (3.71) a. Der MENSCH *nur/sogar/*auch* interessiert mich.
 The human-being only/even/also interests me
- b. HINRICHTUNG [?]*nur/sogar/*auch* kann man das nennen.
 Execution only/even/also can one that call
- (Altmann 1976a: 236–237)

Thirdly, there is the construction in which pseudo-topicalization takes place and the particle stays in a position after the finite verb as in (3.72). He calls this construction with intervening material between the focus and the particle “Distanzstellung” (‘distance-positioning’). Note that Altmann finds the construction equally acceptable with *nur* and *sogar*, even in (3.72b) in which *nennen* follows the FPs and is thus an example for the construction of interest in this dissertation.

- (3.72) a. Der MENSCH interessiert mich *nur/sogar*.
 The human-being interests me only/even.
- b. HINRICHTUNG kann man das *nur/sogar* nennen.
 Execution can one that only/even call
- (Altmann 1976a: 237)

Altmann concludes that *sogar* is possible in topicalization structures and always receives a scalar interpretation. The particle *nur* preferably has a scalar interpretation if it is in a position following the topicalized constituent. In contrast to *auch*, both *nur* and *sogar* are never stressed in these constructions.

It is interesting that Altmann notes interpretational differences in topicalization structures in which the particles follow the focused constituent in contrast to the basic word order and that the scalar interpretation of *nur* is prominent in these constructions. This observation is relevant for the authentic examples of LeA of *nur* in Chapter 3.2 and the experimental evidence of Chapter 4.

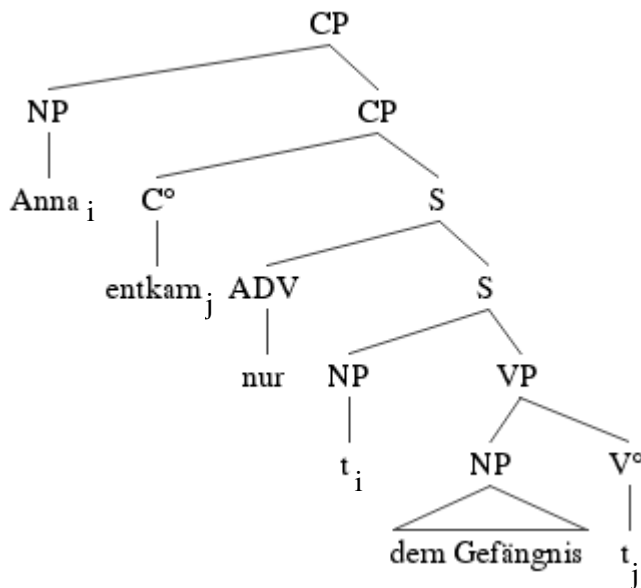
Primus (1992) also belongs to the proponents of the view that LeA of *nur* and *sogar* is possible. She discusses whether examples like the one in (3.73) are counter-examples to the condition that focus adverbs have to precede and c-command their focus.

(3.73) [ANNA]_i entkam nur_i dem Gefängnis
 Anna escaped only the_{DAT} prison

(Primus 1992: 59)⁵⁵

She argues that a movement analysis can account for structures in which the particle follows the focus. The syntactic analysis of (3.73) is illustrated in (3.74). The finite verb *entkam* is moved to the complementizer position C and *Anna* undergoes topicalization. The c-command requirement is satisfied, as *nur* c-commands the trace of *Anna*.

(3.74)



(based on Primus 1992: 60)

The adjusted c-command restriction which follows from this analysis is formulated in (3.75).

(3.75) If a focus X is coindexed with a focus adverb Y, Y c-commands the origin of the chain of X.

(Primus 1992: 60)

This formulation allows for structures with LeA of FPs. However, Primus also notes a decline in acceptability from (3.76a) to (3.76d), which shows that structures with LeA are less acceptable than structures with RiA of the particle.

⁵⁵ The original is in German. I added glosses and translations to the examples of Primus (1992) provided in this chapter.

- (3.76) a. Sogar ANNA ging ins Gefängnis. (+)
Even Anna went to-the prison
- b. ANNA ging sogar ins Gefängnis.
Anna went even to-the prison
- c. ANNA sogar ging ins Gefängnis.
Anna even went to-the prison
- d. Morgen wird ANNA sogar ins Gefängnis gehen (??)
Tomorrow will Anna even to-the prison go
- (Primus 1992: 61)

The decline in acceptability from (3.76a) to (3.76b) is explained by the *precedence preference for focus binders* which is formulated in (3.77). It states that an FP preferably precedes its focus.

- (3.77) For any focus binder Y marked with focus theoretical default feature values and any focus X of Y: Y precedes X.
 (Primus 1992: 61)

The *rightmost condition* formulated in (3.78) accounts for the decline in acceptability from (3.76b) to (3.76c), which is not fulfilled in (3.76c).

- (3.78) A focus adverb is placed in the rightmost position for adverbial operators which satisfies the conditions of focus and scope assignment.
 (Primus 1992: 61)

The sentence in (3.76d) is worse than (3.76c), as it has basic word order and therefore LeA of the particle cannot be accounted for by movement. Thus, the c-command restriction is violated (cf. Primus 1992: 61).

In summary, Primus provides a theory in which LeA of FPs is possible if the particle c-commands the trace of its focus associate. Moreover, her theory can also account for the observation that structures with LeA are less acceptable than structures in which the particle precedes the focused constituent. However, Primus does not assume a difference between *nur* and *sogar* in these structures.

Bayer (1999) adopts examples from Primus as in (3.79a) and transfers them into English as in (3.79b).

- (3.79) a. ANNA entkam_I [_{PrTP} sogar/nur [_{VP} dem Gefängnis e₁]]
Anna escaped even/only the_{DAT} prison
- b. ANNA could [_{PrTP} even/?*only [_{VP} escape from the prison]]
 (Bayer 1999: 58)

Bayer also assumes that *sogar* and *nur* can associate equally well with *Anna* in (3.79a). He claims that sentences like (3.79b) are acceptable with *even*, while LeA with *only* is “much harder or even impossible” (Bayer 1999: 58) for many speakers.

In later work, Bayer (2018) discusses structures with post-positioned *nur* as in (3.80b), which is derived from (3.80a).

- (3.80) a. [_{FinP} Nur [_{FinP} EINER [_{FinP} hat [_{TP} die Polizisten angegriffen]]]]
Only ONE has the policemen attacked
 ‘Only ONE person attacked the policemen’
- b. [_{FinP} EINER [_{FinP} nur [_{Fin} hat [_{TP} die Polizisten angegriffen]]]]
 (Bayer 2018: 248–249)

Although this is not the construction under investigation, his observations concerning the example in (3.80) are interesting for this dissertation. Bayer suggests that the structure in (3.80b) yields an emphatic reading. In his analysis, the particle has a feature for emphasis which causes movement of the focus constituent. This construction also works with *sogar* as in [*an die REGIERUNG sogar*] for which the canonical order is [*sogar an die REGIERUNG*] (Bayer 2018). I claim in this dissertation that emphasis has an influence on the construction under consideration as well.

Krifka (1999) also assumes that LeA of the German particles *nur* and *sogar* is possible. He claims that “[in German], all particles can follow their focus, but this is presumably due to the fact that the focused expressions can undergo certain types of movement, especially to the sentence-initial position” (Krifka 1999: 112). (3.81a) is an example with basic order and RiA of the particles *nur*, *sogar*, and *auch*. In (3.81b), *Peter* has been moved to the front of the sentence. However, all three particles can still associate with *Peter* to their left. Krifka points out that *auch* is the only particle which can be stressed in this construction (see Chapter 2.4.3 for Krifka’s analysis of stressed *auch*).

- (3.81) a. Es hat [{nur/auch/sogar} [Pèter_F die Ausstellung besucht]].
EXPLETIVE has {only/also/even} Peter the exhibition visited
- B. [[Pèter_F]_i [hat [{nur/auch/sogar} [t_i die Ausstellung besucht]]]]
 (Krifka 1999: 112)

In summary, no difference between *XP-nur* and *XP-sogar* is predicted for my judgment studies of Chapter 4 according to the accounts presented in this Chapter 3.1.4, as these accounts consider both constructions to be acceptable.

Chapter 3.1.5 summarizes Barbiers' (1995) observations on Dutch FPs. Similar to the accounts in this section 3.1.4, he assumes that FPs in Dutch can associate with leftward material as long as they c-command the trace of the associated focus.

3.1.5 Barbiers (1995): Observations on Dutch

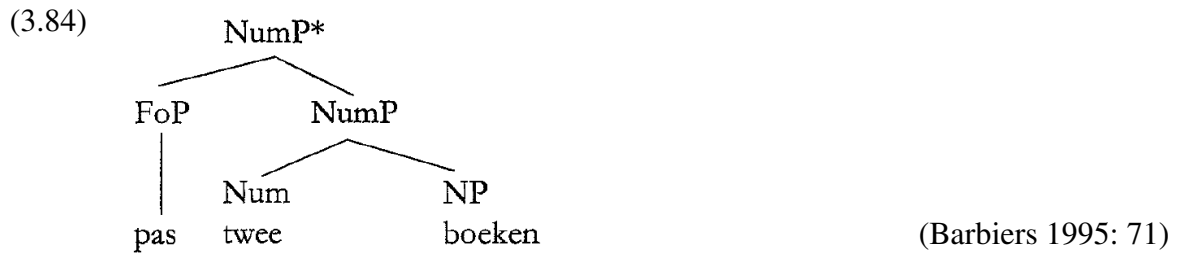
Barbiers deals with Dutch FPs and provides the condition in (3.82). It is similar to Primus' (1992) c-command restriction in (3.75) and differs from Tancredi's (1990) Principle of Lexical Association in that it allows the particle to c-command the trace of its semantic argument, i.e., LeA of the particles is possible. Therefore, the FP "either immediately precedes the **surface** position or the **base position**" (Barbiers 1995: 68) of its semantic argument.

- (3.82) A focus particle immediately c-commands (the trace of) its semantic argument.
 (Barbiers 1995: 65)

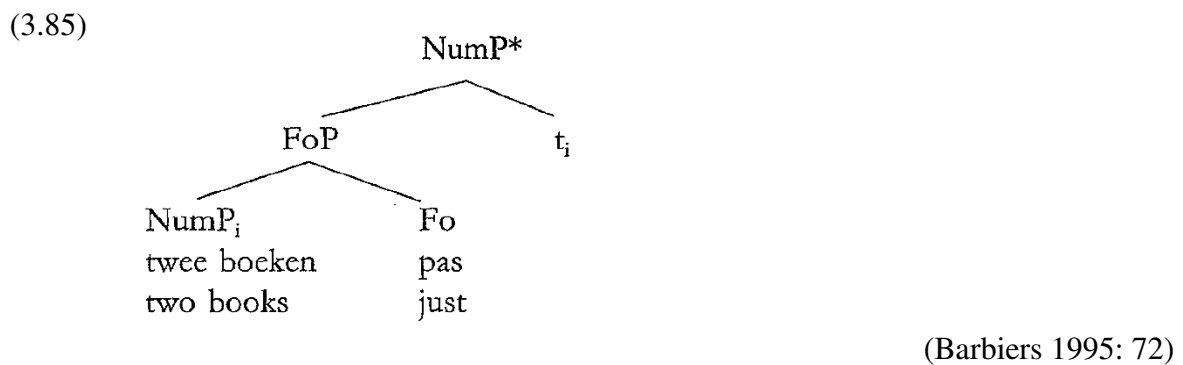
The example in (3.83) shows that the particle *pas* can associate with the numeral that has been moved to the sentence-initial position. The particle immediately precedes the trace of its associated focus. Barbiers (1995: 68) compares the stranded FP in this construction to floating quantifiers, as the particle identifies "the base position of its associated constituent."

- (3.83) TWEE boeken_i denk ik dat Jan pas ____i heeft gekocht.
Two books think I that John just has bought
 (Barbiers 1995: 68)

Barbiers' syntactic analysis of the structure in which the particle immediately precedes its lexical semantic argument is given in (3.84). He analyses FPs as adjuncts.



The semantic argument of the particle can move overtly or covertly to the specifier position of the projection of the FP called FoP, as in (3.85). The semantic argument can undergo further movement from this specifier position, for example, to the sentence initial position in topicalization structures. This is illustrated in (3.85).



Section 3.1.6 summarizes the observations on LeA of English and German FPs presented in Chapter 3.1.

3.1.6 Summary

Concerning English FPs, the observations presented in this chapter agree that LeA of *only* is impossible or at least highly marked, i.e., XP-*only* is usually judged with an asterisk. Only (Rochemont 2018) claims that it is possible in structures with focus preposing. The literature which also looks at LeA of *even* and compares it to LeA of *only* judges XP-*even* to be possible. The picture which emerges on LeA of the corresponding German particles is less homogeneous. Some of the references listed in Table 3.1 (pages 67–68) consider both XP-*nur* and XP-*sogar* to be possible (Erlewine 2014b; Altmann 1976a; Primus 1992; Bayer 1999; Krifka 1999). Hoeksema and Zwarts (1991) consider XP-*nur* to be impossible and XP-*sogar* to be possible, similar to the observations on English. Abraham (2005) and Jacobs (1983) consider both constructions to be marked, although they consider XP-*nur* to be even

worse than XP-*sogar*. Beaver and Clark (2008) and Jäger and Wagner (2003) only look at XP-*nur* and consider this construction to be impossible or marked.

Accounts which assume that an extracted element leaves a trace in its original position and that LeA of FPs is infelicitous claim that FPs like *only* have to c-command the associated focus and that focus association with a trace is impossible (Tancredi 1990; Aoun & Li 1993; Beaver & Clark 2008; Abraham 2005). Accounts which also assume that an extracted element leaves a trace but observe that LeA is possible claim that the particle only has to c-command the trace of its focus associate (Primus 1992; Krifka 1999; Barbiers 1995 on Dutch).

Most of the literature which observes differences between XP-*only* and XP-*even* or XP-*nur* and XP-*sogar* does not provide a detailed analysis or explanation for this difference. Some accounts suppose that semantic differences or different structural constraints between the particles play a role. The only principled and detailed account is provided by Erlewine (2014a, b).

An important observation is that most of the authors do not distinguish several levels of acceptability and just indicate whether LeA is possible or impossible with a certain particle. Primus (1992), for example, considers XP-*nur* and XP-*sogar* to be possible structures and does not mark these structures with question marks. However, she notes that LeA is less acceptable than the corresponding sentence with RiA of the particle. It is thus often unclear whether the authors consider examples without an asterisk or question mark to be perfect. It is also sometimes unclear whether authors consider examples with an asterisk to be completely unacceptable or just worse than the corresponding sentence with LeA of another FP.

The next section is concerned with the question whether LeA of FPs actually occurs in everyday language – a question which is left open in the literature – and looks at German examples with XP-*nur* and XP-*sogar* from spontaneous speech. These examples will show that structures containing LeA of *nur* and *sogar* are possible and that speaker evaluation plays a major role in licensing these structures.

3.2 Authentic data and the role of emphasis

3.2.1 Examples collected from spontaneous speech

I collected examples containing LeA of *nur* and *sogar* which I heard people uttering in spontaneous speech.⁵⁶ I only collected those examples which I could write down shortly after they were uttered so that they contain the exact wording. The examples were uttered by German native speakers from southern and from northern regions of Germany. This suggests that LeA of *nur* and *sogar* is not a peculiarity of a dialect like, for example, Swabian which is spoken in southwestern Germany where this study was carried out. The collection includes 22 examples with LeA of *nur*. Four of these examples contain *bloß* ('solely'), which is a synonym of *nur* and is used in colloquial speech (König et al. 1990: 39). The collection also contains five examples with LeA of *sogar*. All the examples are listed in the appendix A (pages i-vi). In the following, I will present just a selection of representative examples, as there is a degree of repetition in the full set. More examples of the collection and a further analysis of these examples are provided in Chapter 3.2.2 in connection with the notion of emphasis. Proper names in all of the examples were changed for reasons of privacy.

The first example with LeA of *nur* that I collected is shown in (3.86) and was uttered by a four-year-old girl.⁵⁷ The girl told her mother about an incident in Kindergarten. In the sentence printed in bold, *nur* associates with the subject *ich* ('I') to its left. There is contrastive, more specifically corrective focus, on the pronoun *ich* which is contrasted with the pronoun *sie* ('she').

- (3.86) Die Paula hat gesagt, dass SIE Pipi gemacht hat. Aber das stimmt
The Paula has said that she wee-wee made has. But that true-is
gar nicht. ICH hab nur Pipi gemacht.
not at all. I have only wee-wee made

'Paula said that she did a wee-wee. But that's not true at all. Only I did a wee-wee.'

Most of the examples from everyday language contain association with the subject as in (3.86). In (3.87), *nur* associates with the subject *Frau* ('woman'). This example was uttered

⁵⁶ In order to find examples of the construction under investigation in a corpus study, a large corpus of spoken language annotated for focus would be needed.

⁵⁷ Thanks to the girl's mother for sending me this example.

by a dancing instructor of standard and Latin dance. She explained steps that only the female dance partners have to perform while the male dance partners have to perform the basic step on the spot. There is contrastive focus on the subject *Frau* which is contrasted with *Mann* ('man').

- (3.87) Die FRAU macht nur diese Schritte, der Mann macht den Grundschrift.
The woman makes only those steps, the man makes the basic step
'Only the woman performs these steps while the man performs the basic step.'

An example in which *sogar* associates with the subject to its left is shown in (3.88). A group of friends was talking about movies, especially horror and action movies. Somebody brought up the action thriller "Mad Max". The female speaker who earlier in the conversation said that she does not like action thrillers uttered the sentence in (3.88), in which *sogar* associates with the focused subject *ich*. It was unexpected for the hearers that she had seen parts of that movie.

- (3.88) ICH hab sogar Teile von Mad Max gesehen.
I have even parts of Mad Max seen
'Even I watched parts of Mad Max.'

There are also examples with object association. Example (3.89) was uttered by a father in a conversation about his daughter's forthcoming birthday party. In contrast to the years before, the girl invited few boys to the party. The particle *nur* associates with the topicalized object *Drei Jungs*. In this sentence, *nur* does not mean that she invited nobody but three boys, as she also invited girls to her party.

- (3.89) DREI JUNGS hat sie dieses Jahr nur eingeladen.
Three boys has she this year only invited
'She only invited three boys this year.'

The example in (3.90) contains LeA of *sogar* with the object *Laugenwecken* ('pretzel rolls'). Pretzel rolls are the adult speaker's favorite bread rolls and it was therefore especially noteworthy for him that the two women baked some of these rolls.

- (3.90) Mama und Maria haben Brot gebacken. LAUGENwecken haben sie sogar
Mom and Maria have bread baked pretzel rolls have they even
gemacht
made
'Mom and Maria baked bread. They even baked pretzel rolls.'

The examples (3.91) and (3.92) contain association with a topicalized prepositional phrase. The sentence in (3.91) was uttered by a geography teacher while explaining the emergence of hurricanes referring to a terrestrial globe. Here, *nur* associates with the prepositional phrase [*In diesen Breitengraden*].

- (3.91) In DIESEN BREITENGRADEN können die nur entstehen.
In these latitudinal lines can they only emerge
'They can only emerge in these latitudinal lines.'

The sentence in (3.92) with LeA of *sogar* was uttered by a university student during a ride on a punt. A group of friends was discussing that there are a lot of students in Tübingen who have never been on a punt, as they think that it is expensive. However, there are several options for students to rent a punt cheaply. The speaker of (3.92) points out that even the student residence Waldhäuser Ost (WHO) rents punts to students.

- (3.92) Beim WHO kann man sogar nen Kahn mieten.
At the WHO can you even a punting boat rent
'You can even rent a punting boat at the WHO.'

An interesting example with a passive construction is given in (3.93) and contains both *sogar* and *nur*. It was uttered by the German sports commentator and former biathlete Herbert Fritzenwenger on TV during the biathlon men mass start on January 8th, 2017. The French biathlete Martin Fourcade was given something to drink during the sprint. The commentator explained to the TV audience that the athletes often get warm tea to drink and then uttered the sentence in (3.93). The commentator considered it noteworthy that they sometimes just get water to drink and used a construction with multiple FPs. The associated focus is *Wasser* with which *sogar* associates to its right and *nur* to its left.

- (3.93) Sogar WASSER wird ab und zu nur gereicht.
Even Water is sometimes only handed
'They sometimes even only hand water.'

These selected examples clearly show that LeA of *nur* and *sogar* occur in spontaneous speech, although it is not a very common structure and RiA is the preferred word order. This supports Abraham's (2005) idea that constructions with LeA might be possible in spoken language if they are pronounced with clear accentuation.

When comparing the examples from the collection, it becomes apparent that they all have something in common: they were uttered with special emphasis in order to highlight the importance or noteworthiness of the proposition. In the following, I use the terms *special emphasis* and *emphasis* to refer to speaker attitude and emotional involvement expressed in an utterance. The question arises whether this kind of emphasis is a licensing factor for LeA of these particles. The example in (3.94) further supports this idea. It is taken from the movie called "Männer im Wasser" (2008) (the original title is 'Allt flyter'), a Swedish comedy about a group of men who do synchronized swimming together. At a party, the main character Fredrik is asked about his great abdominal muscles. His answer in the dubbed German version of the movie is given in (3.94).

- (3.94) Eine Übung braucht man, nur eine. **EINE ÜBUNG muss man nur**
One exercise need you only one. One exercise must you only
 machen, mehr nicht, mehr nicht, und zwar achtmal.
do, more not, more not, and in fact eight times
 'You only need one exercise, only one. You only have to do one exercise, not more, not more. In fact eight times.'
 (Männer im Wasser 2008, 1:16:54 to 1:17:02)

Fredrik considers the information that you only need one exercise in order to get such great muscles to be surprising and especially noteworthy. He is very excited about it which he signals by using repetitions and accenting most syllables. Moreover, he uses LeA of *nur* in the clause printed in bold. He puts special emphasis on *eine Übung* and especially lengthens the numeral *eine*.⁵⁸ Thus, he uses "emphatic speech style" which signals the speaker's "heightened emotive involvement" (Selting 1994: 383). Additionally, he uses great hand gestures which underline his emotional speech. In this emphatic context, the use of LeA sounds completely natural. The people with whom I watched the movie told me that they did not notice anything strange when I asked them about the scene immediately after Fredrik uttered the sentences in (3.94). Moreover, it is unlikely that the translators used this

⁵⁸ As there is a lot of background noise because of the party, it is not possible to provide a pitch contour.

construction solely to fit better to the speech articulation of the Swedish actor, as the construction also does not fit the lip movements of the actor. I therefore assume that the translators used LeA of *nur* intentionally.

In the following section 3.2.2, I will elaborate on the term *emphasis* and its usages in the linguistic literature. By applying the term to the examples of spontaneous speech, I will develop the definition of emphasis used in this dissertation.

3.2.2 The role of emphasis and expressive meaning

In the literature, different uses of the notion of *emphasis* can be found, which can be attributed to the fact that emphasis plays a role in semantic, pragmatic, phonetic, and syntactic literature and is also closely linked to information structural notions (see Kohler 2006; Niebuhr 2010; Trotzke 2017 for discussions of different notions of emphasis). In this subchapter, I will first give a short overview of accounts dealing with emphasis. In a second step, I will develop the notion of emphasis used in this dissertation by means of authentic examples from the collection described in the previous section.

Different types of emphasis have been distinguished in the literature from early on. Armstrong and Ward (1926: 43) define emphasis as “an all-round special increase of effort on the part of the speaker” and distinguish the two types of emphasis *Special Prominence* and *Intensity*. They demonstrate the difference between the two types by means of the sentence “There was an enormous queue waiting at the theatre” (Armstrong & Ward 1926: 43) with emphasis on the adjective *enormous*. In case of Special Prominence, emphasis on *enormous* expresses contrast, i.e., the speaker contradicts that the queue was small. *Enormous* is especially prominent in the sentence, as all the other words are deaccented (‘neglected’ in the authors’ terms (Armstrong & Ward 1926: 44)).⁵⁹ This notion of emphasis corresponds to contrastive or corrective focus (Niebuhr 2010; see Chapter 2.1 for a definition of these types of foci).

In case of Intensity, the meaning of *enormous* is intensified, i.e., the speaker stresses the large size of the queue (cf. Armstrong & Ward 1926: 43–44). This notion of emphasis is associated with expressive and attitudinal evaluation (cf. Trotzke 2017). Intensifying constituents can be achieved, for example, by means of increased stress on the stressed syllable,

⁵⁹ Note that the default accent in this *there*-construction would be on *queue*. As *enormous* is the only stressed word, everything else must be given in the context (Susanne Winkler, p.c.).

which is produced with a greater breath force while speaking (Armstrong & Ward 1926: 3), by additionally widening or narrowing the range of intonation, i.e., the rise and fall of the voice (Armstrong & Ward 1926: 1), by lengthening or shortening of sounds, or by “repetition, gesture, facial expression, [and] kind of voice” (Armstrong & Ward 1926: 47). This distinction of emphasis, which is also referred to as a distinction between *emphasis for contrast* and *emphasis for intensity*, has often been adopted in the literature (e.g., by Niebuhr 2010; Trotzke & Turco 2015; Trotzke 2017) and according to Niebuhr (2010) goes back to Coleman (1914).⁶⁰ Phonetic studies found different phonetic cues between these two types of emphasis and therefore support this distinction (e.g., Bianchi et al. 2016; Niebuhr 2010).

A similar distinction can also be found in Drach (1963), who differentiates between *Denkwichtigkeit* (‘mental importance’) and *Affektbeladung* (‘affect-ladenness’).⁶¹ *Denkwichtigkeit* is characterized by an intonational peak on the most important constituent of a clause which can occur in different sentence positions. *Affektbeladung*, on the other hand, applies to constituents which involve emotionality and usually occur in the sentence-initial position (Drach 1963: 27). Drach’s (1963) description contains the idea that the different notions of emphasis interact with syntax and that emphasis which involves speaker attitude is involved in preposing constructions. This was also observed by Behaghel (1932) who calls constructions which involve some kind of emotionality of the speaker like excitement, impatience, elation, pain, or joy *Erregungsstellungen* (‘word orders of excitement’) (Behaghel 1932: 254). Elements with increased stress at the beginning of the sentence signal the speaker’s excitement (Behaghel 1932: 8). This idea has been taken up in more recent accounts of marked word orders, for example, in works of Josef Bayer, who assumes a feature of emphasis ([etop] or [ET]) in the syntactic derivation. This feature triggers emphatic topicalization in which the topic is considered noteworthy by the speaker (e.g., Bayer 2001; Bayer & Obernauer 2011; Bayer & Dasgupta 2016).

Zimmermann (2008) provides a discourse-semantic account of contrastive focus and emphasis. He argues that contrastive focus expresses the speaker’s assumption that the content is unlikely and unexpected for the hearer. According to Zimmermann (2008), contrastive focus often involves a special grammatical marking, for example, by means of a specific intonation, morphological markers or marked word orders. This shows that it is not always

⁶⁰ See Niebuhr (2010) for a further distinction between positive and negative emphasis for intensity which involve different phonetic features.

⁶¹ I adopted the rough English translations of *Denkwichtigkeit* and *Affektbeladung* from Wierzba (2014: 11).

possible to make a clear-cut distinction between *emphasis for contrast* and *emphasis for intensity*, as Zimmermann's (2008) account of contrastive focus (i.e., emphasis for contrast) includes speaker evaluation which is also attributed to emphasis for intensity. In the example in (3.95), the speaker considers *caviar* to be unexpected for the hearer's attention and therefore uses a special contrastive marking. (Zimmermann 2008):

(3.95) Q: What did you eat in Russia? A: *Caviar* we ate. / We ate ↑*caviar*!
(Zimmermann 2008: 10⁶²)

Zimmermann's (2008) assumptions on contrastive focus and emphasis are similar to what Krifka (1995) calls *emphatic focus* which is accompanied by emphatic prosody and signals that a focused element of a sentence is less likely in the given context than any other alternative.⁶³ In (3.96), emphatic focus on *Borneo* indicates that Borneo is an exceptional place to visit. The particle *even* can strengthen this meaning component.

(3.96) Mary knows every place on earth. She has (even) been to BORneo!

Frey (2010) discusses constructions containing preposing of the focused element that have an emphatic interpretation. He claims that \bar{A} -movement has the interpretative effect of a Conventional Implicature (CI). The CI operates on a salient set of alternatives and expresses that the speaker considers the focused element, which has undergone \bar{A} -movement, to be "ranked highest in a partial ordering" (Frey 2010: 1423). The ordering can, for example, involve a scale of expectation, truthfulness, or relevance. This differs from accounts which assume that emphasis always involves a scale of likeliness or (un)expectedness (e.g., Krifka 1995; Hartmann 2008; Zimmermann 2008; Bianchi et al. 2016). Frey (2010) provides the example in (3.97). By preposing the focused element *Fleisch* in (3.97a), the speaker directs the hearer's attention to this element, as he considers it more noteworthy that Otto bought meat than that he bought bananas.

⁶² The page number corresponds to the preliminary version of the paper (<http://www.ling.uni-potsdam.de/~zimmermann/papers/MZ2008-Contrast.pdf>; last access: January 30th, 2017)

⁶³ Note that Krifka (1995) does not discuss word order variations in relation to emphatic focus.

- (3.97) Was hat Otto heute auf dem Markt gekauft?
What has Otto today on the market bought
- a. FLEISCH hat Otto heute gekauft, und 3 Pfund BaNAnen.
Meat has Otto today bought and 3 pounds of bananas
 ‘Today, Otto bought meat, and 3 pounds of bananas.’
- b. Otto hat heute FLEISCH gekauft und 3 Pfund BaNAnen.
 (Frey 2010: 1424)

Trotzke and Turco (2015) also assume that the emphatic effect of certain marked word orders goes “beyond information structural interpretations” (Trotzke & Turco 2015: 37) due to their evaluative meaning component. They adopt the notion of emphasis for intensity and claim that this notion also goes beyond *mirative fronting* which refers to word orders which involve unexpectedness or surprise. They suggest that “the marked word order may come with a flavor other than surprise (e.g., disgust and discontent [...])” (Trotzke & Turco 2015: 39). The results of a production study support their claim that [wh+Prt]-constructions like [*wie auch*] as in (3.98) belong to those constructions with which the speaker expresses emphasis for intensity.⁶⁴

- (3.98) Wie auch sollen die Bürger einem korrupten Politiker vertrauen können?
how PART should the citizens a corrupt politician trust can
 ‘How can the citizens trust a corrupt politician?’
 (Trotzke & Turco 2015: 49)

A question which will be investigated in this dissertation is whether LeA of *only/nur* and *even/sogar* belongs to the marked word orders which involve an emphatic interpretation and speaker evaluation. In the following, this question will be investigated theoretically and by means of the examples collected from everyday speech.

Sentences with the particles *even* or *sogar* always express speaker evaluation due to the particles’ scalar meaning component which, according to Krifka (1995), makes *emphatic focus* explicit (see example (3.96)). The particles *only* and *nur*, on the other hand, can have either a non-scalar or scalar reading (see Chapter 2.4.1). In the literature dealing with LeA of *only* or *nur*, most examples suggest an exclusive reading of the particle, i.e., the reading which can be paraphrased with ‘nothing but’ (see, for example, the sentences with LeA of *only* and *nur* provided by Hoeksema and Zwarts (1991) in Chapter 3.1.1: “The

⁶⁴ See Trotzke (2017) for further constructions which yield an emphatic interpretation.

POPE has even/*only permitted this practice”). An additional scalar reading cannot completely be excluded. However, the exclusive reading is more prominent. The difference in scalarity and speaker evaluation between *only/even* and *nur/sogar* in these examples could play a role in the observation that *even* and *sogar* can associate better to their left than *only* and *nur*, i.e., attitudinal evaluation could be a licensing factor for LeA. If this is the case, LeA of *only/nur* is expected to improve in contexts which make a scalar reading of the particle explicit and thus include speaker evaluation.

This idea is supported by Bayer’s (2018) observation on LeA of *nur* in constructions in which the particle is immediately adjacent to its associated focus (see Chapter 3.1.4). In (3.99), *nur* follows its associated focus *EINER*. Bayer claims that *EINER* has been moved to the specifier position of the particle phrase (SpecSPrtP) in order to value the emphasis feature. This construction therefore yields an emphatic interpretation. The particle *nur* is also scalar in this example due to the numeral *EINER* as the associated focus (see chapter 2.4.1).

- (3.99) EINER nur hat die Polizisten angegriffen.
One only has the policemen attacked
 ‘Only ONE person attacked the policemen’

(Bayer 2018: 249)

Bayer’s claim is also in line with Altmann (1976a), who assumes that constructions in which *nur* is immediately adjoined to the right of the focused constituent favor a scalar interpretation of the particle and cannot be substituted by the exclusive particle *ausschließlich* (‘solely’) (Altmann 1976a: 237).

Although this construction differs from the construction under investigation in this dissertation in that there is no material between the particle and its associated focus, the two constructions could nevertheless show similar licensing factors. However, it is important to note that *sogar* is less acceptable if it is immediately adjoined to the right of its associated focus than *nur* (Altmann 1976a). *Even*, on the other hand, seems to be acceptable in this construction as in the example “JOHN even gave his daughter a new bicycle” (Jackendoff 1975: 248). I have to leave the observations on these constructions for future research and turn to the role of scalar meaning and emphasis on the construction under investigation by scrutinizing authentic examples from everyday language.

Some of the authentic examples with LeA of *nur* and all the examples with LeA of *bloß* contain a numeral as the associated focus which leads to a scalar reading of the particle.

This is the case in examples (3.89) and (3.94) above, repeated in (3.100) and (3.101) respectively.

(3.100) DREI JUNGS hat sie dieses Jahr nur eingeladen.

Three boys has she this year only invited

‘She only invited three boys this year.’

(3.101) Eine Übung braucht man, nur eine. **EINE ÜBUNG muss man nur**
One exercise need you only one. One exercise must you only

machen, mehr nicht, mehr nicht, und zwar achtmal.

do, more not, more not, in fact eight times

‘You only need one exercise, only one. You only have to do one exercise, not more, not more. In fact eight times.’

(Männer im Wasser 2008, 1:16:54 to 1:17:02)

In (3.100), the speaker considers it to be surprising that his daughter did not invite more than three boys to her party, as she invited more boys in the years before. In (3.101), it is considered little and also unexpected that not more than one exercise is needed to train ones abdominal muscles effectively. Additionally, the speaker expresses his excitement about this information. These two examples therefore clearly involve speaker evaluation.

The examples in (3.102) to (3.103) also contain numerals as the associated focus of the exclusive *nur*. The sentence in (3.102) was uttered by the sports reporter Christoph Hamm during the biathlon women mass start on January 8th, 2017. The reporter summed up the good performance of the German biathlete Laura Dahlmeier, who was the second to cross the finish line. It is a noticeable result for the reporter that she only made one mistake at the shooting range.

(3.102) EINEN FEHLER hat sie sich am Schießstand nur geleistet.

One mistake has she herself at-the shooting range only afforded

‘She only made one mistake at the shooting range.’

Example (3.103) stems from a sports class instructor. A couple of minutes before class, she told the participants who were already present that a lot of other participants had canceled that day and that she only expects five people to participate. This is considered little and also unexpected.

- (3.103) FÜNF sollten's heute nur werden.
Five should-it today only be
'Only five [participants] are supposed to come today.'

The sentence in (3.104) was uttered during a car trip after the driver saw a road sign with the information that the city Calw is 21 kilometers away. The driver expected that Calw was farther away and was thus surprised.

- (3.104) EINUNDZWANZIG Kilometer sind's nur bis Calw.
Twenty-one kilometers are-it only to Calw
'It's only twenty-one kilometers to Calw.'

Example (3.105) is a remark in the Swabian dialect. The speaker told her neighbors a story about her brother when he was little. It was horrible for him to go shopping, because he could not memorize all the things that his mother told him to buy. One day, his mother told him to go to the butcher in order to buy three different things, and he was not allowed to write them down. The speaker considered it funny that he could not even remember the three items and only brought two.

- (3.105) ZWOI SACHA hot er bloß brocht.
Two things has he only brought
'He only brought two things.'

All four Swabian examples that I collected with LeA of *bloß* contain a numeral as the associated constituent of the particle.

In the examples with numerals, there is a clear speaker evaluation due to the scalar meaning component. In all of these cases, the numeral is considered to be an unexpectedly small amount. There are also examples without numerals that suggest a scalar reading of *nur*. This is, for example, the case in (3.91), repeated in (3.106).

- (3.106) In DIESEN BREITENGRADEN können die nur entstehen.
In these latitudinal lines can they only emerge
'They can only emerge in these latitudinal lines.'

The speaker wanted to express that hurricanes can emerge only in the specific latitudinal lines which he pointed to on the terrestrial globe. It is also considered to be unexpected for the hearers that they cannot emerge anywhere else.

In (3.93), repeated in (3.107), the evaluative component of *nur*, i.e., that it is considered little and unexpected that biathletes sometimes get water to drink, is further strengthened by the simultaneous use of *sogar* at the beginning of the sentence.

- (3.107) *Sogar WASSER wird ab und zu nur gereicht.*
Even Water is sometimes only handed
 ‘They sometimes even only hand water.’

These examples involve the mirative function of *nur* which expresses that something is considered “less than expected” (Zeevat 2009: 124; see Chapter 2.4 of this dissertation). This observation suggests that scalarity is the decisive factor for LeA which is involved in sentences with *nur* if a scalar interpretation is made prominent by the context and which is always involved in sentences with *sogar*. However, there are also examples with LeA of *nur* from everyday language in which the exclusive meaning of *nur* is more prominent. This is the case in example (3.86), repeated in (3.108).

- (3.108) *Die Paula hat gesagt, dass SIE Pipi gemacht hat. Aber das*
The Paula has said that she wee-wee made has. But that
stimmt gar nicht. ICH hab nur Pipi gemacht.
true-is not at all. I have only wee-wee made
 ‘Paula said that she did a wee-wee. But that’s not true at all. Only I did a wee-wee.’

The girl stressed that not her friend Paula but only she herself was doing wee-wee and she did not express that she considers this little or bad, i.e., the exclusive meaning component of *nur* is stressed and the evaluative meaning component of *nur* is not present in this context. Due to the corrective focus, a subtype of contrastive focus (see Chapter 2.1), the example involves emphasis for contrast. However, it is not the case that there is no emphasis for intensity involved at all, as the girl is clearly upset about Paula’s lie and it is important for her to rectify it. Speaker attitude is thus added to emphasis for contrast by means of emotionality. Moreover, K. Hartmann (2008) considers contrastive focus and its subtypes to be an unexpected discourse move. In case of corrective focus, the discourse move is unexpected, as a previous statement is rejected. This is the case in (3.108), as it is rejected that Paula told the truth.

A similar example was introduced in Chapter 1, example (1.06), repeated in (3.109). It was uttered by a three-year-old girl at a playground. The father of another child was sitting

on a seesaw. The three-year-old was very upset about this and told him that only children are allowed to sit on the seesaw. There is contrastive focus on *Kinder* with an exclusive reading of *nur*. As in (3.108), speaker attitude is added by means of the child's emotional involvement. Here too, it can also be argued that contrastive focus is an unexpected discourse move. It is likely that the girl considered it unexpected for the man that he is not allowed to sit on the seesaw. However, I argue that anger characterizes the use of emphasis in this case better than unexpectedness and thus assume that emphasis here goes beyond the notion of mirativity, similar to Trotzke and Turco (2015) and Trotzke (2017).

- (3.109) KINDER dürfen da nur drauf sitzen. Erwachsene machen das kaputt.
Children can there only on sit. Adults make this broken
 'Only children are allowed to sit on this. Adults break it.'

In example (3.87) above, repeated in (3.110), there is no apparent emotionality involved. The dance teacher is not emotional about her dance step explanations. By means of the contrastive focus and the construction with LeA of *nur*, she expressed that this was an especially important information that the dance students should keep in mind. Thus, the function is to increase the hearer's attention and to signal the noteworthiness of the assertion. It can also be argued that the contrastive focus was an unexpected discourse move for the dance students, as they might have expected that both the male and the female dance partners have to make the same steps.

- (3.110) Die FRAU macht nur diese Schritte, der Mann macht den Grundschrift.
The woman makes only those steps, the man makes the basic step
 'Only the woman performs these steps while the man performs the basic step.'

Another example with contrastive focus in which the non-scalar meaning of *nur* is highlighted is given in (3.111). Two professors were recapitulating a discussion they had at a dinner after attending a guest lecture. Professor A said that they had alcohol to drink, but professor B denied that she had alcohol. Afterwards, professor A uttered the sentence (3.111A). Professor B confirms this assertion by uttering (3.111B). She wanted to make sure that those were the true facts of the matter and therefore repeated it with special emphasis. In the clause printed in bold, the restrictive meaning 'nobody but you, and especially not me' is emphasized.

(3.111) A. Dann hab nur ich gesoffen.

Then have only I drunk

‘Then only I drank [alcohol].’

B. Ja, **DU hast nur gesoffen.**

Yes, you have only drunk

‘Yes, only you drank [alcohol].’

The analysis of the examples from everyday language thus provide evidence for the assumption that speaker evaluation and emphasis have a great influence on constructions containing LeA of *nur* and *sogar*. Can we conclude from this observation that these constructions belong to the marked word orders which yield an emphatic interpretation? I argue that the answer to this question is no. I will shortly outline my argumentation in the following and explain it in more detail in Chapter 6.1.

As discussed above, it has been claimed that certain marked word orders induce an emphatic interpretation. Focus preposing is considered to belong to these structures (e.g., Frey 2010). The examples from spontaneous speech containing LeA of FPs are constructions with focus fronting, i.e., the element in the sentence-initial position is narrowly focused. I propose that the speakers do not use LeA of FPs in these examples in order to achieve an emphatic effect but they use focus preposing for this purpose. The consequence of preposing the focused constituent is that the FP is left behind, which in turn leads to LeA of the particle. An important point is that the meaning of the FP has to support the emphatic interpretation of the preposing construction in order to be felicitous in this structure. I will illustrate this point by means of Frey’s example in (3.97), repeated in (3.112) below.

(3.112) Was hat Otto heute auf dem Markt gekauft?

What has Otto today on the market bought

a. FLEISCH hat Otto heute gekauft, und 3 Pfund BaNAnen.

Meat has Otto today bought and 3 pounds of bananas

‘Today, Otto bought meat, and 3 pounds of bananas.’

b. Otto hat heute FLEISCH gekauft und 3 Pfund BaNAnen.

(Frey 2010: 1424)

I assume LeA of *sogar* can be used in (3.112a), which yields the sentence *FLEISCH hat Otto heute sogar gekauft*. The particle *sogar* supports the emphatic effect of focus preposing and strengthens the meaning that it is special that Otto bought meat. If LeA of *nur* is used

in this construction as in *FLEISCH hat Otto heute nur gekauft*, *nur* expresses that it is unexpected that Otto *only* bought meat. The use of scalar *nur* is thus also felicitous in this construction. To put it in a nutshell, my claim is that LeA of *nur* and *sogar* does not belong to the syntactic constructions whose emphatic effect is encoded in the grammar. Instead, LeA of these particles is possible in emphatic focus preposing structures, but it is only possible if the particle supports the evaluative meaning of the structure.

The following section summarizes the observations made in this chapter and provides the hypotheses developed from these observations for the experimental investigation of Chapters 4 and 5.

3.3 Conclusion and hypotheses

This chapter started with an investigation of the question provided in (3.1a), namely what kind of approaches can be found in the literature regarding LeA of FPs. This investigation showed that there are various observations concerning LeA of English and German exclusive and scalar particles. These approaches largely agree that LeA of the exclusive particle *only* is impossible or at least very restricted, while it is an acceptable construction with the scalar particle *even*. The German approaches are more heterogeneous in their judgments concerning constructions with LeA of *nur* and *sogar*. While some assume a difference between these two particles similar to the difference observed between *only* and *even*, other theories assume that it is a possible construction with both particles.

In Chapter 3.2., I investigated the question in (3.1b), namely whether examples with LeA of *nur* and *sogar* can be found in spontaneous speech and how this construction is used. The investigation showed that these constructions do indeed occur in everyday language. Analyzing these examples led to the investigation of the question in (3.1c), namely what role speaker evaluation and emphasis play in LeA of FPs. The analysis suggests that special emphasis in terms of expressive meaning and speaker evaluation is a licensing factor for LeA in different ways and interacts with focus. I do not adopt the distinction between *Special Prominence* and *Intensity* found in the literature on emphasis, as these two concepts go hand in hand in the structures under consideration. *Special Prominence* is used in the literature to refer to structures expressing contrast while *emphasis for intensity* is used to refer to structures with expressive and attitudinal evaluation. Contrastive focus is often used in utterances containing FPs, especially in structures containing exclusive particles. These

structures thus involve *Special Prominence*. However, the examples from everyday language containing contrastive focus and LeA of *only* also involve speaker attitude and thus *Intensity*. In the following, I use terms *emphasis* or *special emphasis* to refer to constructions containing the speaker's attitude and evaluation, often accompanied by emphatic speech style. Concerning LeA of *nur*, the picture emerges that this is a possible structure if

- i. the scalar meaning component of *nur* is highlighted and made prominent by context,
- ii. the speaker uses contrastive focus and expresses that something is especially important, noteworthy, or unexpected,
- iii. the speaker expresses his/her emotional involvement (e.g., feeling of happiness, excitement, disappointment, unhappiness, anger) in addition to 1. or 2.

In this dissertation, I will adopt the term *emphatic focus* for the associated focus of *sogar* or *even* from Krifka (1995), i.e., the focused element is considered to be less likely in the given context. Furthermore, I will also use *emphatic focus* for the associated focus of *nur* and *only* if speaker evaluation, special contrastive emphasis, or emotionality is involved as explained in i. to iii. above. The emphatic focus is characterized by increased stress and can additionally be characterized by further devices of emphatic speech style. According to Selting (1994), emphatic speech style can be signaled by prosodic cues like lengthening of sounds, greater loudness of voice, and higher pitch peaks and also by lexical choice (e.g., *fürchterlich* 'dreadful'), and syntactic devices like using a specific syntactic construction.

Skopeteas and Fanselow (2011: 1698) assume that constituent fronting in languages like German "[...] has the effect of attracting the hearer's attention to that portion of the utterance that may not be in line with the hearer's expectations" (see also Fanselow 2008). I follow the view that speakers use structures with constituent fronting in order to increase the hearer's attention so that the hearer becomes aware of the importance, unexpectedness, or emotionality that the speaker wants to express. In Chapter 3.2.2, I have discussed the question whether LeA of the FPs under consideration belong to the marked structures which yield an emphatic interpretation and attract the hearer's attention. I have argued that LeA does not belong to the marked focus constructions which grammatically encode emphasis but that LeA of *nur* and *sogar* is possible if these particles are inserted in such an emphatic focus structure. In order to be acceptable in this structure, the particle has to support the evaluative meaning. In Chapter 6, I will elaborate on this line of argumentation in more detail.

The above considerations lead to the hypotheses for the German particles *nur* and *sogar* in (3.2), repeated in (3.113).

- (3.113) a. RiA is the preferred word order of *nur* and *sogar*.
 b. The scalar meaning component of *sogar* licenses LeA of this particle. LeA of *sogar* is better than LeA of non-scalar *nur*.
 c. LeA of scalar *nur* is better than LeA of non-scalar *nur*.
 d. Special emphasis improves LeA of *nur*.

These hypotheses will be tested experimentally in Chapter 4. Furthermore, I will test whether these hypotheses can also be verified for the English particles *only* and *even*. I expect the hypothesis in (3.113a) to hold for the English counterparts as well. Because I do not have English examples from spontaneous speech, I cannot make any predictions on the role of scalar meaning and emphasis in LeA of *only* and *even*. Most of the English native speakers I asked doubt that LeA of *only* and *even* is used in spoken English. However, I found the example in (3.114) containing LeA of *even*, which was uttered in the US TV series *Friends*. In this scene, Monica is planning a last-minute bachelor party for Chandler and asks him who he would like to invite besides Joey. He responds that he only wants Joey and his best man Ross to be there. Ross then tells him that even he cannot come to the party.

- (3.114) Monica: Now, who else do you want to invite? [besides Joey]
 Chandler: Uh, no, no, no. Just, uh, Ross... Ross and Joey is embarrassing enough.
 Ross: Uh, actually, sorry, [**I**]_F **can't even make it.**
 (*Friends*, season 8, episode 8, 7:24–7:31)

LeA of *even* sounds very natural in this context and it is likely that LeA is used in spoken English after all.⁶⁵ It would be helpful to have more examples of LeA of *even* and also

⁶⁵ Susanne Winkler brought an attested example from spontaneous speech to my attention which also contains LeA. In (ii), the speaker functions as a tour guide and points to places that are safe and places that are not so safe.

- (ii) A leads B through Davie Village in Vancouver (Canada) where B wanted to live for the next months. Speaker A functions as a tour guide and lists places that are safe and not so safe:

A: This is the restaurant that we will go to tonight. Banana Leaf is our favorite.
 A: This is where you could have breakfast (Red Umbrella). They have fantastic bacon.
 A: **This place** (points), **I would only go to if I had to.**

(Susanne Winkler, p.c.)

The fronted element *this place* is a contrastive topic and is in the scope of *only*. However, the use of the conditional *if I had to* makes this example different from the construction with LeA investigated in this dissertation, as *only* associates with the whole VP *go to this place if I had to go to this place*. The FP *only* thus

examples of LeA of *only* from everyday speech to get an idea in which contexts these structures can occur. In accordance with the majority of judgments in the literature, I expect LeA of *even* to be more acceptable than LeA of *only*.

associates with the topicalized element *this place* but also with the material to its right. The sentence is produced with a bridge contour with a rising accent on the fronted contrastive topic and a falling sentence accent on *had*. It is an answer to the QUD *Under which circumstances would you go to this place?* Without the conditional, the sentence *This place, I would only go to* would correspond to the construction with LeA investigated in this dissertation and would be an answer to the QUD *Where would you only go to?* Although the construction differs from the construction under investigation, it shows that LeA is a phenomenon that can occur in various syntactic structures.

4 Experimental Evidence from German: The Role of Emphasis

The experiments presented in this chapter investigate the assumptions made in the literature about LeA of German FPs and the hypotheses developed in Chapter 3 (see (3.2) and (3.113)). To my knowledge, these assumptions have not yet been tested experimentally. The experiments presented in this chapter address the following questions:

- (4.1) a. Are there differences between certain German FPs with respect to LeA?
 b. What factors can facilitate or license LeA?
 c. Why can some FPs associate better to their left than others?
 d. What role do speaker evaluation and emphasis play?

My main claim is that there are specific factors which can facilitate and license the marked constructions with LeA of *nur* and *sogar*, namely prosody, scalar meaning, and emphasis.

I chose object topicalization as the first construction for both the German and the English experimental investigations for the following reasons.⁶⁴

1. In the literature, topicalization is a common construction in examples of LeA of German and English FPs.

⁶⁴ I had to exclude other constructions with extraction such as *wh*-movement for several reasons. *Wh*-questions containing an FP which associates with the *wh*-element to its left suggest that the speaker is asking for information which has been mentioned previously. In (i), speaker B is asking about the accusative object, which is the associated focus of the particle *nur* and has already been provided by speaker A.

- (i) A: Peter hat nur einen Radiergummi gekauft.
Peter has only an eraser bought
 B: WAS_i hat Peter nur t_i gekauft?
What has Peter only bought
 B': Peter hat nur WAS gekauft?
Peter has only what bought

Asking a dialog partner to close a gap which has been closed at an earlier point in the conversation is known as the *echo effect* (Reis 2012). FPs which associate with the *wh*-element lead to this effect, as they suggest that a sentence containing both the particle and its associated focus has already been uttered. In echo questions, the *wh*-word bears the nuclear accent and the position of the *wh*-word is variable, whereas the rest of the sentence is typically identical to the previous utterance. The question in B could therefore also have been uttered as in B' with the *wh*-word in a position to the right of the particle *nur*. As *wh*-questions containing an FP which associates with the *wh*-element are echo-questions and therefore have special properties, I did not use this construction for my studies. Additionally, focusing elements may interfere with the interpretation of *wh*-questions and cause so-called intervention effects (see Beck 2006, among others). These intervention effects could then be responsible for the unacceptability of *wh*-questions containing an FP and not the LeA of the particle.

2. Topicalization is usually analyzed as a construction which involves extraction and movement (see Bader & Frazier 2005; Frey 2005a, b; Sternefeld 2006; Radford 2009; Pafel 2011; among others).
3. The examples of LeA of German FPs that I collected from everyday language also include examples with object topicalization (see Chapter 3.2).

I chose subject association as the second structure for testing LeA of FPs, as it is also a common structure in examples provided in the literature and most of the examples I collected from everyday language contain subject association (see Chapter 3.2). Moreover, SVO order is a more natural construction than object topicalization, especially in English.

This chapter is divided into three parts: Chapter 4.1 starts with an overview of topicalization in German and then presents rating studies testing the German FPs *nur* ('only'), *sogar* ('even'), and *auch* ('also') in topicalization structures. Moreover, one experiment investigates the role of prosody in these constructions. Chapter 4.2 presents an experiment on LeA of *nur*, *sogar*, and *auch* in a construction with subject association. Chapter 4.3 investigates the role of scalarity and emphasis in LeA of the particle *nur*. Chapter 4.4 provides a short summary and discussion of the experiments of this chapter.

4.1 German focus particles in topicalization structures

The structure of German sentences is often described using the so-called *topological model*.⁶⁵ Two terms which denote different positions of this model will be used in this chapter in order to explain German topicalization: the *prefield* and the *middle field*. In independent declarative clauses, the finite verb is always in the second position of the sentence and basically any constituent can precede the finite verb. German is thus described as a verb-second (V2) language. The *prefield* is the position immediately preceding the finite verb in a non-embedded declarative clause and can be occupied by a constituent of any grammatical function, for example, subject, object, or adjunct (e.g., Fanselow & Lenertová 2011). The *middle field* refers to the position between the finite verb, which is positioned in the *left sentence bracket*, and the (possible) verbal elements at the end of the clause, which are

⁶⁵ See, for example, Drach (1963), Höhle (1986), Pafel (2011), and Wöllstein (2010) for discussions of topological models.

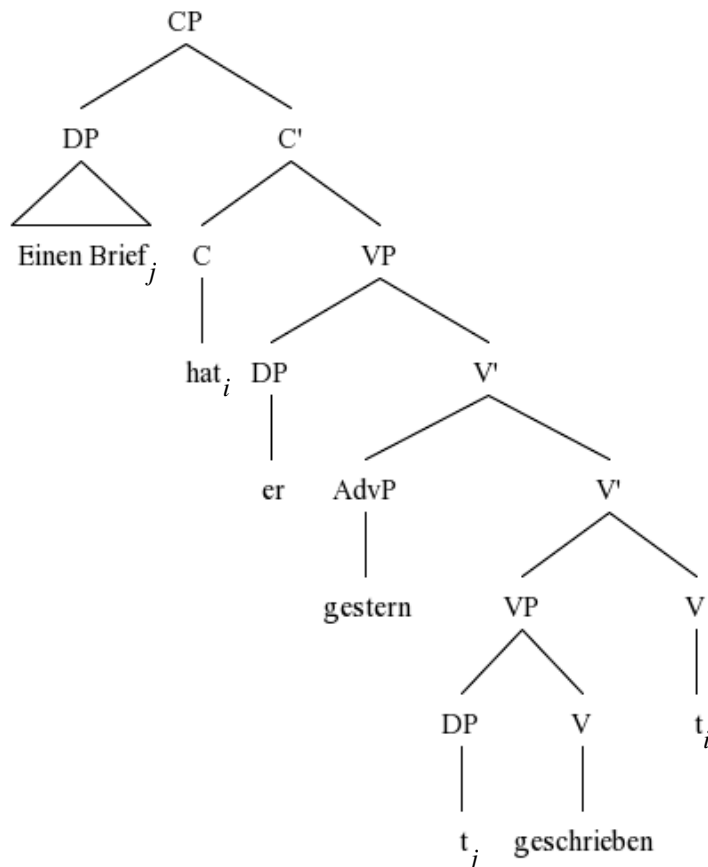
positioned in the *right sentence bracket* (e.g., Wöllstein 2010). The basic topological model of a German canonical V2-sentence and an example are shown in Table 4.1.

Vorfeld (‘Prefield’)	Linke Satzklammer (‘Left sentence bracket’)	Mittelfeld (‘Middle field’)	Rechte Satzklammer (‘Right sentence bracket’)
Die Studenten <i>The students</i>	haben <i>have</i>	für die Prüfung <i>for the exam</i>	gelernt <i>studied</i>

Table 4.1: Basic topological model of a V2-sentence (cf., e.g., Wöllstein 2010).

Topicalization in German is standardly analyzed as \bar{A} -movement of a constituent which is not interrogative or relative to the *prefield* (e.g., Frey 2005b; Pafel 2011). In syntactic tree structures, topicalized elements are moved to SpecCP, which corresponds to the *prefield*. Moreover, the finite verb is moved to C, which corresponds to the *left sentence bracket* (Sternefeld 2006). In (4.2), an example sentence with object topicalization is analyzed in a syntactic tree structure.

(4.2)



(cf. Sternefeld 2006: 334)

There is also a base-generated account of German topicalization which assumes that the fronted constituent is base-generated in the *prefield* and not moved to the sentence-initial position (see, e.g., Cardinaletti 1988). I will, however, follow the widely accepted movement account and more specifically the analysis by Frey (2006), which assumes that no element which is rich in content can be base-generated in the *prefield*.

It is important to note that the preposed element can not only be topical but also focal despite the term *topicalization* (Fanselow & Lenertová 2011). According to Scheutz (1997), a topicalized element which carries a focus accent draws the hearer's attention to this element (Scheutz 1997: 205). In contrast to English, the preposed constituent does not have to provide a link to the preceding discourse (see section 5.1 for a discussion of English topicalization). Topicalization in German is a good way to continue the discourse but it can also be used at the beginning of a new discourse. The preposed constituent forms one intonation unit with the rest of the clause (Frey 2005a). Frey (2004, 2006) claims that there are two movement types in German by which constituents of the *middle field* are moved to the *prefield*:

1. True \bar{A} -movement involves movement of a constituent in the *middle field* which is not in the highest position of the *middle field*. The moved constituent receives a contrastive interpretation.
2. Formal Movement (FM) moves the highest constituent of the *middle field* to the *prefield*. This movement does not have the effect of the moved element being interpreted contrastively.

Frey (2006) shows that constituents which have undergone long topicalization as in (4.3a) are always stressed and receive a contrastive interpretation. Therefore, long topicalization is an instance of true \bar{A} -movement. Long topicalization from *dass*-clauses is, however, a marginal and restricted construction and is more acceptable with topicalized objects than with topicalized subjects (Featherston 2004; Kiziak 2010). Short topicalization of objects is quite common in German and can involve either true \bar{A} -movement or FM. In (4.3b), the topicalized object *den Hans* is not necessarily stressed but can be stressed in a context which triggers a contrastive interpretation by providing a set of alternatives to *Hans*.

- (4.3) a. [CP Den Hans₁ [[C hat₂] [IP Karl [CP dass Maria t₁ morgen
The H.-ACC has Karl that Maria tomorrow
 treffen wird behauptet t₂]]]⁶⁶
meet will claimed
- b. [CP Den Hans₁ [[C wird₂] [IP Maria t₁ morgen treffen t₂]]]
The H.-ACC will Maria tomorrow meet
- (Frey 2006: 236)

Frey (2004) splits the left periphery of German into different positions. Under his analysis, constituents with a contrastive interpretation move into SpecKontrP. Constituents without a contrastive interpretation are moved via FM to SpecFinP (Frey 2004: 29). For reasons of simplification, I will not adopt this analysis in this dissertation, and topicalized elements are assumed to occupy the SpecCP position. The experimental items used in the current study about German FPs in topicalization structures always involve a contrastive interpretation of the fronted constituent and therefore true \bar{A} -movement.⁶⁷

4.1.1 German experiment 1: Comparison between *nur* and *sogar* in short and long topicalization structures

The goal of the first study was to get a first answer to the research question in (4.1a), namely whether there are differences between certain FPs with respect to LeA. The focus sensitive particles under consideration are *nur* and *sogar*. As has been elaborated in Chapter 3.1, it is debated in the literature whether or not these particles behave differently in constructions with LeA. Since the examples of LeA of *nur* in the literature usually highlight the non-scalar interpretation of the particle, the items of this study also contained non-scalar *nur*.

⁶⁶ According to my judgments and the judgments of several colleagues, this is not a good sentence.

⁶⁷ There are also split topicalization structures in German which could play a role in sentences with LeA of FPs in topicalization, as these structures seem to be similar. In split topicalization, only a part of the noun phrase is moved to the *prefield*. An example of split topicalization which contains an FP is provided by Fanselow and Āavar (2002: 3): “Autos besitzt er (nur) schnelle. ‘As for cars, he owns (only) fast ones.’” (see, e.g., Fanselow & Lenertová 2011 and Ott 2012 for further examples). However, the FP is usually not analyzed as belonging to the part of the DP which stays in situ. Moreover, it is controversial whether split topicalization structures involve movement at all (cf., e.g., Kuhn 2001; Molnár & Winkler 2010; Ott 2012 for different analyses of split topicalization).

4.1.1.1 Data elicitation

Design and materials. The first German experiment was an acceptability judgment task. The rating study consisted of two subexperiments, one experiment testing the particle *nur* and one testing *sogar*. There were 20 items for each particle which were very similar but differed slightly because of the particles' different meanings. Items consisted of question-answer pairs in which the questions served as a context used to force the FP in the answer to associate with the direct object. I constructed contexts in which the answers should be equally good for both *nur* and *sogar* so that the two particles can be compared nicely. An example item for *nur* is given in (4.4), while the same item for *sogar* is given in (4.5).

- (4.4) Q1: Glaubst du, dass Peter alle Süßigkeiten aus dem Schrank gegessen hat?
'Do you think that Peter ate all the candy from the cupboard?'

Condition 1: particle-XP, long (SVO with embedded clause):

A1: Nein. Ich glaube, dass er nur die Lakritzstangen gegessen hat.
No. I think that he only the licorice-sticks eaten has

Condition 2: XP-particle, long (topicalization with embedded clause):

A2: Nein. Die Lakritzstangen glaube ich, dass er nur gegessen hat.
No. The licorice-sticks believe I that he only eaten has

Q2: Hat Peter alle Süßigkeiten aus dem Schrank gegessen?
Has Peter all candy from the cupboard eaten

Condition 3: particle-XP, short (SVO without embedded clause):

A3: Nein. Er hat nur die Lakritzstangen gegessen.
No. He has only the licorice-sticks eaten

Condition 4: XP-partile, short (topicalization without embedded clause):

A4: Nein. Die Lakritzstangen hat er nur gegessen.
No. The licorice-sticks has he only eaten

- (4.5) Q1: Glaubst du, dass Peter viele Süßigkeiten aus dem Schrank gegessen hat?
'Do you think that Peter ate much candy from the cupboard?'

A1: Ja. Ich glaube, dass er sogar die Lakritzstangen gegessen hat.
Yes. I think that he even the licorice-sticks eaten has

A2: Ja. Die Lakritzstangen glaube ich, dass er sogar gegessen hat.
Yes. The licorice-sticks believe I that he even eaten has

Q₂: Hat Peter viele Süßigkeiten aus dem Schrank gegessen?
Has Peter much candy from the cupboard eaten

A₃: Ja. Er hat sogar die Lakritzstangen gegessen.
Yes. He has even the licorice-sticks eaten

A₄: Ja. Die Lakritzstangen hat er sogar gegessen.
Yes. The licorice-sticks has he even eaten

The questions of conditions one and two (Q₁) were complex yes-no questions. One of the two bridge verbs *glauben* ('believe') or *denken* ('think') introduced the embedded *dass*-clause ('that-clause'). The perfect tense was used, as this is the most common past tense form in German everyday language (Thieroff & Vogel 2012). In the questions, a superset was introduced which followed a quantifier like *alle* ('all'), *viele* ('many'), or *mehrere* ('several'). In the items with *nur*, the particle provided a contrast to these quantifiers and excluded all the alternatives which are implied in the question except for one alternative. The primary meaning of *nur* in this context corresponds to what Altmann (1976b) calls the *quantitative use of nur* and to what Löbner (1990) calls the *autonomous* or *semantic use of nur*, which has the meaning *nothing but* (see Chapter 2.4.1 for different uses of exclusive particles). The *sondern auch-test* by Löbner (1990) confirms this analysis (see Chapter 2.4.1, page 40):

(4.6) Er hat nicht nur die Lakritzstangen gegessen, sondern auch die Schokoriegel.
He has not only the licorice-sticks eaten but also the candy bars

However, an additional *scalar* or *pragmatic* interpretation cannot be excluded. In the example in (4.4), the particle could, for example, be interpreted with a pejorative meaning, which can be paraphrased with 'Don't worry. He didn't eat the good pieces of candy, only the not so good licorice sticks.' Speaker B then appeases speaker A by considering licorice sticks to be little or bad (cf. Hole 2015). However, the non-scalar use of *nur* is more prominent in the items.

In the items with *sogar*, the particle confirms that all the alternatives implied in the question apply and adds that something unexpected is also part of the alternatives.

In most items, the superset in the questions was, for example, specified by a prepositional phrase. In the questions of examples (4.4) and (4.5), *Süßigkeiten* ('candy') is the superset which is specified by *aus dem Schrank* ('candy from the cupboard'). This suggests that both speaker and hearer know about the cupboard which contains candy. In cases where

the noun introduced a specific superset on its own, it was not specified any further, as, for instance, in the question *Hat Mona mehrere Computerspiele gespielt?* ('Did Mona play several computer games?'). Specifying the superset *computer games* by using a prepositional phrase like *on the computer* would be redundant information, as this is already implied by *computer games*.

The answers contained a subset of the superset which was introduced in the question. In the example items (4.4) and (4.5), the noun *Lakritzstangen* ('licorice sticks') forms a subset of the complex noun phrase *Süßigkeiten aus dem Schrank* ('candy from the cupboard') which was introduced in the question. It was chosen as the object, because a lot of people do not like licorice, which makes the answers with *even* plausible, i.e., it is plausible to assume that it was unexpected for Peter to eat licorice. It also works for the items with *only*, as it is also plausible that Peter ate licorice sticks and not any other kinds of candy from the cupboard, which implies that Peter likes licorice sticks.

The target sentence of condition 1 (A₁) had canonical word order and a subordinate clause. The target of condition 2 (A₂) was an example of long object-topicalization and therefore extraction out of the *dass*-clause. I took long topicalization as a second condition in order to see whether a difference between the two particles can be observed in this construction, which is more marked than short topicalization (see the discussion in 4.1) and has more material between the particle and its associated focus. The yes-no question for conditions 3 and 4 (Q₂) only differed from Q₁ in that it did not contain an embedded clause. The target of condition 3 (A₃) had canonical word order, whereas the target of condition 4 (A₄) was a short topicalization construction. The target sentences of the items had to start with *Nein* ('No') in order to be plausible in the conditions with *nur*, and they had to start with *Ja* ('Yes') in order to be plausible in the conditions with *sogar*.⁶⁸

In addition to the 40 experimental items, there were 40 filler items with differing levels of perceived well-formedness. Among the filler items were ten normed sentences with five levels of grammaticality ranging from grammatical (Standard A) to ungrammatical (Standard E) (cf. Featherston 2009).⁶⁹ I constructed questions as contexts for the standard

⁶⁸ By using non-affirmative *nur* and affirmative *even*, I could use the same contexts for both particles. Different contexts for the two particles must be used in sentences with affirmative *nur* and affirmative *even* or non-affirmative *nur* and non-affirmative *even* in order for the context to make sense for both particles. Although it has been shown that words like *yes* or *no* can have an effect on the following sentence with marked word order (Schmeh et al. 2015), I do not expect such an effect in this experiment. See Chapter 4.3 for studies with affirmative *nur*.

⁶⁹ The normed sentences were kindly provided by Sam Featherston.

sentences which lead to a broad focus interpretation of the answers. All experimental items are listed in the appendix B1 (pages vii-xiii).

Procedure. Items and fillers were distributed across four lists using the Latin square design. Each participant saw every item twice in different conditions, one time with *nur* and one time with *sogar*. Items were presented in isolation and in random order as short pseudo-dialogues between two people named Petra and Sonja. Questions were preceded by the phrase *Petra fragt:* ('Petra asks:') and answers were preceded by the phrase *Sonja antwortet:* ('Sonja answers:'). The task was to rate the naturalness of Sonja's answer on a seven-point rating scale. The experiment was uploaded on the OnExp2 server of the University of Tübingen⁷⁰ and conducted on the internet. Participants first saw the experiment instructions which explained the test procedure and contained three example items of varying degrees of grammaticality with suggestions as to how these examples could be rated. The instructions were followed by a data window asking participants to enter some personal information about their native language, dialect region, age, gender, and handedness. All personal information was treated anonymously. The actual experiment was preceded by a practice session in order to familiarize participants with the task.

Participants. Thirty-two German native speakers participated in the experiment (22 females and 10 males, aged 19 to 31, average age: 23.6).⁷¹ Participants were recruited via the participant list of the collaborative research center SFB 833 of the University of Tübingen and received an OnExp-link to the experiment via email. They were naïve to the purpose of the study.

⁷⁰ <http://www.lingexp.uni-tuebingen.de/OnExp2/index.php> (access: February 15th, 2015)

⁷¹ Four additional participants had to be excluded due to technical problems with the software OnExp. Technical problems in OnExp arise, for example, if several participants work on the experiment at the same time. A typical error is that participants see some of the items more than once while other items are not displayed at all. This can be seen in the OnExp output file.

4.1.1.2 Hypotheses

The hypotheses for this experiment are given in (4.7).

- (4.7)
- a. Canonical word order with RiA of the particles *nur* and *sogar* should be rated better than topicalization with LeA of the particles.
 - b. Short topicalization should be rated better than long topicalization for both particles. No difference between the canonical sentences with and without embedded clauses is expected.
 - c. LeA of *sogar* is expected to receive higher ratings than LeA of *nur*.

I expect a significant effect of *word order* (4.7a), as RiA of the particles is the preferred structure. This should hold for both the embedded and the non-embedded versions of the items. I postulate the hypothesis in (4.7b), as extraction from *dass*-clauses is a marked construction in German. According to the hypothesis in (3.113) of Chapter 3.3, I expect a significant difference between LeA of *sogar* and LeA of *nur* (4.7c), as the items with *nur* suggest a non-scalar reading in this experiment. The assumption that there is a difference between the two particles is, for example, supported by Hoeksema and Zwarts' (1991) and Abraham's (2005) observations while Altmann (1976a), Primus (1992), Krifka (1999), and Erlewine (2014) assume that LeA should be possible with both particles (see Chapter 3.1). Except for Altmann (1976a), none of these authors suggest a difference between scalar and non-scalar *nur*.

4.1.1.3 Results and discussion

I analyzed the items with *nur* and the items with *sogar* in one analysis. The results are illustrated in Figure 4.1. Red bars show the mean ratings of the items with *nur*, blue bars show the mean ratings of the items with *sogar*, and black bars represent the standard filler sentences.

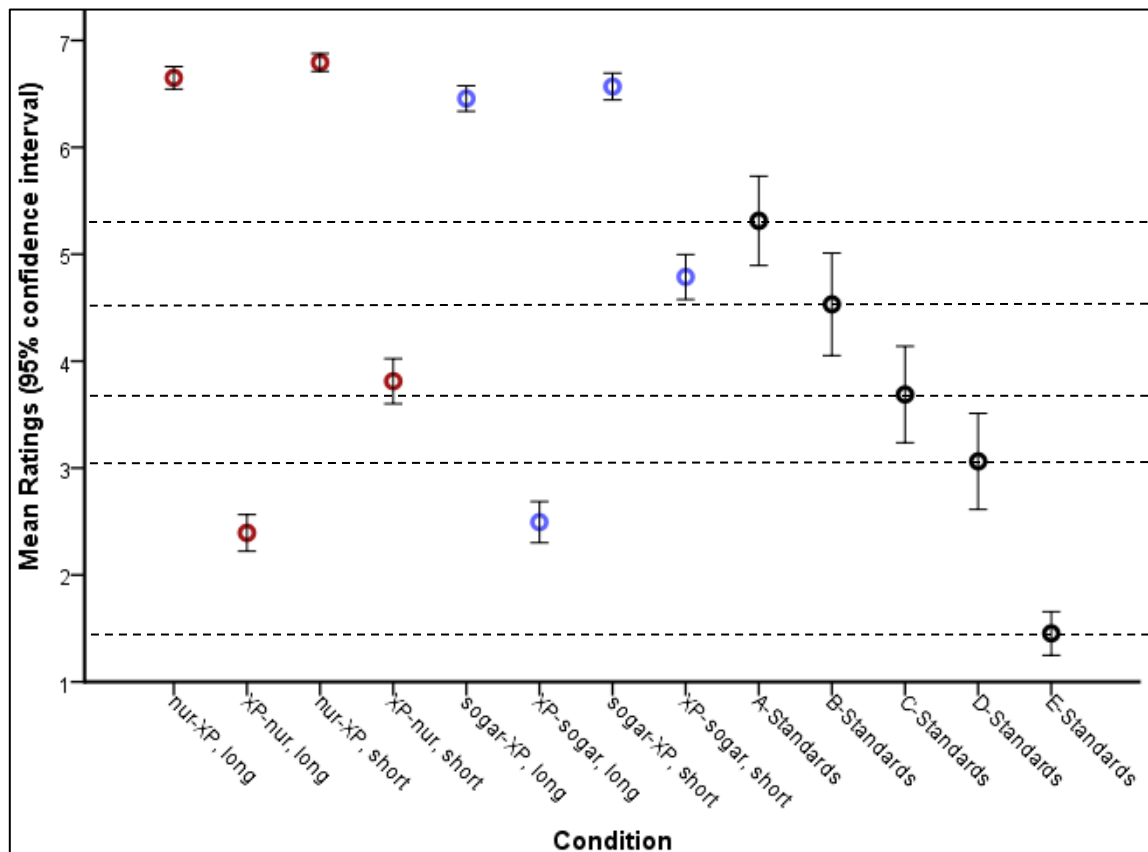


Figure 4.1: Mean ratings of *nur* and *sogar* in canonical (particle-XP) and non-canonical (XP-particle) word order with embedding (long) and without embedding (short). Black bars show standard items.

I conducted a Linear Mixed Effect Model (LMEM) analysis to investigate effects of the factors *particle type* (*sogar* vs. *nur*), *word order* (particle-XP vs. XP-particle) and *complexity* (complex sentence with embedded clause vs. simple sentence without embedded clause). For this analysis, I used the *lme4* package, version 1.1-7 (Bates et al. 2015) for R (R Core Team 2015). As recommended by Baayen (2008) and Baayen et al. (2008), I included crossed random subject and item effects in my models in order to account for by-subject and by-item variance. I compared simpler models to more complex nested models by performing likelihood-ratio tests in order to see whether the inclusion of fixed and random effects is justified (cf. Baayen 2008). I retained those models which were less complex and better fitting. Following Shaoul et al. (2014), the Akaike Information Criterion (AIC) was also taken into account for model quality. All models are written in R-syntax in the following. For this first study, I provide a detailed description of the LMEM analysis. The statistics of the following studies will not be described in detail.

I started with a null model which did not contain any fixed factors and only assumed random subject (1|vp) and random item (1|item) effects:

Model 0: $\text{rating} \sim 1 + (1|\text{vp}) + (1|\text{item})$.

I then tested using likelihood-ratio tests whether both random intercepts are justified and found that the random intercept for item does not improve the model. Therefore, I assumed for the following models that the intercept does not have to be adjusted for the individual items. That there is little variation between the individual items is illustrated in Figure 4.2 which shows mean ratings per item.

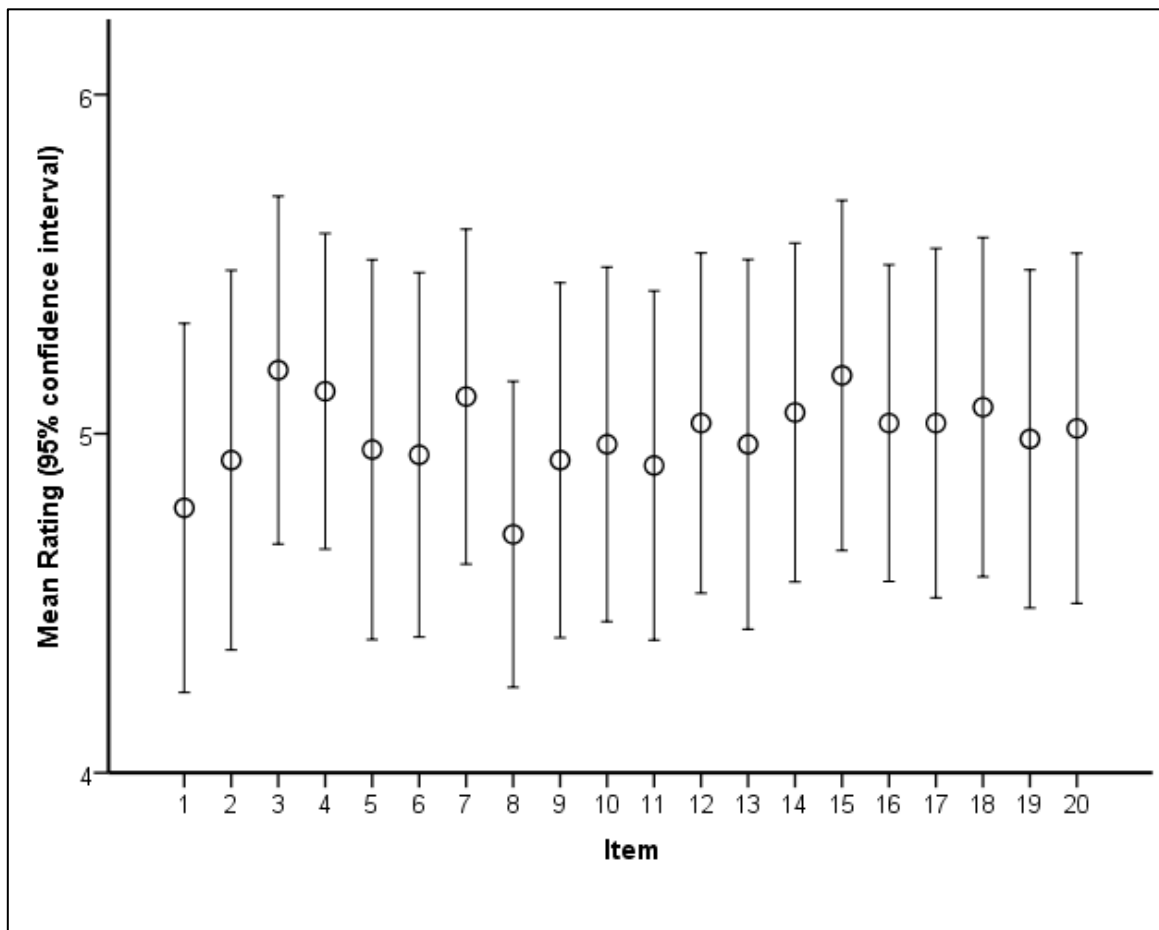


Figure 4.2: Mean ratings per item.

I continued the model comparisons with model 0a:

Model 0a: rating $\sim 1 + (1|vp)$.

In a next step, I compared model 0a to the following two models:

Model 1a: rating $\sim wo + (1|vp)$

and

Model 1b: rating $\sim complex + (1|vp)$.

Model 1a contained the fixed factor *word order* (*wo*); model 1b contained the fixed factor *complexity* (*complex*). The likelihood-ratio tests revealed that model 1a explained the data significantly better than model 0a ($\chi^2(1) = 1354, p < 0.001$). This main effect of *word order* confirms the hypothesis in (4.7a), as sentences with RiA of the FPs were rated better than the conditions with topicalization structures. As can be seen in Figure 4.1, the items with RiA reached ceiling for both *nur* and *sogar*, which shows that the contexts made sense for both particles. These items were rated better than the A-standards.

Model 1b also explained the data significantly better than model 0a ($\chi^2(1) = 79.73, p < 0.001$), which reflects a main effect of *complexity*. However, model 1a had a lower AIC ($AIC_a = 4105.8$ vs. $AIC_b = 5380$), which shows that model 1a performed better than model 1b. Therefore, the next model (model 2), which contained both the main effect *word order* and the main effect *complexity*, was tested against model 1a.

Model 2: rating $\sim wo + complex + (1|vp)$.

This test showed that model 2, which included both fixed effects, is a better model ($\chi^2(1) = 252.44, p < 0.001$). I then added an interaction of *word order* and *complexity* to model 2:

Model 3: rating $\sim wo + complex + wo:complex + (1|vp)$.

The χ^2 -test showed that model 3 performed better than model 2 and indicated a highly significant interaction between the factors *word order* and *complexity* ($\chi^2(1) = 232.57, p < 0.001$). The conditions without embedding were rated better than the conditions with embedding. This effect was bigger for the items with topicalization than for the items with canonical word order, which is confirmed by the significant interaction of *word order* and

complexity. As shown in Figure 4.1, the ratings of items with long extraction are between the ratings of E-standards and D-standards and can therefore be considered to be unnatural. The hypothesis in (4.7b) was thus confirmed, as long extraction was rated worse than short extraction for both particles. Note that the difference between E-standards and D-standards is larger than the difference between all the other standard items. We thus observe a bottom effect for E-standards.

I then added the random slope for subject to the model:

Model 4: rating ~ wo*complex + (1+wo*complex|vp).

This model performed better than model 3 ($\chi^2(9) = 252.56, p < 0.001$). The test whether a random slope for item should also be added did not reveal a significant effect. Therefore, I did not add the random slope for item to my model and thus assume that the interaction between *word order* and *complexity* is invariant across items. In a next step, I added the fixed effect *particle type* (type) to model 4:

Model 5: rating ~ wo*complex + type + (wo*complex|vp).

A comparison to model 4 showed that model 5 was a better model ($\chi^2(1) = 12.33, p < 0.001$), which indicates a difference between the two FPs *nur* and *sogar*. I then built two models by adding the interaction between *type* and *word order* (model 6a) and the interaction between *type* and *complexity* (model 6b) to model 5:

Model 6a: rating ~ wo*complex + type + type:wo + (wo*complex|vp)

and

Model 6b: rating ~ wo*complex + type + type:complex + (wo*complex|vp).

The χ^2 -test revealed that Model 6a explained the data significantly better than model 5 ($\chi^2(1) = 66.02, p < 0.001$) as did model 6b ($\chi^2(1) = 20.67, p < 0.001$). As model 6a had a lower AIC than model 6b (AIC_a = 3315.9 vs. AIC_b = 3361.2), I then compared a model with both interactions (model 7) to model 6a.

Model 7: rating ~ wo*complex + type + type:wo + type:complex + (wo*complex|vp).

The χ^2 -test showed that model 7 performed better than model 6a ($\chi^2(1) = 21.86, p < 0.001$).

I then compared model 7 to model 8, which included the interaction of *word order*, *complexity*, and *particle type*. This comparison revealed that model 8 was a better model ($\chi^2(1) = 25.73, p < 0.001$), which shows that the interaction between the three fixed factors is significant.

Model 8: rating ~ wo*complex*type + (wo*complex|vp).

Adding the random slope for *particle type* did not improve the model. Therefore, model 8 is the best fitting model for my data. The parameters of the final model and a table with the confidence intervals can be found in the appendix B.1 (pages xiii-xiv). Table 4.2 summarizes the significant main effects and interactions of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0a vs. Model 1a]	particle-XP vs. XP-particle	<i>word order*complexity</i> (***) [Model 3 vs. Model 4]
<i>complexity</i> (***) [Model 1a vs. Model 2]	embedded clause vs. simple sentence	<i>word order*particle type</i> (***) [Model 5 vs. Model 6a]
<i>particle type</i> (***) [Model 4 vs. Model 5]	<i>nur</i> vs. <i>sogar</i>	<i>complexity*particle type</i> (***) [Model 5 vs. Model 6b]
		<i>word order*complexity*particle type</i> (***) [Model 7 vs. Model 8]

Table 4.2: Summary of the model selection, German exp. 1 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

The effect of *particle type* suggests a difference between the two FPs which interacts with *word order*. In order to get a clearer picture of these differences, I performed paired t-tests. The paired t-test comparing the two FPs in topicalization structures revealed a significant effect ($t(319) = 4.96, p < 0.001$), which shows that LeA of *sogar* works better than LeA of *nur*. Therefore, the hypothesis in (4.7c) was confirmed. However, this difference only held in the items with short topicalization. In these items, the effect was significant ($t(159) = 7.8, p < 0.001$). As shown in Figure 4.1, short topicalization of *nur* was rated a bit better than C-Standards, and short topicalization of *sogar* was rated a bit better than B-Standards. The difference between *nur* and *sogar* was not significant in the items with long topicalization

($t(159) = 1.16, p > 0.1$). The sentences with long extraction received lower ratings than D-Standards for both particles. Long topicalization therefore seems to be too unnatural to show a contrast between the particles.

Items with *nur* were rated significantly better than items with *sogar* in canonical word order ($t(319) = -4.26, p < 0.001$). This difference might be due to a frequency effect, as *nur* is used more often than *sogar*. The search for *nur* in the DeReko 2014-II corpus via COSMAS II⁷² led to 11,265,529 hits, whereas the search for *sogar* led to 1,641,753 hits which shows that *nur* is more frequent than *sogar*. Another explanation might be that the contexts of my items were best suited for the meaning of *nur*. In the items with *nur*, alternatives are excluded straightforwardly and no further assumptions must be made about the sentences. In the items with *sogar*, on the other hand, participants infer that there is something surprising about the event described in the sentences. In the example in (4.5), the particle *sogar* suggests that it is unlikely for Peter to eat the licorice sticks. As there is no further information given, participants have to infer why this should be unlikely. This makes the items with *sogar* more complex than the items with *nur*. Moreover, probably not all participants agree that eating licorice sticks is an unlikely event.

The difference between *nur* and *sogar* in short topicalization structures confirms Hoeksema and Zwarts' (1991) and Abraham's (2005) assumption that LeA of *sogar* is more acceptable than LeA of *nur*. A point to consider is that the questions in the conditions with *sogar* are already fully answered by means of *Ja* and the sentences with *sogar* only provide further information. This could make these items more acceptable. In the conditions with *nur*, *Nein* is not a complete answer to the question and more information necessarily has to follow. However, if this were an explanation for the difference between the particles, I would not expect the items with *nur* to receive better ratings than the items with *sogar* in canonical word order.

Prosody plays a major role when it comes to focus constructions, especially if the focused element is topicalized. In this first written experiment, I did not explicitly control for prosody and the context questions were the only clue to the InfS of the answers. A major concern about this study, therefore, is that it is unclear which readings of the sentences participants rated.

⁷² <http://www.ids-mannheim.de/cosmas2/web-app/> (access: September 21st, 2015)

In the topicalization conditions, participants might have associated the particles to their right and put the focus on the verb phrase.⁷³ If that was the case, the target sentences would have been grammatical but unnatural as answers to the questions. I therefore conducted a follow-up study with prosodic information in order to highlight the focused material associated with the particles. However, I did not expect the prosodic information to change the overall pattern of results drastically, as the context should have given participants the relevant information as to where to put the focus in the answers. Prosodic information might, however, facilitate LeA of the particles investigated in this dissertation. The follow-up study is presented in the next section.

4.1.2 German follow-up study 1: Comparison between *nur* and *sogar* with capital letters

In this study, the focused elements were written in capital letters, which hinted at prosodic information. Participants were informed that capital letters are supposed to show emphasis in the sense of word stress. The question arises whether participants know how to emphasize words in a written text and where they should put the main stress. Most people should be familiar with the use of capital letters in written texts, as it can be found, for example, in advertisements, headlines, and in literature. In children's literature which is supposed to be read to younger children, capital letters are used to show the reader which words should be stressed while reading. Authors who use this technique must assume that the reader knows how to pronounce capitalized words, otherwise they would not use capital letters. The example in (4.8) is taken from the German children's book "Schnuddel pflanzt einen Gummibärenbaum" ('Schnuddel plants a gummy bear tree') and example (4.9) is taken from the English children's book "You're a Bad Man, Mr Gum!".

⁷³ I follow the assumption that there is an implicit prosody during silent reading, i.e., that the reader projects sentence intonation (e.g., stress, phrasing, and rhythm) onto written text and that implicit prosody can influence the reader's text interpretation (e.g., Fodor 2002; see Breen 2014 for a review).

(4.8) „[...] Und was wird nun aus dem Pflaumenkern?“

And what will-become now of the plum seed

„Ein Apfelbaum mit tausend Pflaumen, Mister Meister Bockelmist.“

An apple-tree with thousand plums Mister Master Bockelmist

„Falsch, mein Junge. Ein PFLAUMENbaum mit tausend Pflaumen.“

Wrong, my boy. A PLUM-tree with thousand plums

(Eckert [Janosch] 2009: 17)

(4.9) Mr. Gum’s bedroom was absolutely grimsters. The wardrobe contained so much mould and old cheese that there was hardly any room for his moth-eaten clothes, and the bed was never made. (I don’t mean that the duvet was never put back on the bed, I mean the bed had never even been MADE. Mr. Gum hadn’t gone to the bother of assembling it. He had just chucked all the bits of wood on the floor and dumped a mattress on top.)⁷⁴

(Stanton 2006: 4)

The capital letters in (4.8) show that special emphasis should be put on *Pflaumen* while reading, as the speaker Mister Meister Bockelmist is correcting the main character Schnuddel by contrasting the fruit *Pflaumen* with the fruit *Apfel*, which Schnuddel mentioned in the previous sentence. *Pflaumen* should therefore receive contrastive stress. In (4.9), the reader probably interprets the phrase *the bed was never made* in the common idiomatic way, namely that Mr. Gum never arranges his bed and the covers after sleeping in the bed. By putting prosodic emphasis on *made*, the author, however, corrects this interpretation and it becomes clear that the literal meaning of making the bed applies in this context, namely to assemble the bed. The example in (4.10) is a headline from an online sports website which also makes use of capital letters in order to put special emphasis on the word *so* (‘this way’).

(4.10) Bundesliga-Kommentar: Musste das wirklich SO enden?

‘German soccer league comment: Did it really have to end THIS WAY?’

(Tobias Hlusiak, 15.04.2015)⁷⁵

⁷⁴ Thanks to Wiltrud Wagner for this example.

⁷⁵ Retrieved from: <https://de.eurosport.yahoo.com/news/bundesliga-kommentar-musste-wirklich-so-enden-123948198--sow.html> (last access: April 16th, 2015)

4.1.2.1 Data elicitation

Design and materials. The 30 items and 40 fillers corresponded to the items of the first judgment study with the modification of using capital letters for prosodically highlighted material.⁷⁶ In the questions, the quantifiers like *alle* ('all') or *viele* ('many') were written with capitals. Highlighting these words should strengthen the intended meanings of the particles in the answers, i.e., the exhaustive meaning of *nur* which contrasts with *alle* or *viele*, and the meaning of *sogar* that the answer is unexpected. In the answers, the accusative object was written with capitals, as this element carried the focus and should be associated with the particle. The whole accusative object was written in capitals, although only one syllable carried stress. I did not only write the stressed syllable in capital letters, as it might be more confusing to read words which are partly written in capital letters. An example item with *nur* is shown in (4.11).

- (4.11) Q₁: Glaubst du, dass Peter ALLE Süßigkeiten aus dem Schrank gegessen hat?
'Do you think that Peter ate all the candy from the cupboard?'
- A₁: Nein. Ich glaube, dass er nur die LAKRITZSTANGEN gegessen hat.
No. I think that he only the licorice-sticks eaten has
- A₂: Nein. Die LAKRITZSTANGEN glaube ich, dass er nur gegessen hat.
No. The licorice-sticks believe I that he only eaten has
- Q₂: Hat Peter ALLE Süßigkeiten aus dem Schrank gegessen?
Has Peter all candy from the cupboard eaten
- A₃: Nein. Er hat nur die LAKRITZSTANGEN gegessen.
No. He has only the licorice-sticks eaten
- A₄: Nein. Die LAKRITZSTANGEN hat er nur gegessen.
No. The licorice-sticks has he only eaten

Procedure. The procedure was identical to the procedure of the first experiment with the exception that the instructions were adapted to the method of using capital letters. In the instructions, participants were informed that capital letters are supposed to show emphasis, accompanied by the example in (4.12), which should clarify the function of capitals. Here,

⁷⁶ Note that the standard filler items also contained a focused word written in capital letters in this experiment. It could be that the use of capital letters also affects the ratings of the standard filler items.

the name *David* is written in capital letters and contrasts with *Fritz*. Therefore, *David* carries contrastive focus.

(4.12) Berta sagt: Fritz hat den Goldfisch gefüttert.

Berta says: Fritz has the goldfish fed

Emma erwidert: Nein, DAVID hat den Goldfisch gefüttert.

Emma replies: No, DAVID has the goldfish fed

The task was to rate the naturalness of the answers on a seven-point scale. Items were distributed across four lists using the Latin square design and uploaded on the OnExp2 server of the University of Tübingen.

Participants. Thirty-two German native speakers participated in the experiment (26 females and 6 males, aged 19 to 38, average age: 23.5).⁷⁷ None of the participants had taken part in the first experiment and they were naïve as to the purpose of the study. The participants were again recruited via the participant list of the collaborative research center SFB 833 and received a link to the experiment via email.

4.1.2.2 Hypotheses

The hypotheses for this follow-up study are listed in (4.13). Hypotheses (4.13a) to (4.13c) correspond to the hypotheses of the previous experiment. Capital letters are expected to facilitate LeA of *nur* and *sogar* (4.13d). Therefore, LeA should work better in this rating study than in the first one. However, the overall pattern of results should not differ from the first, as I assume that the participants of the first experiment placed the focus correctly due to the information provided by the context.

- (4.13) a. As in the preceding experiment, RiA of the FPs should receive better ratings than LeA.
- b. Short topicalization should receive better ratings than long topicalization.
- c. LeA of *sogar* should receive better ratings than LeA of *nur*.

⁷⁷ Eight additional participants were excluded. Those participants were excluded whose results were unusable due to technical difficulties with the software OnExp. Moreover, some participants were randomly excluded in order to have an equal number of participants per list.

- d. Leftward association is expected to be facilitated in this experiment by means of capital letters.

4.1.2.3 Results and discussion

The results are illustrated in Figure 4.3. As above, red bars illustrate the mean ratings of the items with *nur*, blue bars illustrate the mean ratings of items with *sogar*, and black bars illustrate the mean ratings of the standard filler items.

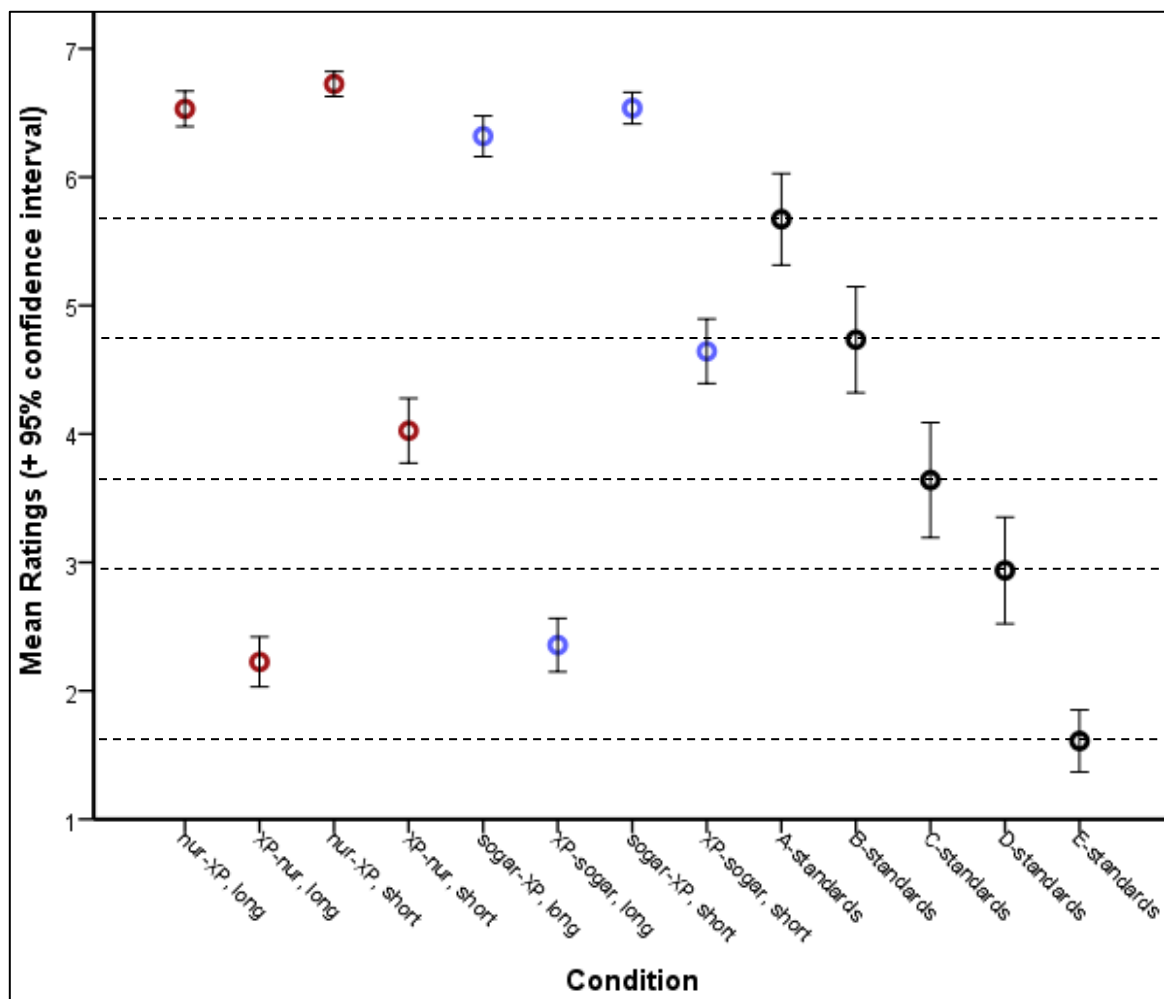


Figure 4.3: Mean ratings of *nur* and *sogar* with capitals in canonical (particle-XP) and non-canonical (XP-particle) word order with embedding (long) and without embedding (short). Black bars show standard items.

As in the preceding experiment, I performed an LMEM analysis to investigate effects of the factors *particle type* (*sogar* vs. *nur*), *word order* (particle-XP vs. XP-particle), and *complexity* (complex sentence with embedded clause vs. simple sentence without embedded clause).

The procedure of the statistical inference using model selection corresponded to the procedure of the preceding experiment. All models which were kept in the analysis are listed in Table 4.3. Only those random intercepts and random slopes were retained which improved model fit.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	5528.1
Model 0a: rating ~ 1 + (1 vp)	5526.1
Model 1a: rating ~ wo + (1 vp)	4290.5
Model 1b: rating ~ complex + (1 vp)	5428.1
Model 2: rating ~ wo + complex + (1 vp)	4002.3
Model 3: rating ~ wo + complex + wo:complex + (1 vp)	3764.7
Model 4: rating ~ wo*complex + (wo*complex vp)	3410.3
Model 5: rating ~ wo*complex + type + (wo*complex vp)	3408.7
Model 6a: rating ~ wo*complex + type + type:wo + (wo*complex vp)	3371.7
Model 6b: rating ~ wo * complex + type + type:complex + (wo *complex vp)	3403.1
Model 7: rating ~ wo*complex + type+ type:wo + type:complex + (wo*complex vp)	3371.7
Model 8: rating ~ wo*complex*type + (wo*complex vp)	3365.8

Table 4.3: Models used in the LMEM analysis of follow-up study 1.

I found a significant effect of *word order* (comparison between models 0a and 1a: $\chi^2(1) = 1237.5, p < 0.001$), which confirmed the hypothesis in (4.13a). The items with particle-XP were rated significantly better than the items with XP-particle.

As in the first experiment, I also found a significant effect of *complexity* (comparison between models 0a and 1b: $\chi^2(1) = 99.9, p < 0.001$). However, model 1b had a lower AIC than model 1a (see Table 4.3). Comparing model 1a to model 2, which contained both fixed effects, led to a better model ($\chi^2(1) = 290.29, p < 0.001$). I also found a significant interaction between *word order* and *complexity* (comparison between models 2 and 3: $\chi^2(1) = 239.56, p < 0.001$). Model 3 was improved further by adding the random slope for subject (comparison between models 3 and 4: $\chi^2(1) = 239.56, p < 0.001$) but not by adding the random slope for item, which suggests that the interaction between *word order* and *complexity* was invariant across items.

The significant interaction of *word order* and *complexity* and the mean ratings suggest that short topicalization was rated better than long topicalization, which confirms the hypothesis in (4.13b). Adding the fixed effect *particle type* to the model almost led to a significant effect (comparison between models 4 and 5: $\chi^2(1) = 3.543$, $p = 0.0597$). This indicates that the difference between the two particles *nur* and *sogar* was smaller than in the experiment without capital letters. I nevertheless kept the fixed factor *type* in my model, as the comparison between models 4 and 5 almost reached significance. Moreover, there could still be significant interactions of *particle type* with other factors. The interaction of *particle type* and *word order* (comparison between models 5 and 6a: $\chi^2(1) = 38.99$, $p < 0.001$) as well as the interaction of *type* and *complexity* (comparison between models 5 and 6b: $\chi^2(1) = 7.64$, $p < 0.01$) were significant. As model 6a had a lower AIC than model 6b, I continued model selection with model 6a. Keeping both interactions further improved the model (comparison between models 6a and 7: $\chi^2(1) = 7.898$, $p < 0.01$). The best fitting model for my data included an interaction of *word order*, *complexity*, and *type* with a random slope for the interaction of *word order* and *complexity* (model 8). Table 4.4 summarizes the results of the model selection. The parameters of model 8 and its confidence intervals can be found in the appendix B.2 (pages xiv-xv).

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0a vs. Model 1a]	particle-XP vs. XP-particle	<i>word order*complexity</i> (***) [Model 2 vs. Model 3]
<i>complexity</i> (***) [Model 1a vs. Model 2]	embedded clause vs. simple sentence	<i>word order*particle type</i> (***) [Model 5 vs. Model 6a]
<i>particle type</i> (p = 0.058) [Model 4 vs. Model 5]	<i>nur</i> vs. <i>sogar</i>	<i>complexity*particle type</i> (**) [Model 5 vs. Model 6b]
		<i>word order*complexity*particle type</i> (**) [Model 6a vs. Model 7]

Table 4.4: Summary of the model selection, follow-up study 1 ($p < 0.001$ ‘***’, < 0.01 ‘**’, < 0.05 ‘*’).

A paired t-test revealed a significant difference between *nur* and *sogar* in topicalization structures ($t(319) = 3.32$, $p < 0.01$), which confirms the hypothesis in (4.13c). As in the

preceding study, this effect stemmed from the significant difference in short topicalization ($t(159) = 5.19, p < 0.001$), whereas there was no significant effect between the particles in long topicalization ($t(159) = 1.12, p > 0.1$). As in the first experiment, I found a significant difference between *nur* and *sogar* in canonical word order ($t(319) = -3.36, p < 0.001$), with higher ratings for the items with *nur*.

The effect of capital letters only partly confirmed the hypothesis in (4.13d). The prosodic information led to better ratings of the short topicalization items with *nur* but not to better ratings of the short topicalization items with *sogar*. This led to a smaller but still significant difference between the two particles in topicalization structures. The capital letters had no effect on the items with RiA and the items with long topicalization.

Overall, the pattern of results was very similar to the first study. This suggests that the participants of the first study did not incorrectly rate readings with RiA of the FPs in the topicalization structures. The context seemed to provide enough information to place the focus in the answer correctly.

That the difference between *nur* and *sogar* became smaller in the items with short topicalization can have various explanations. It might be that LeA of *nur* is more dependent on prosodic information than that of *sogar*. Moreover, it could be the case that the focus on the topicalized element was more unexpected in the items with *nur* than in the items with *sogar* in written language. The capital letters suggest that it is not normal written language and they might facilitate the process of putting the focus on the topicalized element in the items with *nur*.

In order to get a clearer picture of the role of prosody, I conducted a study with auditory stimuli. This experiment is described and discussed in Chapter 4.1.4. Before turning to the prosodic experiment, another follow-up study comparing the three particles *nur*, *sogar*, and *auch* will be discussed in the next section.

4.1.3 German follow-up study 2: Comparison between *nur*, *sogar*, and *auch*

In this second follow-up study, I wanted to test to what extent LeA of *nur* and *sogar* differs from LeA of *auch*. It is generally known that the additive particle *auch* can easily associate to its left and behaves differently from *nur* and *sogar* in that it is stressed in constructions with LeA (see Chapter 2.4.3). The items with LeA of *auch* can thus serve as a control condition to show that topicalization structures with a particle associating to its left are in principle possible in German.

4.1.3.1 Data elicitation

Design and materials. This rating study contained 30 items and 40 fillers. The items were similar to the items of the first two rating studies and consisted of question-answer pairs. I used a 2 x 3 within-subject factorial design with the two-level factor *word order* (canonical word order vs. short object topicalization) and the three-level factor *particle type* (*nur* ('only'), *sogar* ('even'), *auch* ('also')). I also included the between-subject factor *typographical change* by means of capital letters. An example item with capitals is given in (4.14). All experimental items with capitals are listed in the appendix B.3 (pages xv-xxi).

The questions in the items with *auch* differed from the questions of the other two particles due to the additive meaning of the particle. The accusative object of the question belonged to the same subset as the object of the answer. In the example item below, the question of the item with *auch* had the specific fruit *Mangos* ('mangos') as the object (4.14 A₃) and the answer had the fruit *Papayas* ('papayas') as the object (4.14 B₅, B₆). The questions of the items with *nur* and *sogar* had *Fruchtsorten* ('kinds of fruit') as the object and the answers had the specific fruit *Papayas* ('papayas') as the object. In the subexperiment with capital letters, the particle *auch* was capitalized in the condition with topicalization, as the particle is usually stressed when it associates to its left. There were no embedded clauses, as long topicalization structures received low ratings in both the items with *nur* and the items with *sogar* in the first two judgment studies.

- (4.14) A₁: Hat Julia MEHRERE Fruchtsorten für den Nachtisch eingekauft?
Has Julia several kinds-of-fruit for the dessert bought
- B₁: Nein. Sie hat nur PAPAYAS eingekauft. [Condition 1: *nur-XP*]
No. She has only papayas bought
- B₂: Nein. PAPAYAS hat sie nur eingekauft. [Condition 2: *XP-nur*]
No. Papayas has she only bought
- A₂: Hat Julia MEHRERE Fruchtsorten für den Nachtisch eingekauft?
Has Julia several kinds-of-fruit for the dessert bought
- B₃: Ja. Sie hat sogar PAPAYAS eingekauft. [Condition 3: *sogar-XP*]
Yes. She has even papayas bought
- B₄: Ja. PAPAYAS hat sie sogar eingekauft. [Condition 4: *XP-sogar*]
Yes. Papayas has she even bought
- A₃: Hat Julia MANGOS für den Nachtisch eingekauft?
Has Julia mangos for the dessert bought
- B₅: Ja. Und sie hat auch PAPAYAS eingekauft. [Condition 5: *auch-XP*]
Yes. And she has also papayas bought
- B₆: Ja. Und PAPAYAS hat sie AUCH eingekauft. [Condition 6: *XP-auch*]
Yes. And papayas has she also bought

Procedure. Half of the participants conducted the experiment without capital letters and the other half conducted the experiment with capital letters. In the experiment with capitals, participants were informed that capitalized words are supposed to show emphasis. The procedure corresponded to the procedure of the first two rating studies.

Participants. Seventy-two German native speakers recruited via the participant list of the collaborative research center SFB 833 participated in the experiment (51 females, 21 males, aged 19 to 51, average age: 23.2).⁷⁸ None of the participants had taken part in either of the first two studies and were all naïve about the purpose of the study. Participants received a link to the experiment which was uploaded on the OnExp2 server of the University of Tübingen.

⁷⁸ Seventeen additional participants had to be excluded either due to technical difficulties with the software OnExp or they were randomly excluded in order to have an equal number of participants for the experiment with and the experiment without capital letters.

4.1.3.2 Hypotheses

In this second follow-up study, I investigated the hypotheses given in (4.15). The hypotheses in (4.15a) and (4.15c) follow from the results of the first two studies.

- (4.15)
- a. The items with SVO word order should receive better ratings than short topicalization with the particles *nur* and *sogar*.
 - b. The ratings of the items with short topicalization should work best for the particle *auch*, as it can easily associate to its left. The ratings of XP-*sogar* should be better than those of XP-*nur*.
 - c. As in the preceding study, the difference between *nur* and *sogar* should become smaller when capital letters are used.
 - d. Capital letters should not have an effect on the sentences with *auch*, as participants should automatically highlight *auch* prosodically when it associates to its left and no reanalysis should be necessary.

4.1.3.3 Results and discussion

The results are illustrated in Figure 4.4. Red bars represent the mean ratings of the items with *nur*, blue bars represent the mean ratings of the items with *sogar*, and orange bars represent the mean ratings of the items with *auch*.

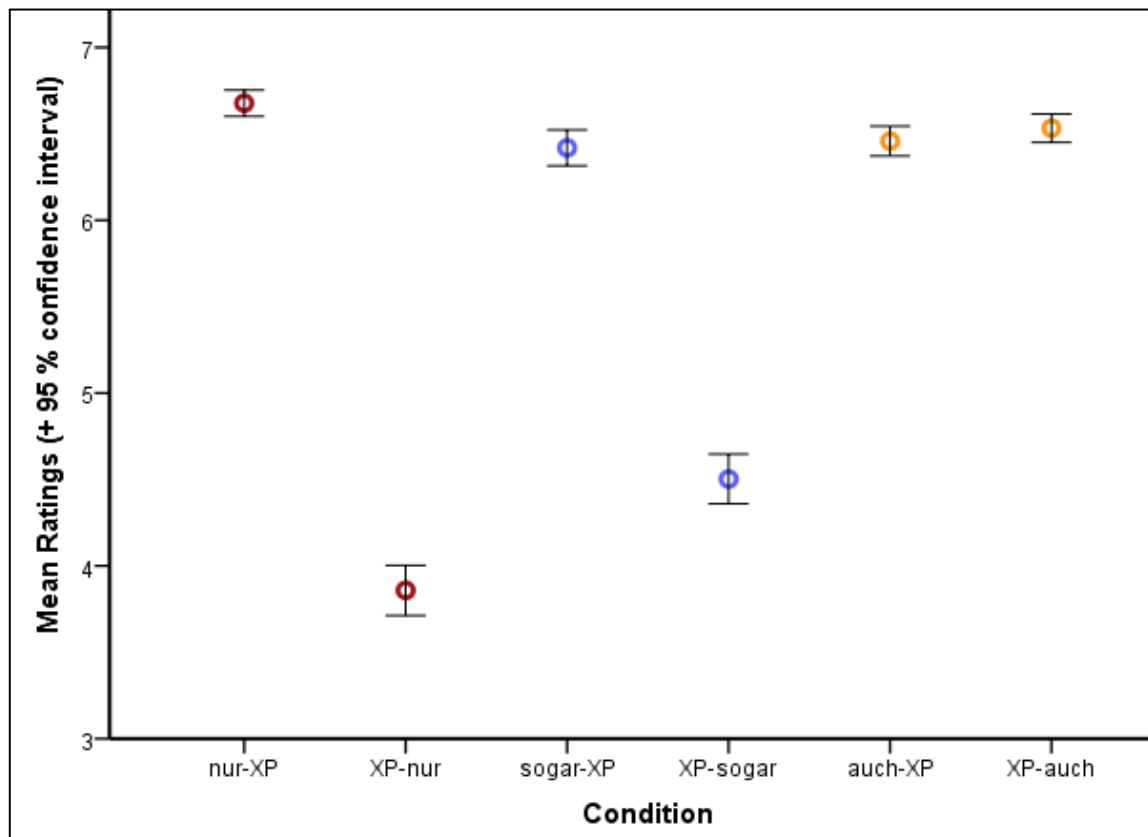


Figure 4.4: *Nur*, *sogar*, and *auch* in canonical word order (particle-XP) and non-canonical word order (XP-particle).

For the statistical analysis, I performed an LMEM analysis with model selection via likelihood-ratio tests. The models are listed in Table 4.5. I only retained random intercepts and random slopes in the models which improved model fit.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	7977.1
Model 0a: rating ~ 1 + (1 vp)	7977.5
Model 1a: rating ~ wo + (1 vp)	7321.9
Model 1b: rating ~ type + (1 vp)	7690.1
Model 2: rating ~ wo + type + (1 vp)	6918.0
Model 3: rating ~ wo + type + wo:type + (1 vp)	6264.2
Model 4: rating ~ wo * type + (wo * type vp)	6187.0
Model 5: rating ~ wo*type + (wo*type vp) + (wo*type item)	6182.5

Table 4.5: Models used in the LMEM analysis of follow-up study 2.

There was a highly significant effect of *word order* (comparison between models 0a and 1a: $\chi^2(1) = 657.59, p < 0.001$) and also a highly significant effect of *particle type* (comparison

between models 0a and 1b: $\chi^2(2) = 291.42, p < 0.001$). Additionally, there was a significant interaction between *word order* and *type* (comparison between models 2 and 3: $\chi^2(2) = 657.81, p < 0.001$). The between-subject factor *typographical change* did not have a significant effect on the overall experiment. As there was no significant effect of *typographical change*, Figure 4.3 reflects the ratings of both the participants who conducted the experiment with and those who conducted the experiment without capitals. However, comparing the mean ratings of the experiment with and without capital letters revealed that *typographical change* had an effect on the particle *nur*. Table 4.6 contains the mean ratings per condition with and without capital letters.

Mean Ratings (SD)		
Condition	Without capital letters	With capital letters
<i>nur</i> -XP	6.71 (0.7)	6.65 (0.77)
XP- <i>nur</i>	3.62 (1.38)	4.1 (1.38)
<i>sogar</i> -XP	6.49 (0.91)	6.34 (1.07)
XP- <i>sogar</i>	4.45 (1.41)	4.56 (1.37)
<i>auch</i> -XP	6.51 (0.8)	6.41 (0.85)
XP- <i>auch</i>	6.52 (0.78)	6.54 (0.8)

Table 4.6: Mean ratings per condition with and without capital letters.

The mean rating of *nur* in non-canonical word order without capital letters was 3.62 (SD: 1.38), whereas the mean rating with capital letters was 4.10 (SD: 1.38). The mean ratings of *sogar* in non-canonical word order did not differ as much. The mean rating without capital letters was 4.45 (SD: 1.41) and the mean rating with capital letters was 4.56 (SD: 1.37). Therefore, I also conducted an LMEM analysis just for *nur* and *sogar* in non-canonical word order to see whether *typographical change* had a significant effect on these items. This analysis is shown on page 148.

The model which explained the data best for the overall study was model 5. It contained an interaction between *word order* and *particle type* and random slopes for both subjects and items. Table 4.7 summarizes the results of the model selection. The parameters of model 5 and its confidence intervals can be found in the appendix B.3 (pages xxi-xxii).

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0a vs. Model 1a]	particle-XP vs. XP-particle	<i>word order*particle type</i> (***) [Model 2 vs. Model 3]
<i>particle type</i> (***) [Model 1a vs. Model 2]	<i>nur</i> vs. <i>sogar</i> vs. <i>auch</i>	

Table 4.7: Summary of the model selection, follow-up study 2 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

I performed paired t-tests to get a clearer picture of the differences between the three FPs. There was a significant difference between *nur* and *sogar* in topicalization ($t(359) = -7.9$, $p < 0.001$), which confirms the hypothesis in (4.15b). This replicates the results of the first two experiments, where I also found a significant difference between these two particles in short topicalization.

There was also a significant difference between *sogar* and *auch* in topicalization ($t(359) = -25.96$, $p < 0.001$). The ratings of *auch* in topicalization were as good as the ratings of *auch* in canonical word order. This confirms that *auch* can associate very well to its left. The ratings of *auch* did not change by means of capital letters and thus the hypothesis in (4.15d) was also confirmed. As there was an effect of *word order* for *nur* and *sogar* but not for *auch*, the hypothesis in (4.15a) was confirmed. All items with canonical word order got high ratings. However, the items with *nur* were significantly better than those with *sogar* ($t(359) = 4.66$, $p < 0.001$) and those with *auch* ($t(359) = 2.49$, $p < 0.05$). There was no significant difference between items with *sogar* and *auch* in canonical word order.

As mentioned before, I also conducted a separate LMEM analysis for *nur* and *sogar* in non-canonical word order. The models used for model selection are listed in Table 4.8.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	2507.8
Model 1a: rating ~ type + (1 vp) + (1 item)	2465.4
Model 1b: rating ~ CAPS + (1 vp) + (1 item)	2500.8
Model 2: rating ~ type + CAPS + (1 vp) + (1 item)	2457.8
Model 3: rating ~ type*CAPS + (1 vp) + (1 item)	2455.7

Table 4.8: Models used in the LMEM analysis of XP-*nur* and XP-*sogar*.

I found a significant effect of *particle type* (comparison between models 0 and 1a: $\chi^2(1) = 44.4$, $p < 0.001$) and also a significant effect of *typographical change* (comparison

between models 0 and 1b: $\chi^2(1) = 9.025, p < 0.01$). As model 1a had a lower AIC than Model 1b, I compared Model 1a to model 2, which contained both the factor *particle type* and the factor *typographical change*. This model explained the data significantly better than model 1a ($\chi^2(1) = 9.66, p < 0.01$). Moreover, there was a significant interaction of *particle type* and *typographical change* (comparison between models 2 and 3: $\chi^2(1) = 4.02, p < 0.05$). The separate statistical analysis of *nur* and *sogar* in non-canonical word order therefore revealed a significant effect of *typographical change*. The ratings of short topicalization with *nur* improved with the use of capital letters so that the difference between *nur* and *sogar* became smaller. This also replicates the findings of the first two experiments concerning the difference between the two particles and confirms the hypothesis in (4.15c). Table 4.9 summarizes the results of the model selection. The parameters of the final model and a table with the confidence intervals can be found in the appendix B.3 (pages xxii-xxiii).

Main effects		Interactions
Factor	Levels	
<i>particle type</i> (***) [Model 0a vs. Model 1a]	<i>nur</i> vs. <i>sogar</i>	<i>particle type</i> * <i>typographical change</i> (*) [Model 2 vs. Model 3]
<i>typographical change</i> (**) [Model 1a vs. Model 2]	no CAPS vs. CAPS	

Table 4.9: Summary of the model selection, XP-*nur* and XP-*sogar* ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

In summary, all four hypotheses were confirmed in this study. The following chapter presents another follow-up study, in which the items of follow-up study 2 were presented auditorily. As I assume that LeA of *nur* and *sogar* is a phenomenon of spoken language and as the application of capital letters led to small changes in the results, I wanted to find out whether real prosodic information has a more pronounced effect on the ratings.

4.1.4 German follow-up study 3: Comparison between *nur*, *sogar*, and *auch* with auditory stimuli

The goal of this experiment was to test whether prosody is a factor which can facilitate LeA of *nur* and *sogar* and is therefore linked to the research question stated in (4.1b).

4.1.4.1 Data elicitation

Design and materials. For this follow-up study, I used the items and fillers of the preceding follow-up study 2. The questions were recorded by a male German native speaker and the answers were recorded by a female German native speaker in separate sessions. The utterances were recorded in a soundproof booth in the laboratories of the collaborative research center SFB 833, using a linear PCM recorder with a sampling rate of 44.1 kHz (16 bit).

The speakers were instructed how to produce the sentences, so that the intonation patterns were the same in the items of the same conditions. The instructor produced the answers for the male speaker and the questions for the female speaker, so that the dialog situation was more natural for the speakers. Moreover, the speakers were corrected if their intonation did not fit the requirements. Recordings were repeated if the utterances sounded unnatural or if the analysis of the intonation patterns with Praat Version 5.4.04 (Boersma & Weenink 2015) revealed inconsistencies.

In some of the questions, the phrase specifying the superset was scrambled in front of the quantifier in order to make it easier for the male speaker to produce the questions. This also makes the status of this phrase as given even clearer. An example of a question in which the specifying phrase was scrambled is given in (4.16).

(4.16) Hat Julia für den Nachtisch mehrere Fruchtsorten ~~für den Nachtisch~~ eingekauft?
Has Julia for the dessert several kinds-of-fruit ~~for the dessert~~ bought?

The female speaker was instructed to make a short break after *Ja* or *Nein* in the answers.

The sound file of each question was merged with the sound file of the respective answer using the software Audacity, version 2.1.0 (Audacity Team 2014). Between the question and the answer, I inserted a pause of four milliseconds. I adjusted the volume of the sound files produced by the male speaker and the ones produced by the female speaker so that the questions and answers sounded like a natural conversation.

The figures below show the f_0 -contours of the example item given in the preceding study in (4.14) with the adjustment shown in (4.16). The contours were made using Praat Version 5.4.04 (Boersma & Weenink 2015). F_0 -maxima on the stressed syllable were determined by using a Praat script. Figure 4.5 shows the intonation contour of the question used for conditions 1 to 4. All questions of these conditions had a high pitch accent on the quantifier, in this example on *mehrere* ('several'). The pitch accent on the quantifier signals that the question is about different kinds of fruit and it is expected that the answer contains information about the fruits Julia bought. The DP *Fruchtsorten* is deaccented which implies that it is given in the discourse. If the pitch accent had been on *Fruchtsorten*, the answer would have been expected to include an alternative to this DP as in the possible answer "Yes, and she also bought several kinds of vegetables".

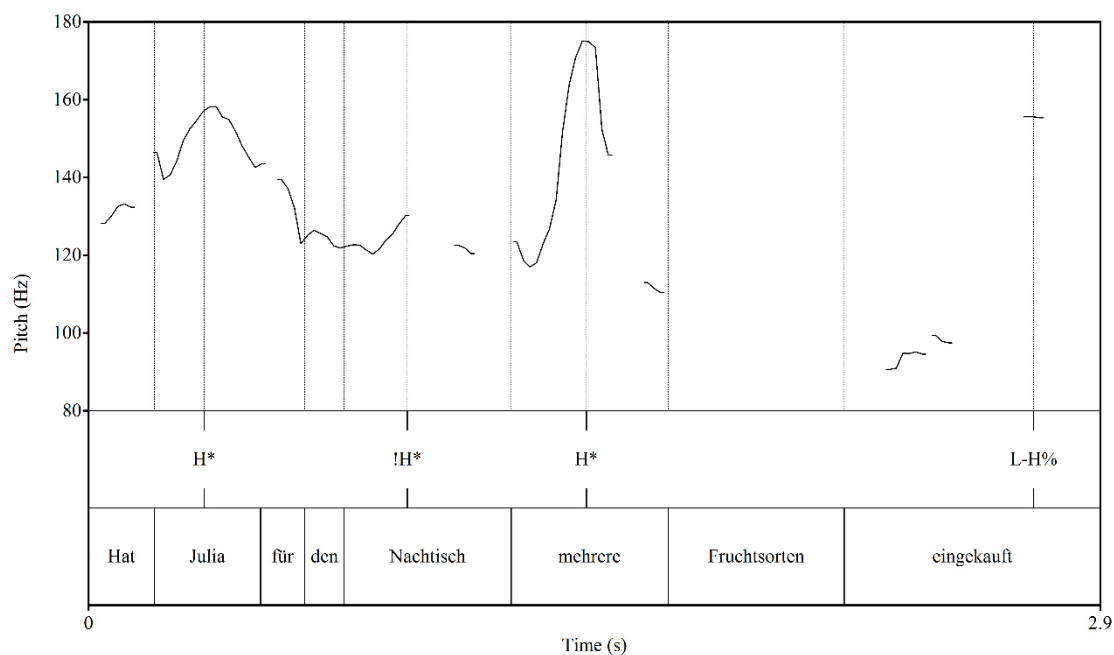


Figure 4.5: F_0 -contour of the question *Hat Julia für den Nachtisch mehrere Fruchtsorten eingekauft?* ('Did Julia buy several kinds of fruit for dessert?').

The intonation contour of the answer of condition 1 can be seen in Figure 4.6. The associated focus of the FP was produced with an L+H* pitch accent. The mean maximum pitch on the stressed syllable of all answers of condition 1 was 299.8 Hz (ranging from 243 to 371 Hz).

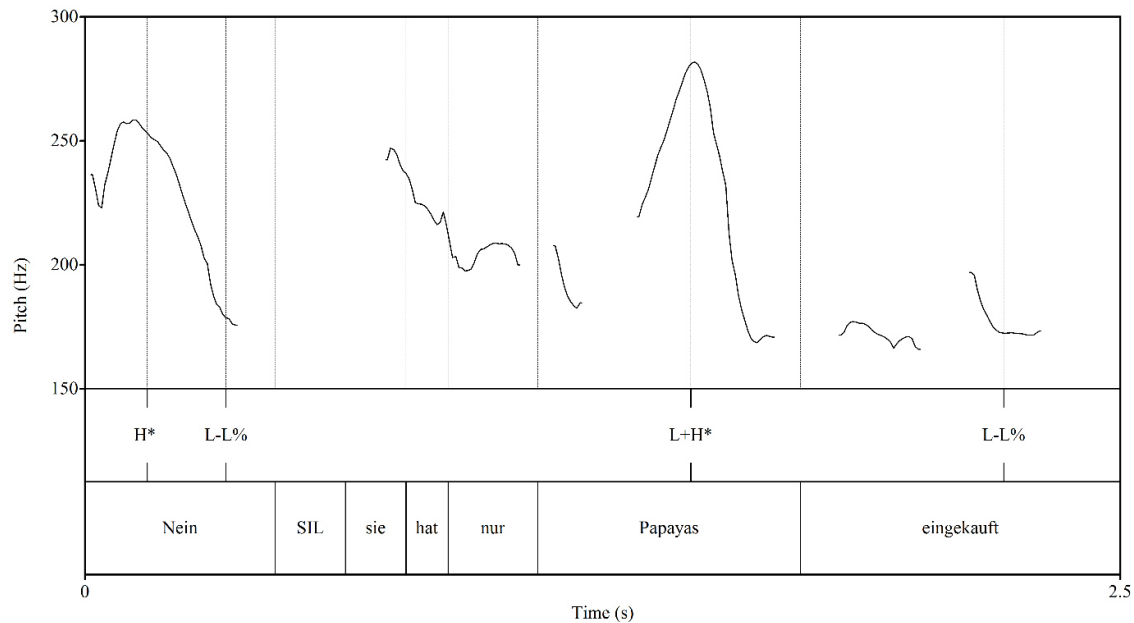


Figure 4.6: F₀-contour of the answer of condition 1: *Nein. Sie hat nur Papayas eingekauft.* ('No. She only bought papayas.').

Figure 4.7 shows the f₀-contour of the answer of condition 2 with LeA of the particle *nur*. The topicalized object was produced with an L+H* pitch accent. The mean maximum pitch on the stressed syllable of all answers of condition 2 was 321.7 Hz (ranging from 271 to 386 Hz). All the words following the object were deaccented. As the verb which followed the particle was also deaccented, the particle could only associate with the accented topicalized object.

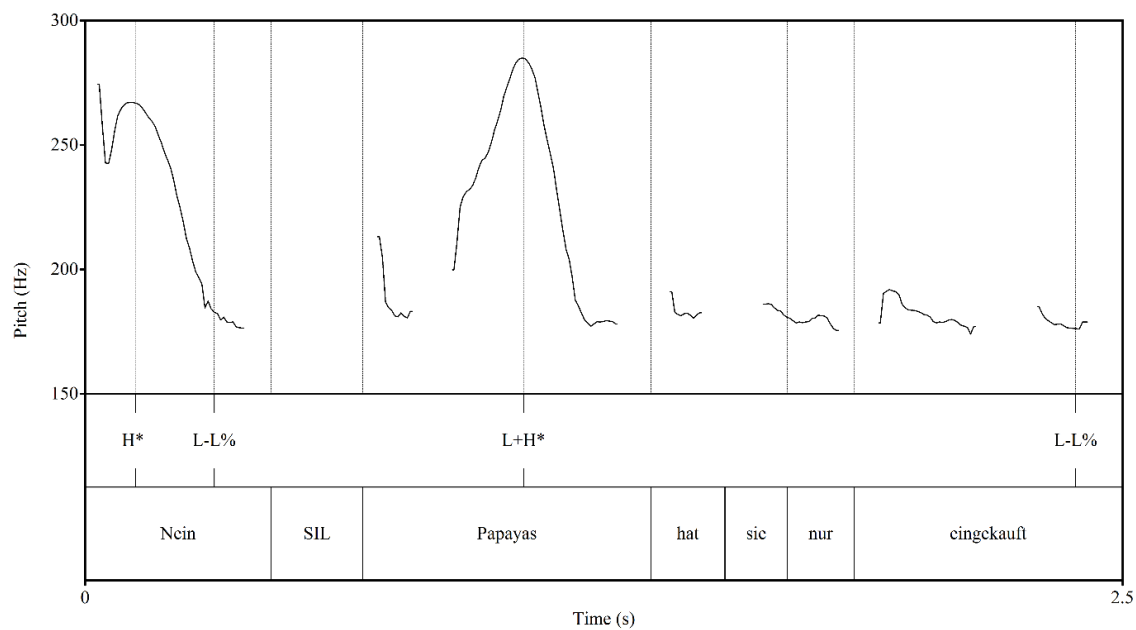


Figure 4.7: F₀-contour of the answer of condition 2: *Nein. Papayas hat sie nur eingekauft.* ('No. Papayas she only bought.')

The intonation contour of condition 3 is shown in Figure 4.8 and basically corresponds to the contour of condition 1. The mean maximum pitch on the stressed syllable of all answers of condition 3 was 318.7 Hz (ranging from 262 to 382 Hz).

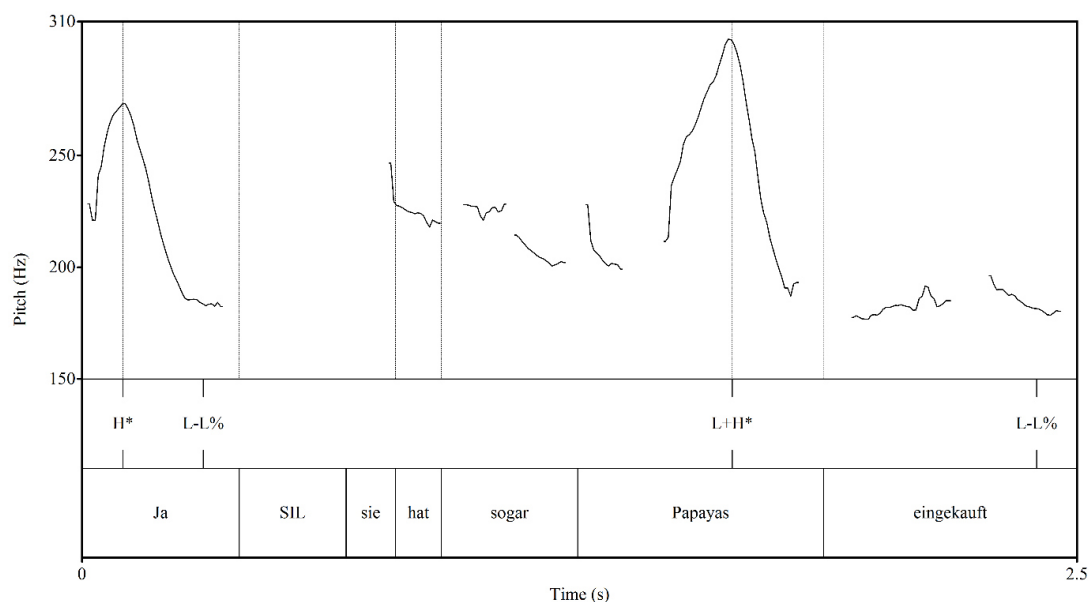


Figure 4.8: F₀-contour of the answer of condition 3: *Ja. Sie hat sogar Papayas eingekauft.* ('Yes. She even bought papayas.')

Figure 4.9 shows the intonation contour of condition 4 which corresponds to the contour of condition 2. The mean maximum pitch on the stressed syllable of all answers of condition 4 was 333.5 Hz (ranging from 252 to 394 Hz).

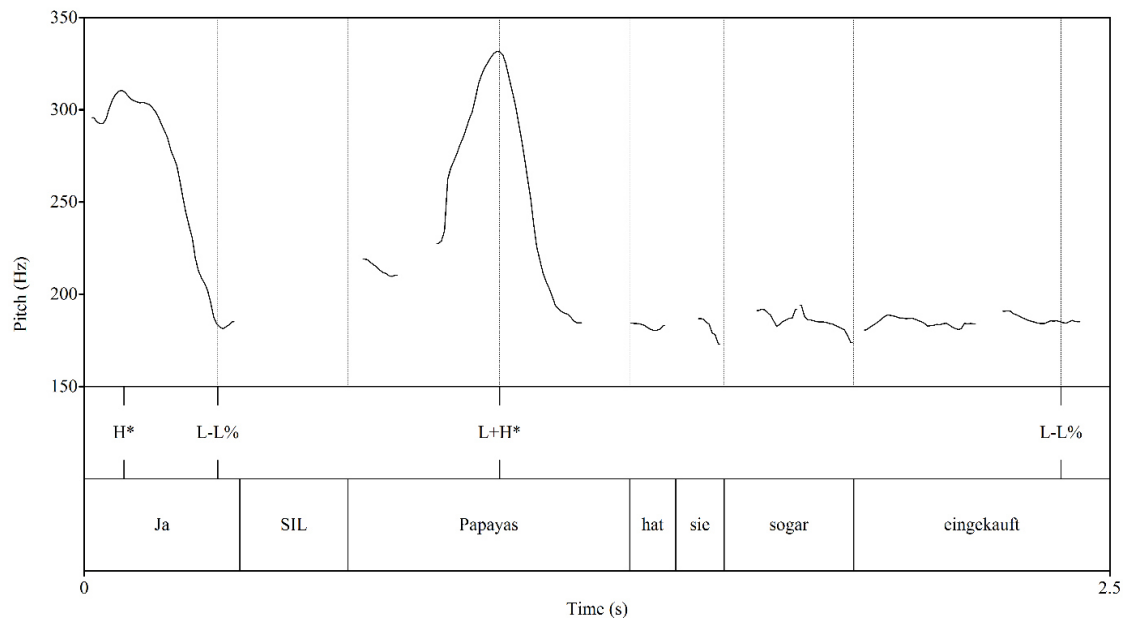


Figure 4.9: F₀-contour of the answer of condition 4: *Ja. Papayas hat sie sogar eingekauft.* ('Yes. Papayas she even bought.').

The f₀-contour of the question for conditions 5 and 6 is illustrated in Figure 4.10. The direct object in the questions of these conditions was produced with a low pitch accent L*⁷⁹ followed by a rising L-H% boundary tone.

⁷⁹ The L* is not visible in the intonation contour due to creaky voice.

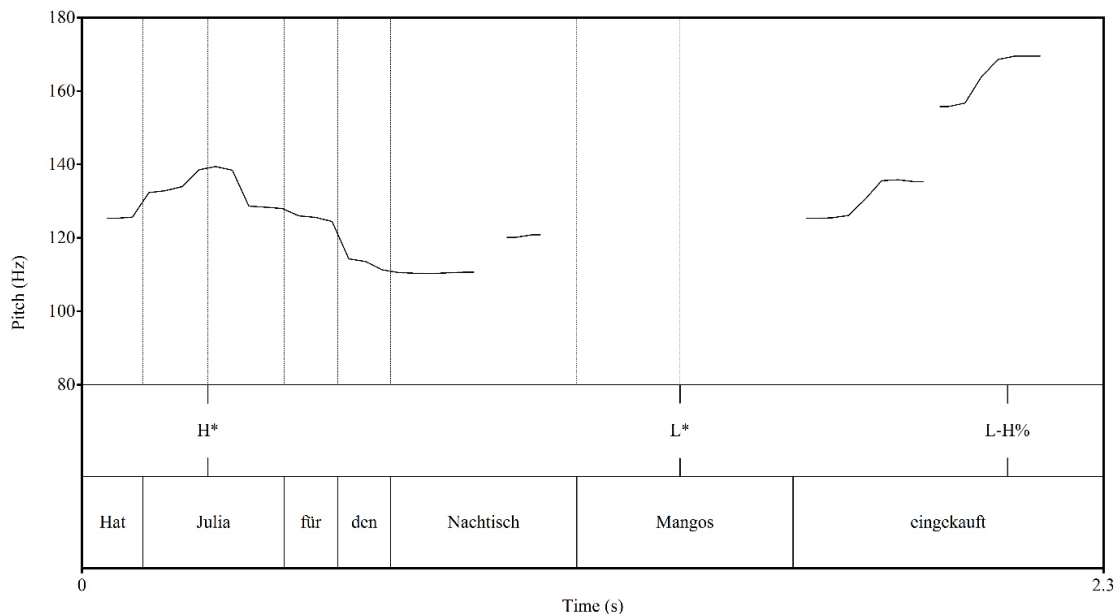


Figure 4.10: F₀-contour of the question *Hat Julia für den Nachtisch Mangos eingekauft?* ('Did Julia buy mangos for dessert?').

Figure 4.11 represents the intonation contour of the answer of condition 5 with RiA of the particle *auch*. As in the answers of conditions 1 to 4, the associated focus of the particle was produced with an L+H* pitch accent. The mean maximum pitch on the stressed syllable of all answers of condition 5 was 325.9 Hz (ranging from 243 to 395 Hz).

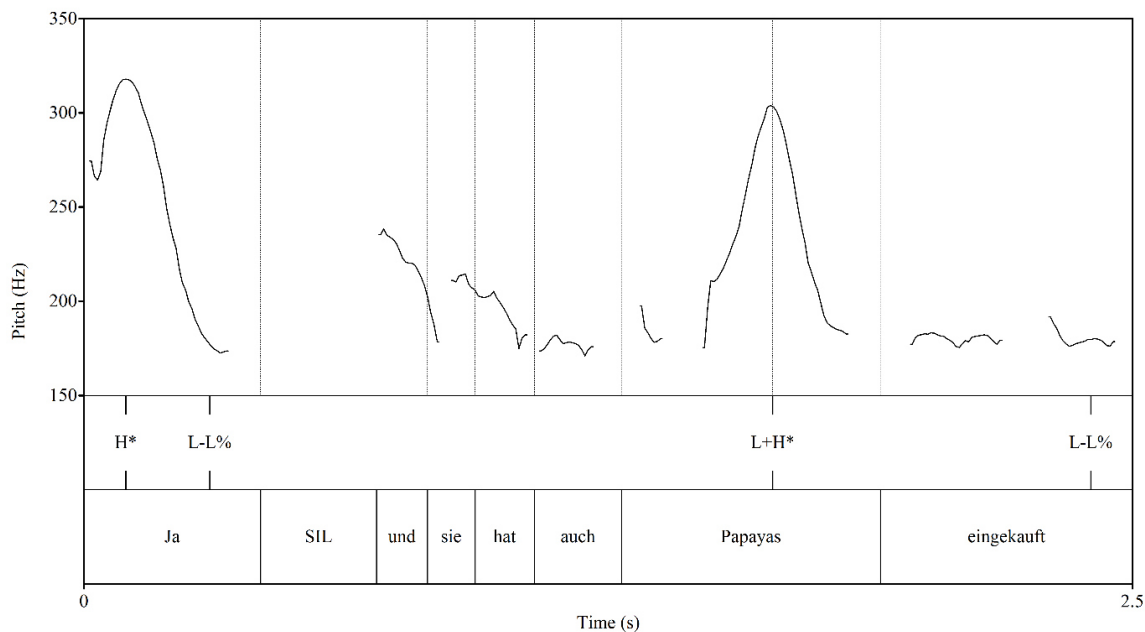


Figure 4.11: F₀-contour of the answer of condition 5: *Ja. Und sie hat auch Papayas eingekauft.* ('Yes. And she also bought papayas.').

The intonation contour of the answer of condition 6 was characterized by a bridge contour with high or rising pitch accents on the associated constituent of *auch* and a nuclear falling accent on the particle itself (represented as H* followed by L-L% in Figure 4.12; this corresponds to H*+L in other notational conventions (see Chapter 2.2.1)). The mean maximum pitch on the stressed syllable of the associated constituent of all answers of condition 6 was 326.8 Hz (ranging from 260 to 390 Hz); the mean maximum pitch on the stressed particle *auch* was 289.9 Hz (ranging from 240 to 335 Hz).

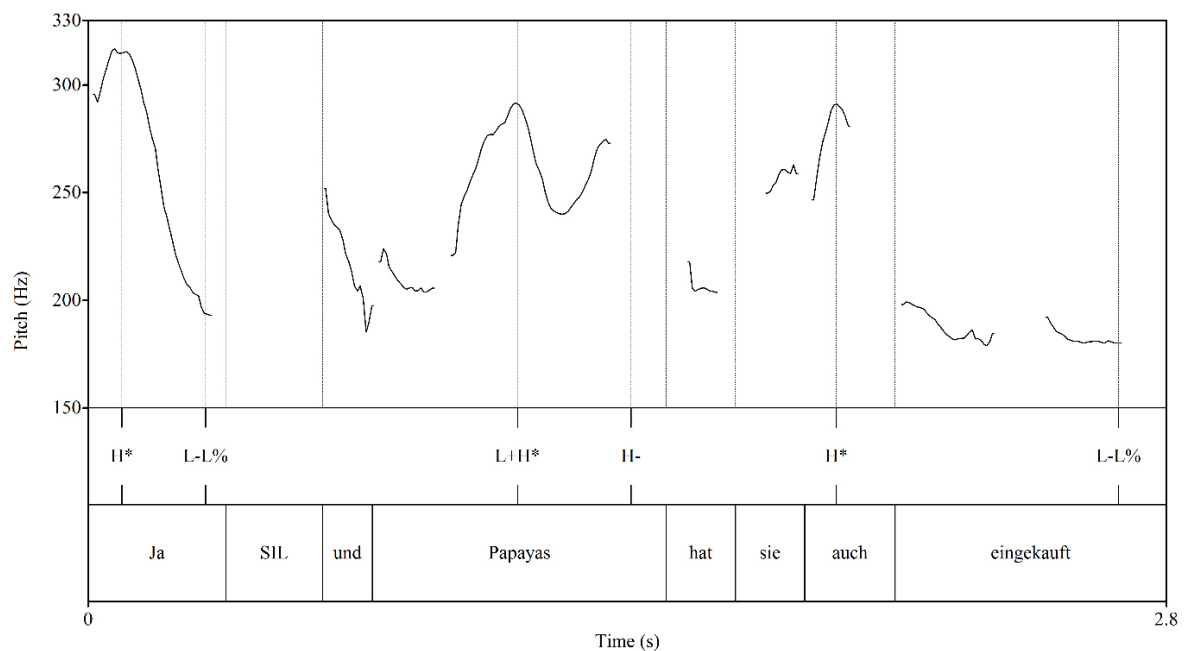


Figure 4.12: F₀-contour of the answer of condition 6: *Ja. Und Papayas hat sie auch eingekauft.* ('Yes. And papayas she also bought.').

The intonation contours of all answers of the same condition in one graph can be found in the appendix B.4 (pages xxiii-xxvi). As the focused words had their main stress on different syllables (e.g., *DROmedare* ('dromedaries') vs. *GePARden* ('cheetahs')) and as some focused words were preceded by a determiner or possessive pronoun while others were not (e.g., *den Balkon* ('the_{ACC} balcony') vs. *Papayas* ('papayas')), the pitch accents of the different items do not occur in the exact same position.

Procedure. The experiment was conducted in soundproof booths of the laboratories for language studies of the collaborative research center SFB 833. Each booth was equipped with a computer. Stimuli were presented electronically using E-Prime 2.0 software (Psychology Software Tools 2013). Participants listened to the question-answer pairs via earphones. The

task was to judge the naturalness of the answers on a seven-point scale. First, participants read the instructions and listened to example question-answer pairs with suggestions as to how the answers could be rated. Instructions were followed by a practice phase to make participants familiar with the task. In the experimental phase, items and fillers were presented in random order. Subjects could listen to the auditory stimuli again by pressing the space bar. They were, however, instructed to rate the answers as spontaneously as possible. After the experiment, participants were asked to fill out a short questionnaire and answer questions as to whether the task was difficult and whether they noticed anything about the stimuli or the experiment.

Participants. Sixty German native speakers participated in the experiment (39 females, 21 males, aged 18 to 62, average age: 24.5). They were recruited via the participant list of the collaborative research center SFB 833 and were paid for their participation. Participants were naïve as to the topic of the study, and they had not participated in any of the preceding studies.

4.1.4.2 Hypotheses

The hypotheses are listed in (4.17). The hypotheses in (4.17a) and (4.17b) follow from the results of the preceding studies. The hypothesis in (4.17c) follows from the assumption that LeA of *nur* and *sogar* in the constructions under investigation are a phenomenon of spoken rather than written language. In the preceding written experiment, LeA of *nur* improved with prosodic information by means of capital letters. This led to a smaller difference between *nur* and *sogar* in non-canonical word order. Therefore, I expect real prosodic information in this study with auditory stimuli to strengthen this effect (4.17d).

- (4.17)
- a. I expect a significant effect of *word order*, as the items with *nur* and *sogar* should receive better ratings in canonical word order than in topicalization.
 - b. RiA of all three particles as well as LeA of *auch* should receive high ratings.
 - c. LeA of both *nur* and *sogar* should work better in the prosodic experiment than in the written studies.
 - d. I expect the difference between the particles to become even smaller with auditory stimuli.

4.1.4.3 Results and discussion

The results are illustrated in Figure 4.13. Red bars show the mean ratings of the items with *nur*, blue bars show the mean ratings of the items with *sogar*, and orange bars show the mean ratings of the items with *auch*.

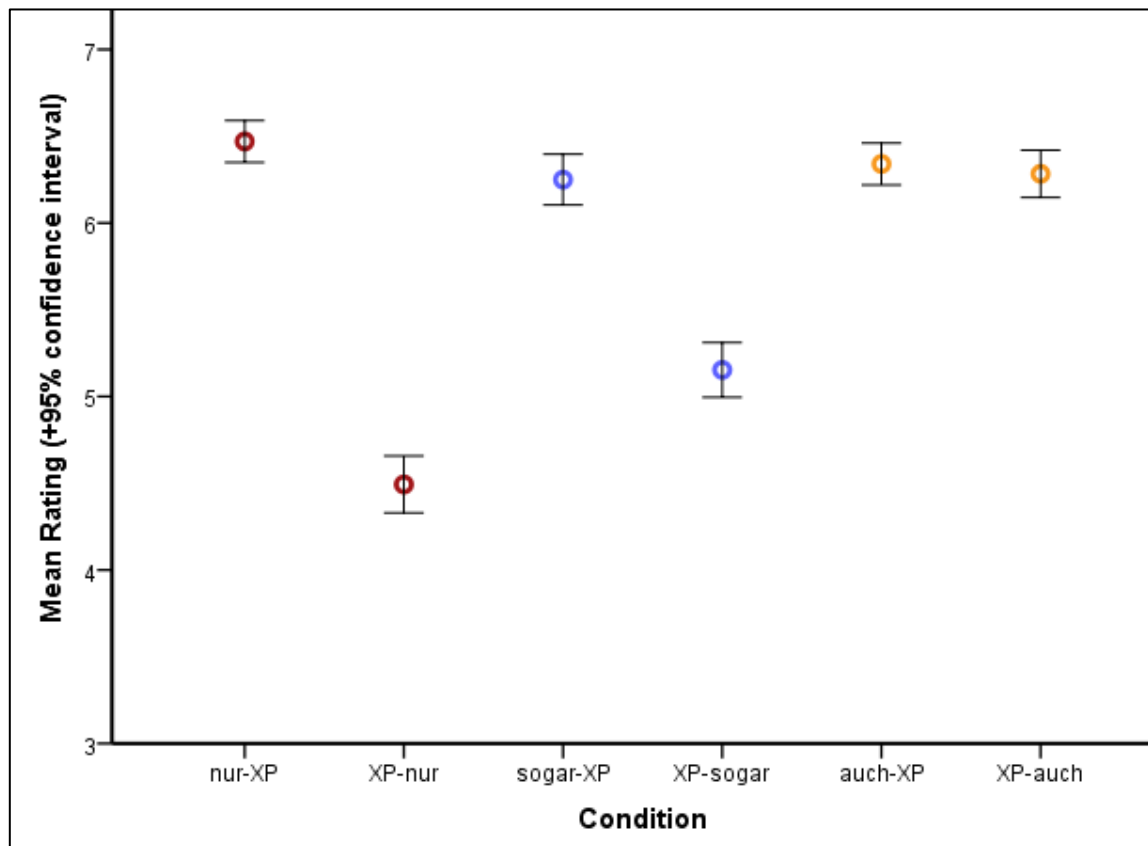


Figure 4.13: *Nur*, *sogar*, and *auch* in canonical word order (particle-XP) and non-canonical word order (XP-particle).

I performed statistical inference using model selection as in the previous studies. The null model and the models I retained for the analysis are shown in Table 4.10.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	6064.9
Model 0a: rating ~ 1 + (1 vp)	6063.0
Model 1a: rating ~ wo + (1 vp)	5719.1
Model 1b: rating ~ type + (1 vp)	5918.8
Model 2: rating ~ wo + type + (1 vp)	5540.6
Model 3: rating ~ wo + type + wo:type + (1 vp)	5285.9
Model 4: rating ~ wo * type + (wo * type vp)	5035.8

Table 4.10: Models used in the LMEM analysis of follow-up study 3.

The overall effects correspond to the effects found in follow-up study 2. There was a highly significant effect of *word order* (comparison between models 0a and 1a: $\chi^2(1) = 345.84$, $p < 0.001$), which confirms the hypothesis in (4.17a). There was also a significant effect of *particle type* (comparison between models 1b and 0a: $\chi^2(2) = 148.2$, $p < 0.001$) and a significant interaction of *word order* and *particle type* (comparison between models 2 and 3: $\chi^2(2) = 258.71$, $p < 0.001$). The model which fitted the data best was model 4, which contained the interaction between *word order* and *particle type* and a random slope for subjects. This model only differed from the final model of the previous study in that it did not contain a random slope for items. I therefore assume no variation across items for this experiment. The parameters of model 4 and its confidence intervals can be found in the appendix B.4 (pages xxvi-xxvii). Table 4.11 summarizes the results of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0a vs. Model 1a]	particle-XP vs. XP-particle	<i>word order*particle type</i> (***) [Model 2 vs. Model 3]
<i>particle type</i> (***) [Model 1a vs. 2]	<i>nur</i> vs. <i>sogar</i> vs. <i>auch</i>	

Table 4.11: Summary of the model selection, follow-up study 3 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

Paired t-tests confirmed a significant difference between *nur* and *sogar* in topicalization ($t(299) = -7.38$, $p < 0.001$) and a significant difference between *sogar* and *auch* in topicalization ($t(299) = -13.13$, $p < 0.001$). The differences between the particles in canonical word order also correspond to the results of the previous study. There was a significant difference between *nur*-XP and *sogar*-XP ($t(299) = -13.13$, $p < 0.001$) and *nur*-XP and

auch-XP ($t(299) = 2.49, p < 0.01$) but no difference between *sogar*-XP and *auch*-XP. Moreover, the items with *auch* got high ratings for both word orders, which confirms the hypothesis in (4.17b).

Table 4.12 shows the mean ratings of this study in comparison to the mean ratings of the previous written study with and without capital letters.⁸⁰

Mean Ratings (SD)		
Condition	Written study (with and without capital letters)	Study with auditory stimuli
<i>nur</i> -XP	6.68 (0.73)	6.47 (1.06)
XP- <i>nur</i>	3.86 (1.4)	4.49 (1.44)
<i>sogar</i> -XP	6.42 (0.1)	6.25 (1.29)
XP- <i>sogar</i>	4.5 (1.39)	5.15 (1.39)
<i>auch</i> -XP	6.46 (0.83)	6.34 (1.06)
XP- <i>auch</i>	6.53 (0.79)	6.28 (1.2)

Table 4.12: Mean ratings per condition; written study vs. study with auditory stimuli.

The conditions XP-*nur* and XP-*sogar* got higher ratings in the study with auditory stimuli (mean rating in follow-up study 2 with and without capital letters for XP-*nur*: 3.86 (SD: 1.4) and for XP-*sogar*: 4.5 (SD: 1.39) vs. mean rating in follow-up study 3 for XP-*nur*: 4.49 (SD: 1.44) and for XP-*sogar*: 5.15 (SD: 1.39). The differences between the two particles in the written and in the auditory study are illustrated in Figure 4.14.

⁸⁰ I am aware that the seven-point rating scale only provides two anchor points at the scale end and does not provide reference items. This is problematic, as “informants can easily find themselves squeezed at one end of the scale or another, since they cannot know in advance how much better or worse later examples will be” (Featherston 2009: 49). Without clear anchor points, it is difficult to directly compare the mean ratings of two experiments. However, I regard the items with RiA as anchor points, as the high ratings of these items are stable across experiments.

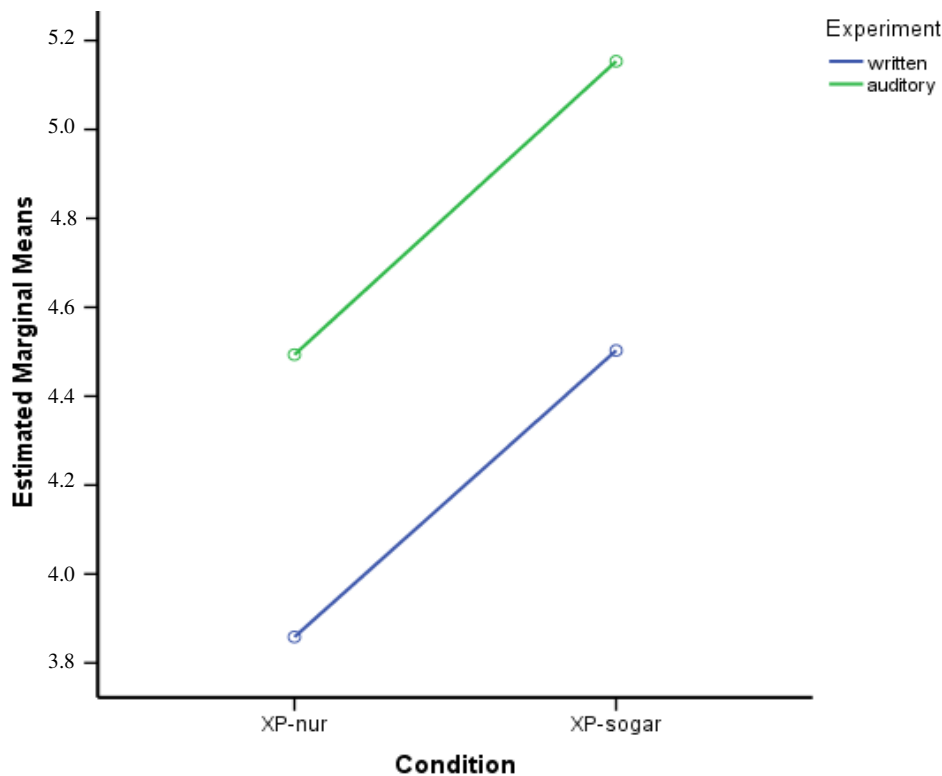


Figure 4.14: Comparison of *XP-nur* and *XP-sogar* in the written and in the auditory rating study.

In order to test whether the mean ratings of the study with auditory stimuli differed significantly from the mean ratings of the written study, I set up an LME (Baayen et al. 2008) using the packages *lme4* (Bates et al. 2015) and *lmertest* (Kuznetsova et al. 2015) for R (R Core Team 2015).⁸¹ This model is shown in (4.18). It included a three-way interaction, along with all necessary lower-level parameters, between *type* (*nur* vs. *sogar* vs. *auch*), *word order* (particle-XP vs. XP-particle), and *experiment* (written vs. auditory) as fixed effects. As random effects, the model included random intercepts for subjects and items, as well as random slopes for the interaction between *type* and *word order* for subjects.

(4.18) Model: $\text{rating} \sim \text{type} * \text{wo} * \text{exp} + (\text{type} * \text{wo} \mid \text{vp}) + (1 \mid \text{item})$

As reference levels, I chose *auch* for type, *XP-particle* for word order, and *prosody* for experiment; therefore, the *auch/topicalization/prosody* condition is the reference condition for all parameters. The parameter for *experiment* was not significant ($\beta = 0.25$, $t(130.9) = 1.85$, $p = 0.067$), indicating no significant difference between the conditions *auch/XP-par-*

⁸¹ Thanks to Fritz Günther for statistical advice.

ticle/prosody and *auch*/XP-particle/written. However, there was a significant interaction between the parameter for *experiment* and the parameter for *nur* ($\beta = -0.88$, $t(130.2) = -4.32$, $p < 0.001$). This indicates that the difference between the conditions *nur*/XP-particle/prosody and *nur*/XP-particle/written differs significantly from the difference between the conditions *auch*/XP-particle/prosody and *auch*/XP-particle/written. The same holds for *sogar*, where the same interaction is also significant ($\beta = -0.90$, $t(131.3) = -5.28$, $p < 0.001$). Note that this does not necessarily imply that the actual difference between the conditions *nur*/XP-particle/prosody and *nur*/XP-particle/written is in itself significant, since the *experiment* effect for the reference condition was positive, while both interaction effects were negative. Therefore, I re-estimated the LMEM with *nur*/XP-particle/prosody as the new reference category. In this analysis, there was a significant effect for the *experiment* ($\beta = -0.63$, $t(129.7) = -3.39$, $p < 0.001$), and therefore a significant difference between the conditions *nur*/XP-particle/prosody and *nur*/XP-particle/written. Since the same argument applies for *sogar*, I also re-estimated a model with *sogar*/XP-particle/prosody as the reference category. Again, there was a significant effect of *experiment* ($\beta = -0.65$, $t(129.7) = -3.67$, $p < 0.001$). The important results of this analysis are repeated in (4.19).

- (4.19) a. Significant difference between XP-*nur* in written study and XP-*nur* in prosody study (blue line in Figure 4.14).
 b. Significant difference between XP-*sogar* in written study and XP-*sogar* in prosody study (green line in Figure 4.14).

The significant difference between the written and the auditory study for both XP-*nur* and XP-*sogar* confirms the hypothesis in (4.17c). However, the difference between *nur* and *sogar* did not get smaller and therefore (4.17d) was not confirmed. The question, then, is how the effect of capital letters in the preceding study can be characterized if they do not resemble the effects of real prosody. It could be the case that capital letters can represent the intonation of the sentences with non-scalar *nur* but not the intonation of the sentences with *sogar*.⁸² The items with *nur* show a clear contrast to the quantifiers in the question. The intonation which follows from this contrast can be represented by capital letters and therefore the ratings for *nur* in topicalization improved with this typographic change. The items with *sogar*, on the other hand, do not show this clear contrast to the question but they add

⁸² Thanks to Jutta Hartmann for bringing this to my attention.

unexpected information. The intonation, which not only comprises emphasis on the topicalized object but also an emotional tone caused by the surprising occurrence of an unlikely event, cannot be captured by the capital letters. Prosodic information in the auditory stimuli can capture the specific intonation requirements for the items with *sogar* and therefore led to better ratings of *sogar* in topicalization. The comparison of the intonation contours of the items with *nur* and *sogar* with LeA supports this possible explanation. The mean maximum pitch of the topicalized object was 321.7 Hz in the items with *nur* and 333.5 Hz in the items with *sogar*. Figure 4.15 shows the intonation contours of Figure 4.6 and Figure 4.8 in one graph. There is a higher pitch accent with a steeper fall on *Papayas* in condition 4 (red line) with LeA of *sogar* than in condition 2 (blue line) with LeA of *nur*. This shows that the intonation patterns of these two conditions are very similar but differ with respect to the exact realization of the pitch accent.⁸³ This difference cannot be captured by capital letters.

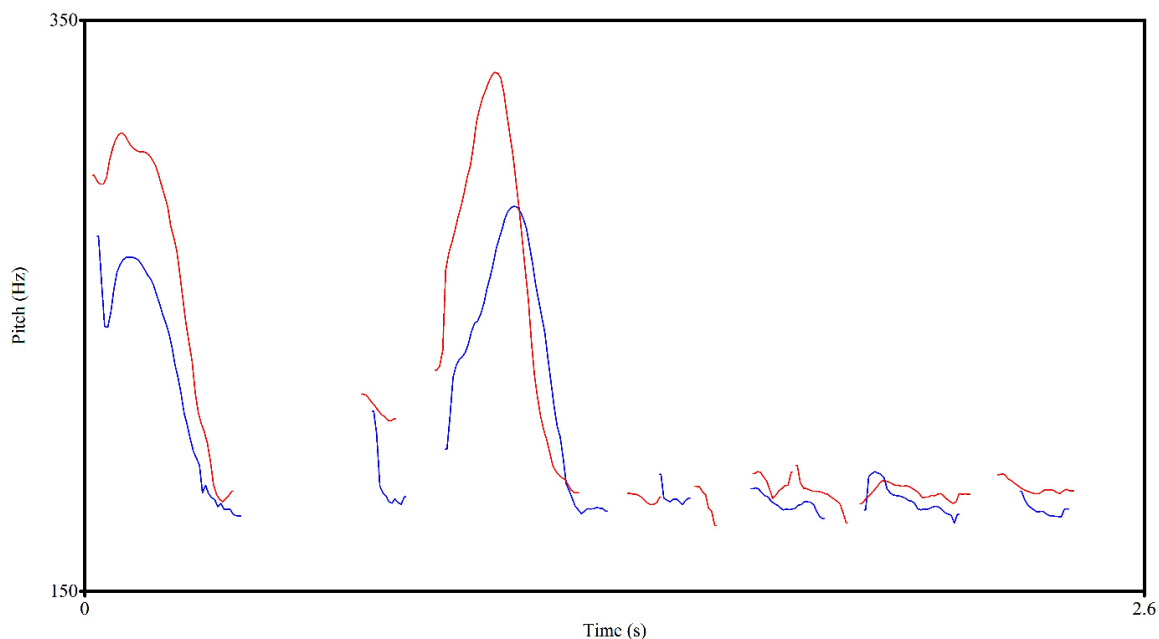


Figure 4.15: Intonation contours of *Nein./Ja. Papayas hat sie nur/sogar eingekauft.*

The short feedback-questionnaires which participants filled out after taking part in the experiment revealed that only five of the 60 participants found the task challenging. All the other participants found it easy to rate the sentences. Some participants wrote that it was pleasant to listen to the items and that they found it easier to rate the auditory stimuli than

⁸³ A production study would help to get a clearer picture of the different intonation contours. I will leave this for future research.

to rate written sentences in other language experiments. None of the participants wrote negative feedback concerning the quality of the stimuli, and none of them wrote that the dialogs sounded artificial. The feedback showed that the auditory material was good for this study. That participants did not have problems with the auditory stimuli is also shown by the fact that only 16 participants made use of the possibility to listen to the stimuli several times and none of these participants repeated items more than once. Four of the 16 participants only repeated filler items and no experimental items. Overall, there were 18 repetitions of experimental items.

In summary, the written studies and the auditory study reported on in section 4.1 revealed that LeA of *sogar* is better than LeA of *nur* in object topicalization structures. Moreover, the factor prosody improves LeA of both particles. An open question is whether the difference between *sogar* and *nur* can also be observed in other structures with LeA of the particles. Therefore, I conducted a study with subject association, which is reported on in the following section.

4.2 German focus particles and subject association

This subchapter examines LeA of German FPs in constructions with subject association and addresses the following questions:

- (4.20) a. Do the ratings for subject association of the German FPs *nur*, *sogar*, and *auch* reveal differences between these particles which are similar to the differences that could be observed in structures with object association?
- b. Which factors can facilitate or license LeA?

I chose LeA with the subject as the second construction, as SVO (subject-verb-object) order is a more natural construction than object topicalization. Moreover, LeA with the subject was the construction I found most often in the examples that I collected from German everyday language (see Chapter 3.2). Examples of LeA of German and English FPs in the literature also frequently contain subject association. Examples (4.21a) and (4.21b) show subject association of the German particles *nur* and *sogar*. Note that Abraham (2005) considers subject LeA with *nur* to be ungrammatical and assigns two question marks to LeA of *sogar* (see chapter 3.1.3).

- (4.21) a. ??Der PAPST hat diese Verhütung sogar erlaubt
The pope has this contraception even permitted
 b. *Der PAPST hat diese Verhütung nur erlaubt
The pope has this contraception only permitted
 (Abraham 2005: 593)

4.2.1 German experiment 2: Comparison between *nur*, *sogar*, and *auch* with subject association

4.2.1.1 Data elicitation

Design and materials. This study was an acceptability judgment task and tested the association of *nur*, *sogar*, and *auch* with the subject. The design and material were similar to the German rating studies on object topicalization. There were 30 items and 40 fillers, which consisted of question-answer pairs. I used the 40 filler items of German follow-up studies 2 (Section 4.1.3) and 3 (Section 4.1.4). For the experimental items, I used a 2 x 3 within-subject factorial design with the factors *word order* (particle-XP vs. XP-particle) and *particle type* (*nur*, *sogar*, *auch*). I additionally included the between-subject factor *typographical change* by means of capital letters. The use of capital letters corresponded to the use of capital letters in German follow-up study 2. As in German follow-up studies 2 and 3, the question of the items with *auch* (Q₂) differed from the questions of the items with *nur* and *sogar* (Q₁). An example item without capital letters is given in (4.22):

- (4.22) Q₁: Haben alle Schüler der Klasse die Mathe-Hausaufgaben gemacht?
Have all students of-the class the math-homework done
- A₁: Nein. Nur Malte hat sie gemacht. [Condition 1: *nur*-XP]
No. Only Malte has them done
- A₂: Nein. Malte hat sie nur gemacht. [Condition 2: XP-*nur*]
No. Malte has them only done
- A₃: Ja. Sogar Malte hat sie gemacht. [Condition 3: *sogar*-XP]
Yes. Even Malte has them done
- A₄: Ja. Malte hat sie sogar gemacht. [Condition 4: XP-*sogar*]
Yes. Malte has them even done
- Q₂: Hat Pia die Mathe-Hausaufgaben gemacht?
Has Pia the math-homework done

A₅: Ja. Und auch Malte hat sie gemacht. [Condition 5: *auch*-XP]
Yes. And also Malte has them done

A₆: Ja. Und Malte hat sie auch gemacht. [Condition 6: XP-*auch*]
Yes. And Malte has them also done

In condition 1, the particle *nur* and its associated focus *Malte* both occupy the prefield and the particle precedes its associated focus. In condition 2, *Malte* is in the prefield while *nur* precedes the participle *gemacht* and therefore associates with *Malte* to its left. The subject with which the particle associated was either a name like *Pia* in the example above or a DP like *captain* as in example (4.23), which only shows condition 1 of the item. The type of associate was however not included as a factor. All the items are listed in the appendix B.5 (pages xxvii-xxxiii).

(4.23) Q₁: Hat die ganze Schiffsbesatzung den neuen Matrosen gelobt?
Has the whole ship's-crew the new sailor praised

A₁: Nein. Nur der Kapitän hat ihn gelobt. [Condition 1: *nur*-XP]
No. Only the captain has him praised

Procedure. The procedure corresponded to the procedure of German follow-up study 2. Items and fillers were distributed across six lists using the Latin square design and presented in random order. The participants who took part in the experiment with capital letters were informed that capital letters are intended to show emphasis. The experiment was preceded by detailed instructions and a practice session. The study was set up using the experimental software OnExp2 of the University of Tübingen, and participants received a link to participate in the experiment online.

Participants. A hundred and eighteen German native speakers recruited via the participant list of the collaborative research center SFB 833 participated in the experiment (82 females, 36 males, aged 19 to 55, average age: 24.1).⁸⁴ Sixty participants completed the experiment without capital letters and 58 completed the version with capital letters. Participants were naïve as to the purpose of the study.

⁸⁴ Ten additional participants had to be excluded due to technical difficulties with the software OnExp, or they were randomly excluded to balance the number of participants per list.

4.2.1.2 Hypotheses

The hypotheses for this study are given in (4.24). They are based on the results of German follow-up study 2, as I expect similar patterns of results for the current study.

- (4.24)
- a. I expect a significant effect of word order, as RiA of the FPs *nur* and *sogar* should be rated better than LeA of the particles.
 - b. RiA as well as LeA of the particle *auch* should receive high ratings and no significant difference between RiA and LeA of this particle is expected.
 - c. LeA of *sogar* should receive higher ratings than LeA of *nur*.
 - d. Capital letters should lead to higher ratings for LeA of *nur*. No other effects for *typographical change* are expected.

4.2.1.3 Results and discussion

Mean ratings for the different conditions with and without capital letters are illustrated in Figure 4.16. Red bars represent mean ratings of conditions 1 and 2 with the particle *nur*, orange bars represent mean ratings of conditions 3 and 4 with the particle *sogar*, and blue bars represent mean ratings of conditions 5 and 6 with the particle *auch*.

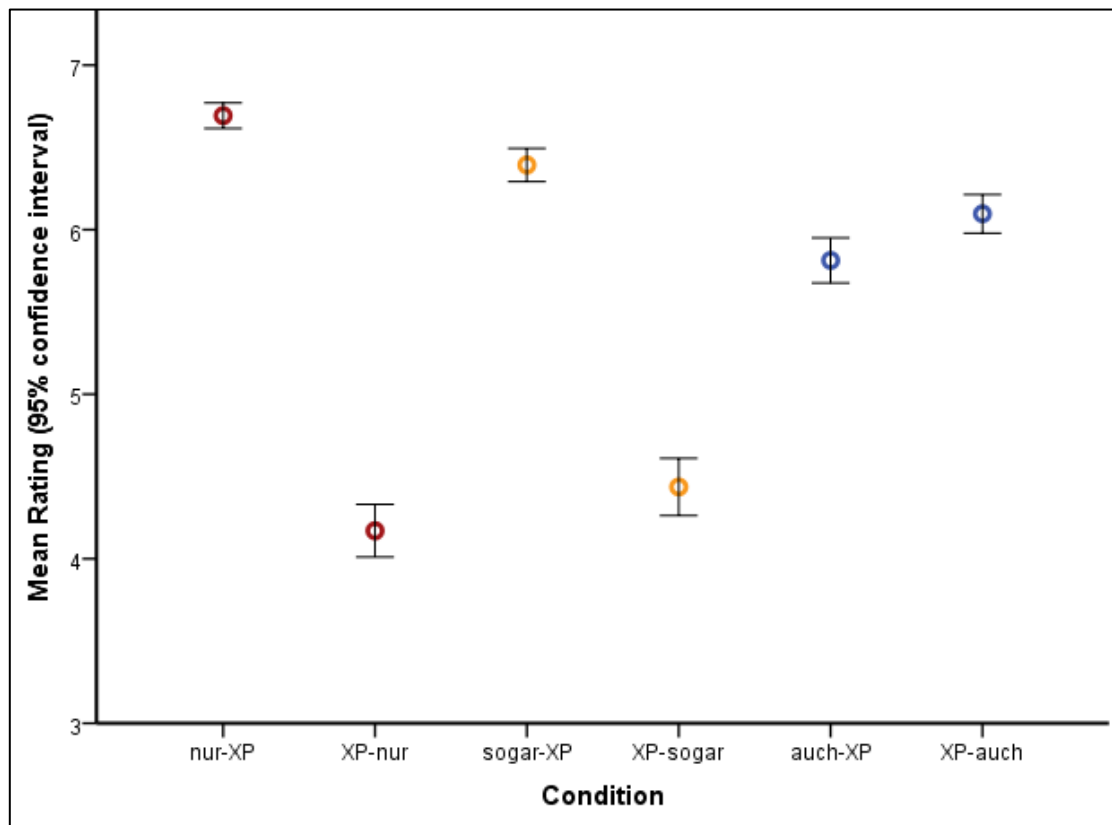


Figure 4.16: Mean ratings of *nur*, *sogar*, and *auch* with RiA (particle-XP) and LeA (XP-particle).

In order to investigate the factors *word order* (particle-XP vs. XP-particle) and *particle type* (*nur*, *sogar*, and *auch*) I set up an LMEM (Baayen et al. 2008) using the package *lme4* (Bates et al. 2015) for R (R Core Team 2015). The models that were kept in the process of model selection via likelihood-ratio tests are listed in Table 4.13. I only retained those random intercepts and random slopes which improved model fit.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	12791
Model 1: rating ~ wo + (1 vp) + (1 item)	11919
Model 2: rating ~ wo + type + (1 vp) + (1 item)	11747
Model 3: rating ~ wo + type + wo:type + (1 vp) + (1 item)	10710
Model 4: rating ~ wo * type + (wo * type vp) + (wo * type item)	9842.9

Table 4.13: Models used in the LMEM analysis of German experiment 2.

There was a significant effect of *word order* (comparison between models 0 and 1: $\chi^2(1) = 873.72, p < 0.001$), which confirmed the hypothesis in (4.24a). Items with RiA of the particles *nur* and *sogar* received higher ratings than those with LeA of these particles.

Adding the factor *particle type* to model 1 improved the model significantly (comparison between models 1 and 2: $\chi^2(2) = 176.08$, $p < 0.001$). Moreover, there was a significant interaction of *word order* and *particle type* (comparison of models 2 and 3: $\chi^2(2) = 1041.2$, $p < 0.001$). The final model, which fits the data best is model 4 which contains the interaction of *word order* and *particle type* as well as random slopes for this interaction. There was neither a significant effect of *typographical change* on the overall results ($\chi^2(1) = 0.563$, $p = 0.45$) nor an effect of *typographical change* on conditions 2 and 4 ($\chi^2(2) = 0.13$, $p = 0.72$).⁸⁵ There were also no significant interactions with *typographical change*. Therefore, the hypothesis in (4.24d) could not be confirmed. Table 4.14 summarizes the results of the model selection. The parameters of model 4 and its confidence intervals can be found in the appendix B.5 (pages xxxiii-xxxiv).

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0 vs. Model 1]	particle-XP vs. XP-particle	<i>word order*particle type</i> (***) [Model 2 vs. Model 3]
<i>particle type</i> (***) [Model 1 vs. 2]	<i>nur</i> vs. <i>sogar</i> vs. <i>auch</i>	

Table 4.14: Summary of the model selection, German exp. 2 (< 0.001 ‘***’, < 0.01 ‘**’, < 0.05 ‘*’).

In order to get a clearer picture of the differences between the particles *nur*, *sogar*, and *auch* in this study, I performed paired t-tests. These tests revealed a significant difference between XP-*nur* and XP-*sogar* (conditions 2 and 4: $t(589) = -3.8$, $p < 0.001$) and also a significant difference between XP-*sogar* and XP-*auch* (conditions 4 and 6: $t(589) = -23.133$, $p < 0.001$). As in the previous German experiments of Chapter 4.1, *nur*-XP received significantly higher ratings than *sogar*-XP (conditions 1 and 3: $t(589) = 16.85$, $p < 0.001$).

Interestingly, *auch*-XP received significantly lower ratings than *sogar*-XP (conditions 3 and 5: $t(589) = 10.891$, $p < 0.001$). Moreover, XP-*auch* was rated significantly better than *auch*-XP (conditions 5 and 6: $t(589) = -6.9806$, $p = < 0.001$). Therefore, the hypothesis in (4.24b) could not be confirmed. Compared to follow-up study 2, *auch*-XP in this study received low ratings (mean rating for *auch*-XP, follow-up study 2: 6.46 (SD: 0.83); mean

⁸⁵ The analysis of conditions 2 and 4 corresponded to the separate LMEM analysis of *nur* and *sogar* in non-canonical word order of German follow-up study 2.

rating for *auch*-XP, current study: 5.81 (SD: 1.21)). One explanation could be that the questions of conditions 5 and 6 were problematic due to different possibilities of focus assignment, leading to a mismatch between the question and the answer. I illustrate this point by means of the question of conditions 5 and 6 in example (4.22), repeated in (4.25). When reading the question Q₂, the default accent is placed on the object *Mathe-Hausaufgaben*. It is then expected that the answer to this question is about homework. An answer including the particle *auch* could then be that Pia also did her biology homework. The answer in A₅ is therefore unexpected, as it is about an alternative to *Pia* and not to *math homework*. When reading A₅, the analysis of Q₂ with the focus on *Mathe-Hausaufgaben* has to be revised, which might have led to lower ratings of these items.

(4.25) Q₂: Hat Pia die Mathe-Hausaufgaben gemacht?

Has Pia the math-homework done

A₅: Ja. Und auch Malte hat sie gemacht.

Yes. And also Malte has them done

If this is the reason for the lower ratings, a difference between the ratings of condition 5 with and without capital letters is expected, as capital letters should indicate which element in the sentence receives a pitch accent and thereby prevent an unintended focus assignment. In the items with capital letters, the subject of the question was written in capitals, i.e., in the example above, *PIA* was capitalized and should therefore receive a pitch accent. In the answer, the alternative to *Pia*, namely *MALTE* was capitalized. Therefore, no mismatch between focus assignment in the question and the answer should occur. However, the mean ratings of condition 5 with and without capital letters only differed slightly (without capital letters: 5.81 (SD: 1.21), with capital letters: 5.86 (SD: 1.15)). Therefore, it is unlikely that the questions led to the lower ratings of the answers. However, in order to completely rule out unintended focus assignments by participants, one would have to conduct a study with auditory stimuli. Another explanation might be that LeA is the preferred word order of *auch* in constructions in which the particle and its associated focus are both in the sentence-initial position. As the particle *auch* is not the main interest of this dissertation, I leave the question why *auch* received relatively low ratings in the conditions with RiA for future research.

In summary, this study revealed differences between the particles under investigation which are similar to the differences in the studies on object topicalization which provides

an answer to the question in (4.20a). Most importantly, *sogar* can also associate better to its left than *nur* in subject association. In contrast to German follow-up study 2, prosodic information by means of capital letters did not lead to a smaller difference between the two particles. However, I expect that ratings of LeA of *nur* and of *sogar* would also improve in a study with auditory stimuli, similar to follow-up study 3.

I consistently found a difference between LeA of *nur* and *sogar* in the studies presented above. However, the puzzle remains as to why *sogar* can associate better to its left than *nur*. The experiments presented in section 4.3 investigate whether scalarity and emphasis play a role in solving this puzzle and thus relate to the research questions in (4.1c) and (4.1d).

4.3 The role of scalarity, speaker evaluation, and emphasis

In the previous studies, one difference between the items with *nur* and *sogar* is that the items with *sogar* involve speaker evaluation while the items with *nur* do not. This is due to the scalar meaning component of the scalar particle *sogar* which implies that the speaker considers something to be unexpected or surprising. In the items with *nur*, the quantitative meaning of the particle, which can be paraphrased as *nothing but* or *nobody but* and does not involve speaker evaluation, is prominent. This is also reflected in the auditory stimuli of follow-up study 3. The speaker who produced the answers of the items used higher pitch accents on the associated focus in the items with *sogar* (see Figure 4.14, page 163) and also used an emotional tone of voice reflecting the unexpectedness of the utterance. In contrast, she produced the items containing *nur* with a neutral tone of voice. Moreover, the non-scalar interpretation of *nur* is more prominent in examples from the literature which are used to show that LeA of *nur* is impossible or at least marked (see Chapter 3.1). The attested examples of LeA with *nur* from everyday language, on the other hand, involve special emphasis and speaker evaluation (see the analysis of authentic examples in Chapter 3.2). These observations strongly suggest that speaker evaluation has a major influence on LeA of *nur* and *sogar*. The following studies test whether speaker evaluation and emotional tone of speech can improve LeA of *nur*.

4.3.1 German experiment 3: The role of scalarity

The goal of this study was to test whether LeA of *nur* improves in items which suggest a scalar interpretation of *nur* and thus involve speaker evaluation.

4.3.1.1 Data elicitation

Design and materials. This acceptability judgment task consisted of 16 experimental items containing the particle *nur* accompanied by 40 distractor filler items. Items and fillers consisted of question-answer pairs. I used a 2 x 2 within-subject factorial design with the two-level factor *word order* (*nur*-XP vs. XP-*nur*) and the two-level factor *association type* (numeral vs. DP), i.e., *nur* associated with either a DP as in (4.26a) and (4.26b) or a numeral as in (4.26c) and (4.26d). Association with a numeral, which is inherently scalar, leads to a scalar interpretation of the particle *nur* if the numeral is focused (e.g., Löbner 1990: 178; Dimroth & Klein 1996: 85–86), i.e., higher numeric values are excluded by the particle *nur* and the speaker considers the numeral in this context to be low (see also the authentic examples with LeA of *nur* and numerals in Chapter 3.2). The items with a DP as the associated focus suggest a non-scalar reading of *nur* as in the preceding studies. All items are listed in the appendix B.6 (pages xxxiv-xxxvi).

(4.26) Q: Stimmt es, dass kaum jemand dem alten Otto beim Umzug geholfen hat?

‘Is it true that hardly anyone helped the old Otto to move?’

- a. Ja, das stimmt. Nur sein Nachbar hat ihm geholfen. [**nur-DP**]
Yes, that is-true. Only his neighbor has him helped
- b. Ja, das stimmt. Sein Nachbar hat ihm nur geholfen. [**DP-nur**]
Yes, that is-true. His neighbor has him only helped
- c. Ja, das stimmt. Nur zwei Nachbarn haben ihm geholfen. [**nur-numeral**]
Yes, that is-true. Only two neighbors have him helped
- d. Ja, das stimmt. Zwei Nachbarn haben ihm nur geholfen. [**numeral-nur**]
Yes, that is-true. Two neighbors have him only helped

There were no experimental conditions which contained the particle *sogar*, as the context questions and the answers would have had to be adjusted to the particle’s meaning. As a consequence, the items with *nur* and *sogar* would not have been minimal pairs for statistical comparison. Moreover, I did not expect better ratings for LeA of *sogar* with a numeral as

the associated focus, because sentences with *sogar* are always scalar, independent of the association type. However, there were three filler items with *sogar*, two with LeA of *sogar*, and one with RiA to get an idea of the ratings of items with *sogar* and a numeral as the associated focus. One of the filler items with LeA of *sogar* is shown in (4.27).

- (4.27) Q: Stimmt es, dass Leon im Urlaub mehrere Bücher gelesen hat?
Is-true it that Leon on vacation several books read has
- A: Ja, das stimmt. Vier Bücher hat er sogar gelesen.
Yes, that is-true. Four books has he even read

Procedure. The procedure corresponded to the procedure of German experiment 1. Items and fillers were distributed across four lists using the Latin square design and they were presented in random order. Items and fillers were set up as a dialog. The experiment was preceded by detailed instructions and a practice session. The study was set up using the experimental software OnExp2 of the University of Tübingen and participants received a link to take part in the experiment online.

Participants. Forty German native speakers recruited via the participant list of the collaborative research center SFB 833 participated in the experiment (36 females, 5 males, aged 20 to 57, average age: 27.2). The participants lacked any knowledge about the purpose of the study.

4.3.1.2 Hypotheses

The hypotheses for this study are listed in (4.28):

- (4.28) a. I expect a significant effect of word order, as the conditions *nur*-DP and *nur*-numeral with RiA of the particle should receive higher ratings than the conditions with LeA.
- b. The condition numeral-*nur* is expected to receive higher ratings than the condition DP-*nur*, as I assume that LeA of *nur* improves when the scalar meaning component of the particle is made prominent.
- c. I do not expect a difference between *nur*-DP and *nur*-numeral.

4.3.1.3 Results and discussion

The results are illustrated in Figure 4.17. Red bars represent mean ratings of the items with a DP as the associated focus of *nur* and green bars represent mean ratings of the items with a numeral as the associated focus of *nur*.

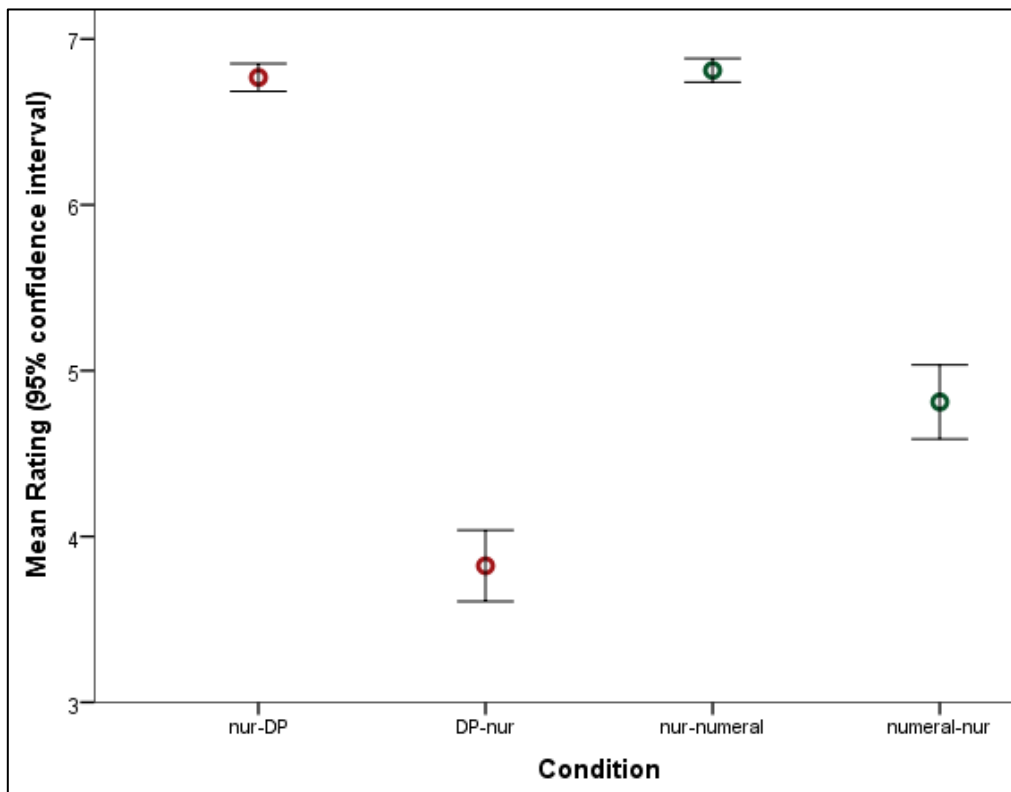


Figure 4.17: Mean ratings of non-scalar *nur* and scalar *nur* with RiA and LeA.

I set up an LMEM (Baayen et al. 2008) using the package *lme4* (Bates et al. 2015) for R (R Core Team 2015) in order to investigate the factors *word order* (particle-XP vs. XP-particle) and *association type* (DP vs. numeral). The models that were kept in the process of model selection via likelihood-ratio tests are listed in Table 4.15. I only retained those random intercepts and random slopes which improved model fit.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	2530.2
Model 1: rating ~ wo + (1 vp) + (1 item)	1934.6
Model 1a: rating ~ association type + (1 vp) + (1 item)	2515.4
Model 2: rating ~ wo + association type + (1 vp) + (1 item)	1890.9
Model 3: rating ~ wo + association type + wo:association type + (1 vp) + (1 item)	1852.0
Model 4: rating ~ wo*association type + (wo*association type vp) + (1 item)	1466.8

Table 4.15: Models used in the LMEM analysis of German experiment 3.

There was a significant effect of *word order* (comparison between models 0 and 1: $\chi^2(1) = 597.54, p < 0.001$), which confirmed the hypothesis in (4.28a). The conditions *nur-DP* and *nur-numeral* received higher ratings than the conditions *DP-nur* and *numeral-nur*. There was also a significant effect of *association type* (comparison between models 0 and 1a: $\chi^2(1) = 16.81, p < 0.001$). However, this effect was smaller than the effect of *word order*. Therefore, I continued model selection with model 1. Adding the factor *association type* to model 1 improved the model significantly (comparison between models 1 and 2: $\chi^2(1) = 45.75, p < 0.001$). Moreover, there was a significant interaction of *word order* and *association type* (comparison of models 2 and 3: $\chi^2(1) = 40.86, p < 0.001$). The final model, which fits the data best, is model 4 which contains the interaction of *word order* and *association type* as well as a random slope for subjects. The parameters of model 4 and its confidence intervals can be found in the appendix B.6 (page xxxvii). Table 4.16 summarizes the results of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0 vs. Model 1]	particle-XP vs. XP-particle	<i>word order*association type</i> (***) [Model 2 vs. Model 3]
<i>association type</i> (***) [Model 1 vs. 2]	DP vs. numeral	

Table 4.16: Summary of the model selection, German exp. 3 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

In addition, I performed paired t-tests. These tests revealed a significant difference between *DP-nur* and *numeral-nur* (conditions 2 and 4: $t(163) = 10.134, p < 0.001$), i.e., LeA of *nur*

was rated significantly better in the items with a numeral as the associated focus. This confirms the hypothesis in (4.28b). Moreover, the comparison between *nur*-DP and *nur*-numeral clearly missed significance (conditions 1 and 3: $t(163) = 1.02$, $p = 0.31$), which confirms the hypothesis in (4.28c).

The mean rating of the two filler items with LeA of *sogar* (see example (4.27)) was 4.72 (SD: 1.25). Although the rating of these items cannot be statistically compared to the items with *nur*, these results suggest that LeA of scalar *nur* (mean rating: 4.81 (SD: 1.45)) is rated as good as LeA of *sogar*.

The results of this study show that the scalar meaning component of *nur* plays a major role in LeA of the particle. Leftward association was rated significantly better in the items with a scalar interpretation of *nur* than in the items with a non-evaluative interpretation of *nur*. Speaker evaluation therefore is a licensing factor of LeA. I argue that the difference between LeA of *nur* and of *sogar* in the studies of sections 4.1 and 4.2 stems from the non-scalar interpretation of *nur* in these items. The items with LeA of *sogar*, on the other hand, always have a scalar interpretation and therefore received higher ratings.

In the final experiment on German FPs in the next section, I investigate whether LeA of scalar *nur* can be further improved by adding special emphasis to the items. Special emphasis strengthens speaker evaluation.

4.3.2 German experiment 4: The role of emphasis

Design and materials. This rating study contained 20 experimental items with scalar *nur*, i.e., the associated focus of the particle was a numeral in all of the items. The particle either associated to its right in canonical word order (*nur*-XP) or to its left (XP-*nur*). There were ten items with subject association as in (4.29) and ten different items with object association (appendix B.7, pages xxxviii-xl). As the items with object and subject association could not be minimal pairs, the factor *association type* was therefore only a repeated measurement factor for subjects but not for items. Additionally, there was the between-subject factor *emphasis*, i.e., half of the participants saw the items with emphasis expressing speaker evaluation added to them, and the other half saw them without emphasis. The items without emphasis were similar to the items with scalar *nur* of German experiment 3 (see section 4.3.1).

In the items with emphasis, the questions started with an interjection like *Oje* ('Oh dear'), *Wow* ('Wow'), or *Mensch* ('Gosh'). Interjections are "prototypical cases of emotive/expressive language" (Foolen 2012: 350). They express the mental attitude or emotional reaction to a situation of the speaker and can be classified as exclamations (e.g., Ameka 1992; Norrick 2009). The answers consisted of two utterances. The first utterance confirmed the question and contained an evaluative phrase like *echt übel* ('really bad'), *echt der Hammer* ('really awesome') or *echt krass* ('just unreal'). The second utterance started with the imperative *Stell dir vor* ('Guess what'). According to Donhauser (1986), the main function of this imperative is to gain attention and to signal that the speaker considers the content of the following statement to be remarkable or unexpected (cf. Donhauser 1986: 197). This imperative was followed by the target sentence printed in bold and ending with an exclamation mark. Moreover, both the question and the answer contained an emoticon in order to strengthen speaker attitude. Emoticons can be used in written communication to establish an emotional tone (cf., e.g., Kaye et al. 2016). The use of emoticons was checked by five people who frequently write and receive messages with emoticons.⁸⁶

(4.29)	Without emphasis	With emphasis
Q:	Stimmt es, dass kaum jemand Tom im Krankenhaus besucht hat?	Oje, stimmt es, dass kaum jemand Tom im Krankenhaus besucht hat? 😞
	<i>'Is it true that hardly anyone visited Tom in the hospital?'</i>	<i>'Oh dear, is it true that hardly anyone visited Tom in the hospital?'</i>
a.	Ja, das stimmt. Nur zwei Leute haben ihn besucht. [nur-XP]	Ja, echt übel. Stell dir vor: Nur zwei Leute haben ihn besucht! 😞 [nur-XP]
	<i>'Yes, that's true. Only two people visited him.'</i>	<i>'Yes, it's really bad. Guess what! Only two people visited him!'</i>
b.	Ja, das stimmt. Zwei Leute haben ihn nur besucht. [XP-nur]	Ja, echt übel. Stell dir vor: Zwei Leute haben ihn nur besucht! 😞 [XP-nur]
	<i>'Yes, that's true. Two people only visited him.'</i>	<i>'Yes, it's really bad. Guess what! Two people only visited him!'</i>

The critical items were interspersed with 36 filler items. In the questionnaires with emphasis, filler items also contained evaluative phrases and emoticons. Among the filler items were four items with the FP *sogar*, two with subject association (one with *sogar-XP*, one

⁸⁶ Thanks to Kim Bökenheide, Tobias Jäger, Andreas Kehl, Sophia Schopper, and Isabel Trott.

with *XP-sogar*) and two with object association (one with *sogar-XP*, one with *XP-sogar*). They were included in order to get an idea of whether emphasis and emotionality can improve LeA of *sogar*. Example (4.30) shows the version with emphasis of the example in (4.27).

(4.30) Q: Wow, stimmt es, dass Leon im Urlaub mehrere Bücher gelesen hat? 😬
 ‘Wow, is it true that Leon read several books on vacation?’

A: Ja, echt krass. Stell dir vor: **Vier Bücher hat er sogar gelesen!** 😊👍
 ‘Yes, it’s great. Guess what: Four books he even read!’

Procedure. Items and fillers with and without emphasis were distributed across two lists respectively using the Latin square design. Items and fillers were presented in random order and as chat conversations between two people named Anna and Nora. The task was to rate the naturalness of the part of the answer that was highlighted in bold. The questionnaire was carried out on paper. The first pages included instructions and asked for personal data which was treated anonymously. There was a short practice phase in order to familiarize participants with the task. The questionnaire contained eight control questions, two in the practice phase and six in the actual experiment. Control questions consisted of a multiple choice task and asked about something that was mentioned either in the question or in the answer of the preceding item in order to make sure that participants read both the questions and the answers carefully.

Participants. Thirty-six German native speakers recruited via three student assistants participated in this study (24 females, 12 males, aged 19 to 51, average age: 25.4).⁸⁷ Participants had no knowledge about the purpose of the study. Participants who filled out the questionnaire with emphasis were asked on the last page of the questionnaire about (i) how often they chat (e.g., via WhatsApp or Facebook) and (ii) how often they use emoticons in chat conversations. To answer the first question, they could choose from the options *very often* (e.g., *several times a day*), *often* (e.g., *several times a week*), *rarely* (e.g., *a couple of times per month*), and *never*. 83.33% indicated that they chat very often, 5.56% indicated that they chat often, and 11.11% indicated that they rarely chat. None of the participants chose the

⁸⁷ Ten additional participants were excluded either due to answering two or more control questions incorrectly, due to only assigning extreme values to all items and fillers or due to missing values. One participant was excluded due to having rated the sentences after correcting them.

option *never*. Therefore, all participants were familiar with chat conversations. For answering the second question about the use of emoticons, participants could choose from the options *very often* (e.g., *emoticons in almost every message and sometimes even several emoticons in one message*), *often* (e.g., *emoticons in almost every message*), *rarely* (e.g., *most messages without emoticons*), and *never*. 27.78% indicated that they use emoticons very often, 50% indicated that they often use emoticons, and 16.67% indicated that they rarely use emoticons. This shows that all of the participants were familiar with emoticons.

4.3.2.1 Hypotheses

The hypotheses for this study are listed in (4.31). The condition *nur*-XP with RiA of the particle should receive higher ratings than the condition XP-*nur* with LeA, in both the items with and the items without emphasis (4.31a). As the statistical effects in the preceding experiments with object association and the experiments with subject association were similar, I did not expect a difference between subject and object association (4.31d).

- (4.31)
- a. I expect a significant effect of *word order*.
 - b. The condition XP-*nur* was expected to receive higher ratings in the items with emphasis than in the items without emphasis.
 - c. I do not expect a difference between *nur*-XP with and without emphasis.
 - d. There should not be a significant effect of *association type*.

4.3.2.2 Results and discussion

The results are illustrated in Figure 4.18. Blue bars represent mean ratings without emphasis; red bars represent mean ratings with emphasis. The association type (subject vs. object) is not distinguished in this graph.

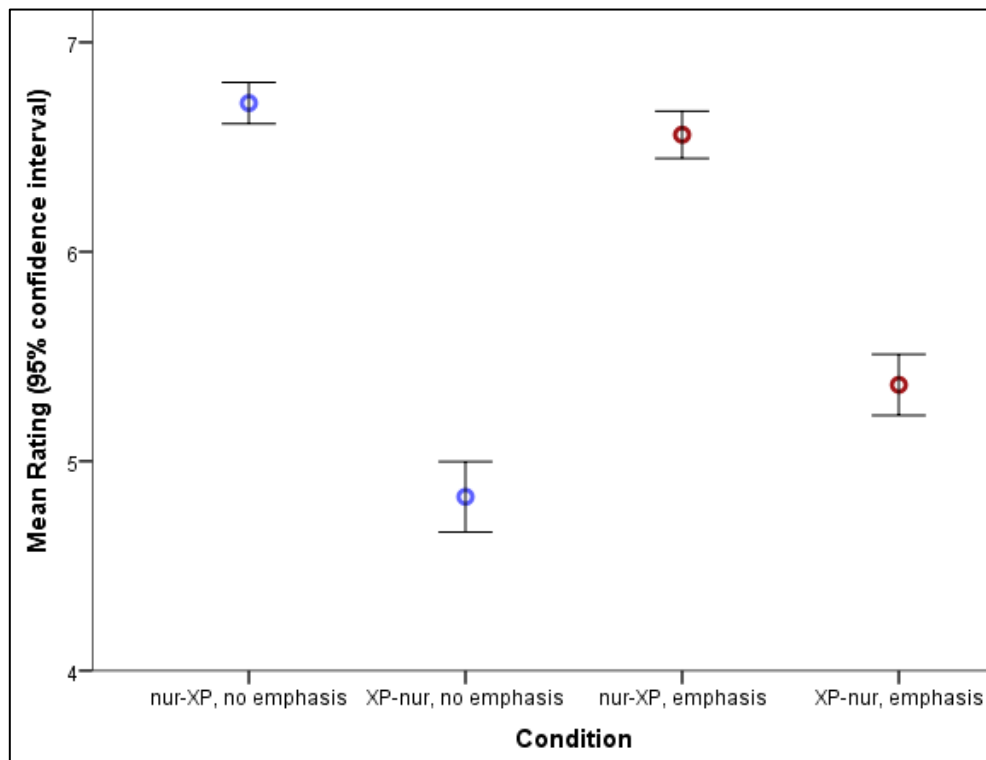


Figure 4.18: Mean ratings of *nur-XP* and *XP-nur*, with and without emphasis.

As in the preceding studies, I conducted an LMEM analysis. The models that were kept in the process of model selection via likelihood-ratio tests are listed in Table 4.17.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	2448.5
Model 1: rating ~ wo + (1 vp) + (1 item)	1999.4
Model 1a: rating ~ wo + (wo vp) + (1 item)	1905.0
Model 2: rating ~ wo + asso + wo:asso + (wo vp) + (1 item)	1901.5
Model 2a: rating ~ wo * asso + (wo * asso vp) + (1 item)	1889.2
Model 3: rating ~ wo * asso + emph + wo:emph + (wo * asso vp) + (1 item)	1886.9

Table 4.17: Models used in the LMEM analysis of German experiment 4.

As expected, there was a significant effect of *word order* (comparison between models 0 and 1: $\chi^2(1) = 451.1, p < 0.001$), which confirmed the hypothesis in (4.31a). Adding a random slope for subjects significantly improved the model (comparison between models 1 and 1a: $\chi^2(2) = 98.36, p < 0.001$). Adding the factor *association type* (subject vs. object) did not improve the model significantly. This confirms the hypothesis in (4.31d). However, there was a significant interaction of *word order* and *association type* (comparison between models 1a and 2: $\chi^2(2) = 7.51, p < 0.05$). Including this interaction in the random slope for

subject further improved the model (comparison between models 2 and 2a: $\chi^2(7) = 26.36$, $p < 0.001$). Adding the between-subject factor *emphasis* did not improve the model significantly. However, there was a significant interaction between *word order*, and *emphasis* (comparison between models 2a and 3: $\chi^2(2) = 6.22$, $p < 0.05$). There was no interaction between *association type* and *emphasis* and no three-way interaction between *word order*, *association type* and *emphasis*. Thus, model 3 was the final model. Table 4.18 summarizes the results of the model selection. The parameters of model 3 and its confidence intervals can be found in the appendix B.7 (pages xl-xli).

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0 vs. Model 1]	particle-XP vs. XP-particle	<i>word order*association type</i> (***) [Model 2 vs. Model 3]
<i>association type</i> (***) [Model 1 vs. 2]	DP vs. numeral	

Table 4.18: Summary of the model selection, German exp. 4 ($p < 0.001$ ‘***’, < 0.01 ‘**’, < 0.05 ‘*’).

In order to test whether the mean ratings of the study without emphasis differed significantly from the mean ratings of the study with emphasis, I analyzed model 3 by using the package *lmertest* (Kuznetsova et al. 2015) for R (R Core Team 2015). As reference levels, I chose *XP-nur* for word order and *no emphasis* for experiment. The parameter for *emphasis* was significant ($\beta = 0.45$, $t(37.12) = 2.34$, $p = 0.025$), indicating a significant difference between the conditions *XP-nur/emphasis* and *XP-nur/no emphasis*. Therefore, emphasis improved LeA of scalar *nur* significantly. In a second analysis, I used *nur-XP* and *no emphasis* as reference levels. In this analysis, the parameter for *experiment* (emphasis vs. no emphasis) was not significant, indicating no significant difference between *nur-XP* with and without emphasis. This confirms the hypothesis in (4.31c). These results explain the significant interaction between *word order* and *emphasis*, as emphasis only had an effect on LeA but not on RiA of *nur*.

Table 4.19 shows the mean ratings divided into subject and object association. The ratings of *nur-XP* were slightly better for object than for subject association and they were slightly better without emphasis than with emphasis. In the items without emphasis, the conditions *subject-nur* and *object-nur* received similar ratings. Emphasis improved the ra-

tings both of *subject-nur* and *object-nur*, however to a different extent: the condition *subject-nur* improved from 4.85 (SD: 1.28) to 5.55 (SD: 0.99) while *object-nur* improved from 4.81 (SD: 1.13) to 5.18 (S: 0.97). Emphasis therefore seems to have a greater effect on LeA of *nur* with subject association than with object association.

	<i>nur</i> -subject	subject- <i>nur</i>	<i>nur</i> -object	object- <i>nur</i>
Without emphasis	6.67 (0.59)	4.85 (1.28)	6.75 (0.81)	4.81 (1.13)
With emphasis	6.52 (0.83)	5.55 (0.99)	6.60 (0.70)	5.18 (0.97)

Table 4.19: Mean ratings (and standard deviations) of subject and object association of *nur*, with and without emphasis.

The mean rating of the filler items with RiA of *sogar* without emphasis was 6.1 (SD: 1.17). The mean rating was slightly lower with emphasis (5.94, SD: 1.12). The mean rating of XP-*sogar* was 4.95 (SD: 1.24) without emphasis and 4.62 (SD: 1.28) with emphasis. Therefore, LeA of this particle was rated lower with emphasis than without emphasis. However, as there were only few filler items with XP-*sogar*, this has to be further tested in the future.

It could be argued that the judgments of LeA of *nur* were better with emphasis than without emphasis, because the participants who filled out the questionnaires with emphasis probably had more fun fulfilling the task due to the colloquial speech and the emoticons used in the items with emphasis and therefore gave better ratings. It would then be expected that ratings should be better in general for all items with emphasis. This was, however, not the case. The items with RiA of *nur* received slightly lower ratings with emphasis than without emphasis and the four filler items with *sogar*-XP and XP-*sogar* received lower ratings with emphasis. Thus, it is not the case that participants generally rate items better that contain colloquial speech and emoticons.

In summary, this study shows that special emphasis further improves LeA of scalar *nur*. The current study and German experiment 3 therefore provide evidence for the hypothesis that evaluative speaker attitude plays a major role in LeA of *nur*. This may also explain the difference between *nur* und *sogar* in the studies of sections 4.1 and 4.2. In these studies, the exclusive, non-evaluative meaning component of *nur* was more prominent and thus involved no speaker evaluation while the items with *sogar* did involve speaker evaluation due to the scalar meaning of the particle. The data of the studies in section 4.3 show that LeA of *nur* significantly improves if the scalar meaning component of the particle is

made prominent and thus confirms the hypothesis in (3.113b) of Chapter 3.3. Moreover, LeA of *nur* further improves if the evaluative meaning is strengthened by means of special emphasis, which confirms the hypothesis in (3.113d) of Chapter 3.3. The question why speaker evaluation is important for LeA will be discussed in Chapter 6.

4.4 Summary and discussion

The experiments in this chapter were designed to answer the research questions in (4.1), repeated in (4.32) below.

- (4.32) a. Are there differences between certain German FPs with respect to LeA?
b. Which factors can facilitate or license LeA?
c. Why can some FPs associate better to their left than others?
d. What role do speaker evaluation and emphasis play?

I developed the hypotheses for the experimental investigation in Chapter 3 from the observations on LeA of *nur* and *sogar* in the literature and from the analysis of examples collected from everyday language. The hypotheses are repeated in (4.33).

- (4.33) a. RiA is the preferred word order of *nur* and *sogar*.
b. The scalar meaning component of *sogar* licenses LeA of this particle. LeA of *sogar* is better than LeA of non-scalar *nur*.
c. LeA of scalar *nur* is better than LeA of non-scalar *nur*.
d. Special emphasis improves LeA of *nur*.

In the literature, some authors assume there to be differences between the particles *nur* and *sogar* with respect to LeA (e.g., Jacobs 1983; Abraham 2005), while others assume that LeA is equally possible for both particles (e.g., Krifka 1999; Erlewine 2014b) (see Chapter 3.1). In the studies of sections 4.1 and 4.2, I consistently found better ratings for *sogar* than for *nur* in (short) topicalization as well as in subject association, and there was a significant interaction of *word order* and *particle type* in all of these studies (cf. research question in (4.32a)). These results therefore confirm the hypothesis in (4.33b) that non-scalar *nur* and *sogar* behave differently with respect to LeA. However, the studies of section 4.3 show that LeA of *nur* improves when the scalar meaning component is made prominent, and the data

suggest that scalar *nur* can associate to its left equally well as *sogar*, especially if special emphasis is involved. These observations confirm the hypotheses in (4.33c) and (4.33d).

LeA of both *nur* and of *sogar* received significantly worse ratings than RiA of both particles. This was expected, as RiA is the preferred word order of *nur* and *sogar* and confirms the hypothesis in (4.33a). RiA of *nur* in all studies and RiA of *sogar* in the studies of sections 4.1 and 4.2 received high ratings. This shows that the contexts fitted both particles. Interestingly, RiA of *nur* was rated significantly better than RiA of *sogar* in all of the studies which included the particle *sogar*. This could be due to a frequency effect (see also the discussion in section 4.1.1, page 134).

In the literature, sentences with LeA of *nur* are often marked with an asterisk or at least two question marks, i.e., the sentences are considered to be unacceptable or ungrammatical (see Chapter 3.1.3). If this were the case, we would expect ratings at the lower end of the seven-point scale. However, the lowest rating of XP-*nur* without embedding was 3.62 (SD: 1.38) in the items with object topicalization and no capital letters (follow-up study 2) and the highest rating of XP-*nur* was 5.55 (SD: 0.99) in the items with subject association and emphasis (German experiment 4). These mean values do not suggest that this construction is totally unacceptable and show that it can reach quite high values in items with speaker evaluation and emphasis. Regarding the research question in (4.33b), I found that the factors prosody (German follow-up study 3), speaker evaluation (German experiment 3), and special emphasis (German experiment 4) improve judgments of XP-*nur*. These findings support the idea that LeA of *nur* is a construction of spoken rather than written language, which was already suspected by Abraham (2005). I expect that ratings for XP-*nur* with emphasis would further improve if items were presented auditorily. The findings of the experiments presented in this chapter thus confirm the hypotheses in (3.113) of Chapter 3.3, repeated above in (4.33) which I developed from authentic data. Chapter 6 contains a detailed summary and discussion of the data and provides an account which combines information structural, pragmatic, and processing aspects.

It is claimed in the literature that the English particle *even* can associate better to its left than *only* (see Chapter 3.1). My experiments of sections 4.1 and 4.2 which show a contrast between non-scalar *nur* and *sogar* suggest that German and English particles might behave similarly. The English experiments in the following Chapter 5 test this assumption.

5 Experimental Evidence from English: The Role of Context

The experiments presented in this chapter are similar to the German experiments of Chapter 4 and address the following research questions:

- (5.1)
- a. Do the English FPs *only* and *even* behave differently with respect to LeA?
 - b. Why can some FPs associate better to their left than others?
 - c. Which factors can facilitate or license LeA? What role does context play?
 - d. Does experimental evidence yield similar patterns of results for German and English?

Chapter 5.1 starts with an overview of topicalization in English and then presents experiments testing the claims in the literature about LeA of the FPs *only* and *even*. It is generally agreed that *only* cannot associate with leftward material while *even* can. However, this has not been tested experimentally thus far (see Chapter 3.1). The experiments therefore relate to the questions in (5.1a). Furthermore, I compared topicalization with and without FPs in order to distinguish the effect of topicalization from the effect of LeA. The last experiment of section 5.1 addresses the question in (5.1c) by looking at the role of context, as context seems to be an important factor in licensing object topicalization in English.

Section 5.2 investigates LeA of *only* and *even* with the subject. In this experiment, the associate of the particle was either a proper name or a numeral in order to test whether the scalar meaning component of *only* has an effect on LeA. Additionally, participants either saw the items with a short context consisting of a single question or with a longer, more specific context in order to test whether contexts which provide more background information and mention specific alternatives facilitate LeA. This experiment thus addresses the questions in (5.1b) and (5.1c).

Section 5.3 provides a summary and discussion of the experiments and relates to the question in (5.1d) by comparing the experimental evidence of this Chapter to the experimental evidence on German FPs of Chapter 4.

5.1 English focus particles in topicalization structures

While object topicalization was quite common in Middle English, it is no longer much used in most dialects of Modern English anymore and needs a suitable context in order to be acceptable (Speyer 2005). Netz and Kuzar (2007) searched for examples of object topicalization in the Santa Barbara Corpus of Spoken American English (SBCSAE). In the few examples they found for this construction, it was used “to express the logical relation of contrast in the discourse” (Netz and Kuzar 2007: 331). According to Ward et al. (2002: 1365), preposing constructions belong to the so-called “information-packaging constructions” which have a non-canonical word order and therefore present information differently than their default canonical counterparts. The complement, which is usually in a position within the VP of a clause, can only occur in the clause initial position if it contributes to the flow of the discourse by providing a discourse-old anaphoric link to the preceding context (e.g., Gregory & Michaelis 2001; Ward et al. 2002; Ward & Birner 2004). The link to the preceding discourse can involve relations such as “type/subtype, entity/attribute, part/whole, identity [...] and simple set inclusion [...]” (Ward & Birner 2004: 159). These relations constitute partially ordered sets, which are also called *posets* (Ward & Birner 2004). Consider the example in (5.2), which was produced by an American native speaker in an everyday conversation. Here, *the bus* is preposed and is contrasted with another kind of public transport, namely *the train*. *The bus* and *the train* are therefore related by a simple set inclusion.

(5.2) The train and I are best friends. The bus, I hate. (American native speaker, 03/13/2015)

In English and many other languages, information which is given or can be inferred from the preceding context usually precedes new information. Preposed elements are therefore marked as familiar (e.g., Ward & Birner 2004). Topicalization is thus considered to be a device for creating cohesion in a text (e.g., Hietaranta 1984).

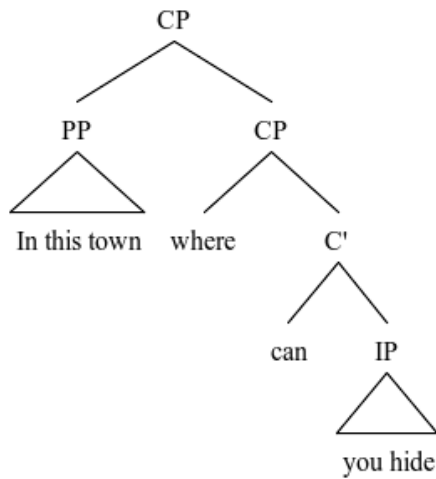
In English, two types of topicalization can be distinguished by means of the information status of the preposed constituent and intonation: *focus fronting* (also referred to as *focus topicalization*, *focus movement*, or *focus preposing*) and *topic fronting* (also referred to as *topicalization* or *non-focus preposing*) (e.g., Gundel 1977; Prince 1981; Ward et al. 2002; Ward & Birner 2004; Newson et al. 2006). Two examples of focus preposing are given in (5.3); two examples of topic preposing are given in (5.4).

- (5.3) a. A: Do you have any bagels?
 B: [A bran muffin I can give you.]
- b. Colonel Kadafy, you said you were planning on sending planes – M-16s I believe they were – to Sudan (Peter Jennings on ABC’s “World News Tonight”)
 (Ward & Birner 2004: 160)
- (5.4) a. A: Did you buy a whole new wardrobe for school?
 B: No, I have lots of clothes. [Most of my stuff my mom gets at Alexander’s].
 (Ward et al. 2002: 1373)
- b. G: Do you watch football?
 E: Yeah. Baseball I like a lot BETTER.
 (G. McKenna to E. Perkins in conversation)
 (Ward & Birner 2004: 161)

In (5.3a), *bran* carries the main stress and is therefore the focus of the sentence by providing new information. The rest of the sentence contains already known information and is usually deaccented. The fronted element and the rest of the sentence form one intonation unit. The preposed constituent *bran muffin* provides a link to the preceding context, as it is related to *bagels* mentioned earlier in the discourse. Both *bran muffins* and *bagels* are members of the inferred poset {*breakfast baked goods*}. Another example of focus preposing is given in (5.3b). Here, *M16s* is the preposed element and refers to the poset {*military planes*} invoked by the prior discourse. Thus, in focus preposing constructions, the related poset is familiar within the discourse and the preposed element is a new link to this poset (Ward & Birner 2004). In (5.4a), the preposed element *Most of my stuff* carries pitch accent. However, the final word *Alexander’s* carries a more prominent pitch accent, as it is the focus of the sentence and offers new information. In (5.4b), the preposed element *baseball* belongs to the same poset as *football*, namely {*sports*}, which was mentioned in the prior discourse. The rest of the clause provides new information and *better* carries the focus. Topic fronting constructions are therefore characterized by two intonation units with multiple pitch accents and a pause after the preposed element which is not the focus (e.g., Prince 1998; Newson et al. 2006).

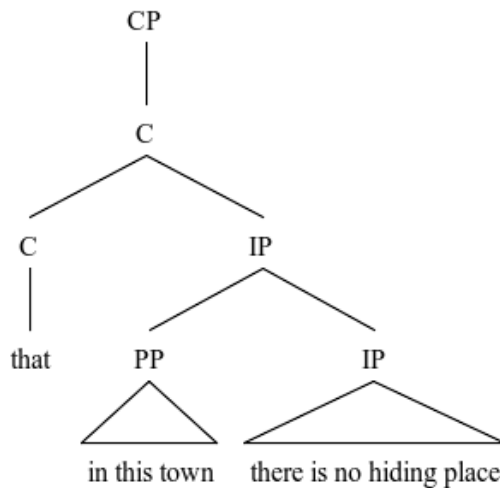
Syntactically, topicalization is often analyzed as adjunction to CP in main clauses (e.g., Authier 1992) or as adjunction to IP in subordinate clauses (e.g., Baltin 1982; Lasnik & Saito 1992; Rochemont 1989; Maki et al. 1999; Culicover 2013 [1992]). These two versions are shown in the tree structures in (5.5) and (5.6).

(5.5)



(Newson et al. 2006: 271)

(5.6)



(Newson et al 2006: 272)

Müller and Sternefeld (1993) argue against both accounts. They propose that topics are “specifiers of their own topic phrase” (Müller & Sternefeld 1993: 485). Rizzi (1997) suggests splitting the left periphery (CP) of sentences into several projections which contain, for example, the focus position FocP and the topic position TopP. This analysis is called the *split CP hypothesis* and accommodates the distinction between focus fronting and topic fronting.

In the following experiments, focus fronting and not topic fronting is used as the construction with LeA of the FPs in order to make sure that the particle is not associated

with a word to its right which carries stress. In the rest of this chapter, the term *topicalization* refers to focus fronting.

5.1.1 English experiment 1: Comparison between *only* and *even* in short and long topicalization structures

5.1.1.1 Data elicitation

Design and materials. The experiment design corresponded to the German experiment on *nur* and *sogar* in short and long topicalization structures (see Chapter 4.1.1). The items of this rating study also consisted of question-answer pairs. There were 20 items with *only*, 20 items with *even*, and 40 filler items. Ten filler items were normed sentences (Gerbrich et al., to appear).⁸⁹ I constructed questions for these standard items which led to a broad focus interpretation of the normed sentences. All the items can be found in the appendix B.8 (pages xli-xlvi). An example item with *only* is given in (5.7), the same item with *even* is given in (5.8).

- (5.7) A₁: Do you think that Harry fed all the animals at the petting zoo?
 B₁: No. I think that he only fed the kangaroos. [only-XP, long]
 B₂: No. The kangaroos I think that he only fed. [XP-only, long]
- A₂: Did Harry feed all the animals at the petting zoo?
 B₃: No. He only fed the kangaroos. [only-XP, short]
 B₄: No. The kangaroos he only fed. [XP-only, short]
- (5.8) A₂: Do you think that Harry fed all the animals at the petting zoo?
 B₁: Yes. I think that he even fed the kangaroos. [even-XP, long]
 B₂: Yes. The kangaroos I think that he even fed. [XP-even, long]
- A₂: Did Harry feed all the animals at the petting zoo?
 B₃: Yes. He even fed the kangaroos. [even-XP, short]
 B₄: Yes. The kangaroos he even fed. [XP-even, short]

The answers of conditions 1 and 3 contained SVO order with RiA of the FP. In the answers of conditions 2 and 4, the focused object was moved to the sentence initial position. This object was the only element which was not introduced in the context and stood in a poset relation to the object mentioned in the question, similar to the question-answer pair in (5.3a).

⁸⁹ Standard filler items were kindly provided by Sam Featherston.

Therefore, this construction is a case of focus fronting and not topic fronting. The fronted constituent was the only element carrying stress in the sentence. In topic fronting structures, there would be another stress at the end of the sentence and the particle would then preferably associate with this stressed element to its right. In the embedded versions, I included the optional complementizer *that* in order to get long extraction in condition 2, as *I think without that* can be analyzed as a parenthesis (e.g., Bayer 2005; Dehé 2009). However, this makes the items of condition 2 more unnatural.

Procedure. Items and fillers were distributed across four lists using a Latin square design. As in German experiment 1, each participant saw two versions of the same item, one condition with *only* and another condition with *even*. The experiment was uploaded on the On-Exp2 server of the University of Tübingen. Items were presented in random order and were set up as dialogs between two people named Sally and Henry. The task was to rate the naturalness of Henry's answers to Sally's questions on a seven-point scale. Participants received the link to the experiment on Amazon Mechanical Turk. They first read the instructions and then entered some personal information into a data window. All personal information was treated anonymously. After a short practice session, the actual experiment started. On the last page of the experiment, participants received a code which they should enter into a box on Mechanical Turk in order to show that they had completed the whole experiment.

Participants. Thirty-two American English native speakers participated in the experiment (18 females and 14 males, aged 23 to 57, average age: 33.4).⁹⁰ They were recruited via Amazon Mechanical Turk. Participants were naïve as to the research question. All participants were paid after the experiment was finished.

5.1.1.2 Hypotheses

The hypotheses for this study are listed in (5.9). As in the corresponding German study, the conditions with particle-XP are expected to receive better ratings than the items with XP-

⁹⁰ 14 additional participants had to be excluded either due to technical difficulties, or because English was not their first native language. Technical problems in OnExp occur frequently when uploading the experiment on Mechanical Turk, as a lot of participants conduct the experiment at the same time.

particle (5.9a). This effect should be even more pronounced than in the German study, as focus fronting per se is a marked construction in English. I postulate the hypothesis in (5.9b), as there was more material between the particle and its associated focus in the items with long topicalization. Moreover, the complementizer *that* might be perceived as superfluous.⁹¹ As LeA of *even* is judged to be possible while LeA of *only* is judged to be impossible in the literature (see Chapter 3.1), I postulate the hypothesis in (5.9c). Note, however, that Jackendoff (1975) considers LeA of *even* to be impossible in topicalization structures, i.e., LeA of *even* is restricted to subject association in his theory. Moreover, Rochemont (2018) suggests that LeA of *only* should be possible in constructions with focus fronting which is the construction used in my English studies (see Chapter 3.1.1). As Rochemont is not concerned with *even*, he makes no predictions whether LeA of *only* in focus fronting is as acceptable as LeA of *even* in the same construction.

- (5.9) a. I expect a significant effect of word order, as RiA is the preferred word order of both *only* and *even*.
- b. Short topicalization should be rated better than long topicalization, both in constructions with *only* and with *even*.
- c. LeA should work better with *even* than with *only*, as reported in the literature.

5.1.1.3 Results and discussion

The results are illustrated in Figure 5.1. Red bars illustrate the conditions with *only*, blue bars illustrate the conditions with *even*, and black bars illustrate the mean ratings of the normed filler sentences. The standards with the worst grammaticality level E (E-Standards) were rated as good as the standards with the grammaticality level D (D-Standards). The contexts in form of questions seem to have made the E-standards more acceptable. Therefore, these items cannot be taken as reference items for the judgments of the experimental items. However, this is not relevant, as none of the experimental conditions were rated worse than D-Standards. The ratings of the other standard items were not affected by the contexts, and led to the expected distribution of the different grammaticality levels.

⁹¹ This assumption follows from discussions with native speakers. In follow-up study 1, the items were tested without the complementizer *that*.

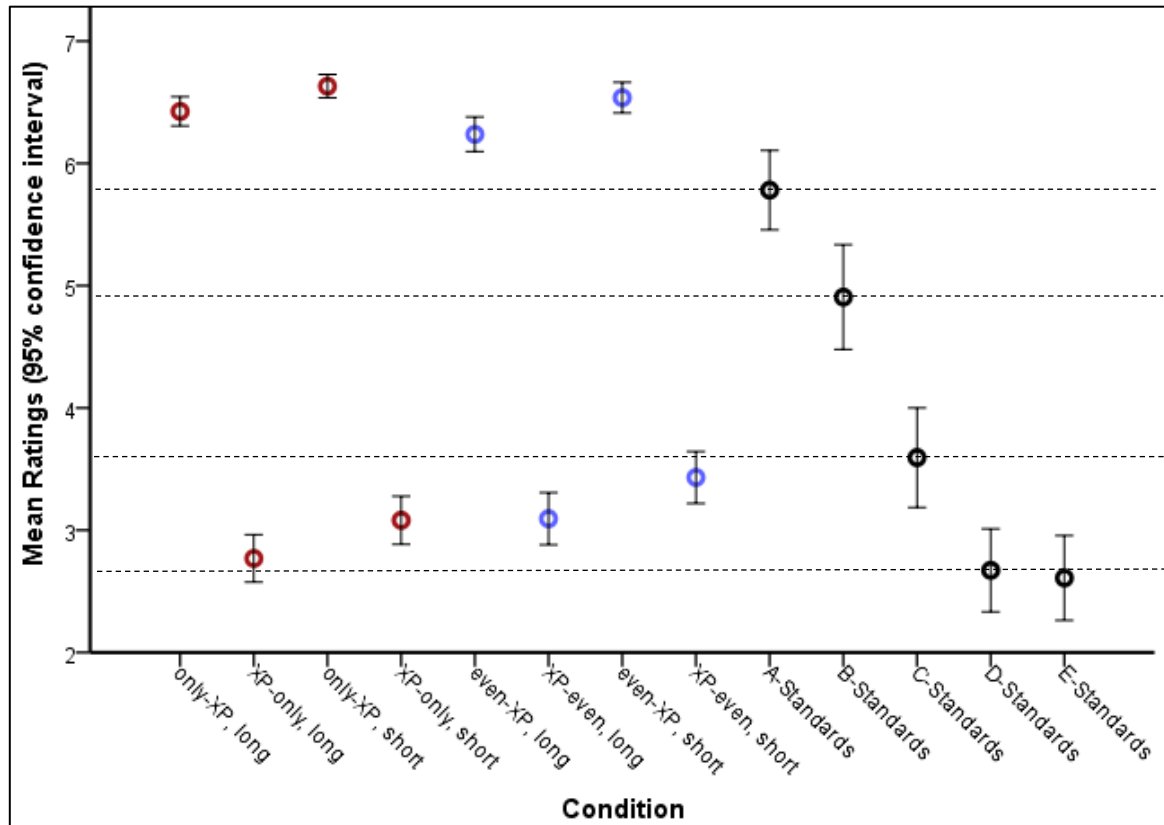


Figure 5.1: Mean ratings of *only* and *even* in canonical (particle-XP) and non-canonical (XP-particle) word order with embedding (long) and without embedding (short). Black bars show standard items.

As in the German rating studies, I conducted an LMEM analysis to investigate effects of the factors *word order* (canonical word order vs. object topicalization), *complexity* (complex sentence with embedded clause vs. simple sentence without embedded clause), and *particle type* (*only* vs. *even*). The procedure of model selection via likelihood-ratio tests corresponded to the procedure used in the German experiments. The null model and the models I retained for my analysis are shown in Table 5.1.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	5388.4
Model 0a: rating ~ 1 + (1 vp)	5386.4
Model 1a: rating ~ wo + (1 vp)	3592.8
Model 1b: rating ~ complex + (1 vp)	5381.3
Model 2: rating ~ wo + complex + (1 vp)	3564.8
Model 3: rating ~ wo + complex + (1+wo vp)	3093.8
Model 4: rating ~ wo + complex + (1+wo vp) + (1+wo item)	3077.8
Model 5: rating ~ wo + complex + type + (1+wo vp) + (1+wo item)	3074.0
Model 6: rating ~ wo + complex + type + type:wo + (1+wo vp) + (1+wo item)	3041.4

Table 5.1: Models used in the LMEM analysis of English experiment 1.

I found a highly significant effect of *word order* (comparison between models 0a and 1a: $\chi^2(1) = 1795.6$, $p < 0.001$). This confirms the hypothesis in (5.9a), as the conditions with RiA of the particles were rated better than the conditions with focus fronting and LeA of the particles. The items with canonical word order received high ratings for both particles, whereas the items with focus fronting received low ratings.

There was also a significant effect of *complexity* (comparison between models 0a and 1b: $\chi^2(1) = 7.05$, $p < 0.001$). Long extraction was rated worse than short extraction for both particles, which confirms the hypothesis in (5.9b). As model 1a had a lower AIC than model 1b, I then compared model 1a to model 2, which included both factors *word order* and *complexity*. Model 2 explained the data significantly better than model 1a ($\chi^2(1) = 29.99$, $p < 0.01$). I did, however, not find a significant interaction between the two factors.

Adding by-subject random slopes for *word order* (comparison between models 2 and 3: $\chi^2(2) = 474.99$, $p < 0.001$) and by-item random slopes for *word order* (comparison between models 3 and 4: $\chi^2(3) = 22.04$, $p < 0.001$) led to significant improvements of the model. Random slopes for *complexity* did not improve model fit. The factor *particle type* improved the model significantly (comparison between models 4 and 5: $\chi^2(1) = 5.76$, $p < 0.05$). Moreover, I found a significant interaction between *word order* and *particle type* (comparison between models 5 and 6: $\chi^2(1) = 34.57$, $p < 0.001$), which indicates differences between the two particles. There was no interaction between *complexity* and *particle type*. Random slopes for *particle type* did not improve the model. The final model fitting the data best was model 6. The parameters of this model and its confidence intervals can be found

in the appendix B.8 (pages xlvi-xlix). Table 5.2 summarizes the results of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0a vs. Model 1a]	particle-XP vs. XP-particle	<i>word order*particle type</i> (***) [Model 6 vs. Model 5]
<i>complexity</i> (***) [Model 1a vs. Model 2]	embedded clause vs. simple sentence	
<i>particle type</i> (***) [Model 4 vs. Model 5]	<i>only</i> vs. <i>even</i>	

Table 5.2: Summary of the model selection, English exp. 1 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

Paired t-tests confirmed a significant difference between *only* and *even* in topicalization structures ($t(319) = 4.84$, $p < 0.001$). The difference between the particles was significant in both the items with long extraction ($t(159) = 3.18$, $p < 0.001$) and the items with short extraction ($t(159) = 4.02$, $p < 0.001$). Therefore, *even* was rated significantly better in topicalization structures than *only*, which confirms the hypothesis in (5.9c). This effect was also present in long topicalization with more material between the particle and its associated focus. However, as can be seen in Figure 5.1, LeA of *even* was also rated quite low and therefore cannot be taken to be a natural construction of English. LeA was rated best for *even* in short topicalization structures. The mean rating of these items can be compared to the ratings of C-standards.

Moreover, there was a significant difference between the two particles in canonical word order ($t(319) = -2.6$, $p < 0.01$). The items with *only*-XP were rated significantly better than the items with *even*-XP, which is similar to what I observed in the German rating studies.

The contrast between *only* and *even* in structures with focus fronting cannot be interpreted as a contrast between grammatical and ungrammatical but rather as a contrast between marked and more marked. It is likely that this is caused by the already marked status of topicalization without FPs. Follow-up study 2 in Chapter 5.1.3 is concerned with the

difference between topicalization with and without an FP in order to test the effect of topicalization on the ratings. The next section deals with the first follow-up study which included prosodic information by means of capital letters.

5.1.2 English follow-up study 1: Comparison between *only* and *even* with capital letters

5.1.2.1 Data elicitation

Design and materials. The items of the first English rating study were used for this follow-up study and modified by means of capital letters, similar to the German follow-up study 1 (see Chapter 4.1.2). In the questions, the quantifiers like *all* or *many* were written in capital letters in order to strengthen the particles' intended meaning. In the answers, the focused object was capitalized. Another modification was that the complementizer *that* was deleted in the answers of condition 2 in order to make the sentences more natural. As the complementizer was still used in the question, I analyzed it as phonetically deleted in the answers. Example (5. 10) shows an item with *only*.

- (5. 10) A₁: Do you think that Harry fed ALL the animals at the petting zoo?
 B₁: No. I think he only fed the KANGAROOS. [only-XP, long]
 B₂: No. The KANGAROOS I think he only fed. [XP-only, long]
 A₂: Did Harry feed ALL the animals at the petting zoo?
 B₃: No. He only fed the KANGAROOS. [only-XP, short]
 B₄: No. The KANGAROOS he only fed. [XP-only, short]

Procedure. The procedure corresponded to the procedure of the German follow-up study 1. Participants were informed about the function of capital letters in the instructions. The example in (5.11) was used in order to illustrate this function, as *Andy* carries corrective focus and is therefore stressed. Moreover, three example items with suggestions as to how these examples could be rated were given in the instructions.

- (5.11) Peter says: Jack fed the goldfish.
 Mary replies: No, ANDY fed the goldfish.

Participants. Thirty-two American English native speakers participated in the experiment (12 females and 20 males, aged 22 to 57, average age: 32.4).⁹² The participants were recruited via Amazon Mechanical Turk. All participants lacked knowledge about the topic of the study.

5.1.2.2 Hypotheses

The hypotheses for this follow-up study are listed in (5.12). The hypotheses in (5.12a) and (5.12b) follow from the results of the preceding study. Prosodic information by means of capital letters is expected to facilitate the constructions with leftward association (5.12c), and the omission of the complementizer *that* is expected to facilitate the conditions with long topicalization (5.12d).

- (5.12)
- a. As in the first English rating study, RiA of the FPs is expected to be preferred over LeA.
 - b. LeA of *even* is expected to receive better ratings than LeA of *only*.
 - c. Capital letters should facilitate LeA and therefore lead to better ratings of both particles.
 - d. The items with long topicalization should be more natural without the complementizer *that*. Therefore, short and long topicalization should receive similar ratings.

5.1.2.3 Results and discussion

Figure 5.2 illustrates the results. Red bars represent the mean ratings of the conditions with *only*, and blue bars represent the mean ratings of the conditions with *even*.

⁹² Twenty additional participants were excluded. Participants whose native tongue was not English and participants whose results were unusable due to technical difficulties with the software OnExp were excluded. Moreover, I randomly excluded participants in order to have an equal number of participants per list.

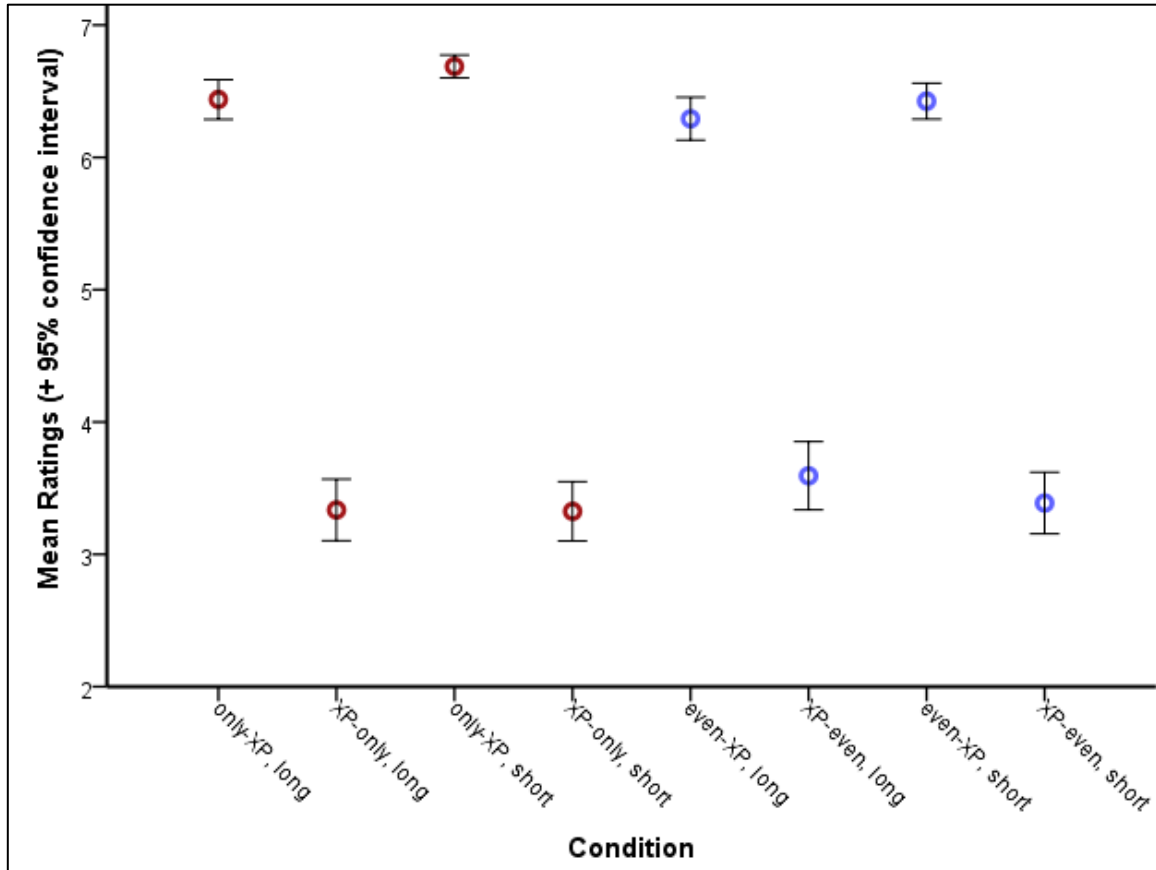


Figure 5.2: Mean ratings of *only* and *even* with capital letters in canonical (particle-XP) and non-canonical (XP-particle) word order with embedding (long) and without embedding (short).

I used linear mixed effects models for statistical analysis. The null model and the models which were considered to be relevant for my data by means of likelihood-ratio tests are listed in Table 5.3.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	5299.6
Model 0a: rating ~ 1 + (1 vp)	5290.8
Model 1a: rating ~ wo + (1 vp)	3849.3
Model 2: rating ~ wo + complex + wo:complex + (1 vp)	3846.3
Model 3: rating ~ wo*complex + (1+wo vp)	3263.5
Model 4: rating ~ wo*complex + type + type:wo + (1+wo vp)	3250.3
Model 5: rating ~ wo*complex + type*wo + (1+wo+type vp)	3236.7

Table 5.3: Models used in the LMEM analysis of English follow-up study 1.

Model selection revealed a highly significant effect of *word order* (comparison between models 0a and 1a: $\chi^2(1) = 1443.4, p < 0.001$). As expected, RiA of the particles was rated better than LeA. This confirms the hypothesis in (5.12a). In contrast to the previous rating study, there was no main effect of *complexity* which might be due to the deletion of the complementizer *that*. However, I found a significant interaction between *word order* and *complexity* (comparison between models 1a and 2: $\chi^2(2) = 7.07, p < 0.05$). In contrast to the random by-item slope, the random by-subject slope had a significant effect on the model (comparison between models 2 and 3: $\chi^2(2) = 586.78, p < 0.001$).

Adding the fixed effect *particle type* to model 3 did not reveal a significant effect. However, there was a significant interaction between *word order* and *particle type* (comparison between models 3 and 4: $\chi^2(2) = 17.15, p < 0.001$). A by-subject random slope for *word order* and *particle type* further improved the model (comparison between models 4 and 5: $\chi^2(2) = 36.77, p < 0.001$). The model which therefore explained my data best was model 5, which included an interaction between *word order* and *complexity*, an interaction between *word order* and *particle type* and by-subject random slopes. The parameters of the model as well as its confidence intervals can be found in the appendix B.9 (page xlix). Table 5.4 summarizes the results of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0a vs. Model 1a]	particle-XP vs. XP-particle	<i>word order*complexity</i> (*) [Model 1a vs. Model 2]
		<i>word order*particle type</i> (***) [Model 3 vs. Model 4]

Table 5.4: Summary of the model selection, follow-up study 1 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

Paired t-tests confirmed a significant difference between *only* and *even* in topicalization structures ($t(319) = 2.24, p < 0.05$). However, the difference between the particles only held for the items with embedded clauses ($t(159) = 2.4, p < 0.05$) and not for the items without embedded clauses ($t(159) = 0.75, p = 0.46$). Therefore, the difference between the two particles was not as apparent as in the first rating study without capital letters and the hypothesis in (5.12b) could only be partly confirmed.

As in the previous study, there was a significant difference between *only* and *even* in canonical word order ($t(319) = -3.43, p < 0.001$).

Table 5.5 lists the mean ratings per condition of the preceding study without capital letters and follow-up study 1 with capital letters.⁹³

Mean Ratings (SD)		
Condition	Without capital letters	With capital letters
<i>only</i> -XP, long	6.43 (0.77)	6.44 (0.96)
XP- <i>only</i> , long	2.77 (1.25)	3.34 (1.5)
<i>only</i> -XP, short	6.63 (0.61)	6.69 (0.55)
XP- <i>only</i> , short	3.08 (1.26)	3.33 (1.44)
<i>even</i> -XP, long	6.24 (0.91)	6.29 (1.04)
XP- <i>even</i> , long	3.09 (1.26)	3.59 (1.65)
<i>even</i> -XP, short	6.54 (0.8)	6.42 (0.87)
XP- <i>even</i> , short	3.43 (1.36)	3.39 (1.49)

Table 5.5: Mean ratings per condition with and without capital letters.

The ratings of the items with *only* in long and short topicalization improved in comparison to the preceding study (mean ratings in English experiment 1: XP-*only*, long: 2.77 (SD: 1.25), XP-*only*, short: 3.08 (SD: 1.26); mean ratings in follow-up study 1: XP-*only*, long: 3.34 (SD: 1.5), XP-*only*, short: 3.33 (SD: 1.44)), whereas the ratings of *even* did only improve in long topicalization (mean rating in English experiment 1: 3.09 (SD: 1.26); mean rating in follow-up study 1: 3.59 (SD: 1.65)) but not in short topicalization (mean rating in English experiment 1: 3.43 (SD: 1.36); mean rating in follow-up study 1: 3.39 (SD: 1.49)). There was no difference between *only* in short topicalization (mean rating: 3.33 (SD: 1.44)), *only* in long topicalization (mean rating: 3.34 (SD: 1.5)) and *even* in short topicalization (mean rating: 3.39 (SD: 1.49)). The higher ratings of the items with *even* in long topicalization could be due to the deletion of the complementizer *that*. The items with long topicalization and *only* improved to a greater extent than the items with short topicalization and *only*. This confirms the hypothesis in (5.12d), i.e., the sentences are more natural without *that* and the difference between conditions 2 and 4 becomes smaller.

⁹³ I am aware that the seven-point rating scale does not provide clear anchor points (see also fn. 81). Thus, it is difficult to directly compare the mean ratings of two experiments. However, I regard the items with RiA as anchor points, as the high ratings of these items are stable across experiments. Table 5.5 shows that the mean ratings of the conditions with RiA are very similar in the two studies.

Capital letters improved the ratings of short topicalization with *only* but not of short topicalization with *even*. Therefore, the hypothesis in (5.12c) was not confirmed.

In this follow-up study, the difference between *only* and *even* disappeared in the items with short topicalization and became smaller in the items with long topicalization. This effect is similar to the effect I found in the German rating studies, but was not expected for the English data, as it is generally accepted in the literature that *even* can associate better to its left than *only*. I assumed for the German experiments that capital letters can only represent the intonation needed for LeA of *nur* but not for the intonation needed for *sogar*. It is plausible that this also holds for the respective English particles. Moreover, topicalization is a marked construction in English and therefore the difference between *only* and *even* in the experiment without capital letters was not as apparent as expected, although it was a significant effect. A control condition with topicalization without a particle was not included in this experiment, as the contexts used for *only* and *even* were not well-suited for topicalization without a particle. In example (5.13), the answer seems to be incomplete.

- (5.13) Q: Did Harry feed ALL the animals in the petting zoo?
A: No. The KANGAROOOS he fed.

I therefore conducted another follow-up study in order to test whether ratings of topicalization without a particle differ from the ratings of topicalization with FPs. In this follow-up study, the items were designed such that the sentences with topicalization without an FP did not sound incomplete. This follow-up study will be discussed in the next section.

5.1.3 English follow-up study 2: Topicalization with and without *only*

The goal of this study was to compare English topicalization with FPs to topicalization without FPs in order to find out whether FPs have an effect on this structure.

5.1.3.1 Data elicitation

Design and materials. In this experiment, I tested isolated sentences without context and used the thermometer judgment method (see Featherston 2008). This method gives participants more freedom for their judgments, as sentences are rated on an open scale and relative

to two given reference examples. This method can capture fine-grained differences of grammaticality. Participants are told that the first reference example is rather unnatural and is worth 20 and the second reference example is quite natural and worth 30. Participants are then instructed to rate the naturalness of the target sentences relative to the two reference examples by typing in the value they want to assign into a box. For the items, I used a 2 x 2 design with the factors *word order* (SVO order vs. topicalization) and *particle* (no particle vs. the particle *only*).

There were 40 items and 40 fillers which were run Latin square.⁹⁴ An example item is given in (5.14). All items are listed in the appendix B.10 (pages I-liv).

- | | | |
|--------|---|---|
| (5.14) | a. I like herb teas, not fruit teas. | [Condition 1: SVO] |
| | b. Herb teas I like, not fruit teas. | [Condition 2: Topicalization] |
| | c. I only like herb teas, not fruit teas. | [Condition 3: SVO+only] |
| | d. Herb teas I only like, not fruit teas. | [Condition 4: Topicalization+only] |

Items of the first condition consisted of canonical word order without a particle and items of condition 2 consisted of topicalization without a particle. Conditions 3 and 4 differed from conditions 1 and 2 in that they contained the exclusive particle *only*. All items ended with a negatively marked contrastive phrase which provided a contrast to the preceding phrase. In (5.14), the negatively marked contrastive phrase is *not fruit teas*. This contrast was necessary for the topicalization conditions with and without a particle, as there was no preceding context. Moreover, due to the negatively marked contrastive phrase, the items with topicalization did not sound incomplete. In (5.14d), the negatively marked contrastive phrase forced the particle to associate with the topicalized object *herb teas*, as the contrasted element *fruit teas* was also a noun. There were no items with *even*, as using this particle in the same items would have lacked plausibility due to the particle's meaning.

Procedure. The experiment was uploaded on the OnExp2 server of the University of Tübingen. Participants received a link to the experiment. The first page with detailed instructions and examples was followed by a data window asking participants to enter some personal information. Afterwards, two practice sessions familiarized participants with thermometer judgments. In the first practice stage, participants were instructed to estimate the length of lines relative to two reference lines which were worth 20 and 30. This task should

⁹⁴ The experiment included items of an experiment on embedded topicalization (see Geibig 2015; Jäger 2018).

familiarize participants with making judgments relative to two fixed points. In the second practice stage, sentences with different levels of grammaticality were rated relative to two reference examples. Then, the actual experiment started. Items were presented in random order.

Participants. Fifty-six American English native speakers recruited via Amazon Mechanical Turk participated in the experiment (28 females and 28 males, aged 21 to 54, average age: 32.8).⁹⁵ Participants were naïve as to the topic of the study.

5.1.3.2 Hypotheses

For this follow-up study, I postulate the following hypotheses:

- (5.15) a. SVO order (conditions 1 and 3) should receive better ratings than object topicalization (conditions 2 and 4).
- b. There should be no difference between SVO order with and without a particle.
- c. Topicalization without a particle is expected to be better than topicalization with a particle due to LeA of *only*.

5.1.3.3 Results and discussion

Figure 5.3 illustrates the results of this experiment. The ratings were converted into z-scores in order to normalize participants' individual scales. Blue bars represent the mean z-scores of SVO order and topicalization without a particle, red bars show the results of SVO order and topicalization with *only*, and black bars represent normed sentences with five different levels of grammaticality.

⁹⁵ Forty participants had to be excluded. Most of them were excluded because of severe technical difficulties with OnExp. Moreover, a lot of people participated whose native language was not English. Some participants were excluded randomly in order to balance the number of participants per list.

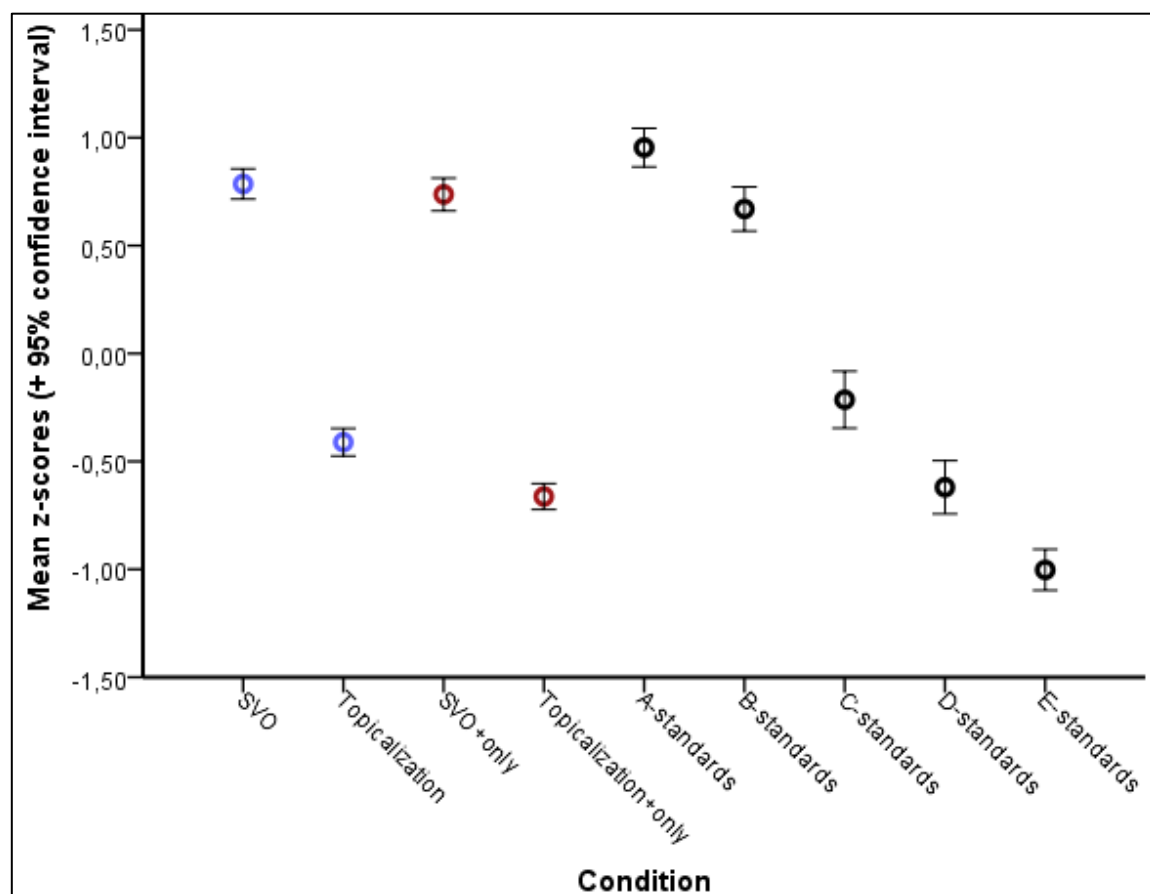


Figure 5.3: Mean z-scores of canonical word order (SVO) and topicalization with and without the particle *only*.

An LMEM analysis was conducted to investigate the effects of *word order* (SVO order vs. topicalization) and *particle* (no particle vs. *only*). The null model and the models retained in the analysis are listed in Table 5.6. For the LMEM analysis, no transformation of the mean ratings into z-scores was necessary, as the random by-subject intercept accounts for participants' individual scales.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	7953.0
Model 0a: rating ~ 1 + (1 vp)	7951.0
Model 1a: rating ~ wo + (1 vp)	7356.6
Model 1b: rating ~ particle + (1 vp)	7949.4
Model 2: rating ~ wo + particle + (1 vp)	7352.2
Model 3: rating ~ wo + particle + wo:particle + (1 vp)	7348.6
Model 4: rating ~ wo * particle + (wo*particle vp)	6944.2
Model 5: rating ~ wo*particle + (wo*particle vp) + (wo*particle item)	6933.5

Table 5.6: Models used in the LMEM analysis of English follow-up study 2.

As expected, there was a highly significant effect of *word order* (comparison between models 0a and 1a: $\chi^2(1) = 596.41, p < 0.001$), as the items with canonical word order received better ratings than the items with topicalization. The first hypothesis in (5.15a) was thus confirmed. The effect of *particle* just missed significance (comparison between models 0a and 1b: $\chi^2(1) = 3.69, p = 0.055$). Keeping both effects in the model, however, improved the model significantly (comparison between models 1a and 2: $\chi^2(1) = 6.48, p < 0.05$). There was also a significant interaction between *word order* and *particle* (comparison between models 2 and 3: $\chi^2(1) = 5.58, p < 0.05$). The model could be further improved by adding by-subject random slopes (comparison between models 3 and 4: $\chi^2(9) = 422.35, p < 0.001$) and by adding by-item random slopes (comparison between models 4 and 5: $\chi^2(10) = 30.74, p < 0.001$). The parameters of the final model and its confidence intervals can be found in the appendix B.10 (page liv). Table 5.7 contains the summary of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0a vs. Model 1a]	SVO vs. Topicalization	<i>word order*particle</i> (*) [Model 2 vs. Model 3]
<i>particle type</i> (*) [Model 1a vs. Model 2]	<i>only</i> vs. no particle	

Table 5.7: Summary of the model selection, follow-up study 2 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

Paired t-tests confirmed the hypotheses in (5.15b) and (5.15c). There was no difference between the items with and without a particle in SVO order, but there was a significant difference between items with and without a particle in topicalization ($t(279) = 5.16, p < 0.001$).

Results show that the participants considered topicalization without a particle to be a quite unnatural construction, as indicated by the big difference between canonical word order (condition 1, repeated in (5.16a) below) and topicalization (condition 2, repeated in (5.16b)). However, topicalization with *only* (5.16c) received significantly worse ratings than topicalization without the particle (5.16b), which shows that the particle makes the marked topicalization structure even worse.

- | | | |
|--------|---|--|
| (5.16) | a. I like herb teas, not fruit teas. | [Condition 1: SVO] |
| | b. Herb teas I like, not fruit teas. | [Condition 2: Topicalization] |
| | c. I only like herb teas, not fruit teas. | [Condition 3: SVO+<i>only</i>] |
| | d. Herb teas I only like, not fruit teas. | [Condition 4: Topicalization+<i>only</i>] |

These results can give further insights into the results of English experiment 1. The relevant conditions of examples (5.7) and (5.8) of Chapter 5.1.1.1 are repeated in (5.17) below. In this first rating study, the difference between LeA of *only* (5.17 B_{4.1}) and LeA of *even* (5.17 B_{4.2}) was not as big as expected. This can be explained by the results of English follow-up study 2, which show that the structure already receives bad ratings without a particle. Adding *only* or *even* to this marked structure cannot reflect a clear difference between the two particles.

- | | | |
|--------|---|-------------------------|
| (5.17) | A ₁ : Did Harry feed all the animals at the petting zoo? | |
| | B _{4.1} : No. The kangaroos he only fed. | [XP-<i>only</i>] |
| | B _{4.2} : Yes. The kangaroos he even fed. | [XP-<i>even</i>] |

Some native speakers of English informed me that topicalization is a phenomenon that indeed occurs in everyday language and can also frequently be found in corpora. However, people need the right context in order to accept this construction. In this context, the focus alternatives should already be mentioned. Therefore, I conducted a follow-up study comparing topicalization without a particle, topicalization with *only* and topicalization with *even* in larger contexts which provided more information and explicit focus alternatives. This experiment is part of the next section 5.1.4.

5.1.4 English follow-up study 3: Comparison between *only* and *even* in items with more specific contexts

The goal of this experiment was to find out whether more specific contexts influence the ratings of topicalization with and without FPs and thus relates to the question in (5.1c).⁹⁶

5.1.4.1 Data elicitation

Design and materials. The items consisted of short stories with five sentences which formed the context and one target sentence. The target sentences were similar to the answers of the first two rating studies but adjusted to the design of this experiment. There were six conditions. The structure of the target sentence of the first condition was SVO order without a particle, the target sentence of the second condition consisted of topicalization without a particle. Condition 3 contained SVO order with the particle *only* and condition 4 contained topicalization with the particle *only*. Conditions 5 and 6 corresponded to conditions 3 and 4 but contained the particle *even* instead of *only*.

I used the same contexts for conditions 1 to 4 but adapted the contexts of conditions 5 and 6 to the meaning of the particle *even*. The first three sentences of the context provided information about the main character of the short story and about the situation. In the example item in (5.18), the first sentence informed participants about the main character Frida who is a journalist. The following two sentences provided the situation. In (5.18), the participants learned that Frida wants to interview some politicians. The fourth sentence introduced two alternatives which are members of the same set and are therefore in a poset relation. In (5.18), the two alternatives *secretary of state* and *governor* belong to the same superset *politicians*, which is already mentioned in the second sentence, and the claim is made that Frida interviewed both of these politicians. The fifth sentence stated whether the fourth sentence is actually true. In the items with *only* and in the items with no particle, the fifth sentence stated that the fourth sentence is not true and then the target sentence provided the information that the fourth sentence is only true for one of the two alternatives, while the other alternative is excluded. In (5.18), the target sentence informs the reader that Frida only interviewed the secretary of state and not the governor. In the items with *even*, the fifth sentence stated that the fourth sentence is indeed true and the target sentence provided an

⁹⁶ This experiment was conducted together with Jutta Hartmann.

additional surprising fact about one of the alternatives. In (5.18), the target sentence of the items with *even* states that Frida interviewed the governor despite the fact that he was surrounded by people. In order to improve the conditions with topicalization, the target sentences of conditions 1 to 4 contained a contrastive continuation and the sentences of conditions 5 and 6 contained a subordinate clause introduced by *although*. According to some of my informants who are English native speakers, topicalization without a continuation sounds incomplete.

(5.18) Frida is a young journalist. One day, she found out about a meeting of politicians in her city. She decided to go there and was very excited to interview some important people after their meeting. Afterwards, she posted on Facebook that she had asked the secretary of state and the governor about the crisis. But she wasn't completely honest.

a. **She had asked the secretary of state but not the governor.** [SVO]

b. **The secretary of state she had asked but not the governor.** [Top.]

c. **She had only asked the secretary of state but not the governor.** [SVO + *only*]

d. **The secretary of state she had only asked but not the governor.** [Top. + *only*]

Frida is a young journalist. One day, she found out about a meeting of politicians in her city. She decided to go there and was very excited to interview some important people after their meeting. Afterwards, she posted on Facebook that she had asked the secretary of state and the governor about the crisis. And this was indeed the case.

e. **She had even asked the governor, although he was surrounded by people.**

[SVO + *even*]

f. **The governor she had even asked, although he was surrounded by people.**

[Top. + *even*]

There were 24 items and 24 fillers. The experimental items are listed in the appendix B.11 (pages lv-lxii). Filler items consisted of contexts and target sentences with varying levels of grammaticality. In order to make sure that participants did not rate the target sentences without carefully reading the contexts, some of the filler items had target sentences which were grammatical but did not fit into the respective contexts and were therefore unnatural due to implausibility. Without reading the contexts, these filler items must receive high ratings, as the target sentences are perfectly natural without considering the contexts. I excluded participants from the analysis who gave high ratings to these items. An example for a filler item which does not fit the context due to violating plausibility is shown in (5.19).

- (5.19) Rose enjoys knitting clothes. Every night, while watching TV, she starts knitting. Rose has a granddaughter that goes to high school. Yesterday, her granddaughter was wearing a new sweater.

Her grandpa Jay probably knitted the sweater.

Procedure. Participants received a link to the experiment which was uploaded on the On-Exp2 server of the University of Tübingen. The first page contained detailed instructions with example items. The target of the first example was a grammatical and a natural continuation of the preceding context, the target of the second example was a continuation of the context but was ungrammatical. These examples should demonstrate that grammaticality can determine the naturalness of the target sentences. The experiment started after entering some personal information into a data window and after a practice phase. Items were presented in random order and the task was to rate the naturalness of the target sentence by choosing a value on a seven-point scale. Participants could optionally leave comments for each item or for the whole experiment.

Participants. Fifty-seven American English native speakers participated in the experiment and were recruited via Amazon Mechanical Turk (28 females and 29 males, aged 21 to 71, mean age: 33.9).⁹⁷ Participants had no knowledge about the purpose of the study. All participants were paid for their participation after the experiment was finished.

5.1.4.2 Hypotheses

For this follow-up study, I postulate the hypotheses in (5.20). The hypotheses (5.20a) to (5.20d) follow from the results of the previous study. The hypothesis in (5.20e) relates to the more specific contexts that were used in this study.

- (5.20) a. Ratings of the conditions with SVO order should be significantly better than ratings of the conditions with topicalization.
- b. No significant difference is expected between conditions 1, 3, and 5 with SVO order.

⁹⁷ 27 additional participants were excluded either because of technical difficulties with OnExp, or because their first native language was not English.

- c. On the basis of the results of the second follow-up study, topicalization without FPs (condition 2) is predicted to receive better ratings than topicalization with *only* (condition 4) and topicalization with *even* (condition 6).
- d. Topicalization with *even* should get better ratings than topicalization with *only* and the difference should be comparable to the first rating study without capital letters.
- e. The more specific context should facilitate the topicalization structures and improve them in general.

5.1.4.3 Results and discussion

The results are illustrated in Figure 5.4. Green bars show the mean ratings of the items without an FP, red bars show the mean ratings of the items with *only*, and blue bars show the mean ratings of the items with *even*.

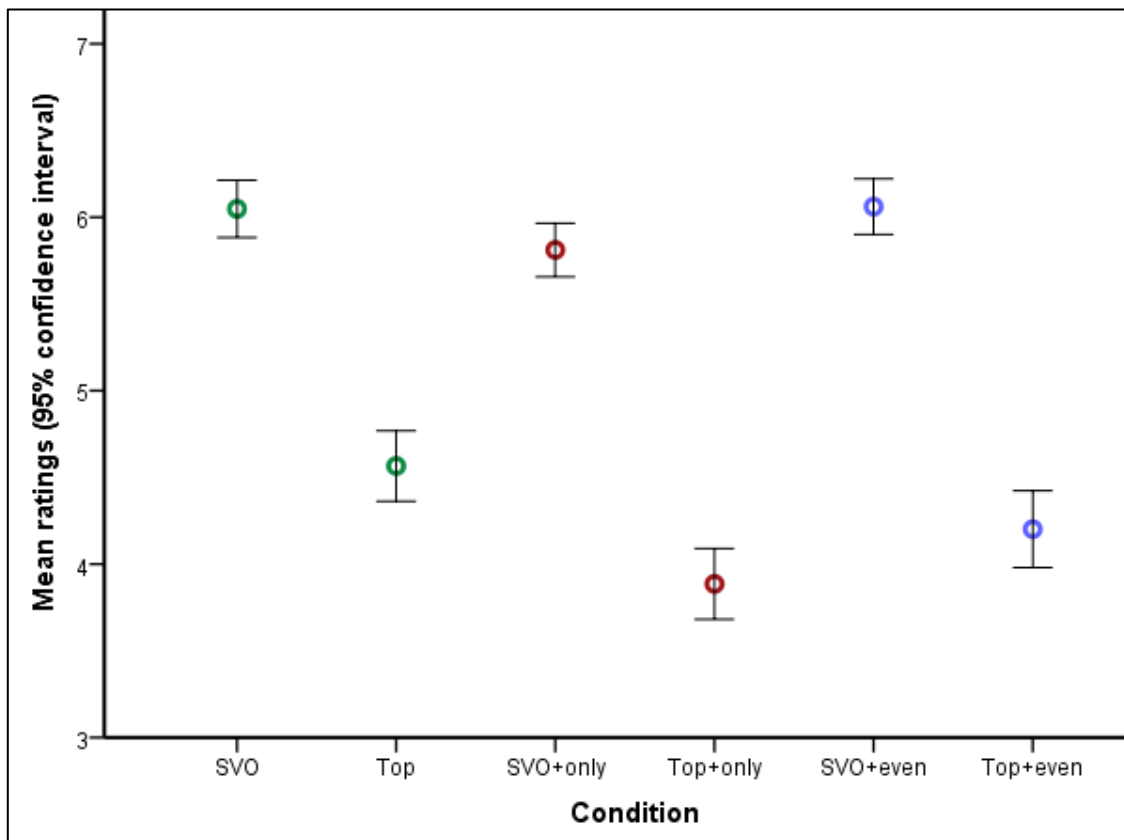


Figure 5.4: Mean ratings of the experimental items with larger contexts.

I investigated the effects of *word order* (SVO word order vs. topicalization) and *particle type* (no particle vs. *only* vs. *even*) by means of an LMEM analysis. The models which were retained in the analysis are listed in Table 5.8.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	5164.4
Model 1a: rating ~ wo + (1 vp) + (1 item)	4617.7
Model 1b: rating ~ type + (1 vp) + (1 item)	5147.0
Model 2: rating ~ wo + type + (1 vp) + (1 item)	4588.8
Model 3: rating ~ wo + type + wo:type + (1 vp) + (1 item)	4584.3
Model 4: rating ~ wo * type + (wo * type vp) + (1 item)	4379.3

Table 5.8: Models used in the LMEM analysis of English follow-up study 3.

Results confirmed the hypothesis in (5.20a), as there was a significant effect of *word order* (comparison between models 0 and 1a: $\chi^2(1) = 548.71$, $p < 0.001$). Items with SVO order received higher ratings than items with topicalization. Moreover, I found a significant effect of *particle type* (comparison between models 0 and 1b: $\chi^2(2) = 21.4$, $p < 0.001$). As model 1a had a lower AIC, I tested this model against model 2 which contained both fixed factors. This comparison again revealed a significant effect (comparison between models 1a and 2: $\chi^2(2) = 32.84$, $p < 0.001$). Furthermore, there was a significant interaction between *word order* and *particle type* (comparison between models 2 and 3: $\chi^2(2) = 8.57$, $p < 0.05$). Adding by-subject random slopes to the model led to the final model 4 which explained the data best (comparison of models 3 and 4: $\chi^2(20) = 244.96$, $p < 0.001$). By-item random slopes did not improve the model. The parameters of the final model and a table with the confidence intervals can be found in the appendix B.11 (page lxiii). Table 5.9 summarizes the results of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0 vs. Model 1a]	SVO vs. Topicalization	<i>word order*particle</i> (*) [Model 2 vs. Model 3]
<i>particle type</i> (***) [Model 1a vs. Model 2]	<i>only</i> vs. <i>even</i> vs. no particle	

Table 5.9: Summary of the model selection, follow-up study 3 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

I also performed paired t-tests to investigate the effects of the different particles. There was a significant difference between *only* and *even* in topicalization ($t(227) = -2.82$, $p < 0.01$), as *even* was rated better than *only* in this construction. There was also a significant difference between the items with no particle and the items with *even* ($t(227) = 2.95$, $p < 0.01$). The hypothesis in (5.20c) could thus be confirmed, as topicalization without an FP was rated significantly better than topicalization with *only* or with *even*.

At first sight, the significant difference between topicalization with *only* and topicalization with *even* confirms the hypothesis in (5.20d). However, these results cannot be interpreted such that LeA works better with *even* than with *only*, as the items with SVO+*even* (5.18e) were also rated significantly better than the items with SVO+*only* (see (5.18c)) ($t(227) = 2.50$, $p < 0.05$). Therefore, the hypothesis in (5.20b) could only partly be confirmed: There was no difference between the items with no particle and the items with *even* in canonical word order, but these conditions were rated better than the items with *only* in canonical word order. That the items with *only* received lower ratings in canonical word order than the items with no particle and the items with *even* might be due to the contrastive continuation “but not the ...”. In the first rating study and in follow-up study 1, *only* received higher ratings in the items with canonical word order than the canonical sentences without a particle or with *even*. In English rating study 1, for example, the condition *only*-XP (repeated in (5.21 B₁)) was rated better than the condition *even*-XP (repeated in (5.21 B₂)). In these studies, target sentences did not contain a contrastive continuation. Stating the alternative again in the contrastive continuation as in this follow-up study 3 could be perceived as superfluous in sentences with *only* and thus make the target sentences semantically odd. Therefore, *only* and *even* cannot be directly compared in this study.

Results confirm the hypothesis in (5.20e), as ratings of the topicalization conditions (5.18b, d, and f) received higher ratings than the topicalization conditions of the preceding

experiments. In English Experiment 1, for instance, the condition *XP-only* (repeated in (5.21 B₃) below) received a mean rating of 3.09 (SD: 1.36), while this condition received a mean rating of 4.16 (SD: 1.83) in this follow-up study 3 (see example (5.18d)). *XP-even* (5.21 B₄) received a mean rating of 3.43 (SD: 1.36) in English experiment 1 and a mean rating of 4.09 (SD: 1.87) in this follow-up study 3 (5.18f). This suggests that a larger context can make topicalization structures more natural. The ratings of the items with canonical word order (5.18c, e) were slightly lower in this experiment than in the previous studies. Thus, more specific contexts do not make every construction better. The items with canonical word order already received high ratings with short question-contexts in the previous studies (5.21 B₁, and B₂), which suggests that a more specific context is not necessary for these items. However, the direct comparison between this experiment and the preceding ones is difficult, as the task and the design of the items was different and the effect of context is therefore hard to determine.

- (5.21) A₁: Did Harry feed all the animals at the petting zoo?
 B₁: No. He only fed the kangaroos. **[only-XP]**
 B₂: Yes. He even fed the kangaroos. **[even-XP]**
 B₃: No. The kangaroos he only fed. **[XP-only]**
 B₄: Yes. The kangaroos he even fed. **[XP-even]**

Participants could optionally leave comments for each item. All comments referring to the experimental items can be found in the appendix B.11 (pages lxiv-lxv). Six participants commented on items with topicalization and FPs while no participants commented on topicalization without FPs or on the items with canonical word order. Five of the participants who left comments for the conditions with LeA of the FPs also corrected the sentences by changing the word order. An example for a comment about an item with topicalization and *only* is shown in (5.22), the item the participant was referring to is shown in (5.23) with the target sentence printed in bold:

- (5.22) “The first clause has a poor word order for natural English (as in previous examples). ‘He even forgot his business jacket’ would be a natural English word order.”

(5.23) Last Wednesday, Brad went abroad for a business meeting. He left his house in a hurry as he had to catch his plane. In the plane, he got the feeling that he was missing something. He was afraid that he forgot important things that he needed for the business meeting. And he indeed forgot some things.

His business jacket he even forgot, although his wife reminded him about it in the morning.

Comments like the one in (5.22) demonstrate that participants understood the intended meaning of the target sentences and that the particle associates to its left in the examples. As participants did not like LeA, they changed the word order in such a way that the focused object is in a position to the right of the particle. If participants had associated the particle with the verb to its right, they would not have complained about the word order. However, they would have still rated the sentence as an unnatural continuation, as the verb is already given and therefore cannot be the focus of the target sentence.

In general, I found differences between *only* and *even* with LeA in the experiments presented in Chapter 5.1. However, the differences were not as clear-cut as expected, as items with LeA of *even* also received low ratings. This could be due to the fact that topicalization is a marked structure in English. Therefore, I conducted an experiment in which FPs associated to their left with the subject, similar to the German experiments in Chapters 4.2.1 and 4.3.1 This experiment is presented in the following section 5.2.

5.2 English focus particles and subject association

In order to gain further insights into LeA of *only* and *even*, I conducted an experiment with subject association of the particles. An example for this construction from the literature is given in (5.24). LeA is assumed to be possible with *even* (see (5.24b)) but not with *only* (see (5.24a)).

- (5.24) a. * [John]_F will only pass the exam.
b. ✓ [John]_F will even pass the exam.

(Erlewine 2014a: 11)

This construction contains the canonical SVO order and does therefore not contain the complexity factor of the marked object topicalization structure used in the preceding experiments. I therefore expect clearer results regarding LeA of *only* and *even* in this study.

5.2.1 English experiment 2: Comparison between *only* and *even* with subject association

5.2.1.1 Data elicitation

Design and materials. This study contained 32 experimental items which consisted of question-answer pairs that were set-up as a dialog between the college student John and the fortune teller Esmerelda.⁹⁸ I chose the setting of fortune telling in order to have an element between the focus particle and its associated focus in the conditions with LeA, namely the modal auxiliary *will*. In the example item in (5.25a), *will* occupies the position between the particle *only* and its associated focus *Ethan*. In the present or simple past tense, the particle is immediately adjacent to its associated focus, as in (5.25b), which is, however, not the construction under consideration.

- (5.25) a. [Ethan]_F will only visit her.
b. [Ethan]_F only visited her.

In the literature on LeA of *only* and *even*, examples with subject association also often contain the modal auxiliary *will* as in (5.24) or other auxiliaries (see Chapter 3.1 for more examples from the literature).

I used a 2 x 2 x 2 design for the experimental items with the factors *word order* (particle-XP vs. XP-particle), *particle type* (*only* vs. *even*), and *associate type* (name vs. numeral), i.e., the subject with which the particle associated was either a proper name as in example (5.26) or a numeral as in (5.27). There were sixteen items with proper names and sixteen different items with numerals in order to optimize the items for each associate type. The factor *associate type* was therefore only a repeated measurement factor for subjects but not for items.

- (5.26) a. *John asks (short context):*
Will all of my brothers visit Grandma in the hospital?
a'. *John asks (long context):*
Yesterday, I visited my grandma in the hospital. She told me that she would love for my brothers to visit her, too. However, my brothers Adam, Ethan, and Richard are very busy, especially Richard. Will all of my brothers visit Grandma, nonetheless?

⁹⁸ Thanks to Kristen Skinner for helping me with the items.

- b. *Esmerelda gazes into her crystal ball and answers:*
 No. Only Ethan will visit her. [*only-name*]
 No. Ethan will only visit her. [*name-only*]
 Yes. Even Richard will visit her. [*even-name*]
 Yes. Richard will even visit her. [*name-even*]
- (5.27) a. *John asks (short context):*
 Will at least thirty professors attend the charity event that the student representatives organized?
- a'. *John asks (long context):*
 The student representatives organized a big charity event. They know for sure that seventy students are coming, but they hope that at least thirty professors will come, too. Will at least thirty professors attend the charity event?
- b. *Esmerelda gazes into her crystal ball and answers:*
 No. Only five will attend it. [*only-numeral*]
 No. Five will only attend it. [*numeral-only*]
 Yes. Even sixty will attend it. [*even-numeral*]
 Yes. Sixty will even attend it. [*numeral-even*]

I varied the associate type in order to test whether LeA of *only* works better if the scalar meaning of *only* is made prominent as in German experiment 3 (see Chapter 4.3.1). Using a numeral as the associate makes it inherently scalar. As the noun phrase following the numeral was already mentioned in the context, I used NP-ellipsis in the answer by not repeating the noun phrase. This is demonstrated in the example (5.28) which is taken from the examples in (5.27).

(5.28) Only five ~~professors~~ will attend it.

NP-ellipsis with numerals is a common phenomenon. An example for NP-ellipsis with a numeral from the literature is given in (5.29).

(5.29) First he played a solo with one hand and then with TWO _ . (Winkler 2016: 362)

With the particle *only*, the numeral is then considered to be low on a context-specific scale and with *even*, the numeral is considered high. In (5.27), John expects at least thirty professors to attend the charity event. In Esmerelda's answer with *only*, five is a low number compared to the expected thirty, whereas in her answers with *even*, sixty is an unexpected high number compared to thirty. In the items with a proper name, the exclusive meaning of

only is more prominent. However, there is also an implicit scale involved in these items, especially in the items with longer contexts in which the alternatives are explicitly mentioned and thus a number of alternatives is introduced. In example (5.26a'), for example, there are three brothers introduced in the context and in the items with *only* it is considered little that one out of three brothers will visit Grandma. Thus, the scalar meaning component of *only* is also present in these items.

Additionally, there was the between-subject factor *context*. Half of the participants saw the items with a short context consisting of a single question as in (5.26a) and (5.27a), the other half saw the items with a longer, more specific context with more background information as in (5.26a') and (5.27a'). In the longer contexts of the items with a proper name, the alternatives were explicitly mentioned. Moreover, it was specified that it is less likely for one of the alternatives that the answer is positive. This is important for conditions 3 and 4 with *even* in order to clarify why it is surprising that the answer is positive for this alternative. In (5.26), *Richard* is the busiest brother. Therefore, he is mentioned in the answers with *even*, as it is surprising that he will also visit Grandma. In the longer contexts of the items with numerals, John mentions that the number of one alternative is already fixed. In (5.27b'), it is already known that seventy students will attend the charity event. John then asks whether the expected number of another alternative, here *thirty professors*, will be reached as well.

Esmerelda's answers were the same in the items with short and long contexts. All items can be found in the appendix B.12 (pages lxv-lxxi).

Procedure. The 32 items were balanced across eight lists, four lists with short contexts and four lists with long contexts, using a Latin square design. They were randomized and interspersed with 40 filler items. Filler items were either about the future like the experimental items or about the past. Among the filler items were also 15 normed standard items (Gerbrich et al., to appear). The experiment was uploaded on the OnExp2 server of the University of Tübingen and participants received a link to the experiment. In the instructions, participants were informed that the college student John is sitting with the fortune teller Esmerelda who tells the fortunes of her clients by gazing into a large crystal ball and that John is going to ask her all kinds of questions about the future and the past. The task was to rate the naturalness of Esmerelda's answers on a seven-point scale. After the instruction page,

participants entered some personal information into a data window. All personal information was treated anonymously. The actual experiment started after a practice session. On the last page of the experiment, participants received a code which they should enter into a box on Mechanical Turk in order to show that they completed the whole experiment.

Participants. Sixty-six American English native speakers recruited via Amazon Mechanical Turk participated in this study (28 females and 38 males, aged 23 to 72, average age: 35.5).⁹⁹

5.2.1.2 Hypotheses

The hypotheses for this follow-up study are listed in (5.30). (5.30a) and (5.30b) follow from the previous studies. (5.30c) follows from the assumption that scalar *only* can associate better to its left than non-scalar *only*, similar to the observations on scalar and non-scalar *nur* in Chapter 4. The items with numerals suggest a scalar interpretation of the particle whereas the items with names suggest a restrictive interpretation.

- (5.30)
- a. I expect a significant effect of word order, as the conditions with RiA of *only* and *even* should receive higher ratings than the conditions with LeA.
 - b. LeA of *even* is expected to receive better ratings than LeA of *only*.
 - c. The items with numeral-*only* are expected to receive higher ratings than the items with name-*only*.
 - d. RiA with *even* should receive lower ratings in the items with numerals than with names. This is expected due to the information of the American English native speaker with whom I discussed the items.
 - e. The more specific contexts in which the alternatives are given are expected to improve LeA of *only* in the items with names, as alternatives are explicitly mentioned in these items.

5.2.1.3 Results and discussion

The mean ratings of the items with names are illustrated in Figure 5.5, the mean ratings of the items with numerals are illustrated in Figure 5.6. The mean ratings include both the

⁹⁹ Twenty-seven additional participants were excluded either because of technical difficulties with OnExp (items were not displayed properly when using certain web browsers), or because their first native language was not English. Moreover, three participants were randomly excluded in order to keep the number of participants per list balanced.

ratings of the items with short and the items with long contexts. Blue bars represent mean ratings of the items with *only*; red bars represent mean ratings of the items with *even*.

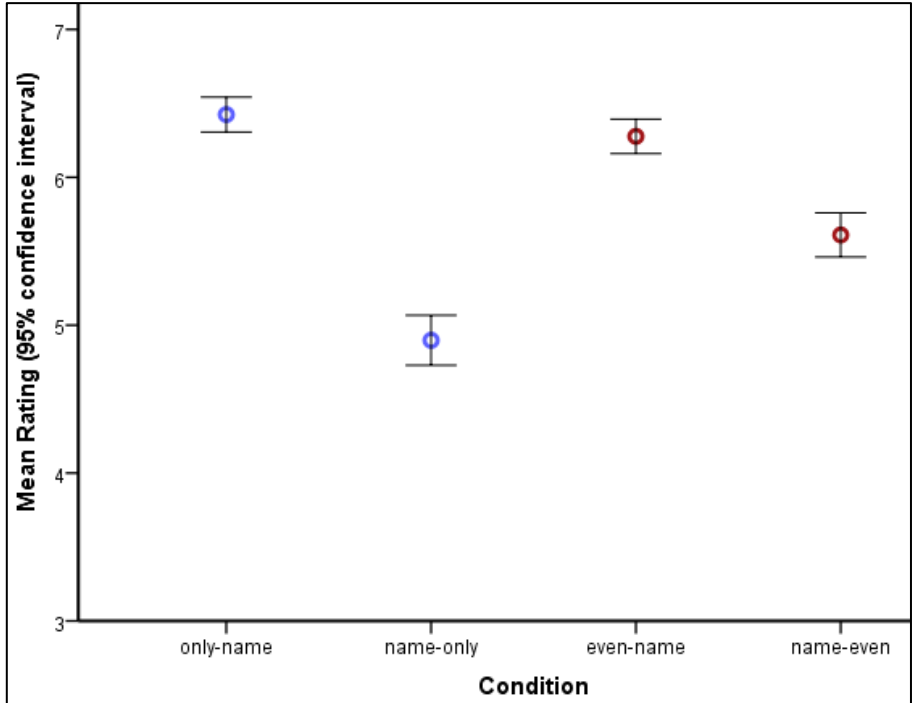


Figure 5.5: Mean ratings of long and short contexts in one graph, association with names.

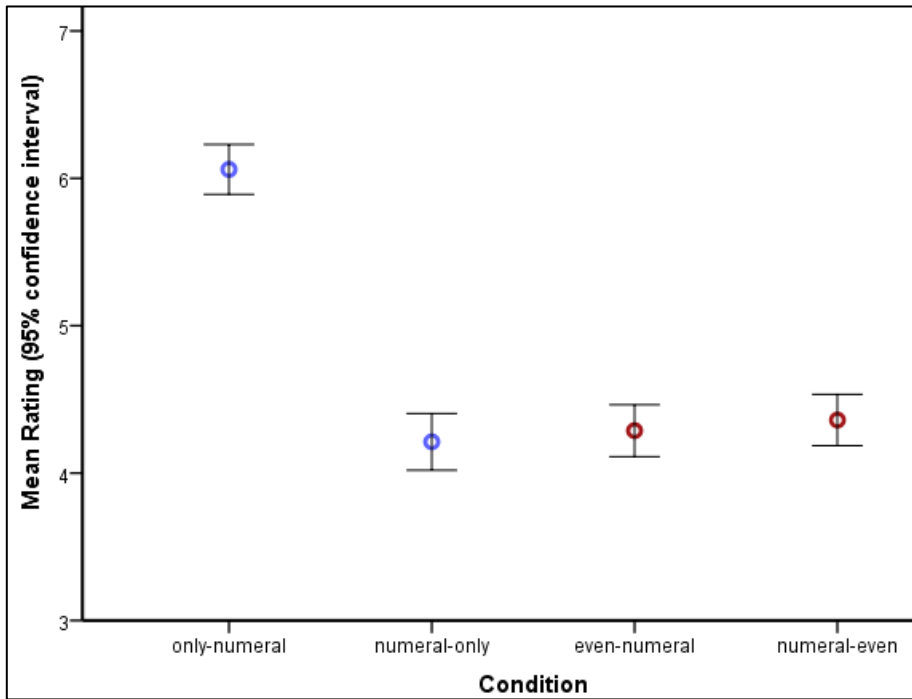


Figure 5.6: Mean ratings of long and short contexts in one graph, association with numerals.

The two graphs reveal different patterns of results for the items with names and the items with numerals. Therefore, I first analyzed the statistical effects of these two sets of items separately. However, the separate LMEM analyses resulted in the same models with the final model consisting of an interaction between *word order* and *particle type* and a random slope for subject (final model: rating ~ wo + type + wo:type + (wo*type|vp) + (1|item)). There was no significant effect of *context* in neither analyses. As the separate analyses revealed the same effects, I conducted a joint LMEM analysis with model selection via likelihood-ratio tests for both sets of items which will be reported in the following. Paired t-tests are provided for each set of items separately. The models which were retained during model selection are listed in Table 5.10.

Model	AIC
Model 0: rating ~ 1 + (1 vp) + (1 item)	7520.1
Model 1: rating ~ wo + (1 vp) + (1 item)	7219.4
Model 1a: rating ~ asso + (1 vp) + (1 item)	7450.8
Model 1b: rating ~ type + (1 vp) + (1 item)	7503.2
Model 2: rating ~ wo + asso + (1 vp) + (1 item)	7151.4
Model 2b: rating ~ wo + asso + (wo + asso vp) + (1 item)	7043.4
Model 3: rating ~ wo + asso + type + (wo + asso vp) + (1 item)	7019.8
Model 4a: rating ~ wo + asso + type + type:wo + (wo + asso vp) + (1 item)	6831.1
Model 4b: rating ~ wo + asso + type + type:asso + (wo + asso vp) + (1 item)	6906.1
Model 5: rating ~ wo + asso + type + type:wo + type:asso + (wo + asso vp) + (1 item)	6704.8
Model 6: rating ~ wo*type*asso + (wo + asso vp) + (1 item)	6672.7
Model 7: rating ~ wo*type*asso + (wo + asso + type vp) + (1 item)	6651.7

Table 5.10: Models used in the LMEM analysis of English experiment 2 (abbreviations: wo = word order, asso = association type, type = particle type).

I investigated the effects of the factors *word order* (particle-XP vs. XP-particle), *association type* (name vs. numeral), and *particle type* (*only* vs. *even*). As there was no effect of the between-subject factor *context* (long vs. short) in the separate statistical analyses, I did not include this factor in the joint analysis.

There was a highly significant effect of *word order* (comparison between models 0 and 1: $\chi^2(1) = 302.71, p < 0.001$), a highly significant effect of *association type* (comparison between models 0 and 1a: $\chi^2(1) = 71.26, p < 0.001$), and a highly significant effect of *particle type* (comparison between models 0 and 1b: $\chi^2(1) = 18.86, p < 0.001$). As the effect of

word order was stronger than the other two factors, I continued the model selection process with model 1. Adding the factor *association type* improved the model significantly (comparison between models 1 and 2: $\chi^2(1) = 70.01, p < 0.001$). There was, however, no significant interaction of *word order* and *association type*.

The model could be further improved by adding a random slope for subjects (comparison between models 2 and 2b: $\chi^2(5) = 118.01, p < 0.001$). Model 2b improved significantly by adding the factor *particle type* (comparison between models 2b and 3: $\chi^2(4) = 25.62, p < 0.001$). There was a significant interaction of *word order* and *particle type* (comparison of models 3 and 4a: $\chi^2(1) = 190.65, p < 0.001$) and also a significant interaction of *particle type* and *association type* (comparison between models 3 and 4b: $\chi^2(1) = 115.65, p < 0.001$). Including both interactions in the model improved the model significantly (comparison of models 4a and 5: $\chi^2(1) = 128.36, p < 0.001$). Moreover, there was a significant three-way interaction between *word order*, *particle type*, and *association type* (comparison between models 5 and 6: $\chi^2(1) = 36.04, p < 0.001$). Adding a random slope for subjects led to the final model 7 which fitted the data best (comparison between models 6 and 7: $\chi^2(7) = 29.02, p < 0.001$). The parameters of the final model 7 and its confidence intervals can be found in the appendix B.12 (pages lxxi-lxxii). Table 5.11 summarizes the results of the model selection.

Main effects		Interactions
Factor	Levels	
<i>word order</i> (***) [Model 0 vs. Model 1]	particle-XP vs. XP-particle	<i>word order*particle type</i> (***) [Model 3 vs. Model 4a]
<i>association type</i> (***) [Model 1 vs. Model 2]	DP vs. numeral	<i>association type*particle type</i> (***) [Model 4a vs. Model 5]
<i>particle type</i> (***) [Model 2b vs. Model 3]	<i>only</i> vs. <i>even</i>	<i>word order*particle type*association type</i> (***) [Model 5 vs. Model 6]

Table 5.11: Summary of the model selection, English exp. 2 ($p < 0.001$ ‘*’, < 0.01 ‘**’, < 0.05 ‘*’).**

I performed paired t-tests to get a clearer picture of the effects revealed by the LMEM analysis. Concerning the items with names, there was a significant difference between the conditions *only-name* and *name-only* ($t(263) = 13.85, p < 0.001$) and also a significant effect

between the conditions *even-name* and *name-even* ($t(263) = 8.75, p < 0.001$). Therefore, the hypothesis in (5.30a) could be confirmed in the items with names, as RiA was rated significantly better than LeA of both particles. Moreover, the condition *name-even* was rated significantly better than the condition *name-only* ($t(263) = 6.76, p < 0.001$), confirming the hypothesis in (5.30b). There was no significant difference between the conditions *only-name* and *even-name*.

Concerning the items with numerals, there was a significant difference between *only-numeral* and *numeral-only* ($t(263) = 15.37, p < 0.001$) but no significant difference between *even-numeral* and *numeral-even*, which also becomes apparent in Figure 5.6, confirming the hypothesis in (5.30d). The ratings of RiA of *even* were as low as the ratings of LeA of *even*. Sam Featherston (p.c.) suggests that *even* can only occur with numerals in speculative contexts as in *Even sixty percent of the students might fail*. In my items, the fortune teller is sure about what will happen in the future and there is no element of speculation. However, this should be further tested and I leave the question why the condition *even-numeral* received low ratings for future research. There was no significant difference between the conditions *numeral-only* and *numeral-even*. The hypothesis in (5.30b) could thus not be confirmed in the items with numerals.

The paired t-tests can give clearer insights into the three-way interaction of *word order*, *particle type*, and *association type*. There were significant differences between RiA and LeA of the particles, with the exception of the particle type *even* when the association type was a numeral. As a consequence, there was a significant difference between LeA of *only* and LeA of *even* in the items with names but not in the items with numerals. Therefore, *only* and *even* behave differently with respect to word order depending on the association type in this experiment.

The hypothesis in (5.30c) could not be confirmed. The relevant conditions are repeated in (5.31). I expected LeA of *only* to be better in the items with numerals (5.31b) which suggest a scalar interpretation of the particle, similar to the results of German experiment 3. In the German experiment, *numeral-nur* with a scalar interpretation received better ratings than *DP-nur* with a non-scalar interpretation. In English, *numeral-only* (5.31b) did not receive higher ratings (mean rating: 4.21 (SD: 1.59)) than *name-only* (5.31a) (mean rating: 4.9 (SD: 1.4)).

(5.31) a. *John asks: Will all of my brothers visit Grandma in the hospital? (short context)*

Esmeralda gazes into her crystal ball and answers:

No. Ethan will only visit her. **[name-only]**

b. *John asks: Will at least thirty professors attend the charity event that the student representatives organized? (short context)*

Esmeralda gazes into her crystal ball and answers:

No. Five will only attend it. **[numeral-only]**

One explanation might be that the contexts of the items with names were better and more natural than the contexts of the items with numerals. This suggestion is supported by the comparison between the conditions with RiA of *only* (the relevant items are repeated in (5.32)): the condition *only-numeral* (5.32b) (mean rating: 6.06 (SD: 1.4)) also received lower ratings than the condition *only-name* (5.32a) (mean rating: 6.42 (SD: 0.98)).

(5.32) a. No. Only Ethan will visit her. **[only-name]**

b. No. Only five will attend it. **[only-numeral]**

The following two adjustments might improve the items with *only* and numerals:

(i) In the items with numerals, a numeral was also given in the context, preceded by *at least* (see example (5.31b)). I suggest that contexts which contain a superset instead of a numeral would be better fitting for the items with *only* as in *Will all of the linguistics professors attend the charity event that the student representatives organized?* The contexts would then be similar to the contexts of the items with names.

(ii) Contexts which do not introduce the noun phrase of the numeral could also be better fitting. These contexts could be similar to the items of German experiment 3 (see Chapter 4.3.1) as in *Is it true that hardly anyone attended the charity event that the student representatives organized?* In this case, there would not be an NP-ellipsis in the answers which could also improve the items. In the items with proper names and also in the items of the preceding studies, there was no NP-ellipsis involved either. Thus, a further study similar to German experiment 3 which solely tests scalar and non-scalar *only* in the same contexts without NP-ellipsis in the answers could shed further light on this topic.

I expect that ratings of LeA of scalar *only* would improve in better fitting contexts. However, I do not expect LeA of scalar *only* to improve in such a way that the ratings would be significantly better than the ratings of LeA of non-scalar *only*. In the current study, the

ratings of LeA of non-scalar *only* were pretty high (mean rating: 4.9 (SD: 1.4)) and I do not expect ratings of LeA of scalar *only* to improve further, even in ideal contexts. This suggests that in English, other aspects play a role in LeA of *only* and *even* than in German (see section 5.3. and Chapter 6 for further discussions).

As mentioned earlier, the between-subject factor *context* neither had an effect on the items with names nor on the items with numerals. Thus, the hypothesis in (5.30e) could not be confirmed. Table 5.12 shows the mean ratings per condition of the items with short and long contexts separately. The mean ratings were a bit lower with long contexts in all the conditions except for the condition name-*only*, where the mean rating was minimally higher with long contexts than with short contexts. That the more specific contexts did not improve the items could mean that the short contexts contained enough information in order to understand and rate the target sentences. Moreover, longer contexts might make the task more complex for participants instead of facilitating it, as more text and information has to be processed.

Condition	Short context, names	Long context, names	Short context, numerals	Long context, numerals
1 (<i>only</i> -XP)	6.56 (0.78)	6.31 (1.11)	6.28 (1.19)	5.86 (1.54)
2 (XP- <i>only</i>)	4.87 (1.39)	4.92 (1.41)	4.29 (1.53)	4.14 (1.64)
3 (<i>even</i> -XP)	6.41 (0.79)	6.16 (1.08)	4.54 (1.21)	4.06 (1.62)
4 (XP- <i>even</i>)	5.95 (0.96)	5.31 (1.36)	4.55 (1.31)	4.19 (1.53)

Table 5.12: Mean ratings (and standard deviations) per condition with short and long contexts.

In the English follow-up study 3 with more specific contexts (see Chapter 5.1.4), mean ratings of the conditions with topicalization were higher than in the preceding experiments with short contexts. I suggest that the more specific contexts were helpful for the items with object topicalization, as topicalization structures are a dispreferred word order in English and need to be licensed by certain contexts which introduce specific alternatives. The items with topicalization contain the two complexity factors object fronting and LeA of the particle. In the construction of the current study with subject association, the sentence initial position was occupied by the subject of the sentence which is also the case in the preferred SVO order. Therefore, LeA of the particle was the only complexity factor in the conditions with XP-particle.

Compared to the experiments of section 5.1, LeA of *only* and *even* received higher ratings.¹⁰⁰ The mean rating of name-*even* in short contexts was 5.95 (SD: 0.96) and the mean rating of name-*only* in short contexts was 4.87 (SD: 1.39), which are high values on a seven-point scale. These results suggests that LeA of the two particles is acceptable for some speakers and that object topicalization led to the low ratings of LeA of *only* and *even* in the first experiments. However, it has to be considered that the target items consisted of short sentences and the only complexity involved was LeA of the particle. This might have contributed to the relatively high ratings, as the sentences are easy to understand despite the position of the particle.

I assume that the ratings can be further improved when items are presented auditorily, similar to German follow-up study 3. However, I will leave the experiment with auditory stimuli for future research.

The main goal of the experiments in this chapter was to test the assumptions made in the literature about LeA of English FPs. It is generally agreed that *even* can associate with leftward material while *only* cannot (e.g., Jackendoff 1975; Abraham 2005; Erlewine 2014a, b; see Chapter 3.1). My experiments confirm that XP-*even* is better than XP-*only* with the exception of the items with short topicalization and the use of capital letters in the study of Chapter 5.1.2 and the items with numerals in experiment 2 of Chapter 5.2.1. However, in experiment 2, the mean ratings of *even*-numeral did not differ from the ratings of numeral-*even* either, which suggests that the contexts were not well-suited for items with *even* and numerals.

In the following section, the results of the English experiments presented above are compared to the results of the German experiments of Chapter 4.

5.3 Summary and discussion

In Chapters 4 and 5, I have presented several experiments testing LeA of German and English FPs. One central goal was to find out whether the rating studies show similar patterns of results for German and English (cf., the research question in (5.1d)). In all 12 studies, there was a highly significant effect of *word order* with high ratings of canonical word order

¹⁰⁰ I am aware that seven-point rating scales do not have anchor points (Featherston 2009), which makes it difficult to compare different experiments.

and RiA of the particles and lower ratings of conditions with LeA of the particles. Furthermore, there was a significant interaction between *word order* and *particle type* in all studies except for the German experiments 3 and 4 which only tested one particle. I found significant differences between the German particles *nur* and *sogar* and the respective English particles *only* and *even* with respect to LeA (cf. the research question in (5.1a)). Adding capital letters to the written studies which hint at prosodic information led to smaller differences between XP-*nur* and XP-*sogar* as well as XP-*only* and XP-*even*, as the ratings of the exclusive particles improved. However, I found again a clear difference between XP-*nur* and XP-*sogar* in the German study with auditory stimuli presented in Chapter 4.1.4, as LeA of both particles improved with real prosody. I therefore assume that capital letters can represent the intonation of contrastive stress needed for LeA of *nur* and *only* in my items and can thus facilitate these constructions. Capital letters cannot represent the intonation needed for LeA of the scalar-additive particles *sogar* and *even* which is also characterized by an emotional tone of being surprised.

Interestingly, the conditions *nur*-XP and *only*-XP with rightward association of the particles received higher ratings than the conditions *sogar*-XP and *even*-XP in most of the experiments, although the items with *sogar* and *even* also received high ratings. This could be due to the fact that *nur* and *only* are more frequent (see also the discussion in 4.4). Another explanation might be that *even* and *sogar* arrange alternatives on a scale implying that something is unlikely. Participants might sometimes not agree that something mentioned in the items with *even* is unlikely, as scales of likelihood differ from person to person due to individual experiences. In the items which suggest a non-scalar interpretation of *only*, likelihood does not play a role.

In summary, my studies indeed show similar patterns of results for the two languages. However, the ratings of items with *nur* and *sogar* in topicalization were higher than the ratings of items with *only* and *even* in topicalization. This follows from the crosslinguistic difference that object topicalization is a frequent structure in German while it is a highly marked structure in English.

Furthermore, I wanted to answer the research question in (5.1c) with my experiments, namely whether there are factors which facilitate LeA of FPs. Prosodic information by means of capital letters improved the ratings of both the items with XP-*nur* and XP-*only*. Prosody in auditory stimuli further improved the ratings of XP-*nur* and XP-*sogar* in German follow-study 3. These findings suggest that prosody is an important factor and that LeA of

these particles is a phenomenon of spoken language. Moreover, English follow-up study 3 (see Chapter 5.1.4) indicates that a more specific context which explicitly names the relevant alternatives can facilitate LeA of *only* and *even* in object topicalization. In the German experiments, I found that scalar meaning and emphasis improve LeA of *nur* (see Chapter 4.3). In English experiment 2 (see Chapter 5.2), I did not find that scalar meaning also plays a role in LeA of *only*. This could be due to the contexts which might not have been ideal for the items with *only*. It could also be the case that in English, other factors have an effect on LeA of *only* and *even* than in German. Emphasis might also be one of these factors, maybe in the sense of stressing contrast, as in the example in (5.33), which involves a contrast between John and Bill. However, I have to leave this for future research.

(5.33) It is John that Mary only likes, not Bill. (Attested example by Peter Culicover)

An important question is whether adding conditions with adjacent LeA to the experimental designs would have changed the results and analyses of the German and English data. In constructions with adjacent LeA, the particle immediately follows its associated focus. A German example is given in (5.34a), an English one in (5.34b). The examples are based on items of my experiments.

(5.34) a. PAPAYAS nur hat sie eingekauft.

PAPAYAS only has she bought

b. ETHAN only visited her.

If we assume that adjacent LeA receives higher ratings than the construction with non-adjacent LeA, an analysis based on locality and prosodic salience might explain the data: (i) an FP is canonically associated with an adjacent constituent, (ii) an FP is canonically associated with a prosodically salient constituent.¹⁰¹ Adjacent LeA should be more acceptable than non-adjacent LeA, as the prosodically prominent particle is closer to its associated focus. However, I asked some German native speakers about the sentence in (5.34a), and they agree with me that it is less acceptable than non-adjacent LeA (*PAPAYAS hat sie nur eingekauft*). In the literature, adjacent LeA is also judged worse than non-adjacent LeA. Primus (1992) claims that the example with non-adjacent LeA in (5.35b) is better than the one with adjacent LeA in (5.35c).

¹⁰¹ Thanks to Sam Featherston for this analysis.

- (5.35) a. Sogar ANNA ging ins Gefängnis. (+)
Even Anna went to-the prison
- b. ANNA ging sogar ins Gefängnis.
Anna went even to-the prison
- c. ANNA sogar ging ins Gefängnis.
Anna even went to-the prison
- d. Morgen wird ANNA sogar ins Gefängnis gehen (??)
Tomorrow will Anna even to-the prison go
- (Primus 1992: 61)

Furthermore, LeA of *sogar* does not seem to be more acceptable than LeA of *nur* if the particle is immediately adjacent to its associated focus. This is illustrated by the examples in (5.36).

- (5.36) a. [?] das Warten nur auf Godot
the waiting only for Godot
- b. ^{?*} der Autor sogar des Erfolgsbuchs
the author even of the bestseller
- c. stolz nur auf sich selbst
proud only of oneself

(Reis 2005: 474)

Adjacent LeA seems to have different restrictions than non-adjacent LeA, and locality and prosodic salience are not enough to explain data on different constructions with LeA.

The next section provides a general discussion of the experimental evidence presented in Chapters 4 and 5 in light of the assumptions made in the literature on LeA of English and German FPs presented in Chapter 3.1 and the examples from everyday language discussed in Chapter 3.2. Moreover, I will elaborate on the deeper question of why speaker evaluation and emphasis influence LeA of the German FPs under investigation by considering processing aspects like salience and accessibility. The idea is that the factors which improve the acceptability of LeA facilitate focus assignment and thus processing of the construction.

6 General Discussion

In this dissertation, I have examined constructions with LeA of the German FPs *nur* and *sogar* and the corresponding English FPs *only* and *even*. As shown in Chapter 2, these particles usually precede and c-command their associated focus (see Chapter 2.3). The central question which results from this observation is: How strong is the c-command requirement between exclusive and scalar particles and their associated focus, and are there factors which render LeA of these particles possible? The acceptability studies reported in this dissertation demonstrate that the c-command relation between the FPs and their associated focus is strong. The sentences with RiA generally received significantly higher ratings than the sentences containing LeA. However, the studies also revealed that there are certain factors which make LeA possible. The following sections elaborate on the findings of this dissertation and their implications in more detail.

Chapter 6.1 focusses on the German data by discussing both the examples collected from spontaneous speech and the main results of the German studies; Chapter 6.2 scrutinizes the findings of the English studies and examines the language specific differences between English and German constructions with LeA. In Chapter 6.3, I will argue that processing related aspects can explain the data of my studies.

6.1 Discussion of the German data

It is unclear from the literature whether structures with LeA are acceptable. The state of the art in Chapter 3.1 has shown that the judgments on constructions containing LeA of the German particles *nur* and *sogar* vary in the literature. While some linguists judge LeA of *sogar* to be more acceptable than LeA of *nur*, others judge LeA of both particles to be acceptable. Moreover, it is also left open whether these structures are used in everyday language. Four central questions thus guide the discussion of the German data: **Q1:** Does LeA of *nur* and *sogar* occur in everyday language and if so, how is it used? **Q2:** How acceptable are constructions containing LeA? **Q3:** Do the results of my German studies support the assumptions in the literature? **Q4:** Do constructions with LeA yield an emphatic interpretation?

Q1: Does LeA of *nur* and *sogar* occur in everyday language and if so, how is it used?

In order to answer the question Q1, I collected examples from everyday spoken language which contain LeA of *nur* or of *sogar* (see Chapter 3.2). The examples clearly show that LeA of these particles occurs in spoken language, although it is not a frequently used construction, and the preferred word order is RiA. A striking observation was that all of the examples with LeA of *nur* have in common that they involve special emphasis characterized by emphatic focus on the associated constituent and the expression of speaker attitude. In the examples, I identified three uses of speaker evaluation which license LeA of *nur*:

Firstly, LeA of *nur* can be used if the scalar meaning component of *nur* is highlighted and made prominent by context. We saw in Chapter 2 that exclusive particles like *nur* have a non-scalar and scalar use. In the non-scalar use, these particles exclude focus alternatives and express the meaning ‘nothing but’ or ‘nobody but’. Depending on context, sentences containing exclusives can additionally contain a scalar, evaluative meaning component, i.e., the speaker evaluates alternatives on a scale. Usually, the scalar use of *nur* refers to a low point on the contextually-relevant scale and expresses the meaning that the speaker considers something to be unexpectedly little or bad (see Chapter 2.4.1). This scalar meaning component is often highlighted in the examples containing LeA of *nur* from spontaneous speech.

Secondly, LeA is possible if the speaker uses contrastive focus and expresses that something is especially important, noteworthy, or unexpected.

Thirdly, the examples from spontaneous speech show that the use of expressive meaning by which the speaker expresses his/her emotional involvement strengthens speaker evaluation (e.g., feeling of happiness, excitement, disappointment, unhappiness, anger). The use of expressive meaning can be added to constructions in which the scalar meaning component of *nur* is highlighted or to constructions with contrastive focus.

The uses of LeA in spoken language show that the expression of speaker evaluation is important in this construction. In sentences containing *nur*, speaker evaluation has to be licensed by context. In sentences containing *sogar*, the evaluative meaning component is always present due to the particle’s lexical semantics. This observation is supported by the experimental investigation. In the following, I will summarize the main results of the German acceptability studies and their interpretations.

Q2: How acceptable are constructions containing LeA?

I conducted rating studies in order to answer the second question (Q2) which has been left open in the literature.

The four main hypotheses for the German rating studies followed from the observations in the literature (Chapter 3.1) and from the analysis of the examples from everyday language (Chapter 3.2). The first hypothesis was that RiA is the preferred word order of *nur* and *sogar*, as these particles usually precede and c-command their associated constituent. The experiments presented in Chapter 4 confirmed this hypothesis: RiA of *nur* and *sogar* received high ratings, whereas the conditions with LeA received significantly lower ratings.

The second hypothesis was that the scalar meaning component of *sogar* licenses LeA of this particle, and that LeA of *sogar* is more acceptable than LeA of *nur* in its non-scalar use. The results of the studies presented in Chapters 4.1 and 4.2 confirmed this hypothesis. These studies examined the acceptability of LeA of *nur*, *sogar*, and *auch* in constructions with object topicalization and in constructions with subject association. The results show that LeA of *sogar* was judged significantly better than LeA of *nur*. In the items of these studies, the non-scalar meaning component of *nur* was prominent, similar to the examples provided in the literature (see Chapter 3.1). The FPs *nur* and *sogar* thus behave differently with respect to LeA. The studies which also included LeA of the additive particle *auch* showed that this construction is judged to be as natural as RiA of *auch*. This was expected, as *auch* frequently occurs in structures with LeA, and differs from *nur* and *sogar* in that it can receive the main pitch accent when associating leftwards (see Chapter 2.4.3).

The third hypothesis was that there are certain factors which license LeA of *nur* and *sogar*. The acceptability study with auditory stimuli yielded that prosody belongs to these factors. Both LeA with *nur* and LeA with *sogar* were judged significantly better when items were presented auditorily than when items were presented in written form.

The experiments in Chapter 4.3 took up the idea of Chapter 3.2 that speaker evaluation and expressive meaning play a role in LeA of FPs. German experiment 3 revealed that LeA of *nur* can be improved when the scalar meaning is made prominent. The associated focus in the items was either a numeral and thus contained a numeric scale highlighting the scalar meaning of *nur* or a DP which made the non-scalar meaning component more prominent. Participants judged LeA of *nur* significantly better in the items containing scalar *nur* than in the items containing non-scalar *nur*. This was taken as evidence that scalar meaning is a

factor which licenses LeA of *nur*. Moreover, these results suggest that LeA of *sogar* was judged to be more natural than LeA of *nur* in the first experiments, because the items with *sogar* involved speaker evaluation due to the particle's meaning while the non-scalar meaning component of *nur* was more prominent in the items with *nur*.

The follow-up study (German experiment 4) confirmed the hypothesis that special emphasis as defined in Chapter 3 can further improve LeA of *nur*. The items were presented as a chat conversation between two people. The items with emphasis contained emphatic speech, like interjections and exclamations. Additionally, the emotional involvement of the chat partners was strengthened by the use of emoticons. The results showed that LeA of *nur* was judged significantly better in the items with emphasis than in the items without emphasis, thus confirming the hypothesis that special emphasis improves LeA of *nur*.

In summary, the German studies revealed the three licensing factors prosody, scalar meaning, and special emphasis. Thus, I argue in this dissertation that LeA of *nur* and *sogar* is a phenomenon of spoken language and can be licensed by speaker evaluation.

In both experiments of Chapter 4.3, the associated focus of *nur* was a numeral and several examples I collected from everyday language also contained a numeral as the associated constituent. This raises the question whether it is really the case that the scalar meaning component of *nur* and special emphasis made the difference in the studies of Chapter 4.3 or whether numerals have special syntactic properties which allow *nur* to associate leftwards.¹⁰¹ Future studies using DPs instead of numerals as the associated constituent which are assigned a low value on a contextually-given scale could shed further light on this issue. I expect that items with LeA in which the scalar meaning component of *nur* is highlighted by context or world knowledge and not by the use of numerals to receive higher ratings than items in which the non-scalar meaning component of *nur* is more prominent. Additionally, I expect items with LeA of scalar *nur* and DPs as the associated constituent to improve if special emphasis is added. Although my collection of examples from everyday language is not large, the examples strongly suggest that the decisive factor for LeA of *nur* is speaker evaluation. Some of these examples contain numerals, but others contain DPs, and they seem to work equally well in spoken language as long as there is an apparent speaker attitude present.

¹⁰¹ Thanks to an anonymous reviewer of Jäger (2018) for pointing this out to me.

In the following, I will compare the findings of my German studies to the assumptions on LeA of German FPs in the literature.

Q3: Do the results of my German studies support the assumptions in the literature?

The acceptability judgment studies of Chapters 4.1 and 4.2 consistently revealed a significant difference between LeA of *nur* and *sogar* and thus confirm the point of view that LeA of *nur* is impossible or at least marked, while LeA of *sogar* is more acceptable. Hoeksema and Zwarts (1991), for example, judge LeA of *sogar* to be possible as in (6.1a) below and LeA of *nur* to be impossible as in (6.1b), indicated by the asterisk. Abraham (2005) uses similar examples and judges LeA of *sogar* with two question marks and LeA of *nur* with an asterisk (see Chapter 3.1.3). Jacobs (1983) assigns two question marks to LeA of *nur* and one question mark to LeA of *sogar*. However, Jacobs' judgments relate to structures in which the associated focus is not in the prefield (see Chapter 3.1.3). Jäger and Wagner (2003) assign one question mark to LeA of *nur*.

- (6.1) a. Der PAPST hat sogar diesen Brauch erlaubt.
 b. *Der PAPST hat nur diesen Brauch erlaubt.

(Hoeksema & Zwarts 1991: 54)

In my studies, the difference between LeA of *sogar* and *nur* is a difference between marked and more marked and not a difference between acceptable and unacceptable. The mean ratings can be roughly transferred to no question mark for the conditions with RiA of *nur* and *sogar*, one question mark for the items containing LeA of *sogar*, and two question marks for the items containing LeA of *nur*. In order to judge LeA of *nur* as completely unacceptable with an asterisk as in (6.1b), the ratings of this construction should be worse. In order to judge LeA of *sogar* as acceptable with no question mark or asterisk as in (6.1a), the judgments should be better.

The results of my ratings studies are not in line with accounts in the literature assuming that LeA of both *nur* and *sogar* is acceptable and judging sentences containing LeA of these particles neither with question marks nor with an asterisk (see Chapter 3.1.4). An example provided by Bayer (1999) is shown in (6.2). While Bayer judges LeA of *even* to be possible and LeA *only* to be impossible in (6.2b), he judges LeA of both *sogar* and *nur* to be possible (6.2a). Altmann (1976a), Primus (1992), and Krifka (1999) also judge LeA of *nur* and *sogar* to be acceptable.

- (6.2) a. ANNA entkam_I [_{PrTP} sogar/nur [_{VP} dem Gefängnis e_I]]
Anna escaped even/only the-DAT prison
- b. ANNA could [_{PrTP} even/?*only [_{VP} escape from the prison]]

(Bayer 1999: 58)

Erlewine (2014b) also assumes that LeA is possible in German and proposes that in contrast to English, syntactic reconstruction is a possible mechanism for explaining LeA of German FPs. The experimental evidence of this dissertation does not confirm Erlewine's judgments on German and the judgments presented in Chapter 3.1.4. The ratings show that (i) both LeA of *nur* and *sogar* are marked constructions and less acceptable than RiA, (ii) that LeA of *sogar* is better than LeA of non-scalar *nur*, and (iii) that LeA of *nur* can be licensed by speaker evaluation. Syntactic reconstruction cannot account for these findings. It neither predicts a difference between *sogar* and *nur*, nor between non-scalar and scalar *nur*.

Most assumptions in the literature do not consider the possibility that certain factors facilitate or license LeA. There are, however, exceptions. Abraham (2005), who judges LeA of *nur* and *sogar* to be unacceptable, notes that there might be examples in spoken language with clear accentuation in which FPs do not c-command their associated focus. He claims that the parser can easily reconstruct the focus associate in these cases. My perception study with auditory stimuli (Chapter 4.1.4) confirms this assumption and shows that prosody is a factor which can improve and facilitate LeA. The examples collected from everyday language show that constructions containing LeA of *nur* and *sogar* occur in spoken language, and that they involve clear accentuation. So why don't we find LeA in written language? One explanation is that LeA causes ambiguities in written language and forces the parser to reanalyze the expected sentence structure and focus assignment. As RiA is the preferred word order, the parser expects the focused constituent to follow the FP.

Another exception is Altmann (1976a). He observes that *nur* preferably occurs in its scalar use in constructions with LeA. The study presented in Chapter 4.3.1 provides evidence for Altmann's (1976a) observation. LeA of *nur* was judged significantly better if the particle's scalar meaning component was prominent. This was taken as evidence that scalar meaning is a factor which licenses LeA. I claim that LeA of *sogar* was judged significantly better than LeA of *nur* in the studies of Chapters 4.1 and 4.2, as *sogar* is always scalar whereas the items with *nur* suggested a non-scalar interpretation.

In summary, the judgments in the literature only partly conform to the results of my acceptability studies and my analysis of authentic data. I agree with Erlewine (2014b) in the assumption that the grammar in principle allows structures with LeA, and that other factors determine whether this construction is possible for a specific particle. In contrast to Erlewine, however, I argue that not only the lexical semantics of the particle but also pragmatic factors like speaker evaluation and context determine whether LeA is acceptable. Erlewine's analysis of *only* does not allow LeA under any circumstances. Therefore, this analysis cannot be applied to LeA of *nur*, which can be improved by prosody and speaker evaluation.

My data shows that special emphasis plays a major role in licensing LeA of *nur*. One decisive question arises: Why does emphasis improve and license LeA? One possible explanation is that LeA of *nur* and *sogar* belongs to the marked word orders which are assumed in the literature to yield an emphatic interpretation. I will elaborate on this idea in the following.

Q4: Does LeA yield an emphatic interpretation?

There are several accounts which ascribe certain word orders an emphatic effect and claim that emphasis is encoded in the grammar (see Chapter 3.2.2). Frey (2010: 1416), for instance, proposes that “ \bar{A} -movement to the left periphery of a declarative clause is associated with a conventional implicature which encodes the emphatic interpretation of the moved item.” An example is illustrated in (6.3). In this example, the question establishes a ranking order by asking about something extraordinary. Frey (2010) argues that (6.3a) is a more appropriate answer than the answer with canonical word order in (6.3b), because the emphatic preposing construction takes up the ranking order of the question.

- (6.3) Was hat Otto dieses Mal Besonderes auf dem Markt gekauft?
 ‘Which extraordinary thing did Otto buy on the market this time?’
- a. PaPAyas₁ hat er dieses Mal t₁ gekauft,
Papayas has he this time bought
 - b. Er hat dieses Mal PaPAyas gekauft

(Frey 2010: 1424)

The phenomenon that certain constructions with focus preposing come along with an emphatic interpretation has also been called *mirative fronting*. Bianchi et al. (2016) adopt this

notion for Italian preposing constructions in emphatic contexts. Similar to Frey (2010), they analyze the mirative interpretation as a CI.

Examples like the one in (6.3a) are very similar to the target sentences of my German experiments containing short topicalization, with the difference that there is no FP in (6.3a). I therefore propose that the construction without the FP yields an emphatic interpretation involving a scale of expectation or relevance, and the speaker wants to draw the hearer's attention to this. The scalar particle *sogar* supports the emphatic interpretation, while non-scalar *nur* does not. This explains the difference between *nur* and *sogar* in my studies testing LeA in topicalization structures and it also explains why speaker evaluation and emphasis can facilitate and improve LeA of *nur*: the evaluative meaning component of scalar *nur* is compatible with the evaluative meaning component of the syntactic construction.

In addition to the canonical word order with RiA and the construction with LeA, another possible word order would be to prepose the FP together with its focus associate as in (6.4).

- (6.4) a. Nur PaPAyas hat er dieses Mal gekauft.
Only papayas has he this time bought
- b. PaPAyas hat er dieses Mal nur gekauft.
Papayas has he this time only bought

The sentence in (6.4a) is a completely acceptable construction. According to my judgments, however, (6.4a) does not have the emphatic interpretation that (6.4b) has. In emphatic constructions with focus fronting, the emphatic focus needs to be at the sentence-initial position by itself.

A question which arises is whether this explanation also holds for the constructions with subject association examined in Chapters 4.2.1 and 4.3. An example item with LeA of *nur* is repeated in (6.5) (see German experiment 2).

- (6.5) Q₁: Haben alle Schüler der Klasse die Mathe-Hausaufgaben gemacht?
Have all students of-the class the math-homework done
- A₂: Nein. Malte hat sie nur gemacht. **[Condition 2: XP-*nur*]**
No. Malte has them only done

In these cases, the structure without the particle is not a marked syntactic construction, as it contains the canonical subject-before-object order. However, the structure is very similar to

the sentence with object fronting in (6.3a) in that the narrowly focused element is in the sentence-initial position and is the only element that receives a pitch accent in the utterance. Producing the subject in the sentence-initial position with increased stress makes the structure more emphatic. It is also a construction which needs to be licensed by a specific context in order to be acceptable. I therefore argue that the key characteristic for the construction is narrow emphatic focus in the sentence-initial position, no matter whether the focus is the subject or the object. Thus, my argumentation can be applied to LeA in structures with object and subject association. As mentioned in Chapter 3.2.2, Behaghel (1932) already observed that elements with increased stress at the beginning of the sentence signal speaker's excitement. If FPs are inserted into constructions with increased stress on the focused element at the beginning of the sentence, they have to support or strengthen the emphatic interpretation of the structure in order to be felicitous in this construction. I thus analyze the observed speaker intention at the semantics-pragmatics interface: the emphatic effect is caused by the context and the construction in which the particle is inserted, and the particle itself must have an evaluative meaning component in order to be acceptable in this construction.¹⁰²

To summarize my findings on LeA of *nur* and *sogar*, I argue that LeA does not belong to the marked focus constructions which yield an emphatic interpretation but that LeA of these particles is possible if they are inserted in such an emphatic focus structure. In order for FPs to be felicitous in these structures, the particle has to support the emphatic interpretation of the construction. I assume that this is the reason why the examples of LeA of *nur* from everyday language all involve an emphatic context in which the speaker's attitude is highlighted and why LeA of *nur* in my studies improved in the items in which the scalar meaning component of *nur* was prominent and if emphasis was added.

Let us now turn to the findings of the English judgment studies of Chapter 5.

¹⁰² Thanks to Detmar Meurers (p.c.) for the important question whether the observed speaker intention is part of the lexical semantics of FPs or whether it is a purely pragmatic phenomenon. It is also important to note that the FPs under consideration differ from expressive particles such as *damn* which always express an emotional involvement of the speaker and thus make an utterance emphatic (e.g., *I read this book.* vs. *I read this damn book*). The FPs under investigation do not have a similar effect. An emotional context is needed in order to have a strong emotional effect in utterances containing FPs.

6.2 Discussion of the English data

In this section, I compare the results of my English rating studies to the assumptions on LeA of *only* and *even* in the literature. The second goal of this section is to interpret differences between the English and the German data. I thus address the following leading questions:

Q5: Do the results of my English studies support the assumptions in the literature? **Q6:** Are there language-specific differences between English and German?

Q5: Do the results of my English studies support the assumptions in the literature?

Concerning LeA of the English particles *only* and *even*, the judgments in the literature are more homogenous than the judgments on LeA of the corresponding German particles. Regarding English FPs, the picture emerges that the c-command relation between the exclusive particle *only* and its associated focus is fixed, i.e., LeA of this particle is generally considered to be impossible in the literature. An exception is Rochemont (2018) who assumes that LeA of *only* is possible in structures containing focus fronting but impossible in structures containing topic fronting. The observation that *only* cannot associate to its left is covered by the widely adopted Principle of Lexical Association (PLA) which states that “[a]n operator like *only* must be associated with a lexical constituent in its c-command domain” (Tancredi 1990: 30). This principle is often assumed to explain why FPs like *only* cannot associate with leftward material. It has also been claimed that *even*, in contrast to *only*, can associate leftwards, a puzzle first introduced by Jackendoff (1975). Although this difference has been confirmed in many works, it has often been left unexplained. An exception for this is Erlewine (2014a, b). He proposes that the grammar in principle allows LeA of FPs and that the semantics of the respective particles specifies whether it is an acceptable construction or not. According to Erlewine, the decisive difference between *only* and *even* is that AwF leads to truth-conditional effects in structures containing *only* while it does not affect the truth-conditions in structures containing *even*. Erlewine also claims that LeA of *even* is restricted to certain constructions and proposes the mechanism *Inverse Trace Conversion* which can account for his observations on constructions with LeA of *only* and *even*.

Does the experimental evidence of my dissertation confirm the widely adopted view that LeA of *only* is impossible while LeA of *even* is possible? The results show that the acceptability of LeA in structures with *only* and *even* varies, for example, the ratings are better in structures with subject fronting than in structures with object fronting. The ratings

of LeA of *only* do not support the assumption that it is completely unacceptable. Moreover, the ratings of LeA of *even* are not in line with the view that it is a completely acceptable structure. Thus, the picture is not as black and white as proposed in the literature. I now elaborate on the acceptability studies in detail. I conducted several studies testing LeA in structures with object topicalization (Chapter 5.1), and one study testing LeA in structures with subject association (Chapter 5.2).

English experiment 1 and its follow-up studies (Chapter 5.1) tested LeA of *only* and *even* in structures with object focus fronting. In these structures, both LeA of *only* and LeA of *even* received low ratings while RiA of both particles received high ratings. In most of the studies, LeA of *even* was rated significantly better than LeA of *only*, which suggests that these particles indeed behave differently with respect to LeA. However, the difference was not as pronounced as expected. This can be explained by the observation that focus fronting is a marked and very restricted structure in English. The follow-up studies (Chapters 5.1.3 and 5.1.4) showed that topicalization without an FP was judged significantly worse than canonical SVO order. Inserting an FP in this already marked structure leads to even lower ratings. The ratings of the items with LeA of *only* and *even* seemed to improve with more specific context in the study (Chapter 5.1.4), which indicates that context can facilitate LeA in topicalization structures. In these items, LeA of *even* was rated significantly better than LeA of *only*. However, RiA of *even* was also rated significantly better than RiA of *only*, suggesting that the items with *even* had better suiting contexts which might have led to the difference between LeA of *even* and *only*.

English experiment 2 (Chapter 5.2) tested LeA of *only* and *even* in constructions with subject association. This study addressed three main questions: (i) How acceptable is LeA in structures with subject association? (ii) Does scalar meaning improve the judgments of LeA of *only*? (iii) Are constructions with LeA rated better in items with more specific contexts?

In order to test the role of scalar meaning, the FP either associated with a proper name or with a numeral. As in the German experiment of Chapter 4.3.1, numerals were used to make the scalar meaning component of *only* prominent. Similar examples can also be found in the literature. Erlewine (2014b) provides the example in (6.6) in which the proper name *John* is the focus associate. According to his judgments, LeA with the proper name works with *even* but not with *only*.

- (6.6) a. *[John]_F will only pass the exam.
 b. [✓][John]_F will even pass the exam.

(Erlewine 2014b: 11)

Erlewine (2014b) also provides an example with a numeral as the associated focus of *even*, which is given in (6.7). Note, however, that this example contains a passive structure, a structure which I did not test in my studies.

- (6.7) Of course ten protesters were arrested. [✓][Fifty]_F protesters were even arrested.

(Erlewine 2014a: 137)

In the items with numerals as the associated focus, which should make the scalar meaning component of *only* more prominent, there was no significant difference between LeA of *only* and *even*. The ratings of LeA of these particles were lower than the ratings of LeA in the items with proper names. Interestingly, RiA of *even* received ratings as low as LeA of *even* and *only* (see Chapter 5.2.1.3 for a discussion). In contrast to the German study of Chapter 4.3.1, LeA of *only* did not improve with the use of numerals. As discussed in Chapter 5.2.1.3, I assume that the contexts were more natural in the items with proper names than in the items with numerals (see Chapter 5.2.1.3 for suggestions of how the contexts could be improved). Furthermore, it could be that the items with proper names suggested an evaluative interpretation of the items with *only*. The results of this experiment provide neither strong evidence for nor strong evidence against the assumption that scalar meaning and speaker evaluation improve LeA of *only*.

In order to test the role of context in my study, participants either saw the items with longer, more specific contexts or short contexts. However, the between-subject factor *context* did not have a statistical effect on the ratings. The results revealed a significant difference between LeA of *even* and *only* in the items with names as the associated focus, similar to the examples in (6.6). This confirms Erlewine's judgment that LeA of *even* works better than LeA of *only*. However, LeA of *only* received higher ratings than expected (mean rating: 4.87 (SD: 1.39)), which does not confirm the assumption that LeA of *only* is completely unacceptable in this structure.

In summary, the results of the English studies are not as clear-cut as the German ones. The question I will address next is whether there are language-specific differences between

English and German which make a unified explanation for the English and German data impossible.

Q6: Are there language-specific differences between English and German?

I argued above that in German, structures in which the focused object or subject occupy the sentence-initial position belong to the focus constructions which yield an emphatic interpretation. While the scalar particle *sogar* and scalar *nur* are compatible with this emphatic effect and can thus be used in this construction associating with the leftward focus constituent, non-scalar *nur* is not compatible with the emphatic effect of the syntactic construction due to the missing speaker evaluation. Let us discuss to what extent this argumentation can be applied to the English data. That LeA of *even* was rated better than LeA of *only* in most of my experiments suggests that speaker evaluation, which is present in the items with *even*, might be a relevant factor. However, the study in Chapter 5.2 did not reveal a difference between scalar and non-scalar *only*, and the items with DPs involving a non-scalar reading received higher ratings than the items with the numerals suggesting a scalar reading. As mentioned earlier, other factors could have led to these results, and the effect of using numerals is unclear in this study. Further studies are thus needed which make a clearer distinction between scalar and non-scalar *only*. The explanation of the German data, namely that LeA of *nur* and *sogar* is possible if the particles are inserted into an emphatic focus construction, cannot be applied to English at this point, and future studies are needed in order to test whether emphasis can improve LeA in English.

We have seen in Chapter 5.1 that focus preposing in English underlies different restrictions than focus fronting in German. Focus preposing in English has been ascribed the effect of expressing contrast (Netz and Kuzar 2007: 331), and it has been observed that preposed constituents are marked as familiar in discourse and create a link to the preceding context. It might be that the use of FPs has to strengthen these characteristics of preposing constructions, which do not necessarily involve speaker evaluation. In the studies with focus topicalization (Chapter 5.1), I used poset relations such that the focused element provides an anaphoric link to the preceding discourse. Moreover, the particle *only* strengthens the contrast of the answer to the preceding discourse. Nevertheless, the conditions with LeA received low ratings in the first acceptability studies. However, the ratings were better in

the study with more specific contexts which supported the particles' meaning and the contextual requirements of focus preposing, suggesting that specific contexts can facilitate constructions with LeA (Chapter 5.1.4). In the study of Chapter 5.2, LeA received good ratings in the items with proper names. In contrast to the first studies, the FPs associated with the subject and did thus not contain the dispreferred word order of object fronting. I propose that LeA was easier to process in subject association, as the complexity factor of object fronting was not involved. As focus fronting in English underlies different restrictions than focus fronting in German, it is likely that the use of FPs in these constructions underlies different restrictions as well and has different requirements on the context.

Another important point to consider is that word order in English is generally more restricted than in German, and word orders that deviate from canonical SVO order are not as common. This makes it plausible that English FPs have a stronger requirement for RiA. These factors are likely to contribute to LeA of FPs, making it a more restricted construction than in German, as the c-command relation between the particle and its associated constituent is stronger. Further studies are needed in order to get a clearer picture of the factors that affect LeA of *only* and *even*. It would be helpful to have examples from English everyday language in order to know in which contexts LeA can occur. The only example I found contains LeA of *even* and was uttered in the US series *Friends* (see example (3.114) on page 118). As this example sounds very natural, I believe that LeA is a construction that is used in English spoken language.

The following section will address the question whether processing aspects can explain why the factors which I identified in my investigation facilitate LeA of the FPs under consideration.

6.3 Processing factors as a possible explanation

The deeper question which arises when considering the German data is: Why do speaker evaluation and emphasis license LeA of certain FPs which preferably associate rightwards? In the following, I will consider processing aspects as a possible explanation by adopting the notions *salience*, *cognitive prominence*, and *accessibility*.¹⁰³ I will shortly introduce their

¹⁰³ Thanks to Peter Culicover for suggesting that salience and accessibility might play a role.

use in the literature and then specify how they can be applied to the phenomenon under consideration.

Kecskes (2013: 71) provides the following definition of *salience*: “As a semiotic notion, salience refers to the relative importance or prominence of signs.” The linguistic notion of salience “describes the accessibility of entities in a speaker’s or hearer’s memory and how this accessibility affects the production and interpretation of language.” (Kecskes 2013: 72). Constituents in a sentence that are highlighted by the speaker and thus made salient are considered to be most important in the discourse and stand out in comparison to other entities of the sentence. Prat-Sala and Branigan (2000) demonstrate this idea by means of the example in (6.8).

(6.8) There was this old car near the bridge, with a shattered windscreen and flat tires.
(Prat-Sala & Branigan 2000: 168)

The producer of this sentence introduces the two entities *car* and *bridge*. However, *car* is the more prominent and thus more salient entity, as it is introduced first, used in a focusing structure, and described in more detail.

It has been observed that salience and cognitive prominence are crucial in anaphor resolution, i.e., in determining the antecedent of a pronoun. The sentence in (6.9) is an example for anaphor resolution in a structure with several possible antecedents. In this sentence, the pronoun *she* could refer to *Anne* or *Sarah*. However, *Anne* is the preferred antecedent, as she is the subject and the agent in this sentence and thus more prominent.

(6.9) Anne impressed Sarah when she bent the steel bar. (she = Anne)
(Cowles et al. 2007: 4)

Cowles et al. (2007: 6) propose that “a referent that is currently ‘in focus’ at the center of attention [...] is most likely to be referred to with a pronoun [...]”. Different factors have been identified which make an entity more salient and thus the center of attention. Various studies have shown that both topic and focus serve this function (see Cowles et al. 2007 and references therein). In the following, I will summarize Arnold’s (1998) findings on anaphor resolution.

Arnold (1998) conducted a rating study on anaphora resolution and the role of topic and focus. Items consisted of three sentences as in (6.10). The first one provided a context without introducing any characters, the second one introduced two characters by using

proper names, here *Ann* and *Emily*, and either consisted of a construction in which the subject was the topic of the sentence (A.ii) or a cleft construction which makes the focused element prominent (B.ii). The third sentence referred back to one of the two characters, either by repeating the respective proper name or by using a pronoun.

(6.10)

A. Without cleft

- i. The guests were nervously standing around in the living room, trying to decide which person to talk to.
- ii. Ann decided to say hi to Emily first.
- iii. Emily/She looked like the friendliest person in the group.
- iii'. Ann/She hated to be in a room full of people where no-one was talking.

B. With cleft

- i. The guests were nervously standing around in the living room, trying to decide which person to talk to.
- ii. The one Ann decided to say hi to first was Emily.
- iii. Emily/She looked like the friendliest person in the group.
- iii'. Ann/She hated to be in a room full of people where no-one was talking.

(Arnold 1998: 140)

The results showed that in the items without a cleft construction as in (6.10A), participants preferred the versions in which a pronoun was used in the third sentence to refer to the topic of the second sentence. In the items which contained a cleft construction (6.10B), they also preferred a pronoun which refers back to the focus of the second sentence. If the third sentence did not refer back to the topic of the second sentence or the focus in the cleft construction of the second sentence, participants preferred a proper name to refer to that entity. According to Arnold (1998: 144), these results indicate that “the referents of both subjects and the focus of clefts are more activated than other arguments.” Therefore, both topic and focus increase the cognitive prominence of their referents.

The priming studies of Cowles et al. (2007) confirm the assumption that both topic and focus – especially if the focus is produced with a contrastive intonation – increase accessibility.

Garrod and Sanford (1994) also identified factors which increase salience, for example, in anaphor resolution. They report a study by Sanford et al. (1988) which showed that characters introduced in a story with proper names are especially salient to the reader.

Salience is often reflected in word order. It has already been observed in early literature that speakers tend to place the words to which they want to draw the hearer's attention at the beginning of the sentence. Osgood and Bock (1977) provide the following citation of Wundt (1979 [1900]):

“Where word positioning is free, not bound by a hard and fast traditional rule, etc., the words follow each other according to the degree of emphasis on the concept that forms the main content of the statement. It is also the first in the sentence.

(Wundt 1970: 29, taken from Osgood & Bock 1977: 93)

Osgood and Bock (1977) present three production principles of salience. The idea behind all these principles is that salient meaning components occur at the beginning of the sentence. The first principle is *Naturalness* and refers to the most common regular word order. In many languages, the subject precedes the object, as the subject is more salient than the object. The natural order in action relations is that the actor precedes the recipient of the action, as the actor is more prominent than the recipient. The principles *Vividness* and *Motivation-of-the-speaker* can lead to a change of the canonical word order. *Vividness* refers to the affective intensity of a word which is part of its lexical semantics. Constituents which have a high affective intensity are salient and can undergo movement to the left. *Motivation-of-the-speaker* refers, for example, to the speaker's “interest, concern, [and] ego involvement” (Osgood & Bock 1977: 90). High speaker motivation can also lead to leftward movement of the respective constituent.

These observations are also supported by Kecskes (2013: 73). He claims that it can be observed in many languages that “the element intended to have the greatest salience or importance is placed at the beginning of the sentence, regardless of its grammatical category.” This can lead to a change in word order like topicalization. Kecskes (2013) provides the English example given in (6.11). The structural change by means of an it-cleft construction increases salience.

(6.11) Peter likes dogs. It is Peter who likes dogs. (Structural change)

(Kecskes 2013: 73)

Furthermore, Kecskes (2013) observes that emotional intensity increases salience, which can also lead to leftward movement. Kecskes examples are given in (6.12).

- (6.12) a. Never have I got such a slap in the face.
b. To grandma's house we go.

(Kecskes 2013: 73)

Kecskes (2013) discusses whether word orders in which the focused element comes first clashes with the principle that given/old information tends to precede new information (e.g., Halliday 1967), as given information is more accessible and already salient in the discourse. He assumes that old-before-new belongs to the concept of *inherent salience* which refers to a natural word order preference, similar to Osgood and Bock's (1977) principle of *Naturalness*. Focused-first, on the other hand, belongs to *emergent situational salience* which can be caused by factors such as vividness and speaker motivation. According to Kecskes' socio-cognitive approach to salience, "[i]nherent salience (old-before-new) and emergent situational salience (focused-first) are intertwined and affect each other continuously in the communicative process" (Kecskes 2013: 79). Under this approach, the speaker uses the syntactic construction and other linguistic devices which (s)he considers to be best suited for expressing his/her intentions (Kecskes 2013: 75).

In (6.13), I summarize the factors that have been identified to increase salience of constituents which are relevant for the construction under consideration in this dissertation:

- (6.13) a. Both topic and focus (especially contrastive focus) have the function to increase cognitive prominence.
b. The element intended to have the greatest salience or importance is placed at the beginning of the sentence. (Kecskes 2013: 73)
c. High speaker motivation and emotional intensity increase salience and can cause leftward movement.
d. The subject is more salient than the object.
e. Characters introduced by proper names are especially salient.

In the following, I will apply the factors listed in (6.13) to my studies on LeA of FPs. As stated in (6.13a) and (6.13b), focus with a contrastive intonation increases salience, and speakers tend to place the most important constituents at the beginning of the sentence. Both of these factors apply to the construction under investigation. This can be illustrated by

looking again at the examples from everyday language. One of these examples is repeated in (6.14). Here, *Kinder* is contrastively focused; therefore, (6.13a) applies. The contrastive focus is the most important entity of the sentence that the speaker produced at the beginning of the sentence; thus, (6.13b) applies as well. Moreover, high speaker motivation and emotional intensity are involved which further increase cognitive prominence; therefore, (6.13c) also applies. In this example, the most important word is the subject and the canonical, “natural” word order applies (6.13d). We also saw examples with topicalization. In these cases, leftward movement is licensed by high speaker motivation and emotional intensity.

- (6.14) KINDER dürfen da nur drauf sitzen. Erwachsene machen das kaputt.
 Children *can there only on sit. Adults make this broken*
 ‘Only children are allowed to sit on this. Adults break it.’

In the light of the notions of salience and cognitive prominence, I argue that in the construction under investigation, the expression of speaker evaluation and emphasis highlights the importance of the focused constituent and draws the hearer’s attention to it. The use of emphatic focus at the beginning of the sentence has the function to make the focused constituent salient and cognitively prominent in the utterance. Therefore, the structure is already emphatic without the use of an FP. When the parser encounters the FP later in the sentence, the emphatically focused element at the beginning of the sentence is a salient and accessible associated constituent of the FP, thus making it easier to process the dispreferred LeA and to reconstruct the relation between the FP and its associated constituent. In order for the particle to be acceptable in this construction, it has to support the emphatic meaning of the structure. In other words, if the associated constituent is not in a position c-commanded by the FP, the associated constituent must be made especially salient. The factors prosody, speaker evaluation, and emphasis, which I identified in my studies, all have the function to increase the salience of the focused element in the construction. This makes the focus a salient associate for the FP, and LeA of the FP works in this emphatic construction, especially if the particle’s evaluative meaning component is prominent and supports the emphatic construction.

V2-structures in German with LeA of an FP and no material following the particle further support the idea that processing plays a role in LeA of FPs. An example for such a construction by Jacobs is given in (3.61) in Chapter 3, repeated in (6.15) for convenience.

(6.15) Seine Mütter kommt morgen nur/sogar.
His mother will-come tomorrow only/even

(Jacobs 1983: 108)

In these cases, the associated constituent *seine Mutter* occupies the sentence-initial position and is the only element which is focused in this sentence which makes it salient. Its salience is further increased by the fact that there is no material following the particle which could be the associated constituent. Therefore, *seine Mutter* is easy to identify as the associated focus of the particle.

The processing approach based on the cognitive notion of salience, which I applied to the German data, can also be applied to my observations on LeA of *only* and *even*, although the results of my English studies are not as clear-cut as the German ones. LeA of both *only* and *even* received the highest ratings in the items in which the associated focus was the subject introduced with a proper name (see Chapter 5.2.1). An example item is repeated in (6.16). The relevant conditions are name-*only* and name-*even*.

- (6.16) a. *John asks (short context):*
 Will all of my brothers visit Grandma in the hospital?
- b. *Esmerelda gazes into her crystal ball and answers:*
- | | |
|-----------------------------------|----------------------|
| No. Only Ethan will visit her. | [<i>only-name</i>] |
| No. Ethan will only visit her. | [<i>name-only</i>] |
| Yes. Even Richard will visit her. | [<i>even-name</i>] |
| Yes. Richard will even visit her. | [<i>name-even</i>] |

In the conditions with LeA, the proper name, which refers to the subject and agent of the utterance, is placed at the beginning of the sentence. Word order in English is more fixed than in German and the preference for the subject to precede the object is stronger. It can be argued that the salience factor *Naturalness* (Osgood & Bock 1977) is stronger in English than in German. This explains why the items of the studies containing object topicalization received low ratings. The items with subject association as in (6.16) contain the canonical word order with the salient subject and agent in the sentence-initial position. Thus, the factor that the subject is more salient than the object (6.13d) applies. The factor in (6.13a), namely that focus has the function to increase cognitive prominence, is also fulfilled, as the subject is the focus of the sentence. Additionally, the focused subject occupies the sentence-initial position. Thus, the factor in (6.13b) applies.

Another factor that is fulfilled is the one in (6.13e), which says that characters introduced by proper names make the referent especially salient. The items with numerals in the same study did not fulfil this factor and received lower ratings. In the relevant conditions of the example in (6.16), the subject is the most prominent element in the sentence which also makes it the salient associated constituent of the FP and facilitates the dispreferred LeA. In all the other English items with LeA, the associated constituent was not as prominent, as fewer factors were fulfilled. The processing approach based on the cognitive notion of salience can thus explain why LeA of *only* and *even* worked best in the conditions name-*only* and name-*even*: in these items, the salient focused subject precedes the object and thus conforms to the “natural” English word order. In contrast, the items of the studies with object topicalization do not conform to this requirement, which makes it harder for the parser to process the object fronting structures.

In summary, considering cognitive factors for explaining the construction under investigation proved to be very fruitful. In structures with LeA of FPs, the associated constituent of the particle has to be made as salient as possible in order to license the construction. Salient constituents are accessible for the parser and thus facilitate processing structures with LeA. By means of the example in (6.14) (*KINDER dürfen da nur drauf sitzen*) we saw that several factors apply which increase salience. The emphatic, contrastive focus on the subject in the sentence-initial position makes *Kinder* especially salient and accessible. The parser can thus easily recognize this element as the focus associate of *nur*, which makes LeA easier to process. The cognitive notion of salience also provided further insights into the English data. As English has a strong preference for SVO order, Osgood and Bock’s (1977) salience principle *Naturalness* is an important factor. It refers to the most common regular word order. The subject is more prominent than the object and usually occurs in the sentence-initial position. This explains the low ratings of LeA in constructions with object topicalization. LeA of *only* and *even* received higher ratings in constructions with subject association, in which the subject was at the beginning of the sentence. Future experiments are needed to answer the open question whether special emphasis can improve LeA of *only* and *even*. According to Kecskes (2013), emotional intensity also increases salience in English. I therefore expect emotional intensity to improve constructions with LeA, as it makes the leftward focus associate more accessible for the parser.

The following Chapter 7 shortly summarizes the main findings of this dissertation and ends with an outlook.

7 Conclusion and Outlook

This study on LeA of English and German FPs investigated the overall research question introduced in Chapter 1, repeated in (7.1).

(7.1) How strong is the c-command relation between focus sensitive particles and their associated focus? Is their relation fixed or are there factors which can license LeA?

In my investigation, I focused on the English FPs *only* and *even* and the German FPs *nur* and *sogar*. These particles preferably c-command their associated constituent. However, it is controversial in the literature how strong this c-command relation is. To my knowledge, this study provides the first experimental investigation dealing with this phenomenon.

In the analysis of examples from German everyday language and in various acceptability judgment studies, I identified the following factors which license LeA of the German FPs under consideration: (i) prosody, (ii) speaker evaluation, and (iii) special emphasis. The acceptability studies on English FPs revealed that LeA of *only* and *even* is rated best if the associated focus is the subject introduced by a proper name.

From my observations, I conclude that the c-command relation between the FPs under consideration and their associated focus is strong but not fixed in such a way that LeA is impossible, as there are factors which improve and license this construction. Moreover, examples I collected from spontaneous speech provide evidence that LeA of *nur* and *sogar* occurs in spoken language.

I based my explanations of the data on theories dealing with emphatic syntactic constructions and on theories dealing with salience and cognitive prominence. Therefore, I propose an account which combines information structure, pragmatics, and processing. Without going into detail, I outline the main arguments of this approach in (7.2) (see Chapter 6 for a detailed discussion of my studies).

- (7.2) a. The grammar in principle allows LeA of FPs. However, certain factors like prosody, context, evaluative meaning, and emphasis are needed in order to license the structure.
- b. Scalar meaning has been identified as a licensing factor for LeA in German. This can explain why LeA of the scalar particle *sogar* was judged significantly better than LeA of non-scalar *nur*. Moreover, it has been shown that scalar *nur* can associate better to its left than non-scalar *nur*.

- c. Special emphasis further improved LeA of *nur*. I argued that LeA does not belong to the syntactic constructions which yield an emphatic interpretation. FPs can be inserted into a construction with an emphatic narrow focus in the sentence-initial position and can then associate with this focused element leftwards. However, the particle's meaning has to support the emphatic, evaluative interpretation of the structure in order to be acceptable.
- d. The emphatic narrow focus occupies the sentence-initial position, because speakers tend to produce the most important entities first in order to draw the hearer's attention to it.
- e. From a cognitive perspective, salience or cognitive prominence is the necessary ingredient for LeA, i.e., the focused constituent has to be especially salient so that the parser can easily reconstruct this constituent as the focus associate of the FP.
- f. The factors identified to improve and license LeA of German and English FPs serve the function to make the focus a salient associate for the FP.

Future studies are needed in order to support this approach. More prosodic studies could shed further light on the role of the identified factors, as I assume that LeA of exclusive and scalar particles is a phenomenon of spoken language. A possible follow-up study for German experiment 4 on the role of emphasis would be to present items auditorily. I expect high ratings for items containing LeA of *nur* or *sogar* which are placed in an emphatic context and in which the focus associate is produced with increased emphasis. Production studies in which contexts are presented auditorily and participants have to produce the target sentences themselves could also reveal interesting results. I hypothesize that participants have more problems producing target sentences with LeA in items without evaluative contexts than target sentences which include speaker evaluation and emphasis.

Future studies are also needed to gain further insights about the factors that influence LeA of English FPs, as the results of my English studies were not as conclusive as the German ones. I predict ratings of constructions containing LeA of *only* and *even* to improve if items are presented auditorily and the associated focus constituents are produced with a high pitch accent with increased stress in order to make them more prominent. Ratings should be especially good for auditorily presented items which contain subject association and proper names similar to the items of English experiment 2 which were presented in written form.

Online experiments like eye-tracking could shed further light on the processing of constructions containing LeA, as eye movements show whether participants have to reanalyze the sentence when encountering the FP without a plausible focus associate in its c-command domain. Thus, participants might look back at the leftward focus constituent and

reread the sentence. Moreover, the influence of different factors like emphasis on processing could be tested in eye-tracking or other online studies.

Another interesting question for future research is whether similar observations on LeA of exclusive and scalar particles can be made on FPs of other languages. Beaver and Clark (2008) provide cross-linguistic examples which show that exclusive particles corresponding to *only* cannot associate with extracted material while focus-sensitive particles corresponding to *always* can. The studies of this dissertation show that certain factors can influence the acceptability of LeA of exclusive particles like *only* and *nur*, and I expect that this is also the case in other languages. This assumption is supported by Stefan Sudhoff's (p.c.) conjecture that Dutch exclusive particles with a scalar interpretation and scalar particles should be able to associate leftwards (see Chapter 3.1.1).

A corpus study on LeA would also be desirable to get more authentic data that shows how frequent the structure occurs and in which contexts it is used. However, it is difficult to explicitly search for these structures in corpora, as the restriction that the associated focus should occupy a position to the left of the particle can usually not be implemented in the search entry. Searching for occurrences of a specific particle leads to a huge amount of results, and most of them do not contain LeA. The only possibility to get examples for LeA in most corpora is to search for structures in which the particle occurs at the end of the sentence and thus has to associate with leftward material. However, the construction under investigation contains material following the particle. A corpus annotated for information structural categories like focus could solve this problem, as it can then be specified in the search entry that the focused constituent has to precede the particle. There are already studies on focus annotation of corpora (e.g., Ziai & Meurers 2014; De Kuthy et al. 2016). I therefore expect that searching for LeA of FPs in larger corpora will be possible in the future. As I assume that LeA of *nur* and *sogar* is a phenomenon of spoken language, I expect that most examples of these constructions can be found in corpora of spoken language which are annotated for focus.

I want to end this dissertation with some thoughts on the broader question which arises, namely which implications the findings of this study have on certain other syntactic constructions that have been judged to be impossible, like, for example, *syntactic islands*. It has been argued that extraction from islands leads to ungrammaticality (Ross 1967). The sentence in (7.3) is an example for the observation that it is impossible to extract from complex noun phrases. Therefore, complex noun phrases are islands for extraction.

(7.3) *The man who I read a statement which was about is sick. (Ross 1967: 119)

The claim in the literature that *only* has to c-command its associated focus and that the associated constituent cannot be extracted from the particle's domain is very similar to the claims on syntactic islands. Thus, the domain of *only* can be called an “*only*-island”. My observations on *only*-islands can also be compared to experimental studies on syntactic islands which claim that extra-grammatical factors are responsible for the unacceptability of the structures (see, for example, Hofmeister & Sag 2010 and references therein). Hofmeister and Sag (2010: 367–368) argue that “island constructions have features that are known independently to produce processing difficulty. As we show, controlling the factors that make processing more difficult can also dramatically improve the acceptability of island-violating sentences.”¹⁰³ The current study contributes to this line of research by demonstrating that the acceptability of LeA of certain FPs can be improved by factors which make the associated constituent of the particle salient and thus facilitate processing.

¹⁰³ Similar observations have been made on *Freezing* constructions (see, for example, Hofmeister et al. 2015; Winkler et al. 2016; Culicover & Winkler 2018).

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Appendix A: Examples from Spontaneous Speech

I. Examples with XP-*nur* uttered by children

- (1) Die Paula hat gesagt, dass SIE Pipi gemacht hat. Aber das stimmt
The Paula has said that she wee-wee made has. But that true-is
 gar nicht. **ICH hab nur Pipi gemacht.**
not at all. I have only wee-wee made

‘Paula said that she made wee-wee. But that’s not true at all. Only I made wee-wee.’

Context: Four-year-old girl told her mother about an incident in Kindergarten.

Analysis: Corrective focus on *ICH*, emphatic speech, emotionality

- (2) **KINDER dürfen da nur drauf sitzen.** Erwachsene machen das kaputt.
Children can there only on sit. Adults make this broken
 ‘Only children are allowed to sit on this. Adults break it.’

Context: Three-year-old girl at a playground told the dad of another child that he is not allowed to sit on the seesaw.

Analysis: Contrastive focus on *KINDER*, emphatic speech, emotionality

- (3) **ICH hab nur eine Befreit-Karte.**

I have only a break-free-card

‘I am the only one who has a break-free-card.’

Context: Ten-year old uttered this sentence during a board game as a response to her sister who claimed that all the players of the game had a break-free-card.

Analysis: Corrective focus on *ICH* with special emphasis

II. Examples with XP-*nur* uttered by adults: non-scalar interpretation is prominent

- (4) A. Dann hab nur ich gesoffen.
Then have only I drunk
 ‘Then only I drank [alcohol].’

B. Ja, **DU hast nur gesoffen.**

Yes, you have only drunk

‘Yes, only you drank [alcohol].’

Context: Two professors were recapitulating a discussion they had at a dinner after attending a guest lecture. Professor A said that they had alcohol to drink, but professor B denied that she had alcohol.

Analysis: Corrective focus on *DU* with special emphasis

- (5) **Die FRAU macht nur diese Schritte**, der Mann macht den Grundschrift.

The woman makes only those steps, the man makes the basic step
'Only the woman performs these steps while the man performs the basic step.'

Context: This example was uttered by a dancing instructor of standard and Latin dance.

Analysis: Contrastive focus on *FRAU* with special emphasis

- (6) **ICH bin nur hier.**

I am only here
'Only I am here.'

Context: The speaker was asked at a concert whether her boyfriend is also at the concert. However, he had an appointment and could not attend the concert.

Analysis: Contrastive focus on *ICH* with special emphasis

- (7) **Oder SIE macht nur drei Wochen Urlaub.**

Or she makes only three weeks vacation
'Or only she is on vacation for three weeks.'

Context: Two friends were talking about a British family who told them that they are on a three-week vacation. It was October and the two friends were wondering whether the daughter of the British family had a three-week school-break during that time of the year. The speaker of the sentence in (7) joked that maybe only this girl had a three-week break while her school-mates were in school.

Analysis: Contrastive focus, special emphasis, joking

- (8) **Die EMOTIONEN sollten nur den Unterschied machen.**

The emotions should only the difference make
'Only the emotions should make the difference.'

Context: One of my colleagues said this to me when I was planning my experiment on the effect of emphasis. He meant that no other factors should influence the data. He did not notice that he used LeA of *nur*.

Analysis: Contrastive focus, special emphasis

- (9) **In DIESEN BREITENGRADEN können die nur entstehen.**

In these latitudinal lines can they only emerge
'They can only emerge in these latitudinal lines.'

Context: Geography teacher explained the emergence of hurricanes by means of a terrestrial globe.

Analysis: Contrastive focus, special emphasis

(10) **Bei uns im Projekt haben sie die nur gestrichen.***At our in-the project have they them only canceled*

‘They only canceled them in our project.’

Context: The speaker told her colleague that the research project she was working in did not get the money for student assistants for which they applied. Her colleague then asked whether this happened to the other projects as well. The sentence in (10) is the response to this question.

Analysis: Contrastive focus with special emphasis, speaker expressed that she considered it to be unfair that all the other projects got the money for student assistants.

III. Examples with XP-*nur* uttered by adults: scalar interpretation is prominent(11) **DREI JUNGS hat sie dieses Jahr nur eingeladen.***Three boys has she this year only invited*

‘She only invited three boys this year.’

Context: Father was surprised that his daughter only invited three boys to her birthday party, as she invited more boys the year before.

Analysis: Associated focus is a numeral, three is considered to be unexpectedly little

(12) **FÜNF sollten’s heute nur werden.***Five should-it today only be*

‘Only five [participants] are supposed to come today.’

Context: A sports class instructor told the participants who were already present that a lot of other participants canceled that day and that she only expects five people to participate.

Analysis: Associated focus is a numeral, five is considered to be unexpectedly little

(13) **EINEN FEHLER hat sie sich am Schießstand nur geleistet.***One mistake has she herself at-the shooting range only afforded*

‘She only made one mistake at the shooting range.’

Context: The sports reporter Christoph Hamm summed up the good performance of the German biathlete Laura Dahlmeier during the biathlon women mass start on January 8th, 2017.

Analysis: Associated focus is a numeral, one is considered to be unexpectedly little

- (14) **EINUNDZWANZIG Kilometer sind's nur bis Calw.**

Twenty-one kilometers are-it only to Calw

‘It’s only twenty-one kilometers to Calw.’

Context: When seeing a road sign with the information that the city Calw is 21 kilometers away, the car driver was surprised that Calw is so close.

Analysis: Associated focus is a numeral, twenty-one is considered to be unexpectedly little

- (15) **Sogar WASSER wird ab und zu nur gereicht.**

Even Water is sometimes only handed

‘Sometimes, they even only hand water.’

Context: The German sports commentator and former biathlete Herbert Fritzenwenger explained during the biathlon men mass start on January 8th, 2017 what the biathletes get to drink during the race.

Analysis: Simultaneous use of *nur* and *sogar*, unexpectedness

IV. Examples with XP-*nur* uttered by adults: scalar and non-scalar interpretation

- (16) **Ein FORUM hat er nur gefunden.**

An internet forum has he only found

‘He only found an internet forum.’

Context: Two colleagues were talking about a student. The sentence in (16) is a response to the question whether the student found a crowdsourcing marketplace similar to Mechanical Turk for recruiting English native speakers.

Analysis: Contrastive focus on *FORUM*, an internet forum is not considered to be as good as a crowdsourcing marketplace.

- (17) A. **War Maria zuhause?**

Was Mary at home

‘Was Mary at home?’

- B. **Nein. Der FRANK war nur da.**

No The Frank was only there

‘No. Only Frank was there.’

Context: Before this conversation, speaker B went to his neighbor Mary in order to give her a present. Speaker A knew about that and asked if Mary was at home. Speaker B responded that only Mary’s son Frank was at home.

Analysis: Contrastive focus on *FRANK*, it is considered bad that Mary was not at home.

- (18) **Emily, Nora und Ida waren nur da.**

Emily Nora and Ida were only there

‘Only Emily, Nora, and Ida were there.’

Context: The speaker told a friend that there were few people present at a meeting.

Analysis: It is expressed that more people were expected to be there.

IV. Examples with XP-*bloß* uttered by adults: scalar interpretation

- (19) **ZWOI SACHA hot er bloß brocht.**

Two things has he only brought

‘He only brought two things.’

Context: The Speaker was talking about her brother who should have brought home more items from the store.

Analysis: Associated focus is a numeral, two is considered to be little

- (20) **DREI Wocha war se bloß d’rhoim.**

Three weeks was she only at home

‘She was only home for three weeks.’

Context: The speaker was talking about a woman from Hungary who only went home for three weeks after having worked in Germany for months.

Analysis: Associated focus is a numeral, three is considered to be little

- (21) **TWOIAVIERZIG hot er bloß werda dürfa.**

Fourty-two has he only get may

‘He only got to be fourty-two years old.’

Context: Speaker was talking about Elvis Presley who died at the age of forty-two.

Analysis: Associated focus is a numeral, forty-two is considered to be little

- (22) **ZWEI haben bloß noch daheim gewohnt.**

Two have only still at home lived

‘Only two still lived at home.’

Context: The speaker told a story of the past about her daughters and explains that only two of her three daughters still lived at home.

Analysis: Associated focus is a numeral, two is considered to be little

IV. Examples with XP-sogar uttered by adults

- (23) **ICH hab sogar Teile von Mad Max gesehen.**

I have even parts of Mad Max seen

‘Even I watched parts of Mad Max.’

Context: The female speaker who said earlier in the conversation that she does not like action thrillers uttered this sentence.

Analysis: It is considered to be unexpected that the speaker watched parts of the movie ‘Mad Max’.

- (24) **Ach, die Millers waren sogar da.**

Oh the Millers were even there

‘Oh, even the Millers were there.’

Context: Two people talk about a party that the speaker of (25) could not attend. The friend told her that the Miller family was at the party.

Analysis: It is considered to be unexpected that the Millers came to the party.

- (25) Mama und Maria haben Brot gebacken. **LAUGENwecken haben sie sogar gemacht.**

Mom and Maria have bread baked pretzel rolls have they even

gemacht.
made

‘Mom and Maria baked bread. They even baked pretzel rolls.’

Analysis: The speaker is excited that they baked pretzel rolls.

- (26) **Beim WHO kann man sogar nen Kahn mieten.**

At the WHO can you even a punting boat rent

‘You can even rent a punting boat at the WHO.’

Context: A group of friends talks about the places where students can rent punting boats at a cheap rate.

Analysis: It is considered to be surprising that punting boats can be rented at the student residence WHO.

- (27) **Bei Linguistic Evidence haben das Leute sogar gemacht.**

At Linguistic Evidence have that people even done

‘People did that even at Linguistic Evidence.’

Context: The speaker of (27) told his colleague that people often do not include the statistical analysis into abstracts due to the page limit.

Analysis: It is considered to be surprising that there are abstracts at the conference Linguistic Evidence without statistical analysis.

Appendix B: Materials of the Experimental Investigation

B.1 Materials of German experiment 1: Comparison between *nur* and *sogar* in short and long topicalization structures

I. Items

Items with *nur*:

- (1) A₁: Glaubst du, dass Peter alle Süßigkeiten aus dem Schrank gegessen hat?
 B₁: Nein. Ich glaube, dass er nur die Lakritzstangen gegessen hat.
 B₂: Nein. Die Lakritzstangen glaube ich, dass er nur gegessen hat.
- A₂: Hat Peter alle Süßigkeiten aus dem Schrank gegessen?
 B₃: Nein. Er hat nur die Lakritzstangen gegessen.
 B₄: Nein. Die Lakritzstangen hat er nur gegessen.
- (2) A₁: Glaubst du, dass Thea auf Safari alle Raubkatzenarten Afrikas gesehen hat?
 B₁: Nein. Ich glaube, dass sie nur Löwen gesehen hat.
 B₂: Nein. Löwen glaube ich, dass sie nur gesehen hat.
- A₂: Hat Thea auf Safari alle Raubkatzenarten Afrikas gesehen?
 B₃: Nein. Sie hat nur Löwen gesehen.
 B₄: Nein. Löwen hat sie nur gesehen.
- (3) A₁: Glaubst du, dass Malte alle Hausaufgaben gemacht hat?
 B₁: Nein. Ich glaube, dass er nur die Deutsch-Hausaufgaben gemacht hat.
 B₂: Nein. Die Deutsch-Hausaufgaben glaube ich, dass er nur gemacht hat.
- A₂: Hat Malte alle Hausaufgaben gemacht?
 B₃: Nein. Er hat nur die Deutsch-Hausaufgaben gemacht.
 B₄: Nein. Die Deutsch-Hausaufgaben hat er nur gemacht.
- (4) A₁: Glaubst du, dass Jakob mehrere Kampfsportarten ausprobiert hat?
 B₁: Nein. Ich glaube, dass er nur Taekwondo ausprobiert hat.
 B₂: Nein. Taekwondo glaube ich, dass er nur ausprobiert hat.
- A₂: Hat Jakob mehrere Kampfsportarten ausprobiert?
 B₃: Nein. Er hat nur Taekwondo ausprobiert.
 B₄: Nein. Taekwondo hat er nur ausprobiert.
- (5) A₁: Glaubst du, dass Tabea alle Gedichte von Friedrich Schiller auswendig gelernt hat?
 B₁: Nein. Ich glaube, dass sie nur ‚Die Glocke‘ auswendig gelernt hat.
 B₂: Nein. ‚Die Glocke‘ glaube ich, dass sie nur auswendig gelernt hat.
- A₂: Hat Tabea alle Gedichte von Friedrich Schiller auswendig gelernt?
 B₃: Nein. Sie hat nur ‚Die Glocke‘ auswendig gelernt.
 B₄: Nein. ‚Die Glocke‘ hat sie nur auswendig gelernt.
- (6) A₁: Glaubst du, dass Claudia die Hauptstädte aller US-Bundesstaaten besucht hat?
 B₁: Nein. Ich glaube, dass sie nur Honolulu besucht hat.
 B₂: Nein. Honolulu glaube ich, dass sie nur besucht hat.

A₂: Hat Claudia die Hauptstädte aller US-Bundesstaaten besucht?

B₃: Nein. Sie hat nur Honolulu besucht.

B₄: Nein. Honolulu hat sie nur besucht.

(7) A₁: Glaubst du, dass Julia mehrere Fruchtsorten für den Nachttisch eingekauft hat?

B₁: Nein. Ich glaube, dass sie nur Papayas eingekauft hat.

B₂: Nein. Papayas glaube ich, dass sie nur eingekauft hat.

A₂: Hat Julia mehrere Fruchtsorten für den Nachttisch eingekauft?

B₃: Nein. Sie hat nur Papayas eingekauft.

B₄: Nein. Papayas hat sie nur eingekauft.

(8) A₁: Glaubst du, dass Emma in der Schule mehrere Instrumente gelernt hat?

B₁: Nein. Ich glaube, dass sie nur Mundharmonika gelernt hat.

B₂: Nein. Mundharmonika glaube ich, dass sie nur gelernt hat.

A₂: Hat Emma in der Schule mehrere Instrumente gelernt?

B₃: Nein. Sie hat nur Mundharmonika gelernt.

B₄: Nein. Mundharmonika hat sie nur gelernt.

(9) A₁: Glaubst du, dass der Fahrschüler alle Verkehrsschilder auf der Strecke übersehen hat?

B₁: Nein. Ich glaube, dass er nur das Überholverbot übersehen hat.

B₂: Nein. Das Überholverbot glaube ich, dass er nur übersehen hat.

A₂: Hat der Fahrschüler alle Verkehrsschilder auf der Strecke übersehen?

B₃: Nein. Er hat nur das Überholverbot übersehen.

B₄: Nein. Das Überholverbot hat er nur übersehen.

(10) A₁: Glaubst du, dass Egon im Streichelzoo alle Tiere gestreichelt hat?

B₁: Nein. Ich glaube, dass er nur die Dromedare gestreichelt hat.

B₂: Nein. Die Dromedare glaube ich, dass er nur gestreichelt hat.

A₂: Hat Egon im Streichelzoo alle Tiere gestreichelt?

B₃: Nein. Er hat nur die Dromedare gestreichelt.

B₄: Nein. Die Dromedare hat er nur gestreichelt.

(11) A₁: Denkst du, dass Sina bei der Premiere alle Hauptdarsteller von ‚Fluch der Karibik‘ gesehen hat?

B₁: Nein. Ich denke, dass sie nur Orlando Bloom gesehen hat.

B₂: Nein. Orlando Bloom denke ich, dass sie nur gesehen hat.

A₂: Hat Sina bei der Premiere alle Hauptdarsteller von ‚Fluch der Karibik‘ gesehen?

B₃: Nein. Sie hat nur Orlando Bloom gesehen.

B₄: Nein. Orlando Bloom hat sie nur gesehen.

(12) A₁: Denkst du, dass der Kochlehrling an seinem ersten Arbeitstag alle Gerichte versalzen hat?

B₁: Nein. Ich denke, dass er nur die Schnitzel versalzen hat.

B₂: Nein. Die Schnitzel denke ich, dass er nur versalzen hat.

- A₂: Hat der Kochlehrling an seinem ersten Arbeitstag alle Gerichte versalzen?
 B₃: Nein. Er hat nur die Schnitzel versalzen.
 B₄: Nein. Die Schnitzel hat er nur versalzen.
- (13) A₁: Denkst du, dass der Schulleiter alle Lehrer zu seinem Geburtstag eingeladen hat?
 B₁: Nein. Ich denke, dass er nur die Referendare eingeladen hat.
 B₂: Nein. Die Referendare denke ich, dass er nur eingeladen hat.
- A₂: Hat der Schulleiter alle Lehrer zu seinem Geburtstag eingeladen?
 B₃: Nein. Er hat nur die Referendare eingeladen.
 B₄: Nein. Die Referendare hat er nur eingeladen.
- (14) A₁: Denkst du, dass das Mädchen alle Möbel ihrer Oma angemalt hat?
 B₁: Nein. Ich denke, dass sie nur den Schaukelstuhl angemalt hat.
 B₂: Nein. Den Schaukelstuhl denke ich, dass sie nur angemalt hat.
- A₂: Hat das Mädchen alle Möbel ihrer Oma angemalt?
 B₃: Nein. Sie hat nur den Schaukelstuhl angemalt.
 B₄: Nein. Den Schaukelstuhl hat sie nur angemalt.
- (15) A₁: Denkst du, dass der Maler am Dienstag das ganze Haus gestrichen hat?
 B₁: Nein. Ich denke, dass er nur den Balkon gestrichen hat.
 B₂: Nein. Den Balkon denke ich, dass er nur gestrichen hat.
- A₂: Hat der Maler am Dienstag das ganze Haus gestrichen?
 B₃: Nein. Er hat nur den Balkon gestrichen.
 B₄: Nein. Den Balkon hat er nur gestrichen.
- (16) A₁: Denkst du, dass Pia im Supermarkt viele Kosmetikprodukte geklaut hat?
 B₁: Nein. Ich denke, dass sie nur Wimperntusche geklaut hat.
 B₂: Nein. Wimperntusche denke ich, dass sie nur geklaut hat.
- A₂: Hat Pia im Supermarkt viele Kosmetikprodukte geklaut?
 B₃: Nein. Sie hat nur Wimperntusche geklaut.
 B₄: Nein. Wimperntusche hat sie nur geklaut.
- (17) A₁: Denkst du, dass der Journalist viele Politiker zur Europakrise befragt hat?
 B₁: Nein. Ich denke, dass er nur den Bildungsminister befragt hat.
 B₂: Nein. Den Bildungsminister denke ich, dass er nur befragt hat.
- A₂: Hat der Journalist viele Politiker zur Europakrise befragt?
 B₃: Nein. Er hat nur den Bildungsminister befragt.
 B₄: Nein. Den Bildungsminister hat er nur befragt.
- (18) A₁: Denkst du, dass Carla alle Wertsachen im Hotel vergessen hat?
 B₁: Nein. Ich denke, dass sie nur ihre Goldkette vergessen hat.
 B₂: Nein. Ihre Goldkette denke ich, dass sie nur vergessen hat.
- A₂: Hat Carla alle Wertsachen im Hotel vergessen?
 B₃: Nein. Sie hat nur ihre Goldkette vergessen.
 B₄: Nein. Ihre Goldkette hat sie nur vergessen.

- (19) A₁: Denkst du, dass der Tierschützer alle Kühe aus dem Schlachthof befreit hat?
 B₁: Nein. Ich denke, dass er nur die Kälber befreit hat.
 B₂: Nein. Die Kälber denke ich, dass er nur befreit hat.

A₂: Hat der Tierschützer alle Kühe aus dem Schlachthof befreit?
 B₃: Nein. Er hat nur die Kälber befreit.
 B₄: Nein. Die Kälber hat er nur befreit.

- (20) A₁: Denkst du, dass die Putzfrau den ganzen Festsaal geputzt hat?
 B₁: Nein. Ich denke, dass sie nur die Fenster geputzt hat.
 B₂: Nein. Die Fenster denke ich, dass sie nur geputzt hat.

A₂: Hat die Putzfrau den ganzen Festsaal geputzt?
 B₃: Nein. Sie hat nur die Fenster geputzt.
 B₄: Nein. Die Fenster hat sie nur geputzt.

Items with *sogar*:

1. A₁: Glaubst du, dass Peter viele Süßigkeiten aus dem Schrank gegessen hat?
 B₁: Ja. Ich glaube, dass er sogar die Lakritzstangen gegessen hat.
 B₂: Ja. Die Lakritzstangen glaube ich, dass er sogar gegessen hat.

A₂: Hat Peter viele Süßigkeiten aus dem Schrank gegessen?
 B₃: Ja. Er hat sogar die Lakritzstangen gegessen.
 B₄: Ja. Die Lakritzstangen hat er sogar gegessen.

2. A₁: Glaubst du, dass Thea auf Safari alle Raubkatzenarten Afrikas gesehen hat?
 B₁: Ja. Ich glaube, dass sie sogar Leoparden gesehen hat.
 B₂: Ja. Leoparden glaube ich, dass sie sogar gesehen hat.

A₁: Hat Thea auf Safari alle Raubkatzenarten Afrikas gesehen?
 B₃: Ja. Sie hat sogar Leoparden gesehen.
 B₄: Ja. Leoparden hat sie sogar gesehen.

3. A₁: Glaubst du, dass Malte ausnahmsweise alle Hausaufgaben gemacht?
 B₁: Ja. Ich glaube, dass er sogar die Deutsch-Hausaufgaben gemacht hat.
 B₂: Ja. Die Deutsch-Hausaufgaben glaube ich, dass er sogar gemacht hat.

A₂: Hat Malte ausnahmsweise alle Hausaufgaben gemacht?
 B₃: Ja. Er hat sogar die Deutsch-Hausaufgaben gemacht.
 B₄: Ja. Die Deutsch-Hausaufgaben hat er sogar gemacht.

4. A₁: Glaubst du, dass Jakob mehrere Kampfsportarten ausprobiert hat?
 B₁: Ja. Ich glaube, dass er sogar Taekwondo ausprobiert hat.
 B₂: Ja. Taekwondo glaube ich, dass er sogar ausprobiert hat.

A₂: Hat Jakob mehrere Kampfsportarten ausprobiert?
 B₃: Ja. Er hat sogar Taekwondo ausprobiert.
 B₄: Ja. Taekwondo hat er sogar ausprobiert.

5. A₁: Glaubst du, dass Tabea alle Gedichte von Friedrich Schiller auswendig gelernt hat?
 B₁: Ja. Ich glaube, dass sie sogar ‚Die Glocke‘ auswendig gelernt hat.
 B₂: Ja. ‚Die Glocke‘ glaube ich, dass sie sogar auswendig gelernt hat.

- A₂: Hat Tabea alle Gedichte von Friedrich Schiller auswendig gelernt?
 B₃: Ja. Sie hat sogar ‚Die Glocke‘ auswendig gelernt.
 B₄: Ja. ‚Die Glocke‘ hat sie sogar auswendig gelernt.
6. A₁: Glaubst du, dass Claudia viele Hauptstädte der US-Bundesstaaten besucht hat?
 B₁: Ja. Ich glaube, dass sie sogar Honolulu besucht hat.
 B₂: Ja. Honolulu glaube ich, dass sie sogar besucht hat.
- A₂: Hat Claudia viele Hauptstädte der US-Bundesstaaten besucht?
 B₃: Ja. Sie hat sogar Honolulu besucht.
 B₄: Ja. Honolulu hat sie sogar besucht.
7. A₁: Glaubst du, dass Julia mehrere Fruchtsorten für den Nachtschisch eingekauft hat?
 B₁: Ja. Ich glaube, dass sie sogar Papayas eingekauft hat.
 B₂: Ja. Papayas glaube ich, dass sie sogar eingekauft hat.
- A₂: Hat Julia mehrere Fruchtsorgen für den Nachtschisch eingekauft?
 B₃: Ja. Sie hat sogar Papayas eingekauft.
 B₄: Ja. Papayas hat sie sogar eingekauft.
8. A₁: Glaubst du, dass Emma in der Schule mehrere Instrumente gelernt hat?
 B₁: Ja. Ich glaube, dass sie sogar Mundharmonika gelernt hat.
 B₂: Ja. Mundharmonika glaube ich, dass sie sogar gelernt hat.
- A₂: Hat Emma in der Schule mehrere Instrumente gelernt?
 B₃: Ja. Sie hat sogar Mundharmonika gelernt.
 B₄: Ja. Mundharmonika hat sie sogar gelernt.
9. A₁: Glaubst du, dass der Fahrschüler viele Verkehrsschilder auf der Strecke übersehen hat?
 B₁: Ja. Ich glaube, dass er sogar das Überholverbot übersehen hat.
 B₂: Ja. Das Überholverbot glaube ich, dass er sogar übersehen hat.
- A₂: Hat der Fahrschüler viele Verkehrsschilder auf der Strecke übersehen?
 B₃: Ja. Er hat sogar das Überholverbot übersehen.
 B₄: Ja. Das Überholverbot hat er sogar übersehen.
10. A₁: Glaubst du, dass Egon im Streichelzoo viele Tiere gestreichelt hat?
 B₁: Ja. Ich glaube, dass er sogar die Dromedare gestreichelt hat.
 B₂: Ja. Die Dromedare glaube ich, dass er sogar gestreichelt hat.
- A₂: Hat Egon im Streichelzoo viele Tiere gestreichelt?
 B₃: Ja. Er hat sogar die Dromedare gestreichelt.
 B₄: Ja. Die Dromedare hat er sogar gestreichelt.
11. A₁: Denkst du, dass Sina bei der Premiere alle Hauptdarsteller von ‚Fluch der Karibik‘ gesehen hat?
 B₁: Ja. Ich denke, dass sie sogar Orlando Bloom gesehen hat.
 B₂: Ja. Orlando Bloom denke ich, dass sie sogar gesehen hat.
- A₂: Hat Sina bei der Premiere alle Hauptdarsteller von ‚Fluch der Karibik‘ gesehen?
 B₃: Ja. Sie hat sogar Orlando Bloom gesehen.
 B₄: Ja. Orlando Bloom hat sie sogar gesehen.

12. A₁: Denkst du, dass der Kochlehrling an seinem ersten Arbeitstag alle Gerichte versalzen hat?
B₁: Ja. Ich denke, dass er sogar die Schnitzel versalzen hat.
B₂: Ja. Die Schnitzel denke ich, dass er sogar versalzen hat.
- A₂: Hat der Kochlehrling an seinem ersten Arbeitstag alle Gerichte versalzen?
B₃: Ja. Er hat sogar die Schnitzel versalzen.
B₄: Ja. Die Schnitzel hat er sogar versalzen.
13. A₁: Denkst du, dass der Schulleiter alle Lehrer zu seinem Geburtstag eingeladen hat?
B₁: Ja. Ich denke, dass er sogar die Referendare eingeladen hat.
B₂: Ja. Die Referendare denke ich, dass er sogar eingeladen hat.
- A₂: Hat der Schulleiter alle Lehrer zu seinem Geburtstag eingeladen?
B₃: Ja. Er hat sogar die Referendare eingeladen.
B₄: Ja. Die Referendare hat er sogar eingeladen.
14. A₁: Denkst du, dass das Mädchen viele Möbel ihrer Oma angemalt hat?
B₁: Ja. Ich denke, dass sie sogar den Schaukelstuhl angemalt hat.
B₂: Ja. Den Schaukelstuhl denke ich, dass sie sogar angemalt hat.
- A₂: Hat das Mädchen viele Möbel ihrer Oma angemalt?
B₃: Ja. Sie hat sogar den Schaukelstuhl angemalt.
B₄: Ja. Den Schaukelstuhl hat sie sogar angemalt.
15. A₁: Denkst du, dass der Maler am Dienstag das ganze Haus gestrichen hat?
B₁: Ja. Ich denke, dass er sogar den Balkon gestrichen hat.
B₂: Ja. Den Balkon denke ich, dass er sogar gestrichen hat.
- A₂: Hat der Maler am Dienstag das ganze Haus gestrichen?
B₃: Ja. Er hat sogar den Balkon gestrichen.
B₄: Ja. Den Balkon hat er sogar gestrichen.
16. A₁: Denkst du, dass Pia im Supermarkt viele Kosmetikprodukte geklaut hat?
B₁: Ja. Ich denke, dass sie sogar Wimperntusche geklaut hat.
B₂: Ja. Wimperntusche denke ich, dass sie sogar geklaut hat.
- A₂: Hat Pia im Supermarkt viele Kosmetikprodukte geklaut?
B₃: Ja. Sie hat sogar Wimperntusche geklaut.
B₄: Ja. Wimperntusche hat sie sogar geklaut.
17. A₁: Denkst du, dass der Journalist viele Politiker zur Europakrise befragt hat?
B₁: Ja. Ich denke, dass er sogar den Bildungsminister befragt hat.
B₂: Ja. Den Bildungsminister denke ich, dass er sogar befragt hat.
- A₂: Hat der Journalist viele Politiker zur Europakrise befragt?
B₃: Ja. Er hat sogar den Bildungsminister befragt.
B₄: Ja. Den Bildungsminister hat er sogar befragt.
18. A₁: Denkst du, dass Carla viele Wertsachen im Hotel vergessen hat?
B₁: Ja. Ich denke, dass sie sogar ihre Goldkette vergessen hat.
B₂: Ja. Ihre Goldkette denke ich, dass sie sogar vergessen hat.

A₂: Hat Carla viele Wertsachen im Hotel vergessen?

B₃: Ja. Sie hat sogar ihre Goldkette vergessen.

B₄: Ja. Ihre Goldkette hat sie sogar vergessen.

19. A₁: Denkst du, dass der Tierschützer alle Kühe aus dem Schlachthof befreit hat?

B₁: Ja. Ich denke, dass er sogar die Kälber befreit hat.

B₂: Ja. Die Kälber denke ich, dass er sogar befreit hat.

A₂: Hat der Tierschützer alle Kühe aus dem Schlachthof befreit?

B₃: Ja. Er hat sogar die Kälber befreit.

B₄: Ja. Die Kälber hat er sogar befreit.

20. A₁: Denkst du, dass die Putzfrau den ganzen Festsaal geputzt hat?

B₁: Ja. Ich denke, dass sie sogar die Fenster geputzt hat.

B₂: Ja. Die Fenster, denke ich, dass sie sogar geputzt hat.

A₂: Hat die Putzfrau den ganzen Festsaal geputzt?

B₃: Ja. Sie hat sogar die Fenster geputzt.

B₄: Ja. Die Fenster hat sie sogar geputzt.

II. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood [`lmerMod`]

Formula: `rating ~ wo * complex * type + (wo * complex | vp)`

Data: `d`

AIC	BIC	logLik	deviance	df.resid
3272.3	3370.2	-1617.1	3234.3	1261

Scaled residuals:

Min	1Q	Median	3Q	Max
-4.590	-0.531	0.145	0.522	5.029

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
vp	(Intercept)	0.173	0.417	
	wo1	0.131	0.362	-0.78
	complex1	0.046	0.214	-0.13 -0.02
	wo1:complex1	0.0534	0.231	0.03 0.28 -0.95
	Residual	0.6313	0.795	

Number of obs: 1280, groups: vp, 32

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	4.995	0.077	64.90
wo1	1.623	0.068	23.97
complex1	-0.496	0.044	-11.33
type1	-0.082	0.022	-3.69
wo1:complex1	0.432	0.046	9.29
wo1:type1	0.187	0.022	8.41
embed1:type1	0.105	0.022	4.75

wol:complex1:type1 -0.113 0.022 -5.10

Correlation of Fixed Effects:

	(Intr)	wol	embed1	type1	w1:emb1	w1:type1	emb1:1
wol	-0.706						
complex1	-0.111	-0.014					
type1	0.000	0.000	0.000				
wol:compl1	0.025	0.229	-0.719	0.000			
wol:type1	0.000	0.000	0.000	0.000	0.000		
compl1:type1	0.000	0.000	0.000	0.000	0.000	0.000	
w1:com1:ty1	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	4.689	5.151
wol	1.439	1.777
embed1	-0.653	-0.472
type1	-0.088	0.001
wol:embed1	0.369	0.550
wol:type1	0.099	0.188
embed1:type1	0.020	0.108
wol:embed1:type1	-0.102	-0.013

B.2 Materials of German follow-up study 1: Comparison between *nur* and *sogar* with capital letters

I. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood [lmerMod]

Formula: rating ~ wo * embed * type + (wo * embed | vp)

Data: d

AIC	BIC	logLik	deviance	df.resid
3361.4	3459.3	-1661.7	3323.4	1261

Scaled residuals:

Min	1Q	Median	3Q	Max
-5.398	-0.433	0.092	0.505	3.754

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
vp	(Intercept)	0.428	0.654	
	wol	0.221	0.470	-0.79
	complex1	0.052	0.227	-0.12 0.10
	wol:compl1	0.052	0.228	0.52 -0.45 -0.91
	Residual	0.659	0.812	

Number of obs: 1280, groups: vp, 32

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	4.920	0.118	41.73
wol	1.608	0.086	18.66
complex1	-0.563	0.046	-12.20
type1	-0.044	0.023	-1.93
wol:compl1	0.459	0.046	9.95
wol:type1	0.144	0.023	6.33
compl1:type1	0.064	0.023	2.82
wol:compl1:type1	-0.058	0.023	-2.55

Correlation of Fixed Effects:

	(Intr)	wol	compl1	type1	wl:c1	wl:t1	c1:t1
wol	-0.748						
complex1	-0.101	0.081					
type1	0.000	0.000					
wol:compl1	0.447	-0.382	-0.687	0.00			
wol:type1	0.00	0.00	0.00	0.00	0.00		
compl1:type1	0.00	0.00	0.00	0.00	0.00	0.00	
wol:compl1:ty1	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	4.844	5.145
wol	1.490	1.755
embed1	-0.581	-0.410
type1	-0.126	-0.039
wol:embed1	0.341	0.523
wol:type1	0.143	0.230
embed1:type1	0.062	0.149
wol:embed1:type1	-0.157	-0.070

B.3 Materials of German follow-up study 2: Comparison between *nur*, *sogar*, and *auch*

I. Items

- A₁: Hat Peter ALLE Süßigkeiten aus dem Schrank gegessen?
 B₁: Nein. Er hat nur die LAKRITZSTANGEN gegessen.
 B₂: Nein. Die LAKRITZSTANGEN hat er nur gegessen.
 B₃: Ja. Er hat sogar die LAKRITZSTANGEN gegessen.
 B₄: Ja. Die LAKRITZSTANGEN hat er sogar gegessen.

A₂: Hat Peter die SCHOKORIEGEL aus dem Schrank gegessen?
 B₅: Ja. Und er hat auch die LAKRITZSTANGEN gegessen.
 B₆: Ja. Und die LAKRITZSTANGEN hat er AUCH gegessen.
- A₁: Hat Thea auf Safari in Afrika MEHRERE Raubkatzenarten gesehen?
 B₁: Nein. Sie hat nur GEPARDEN gesehen.
 B₂: Nein. GEPARDEN hat sie nur gesehen.

B₃: Ja. Sie hat sogar GEPARDEN gesehen.

B₄: Ja. GEPARDEN hat sie sogar gesehen.

A₂: Hat Thea auf Safari in Afrika ELEFANTEN gesehen?

B₅: Ja. Und sie hat auch GEPARDEN gesehen.

B₆: Ja. Und GEPARDEN hat sie AUCH gesehen.

3. A₁: Hat Malte ALLE Hausaufgaben gemacht?

B₁: Nein. Er hat nur die DEUTSCH-Hausaufgaben gemacht.

B₂: Nein. Die DEUTSCH-Hausaufgaben hat er nur gemacht.

B₃: Ja. Er hat sogar die DEUTSCH-Hausaufgaben gemacht.

B₄: Ja. Die DEUTSCH-Hausaufgaben hat er sogar gemacht.

A₂: Hat Malte die MATHE-Hausaufgaben gemacht?

B₅: Ja. Und er hat auch die DEUTSCH-Hausaufgaben gemacht.

B₆: Ja. Und die DEUTSCH-Hausaufgaben hat er AUCH gemacht.

4. A₁: Hat Jakob MEHRERE Kampfsportarten ausprobiert?

B₁: Nein. Er hat nur TAEKWONDO ausprobiert.

B₂: Nein. TAEKWONDO hat er nur ausprobiert.

B₃: Ja. Er hat sogar TAEKWONDO ausprobiert.

B₄: Ja. TAEKWONDO hat er sogar ausprobiert.

A₂: Hat Jakob in der Kampfsportschule KARATE ausprobiert?

B₅: Ja. Und er hat auch TAEKWONDO ausprobiert.

B₆: Ja. Und TAEKWONDO hat er AUCH ausprobiert.

5. A₁: Hat Tabea ALLE Gedichte von Friedrich Schiller auswendig gelernt?

B₁: Nein. Sie hat nur ‚Die GLOCKE‘ auswendig gelernt.

B₂: Nein. ‚Die GLOCKE‘ hat sie nur auswendig gelernt.

B₃: Ja. Sie hat sogar ‚Die GLOCKE‘ auswendig gelernt.

B₄: Ja. ‚Die GLOCKE‘ hat sie sogar auswendig gelernt.

A₂: Hat Tabea das Gedicht ‚Der TAUCHER‘ von Friedrich Schiller auswendig gelernt?

B₅: Ja. Und sie hat auch ‚Die GLOCKE‘ auswendig gelernt.

B₆: Ja. Und ‚Die GLOCKE‘ hat sie AUCH auswendig gelernt.

6. A₁: Hat Claudia in Berlin VIELE Museen besucht?

B₁: Nein. Sie hat nur das TECHNIKMUSEUM besucht.

B₂: Nein. Das TECHNIKMUSEUM hat sie nur besucht.

B₃: Ja. Sie hat sogar das TECHNIKMUSEUM besucht.

B₄: Ja. Das TECHNIKMUSEUM hat sie sogar besucht.

A₂: Hat Claudia in Berlin das PERGAMONMUSEUM besucht?

B₅: Ja. Und sie hat auch das TECHNIKMUSEUM besucht.

B₆: Ja. Und das TECHNIKMUSEUM hat sie AUCH besucht.

7. A₁: Hat Julia MEHRERE Fruchtsorten für den Nachtsch eingekauft?

B₁: Nein. Sie hat nur PAPAYAS eingekauft.

B₂: Nein. PAPAYAS hat sie nur eingekauft.

B₃: Ja. Sie hat sogar PAPAYAS eingekauft.

B₄: Ja. PAPAYAS hat sie sogar eingekauft.

- A₂: Hat Julia MANGOS für den Nachttisch eingekauft?
B₅: Ja. Und sie hat auch PAPAYAS eingekauft.
B₆: Ja. Und PAPAYAS hat sie AUCH eingekauft.
8. A₁: Hat Emma in der Schule MEHRERE Instrumente gelernt?
B₁: Nein. Sie hat nur MUNDHARMONIKA gelernt.
B₂: Nein. MUNDHARMONIKA hat sie nur gelernt.
B₃: Ja. Sie hat sogar MUNDHARMONIKA gelernt.
B₄: Ja. MUNDHARMONIKA hat sie sogar gelernt.
- A₂: Hat Emma in der Schule FLÖTE gelernt?
B₅: Ja. Und sie hat auch MUNDHARMONIKA gelernt.
B₆: Ja. Und MUNDHARMONIKA hat sie AUCH gelernt.
9. A₁: Hat der Fahrschüler VIELE Verkehrsschilder auf der Strecke ignoriert?
B₁: Nein. Er hat nur das ÜBERHOLVERBOT ignoriert.
B₂: Nein. Das ÜBERHOLVERBOT hat er nur ignoriert.
B₃: Ja. Er hat sogar das ÜBERHOLVERBOT ignoriert.
B₄: Ja. Das ÜBERHOLVERBOT hat er sogar ignoriert.
- A₂: Hat der Fahrschüler das STOPPSCHILD auf der Strecke ignoriert?
B₅: Ja. Und er hat auch das ÜBERHOLVERBOT ignoriert.
B₆: Ja. Und das ÜBERHOLVERBOT hat er AUCH ignoriert.
10. A₁: Hat Egon im Streichelzoo VIELE Tiere gestreichelt?
B₁: Nein. Er hat nur die DROMEDARE gestreichelt.
B₂: Nein. Die DROMEDARE hat er nur gestreichelt.
B₃: Ja. Er hat sogar die DROMEDARE gestreichelt.
B₄: Ja. Die DROMEDARE hat er sogar gestreichelt.
- A₂: Hat Egon im Streichelzoo die ESEL gestreichelt?
B₅: Ja. Und er hat auch die DROMEDARE gestreichelt.
B₆: Ja. Und die DROMEDARE hat er AUCH gestreichelt.
11. A₁: Hat Sina bei der Premiere von ‚Fluch der Karibik‘ ALLE Hauptdarsteller fotografiert?
B₁: Nein. Sie hat nur ORLANDO BLOOM fotografiert.
B₂: Nein. ORLANDO BLOOM hat sie nur fotografiert.
B₃: Ja. Sie hat sogar ORLANDO BLOOM fotografiert.
B₄: Ja. ORLANDO BLOOM hat sie sogar fotografiert.
- A₂: Hat Sina bei der Premiere von ‚Fluch der Karibik‘ JOHNNY DEPP fotografiert?
B₅: Ja. Und sie hat auch ORLANDO BLOOM fotografiert.
B₆: Ja. Und ORLANDO BLOOM hat sie AUCH fotografiert.
12. A₁: Hat der Kochlehrling an seinem ersten Arbeitstag ALLE Gerichte versalzen?
B₁: Nein. Er hat nur die SCHNITZEL versalzen.
B₂: Nein. Die SCHNITZEL hat er nur versalzen.
B₃: Ja. Er hat sogar die SCHNITZEL versalzen.
B₄: Ja. Die SCHNITZEL hat er sogar versalzen.
- A₂: Hat der Kochlehrling an seinem ersten Arbeitstag die POMMES versalzen?
B₅: Ja. Und er hat auch die SCHNITZEL versalzen.
B₆: Ja. Und die SCHNITZEL hat er AUCH versalzen.

13. A₁: Hat der Schulleiter ALLE Lehrer zu seinem Geburtstag eingeladen?
B₁: Nein. Er hat nur die REFERENDARE eingeladen.
B₂: Nein. Die REFERENDARE hat er nur eingeladen.
B₃: Ja. Er hat sogar die REFERENDARE eingeladen.
B₄: Ja. Die REFERENDARE hat er sogar eingeladen.

A₂: Hat der Schulleiter die LEHRER zu seinem Geburtstag eingeladen?
B₅: Ja. Und er hat auch die REFERENDARE eingeladen.
B₆: Ja. Und die REFERENDARE hat er AUCH eingeladen.

14. A₁: Hat das Mädchen ALLE Möbel ihrer Oma angemalt?
B₁: Nein. Sie hat nur den SCHAUKELSTUHL angemalt.
B₂: Nein. Den SCHAUKELSTUHL hat sie nur angemalt.
B₃: Ja. Sie hat sogar den SCHAUKELSTUHL angemalt.
B₄: Ja. Den SCHAUKELSTUHL hat sie sogar angemalt.

A₂: Hat das Mädchen den SCHRANK ihrer Oma angemalt?
B₅: Ja. Und sie hat auch den SCHAUKELSTUHL angemalt.
B₆: Ja. Und den SCHAUKELSTUHL hat sie AUCH angemalt.

15. A₁: Hat der Maler am Dienstag das GANZE Haus gestrichen?
B₁: Nein. Er hat nur den BALKON gestrichen.
B₂: Nein. Den BALKON hat er nur gestrichen.
B₃: Ja. Er hat sogar den BALKON gestrichen.
B₄: Ja. Den BALKON hat er sogar gestrichen.

A₂: Hat der Maler am Dienstag die HAUSWAND gestrichen?
B₅: Ja. Und er hat auch den BALKON gestrichen.
B₆: Ja. Und den BALKON hat er AUCH gestrichen.

16. A₁: Hat Pia im Supermarkt VIELE Kosmetikprodukte geklaut?
B₁: Nein. Sie hat nur WIMPERNTUSCHE geklaut.
B₂: Nein. WIMPERNTUSCHE hat sie nur geklaut.
B₃: Ja. Sie hat sogar WIMPERNTUSCHE geklaut.
B₄: Ja. WIMPERNTUSCHE hat sie sogar geklaut.

A₂: Hat Pia im Supermarkt LIDSCHATTEN geklaut?
B₅: Ja. Und sie hat auch WIMPERNTUSCHE geklaut.
B₆: Ja. Und WIMPERNTUSCHE hat sie AUCH geklaut.

17. A₁: Hat der Journalist VIELE Politiker zu der Krise befragt?
B₁: Nein. Er hat nur den BILDUNGSMINISTER befragt.
B₂: Nein. Den BILDUNGSMINISTER hat er nur befragt.
B₃: Ja. Er hat sogar den BILDUNGSMINISTER befragt.
B₄: Ja. Den BILDUNGSMINISTER hat er sogar befragt.

A₂: Hat der Journalist den AUßENMINISTER zu der Krise befragt?
B₅: Ja. Und er hat auch den BILDUNGSMINISTER befragt.
B₆: Ja. Und den BILDUNGSMINISTER hat er AUCH befragt.

18. A₁: Hat Carla MEHRERE Wertsachen im Hotel vergessen?
B₁: Nein. Sie hat nur ihre GOLDKETTE vergessen.
B₂: Nein. Ihre GOLDKETTE hat sie nur vergessen.

B₃: Ja. Sie hat sogar ihre GOLDKETTE vergessen.

B₄: Ja. Ihre GOLDKETTE hat sie sogar vergessen.

A₂: Hat Carla ihre OHRRINGE im Hotel vergessen?

B₅: Ja. Und sie hat auch ihre GOLDKETTE vergessen.

B₆: Ja. Und ihre GOLDKETTE hat sie AUCH vergessen.

19. A₁: Hat der Tierschützer ALLE Tiere aus dem Labor befreit?

B₁: Nein. Er hat nur die RATTEN befreit.

B₂: Nein. Die RATTEN hat er nur befreit.

B₃: Ja. Er hat sogar die RATTEN befreit.

B₄: Ja. Die RATTEN hat er sogar befreit.

A₂: Hat der Tierschützer die MÄUSE aus dem Labor befreit?

B₅: Ja. Und er hat auch die RATTEN befreit.

B₆: Ja. Und die RATTEN hat er AUCH befreit.

20. A₁: Hat die Putzfrau den GANZEN Festsaal geputzt?

B₁: Nein. Sie hat nur die FENSTER geputzt.

B₂: Nein. Die FENSTER hat sie nur geputzt.

B₃: Ja. Sie hat sogar die FENSTER geputzt.

B₄: Ja. Die FENSTER hat sie sogar geputzt.

A₂: Hat die Putzfrau den BODEN des Festsaals geputzt?

B₅: Ja. Und sie hat auch die FENSTER geputzt.

B₆: Ja. Und die FENSTER hat sie AUCH geputzt.

21. A₁: Hat sich Fritz bei seinem Fahrradunfall MEHRERE Knochen gebrochen?

B₁: Nein. Er hat sich nur das SCHULTERBLATT gebrochen.

B₂: Nein. Das SCHULTERBLATT hat er sich nur gebrochen.

B₃: Ja. Er hat sich sogar das SCHULTERBLATT gebrochen.

B₄: Ja. Das SCHULTERBLATT hat er sich sogar gebrochen.

A₂: Hat sich Fritz bei seinem Fahrradunfall den ARM gebrochen?

B₅: Ja. Und er hat sich auch das SCHULTERBLATT gebrochen.

B₆: Ja. Und das SCHULTERBLATT hat er sich AUCH gebrochen.

22. A₁: Hat Karl VIELE verschiedene Bäume in den Garten gepflanzt?

B₁: Nein. Er hat nur MAGNOLIEN gepflanzt.

B₂: Nein. MAGNOLIEN hat er nur gepflanzt.

B₃: Ja. Er hat sogar MAGNOLIEN gepflanzt.

B₄: Ja. MAGNOLIEN hat er sogar gepflanzt.

A₂: Hat Karl APFELBÄUME in den Garten gepflanzt?

B₅: Ja. Und er hat auch MAGNOLIEN gepflanzt.

B₆: Ja. Und MAGNOLIEN hat er AUCH gepflanzt.

23. A₁: Hat der Reitstallbesitzer MEHRERE Pferderassen gezüchtet?

B₁: Nein. Er hat nur KALTBLÜTER gezüchtet.

B₂: Nein. KALTBLÜTER hat er nur gezüchtet.

B₃: Ja. Er hat sogar KALTBLÜTER gezüchtet.

B₄: Ja. KALTBLÜTER hat er sogar gezüchtet.

- A₂: Hat der Reitstallbesitzer ARABER gezüchtet?
B₅: Ja. Und er hat auch KALTBLÜTER gezüchtet.
B₆: Ja. Und KALTBLÜTER hat er AUCH gezüchtet.
24. A₁: Hat Bernd am 1. April seine GANZE Familie reingelegt?
B₁: Nein. Er hat nur seine OMA reingelegt.
B₂: Nein. Seine OMA hat er nur reingelegt.
B₃: Ja. Er hat sogar seine OMA reingelegt.
B₄: Ja. Seine OMA hat er sogar reingelegt.
- A₂: Hat Bernd am 1. April seine SCHWESTER reingelegt?
B₅: Ja. Und er hat auch seine OMA reingelegt.
B₆: Ja. Und seine OMA hat er AUCH reingelegt.
25. A₁: Hat Rolf in der Schweiz MEHRERE Berge bestiegen?
B₁: Nein. Er hat nur das MATTERHORN bestiegen.
B₂: Nein. Das MATTERHORN hat er nur bestiegen.
B₃: Ja. Er hat sogar das MATTERHORN bestiegen.
B₄: Ja. Das MATTERHORN hat er sogar bestiegen.
- A₂: Hat Rolf in der Schweiz das JAKOBSHORN bestiegen?
B₅: Ja. Und er hat auch das MATTERHORN bestiegen.
B₆: Ja. Und das MATTERHORN hat er AUCH bestiegen.
26. A₁: Hat der Automechaniker die GANZE Bremsanlage des Autos ersetzt?
B₁: Nein. Er hat nur den BREMSKRAFTREGLER ersetzt.
B₂: Nein. Den BREMSKRAFTREGLER hat er nur ersetzt.
B₃: Ja. Er hat sogar den BREMSKRAFTREGLER ersetzt.
B₄: Ja. den BREMSKRAFTREGLER hat er sogar ersetzt.
- A₂: Hat der Automechaniker die BREMSSCHLÄUCHE des Autos ersetzt?
B₅: Ja. Und er hat auch den BREMSKRAFTREGLER ersetzt.
B₆: Ja. Und den BREMSKRAFTREGLER hat er AUCH ersetzt.
27. A₁: Hat der Angeklagte im Gerichtssaal ALLE Anwesenden beleidigt?
B₁: Nein. Er hat nur den RICHTER beleidigt.
B₂: Nein. Den RICHTER hat er nur beleidigt.
B₃: Ja. Er hat sogar den RICHTER beleidigt.
B₄: Ja. Den RICHTER hat er sogar beleidigt.
- A₂: Hat der Angeklagte im Gerichtssaal den STAATSANWALT beleidigt?
B₅: Ja. Und er hat auch den RICHTER beleidigt.
B₆: Ja. Und den RICHTER hat er AUCH beleidigt.
28. A₁: Hat Simon die GANZE Wohnung aufgeräumt?
B₁: Nein. Er hat nur die ABSTELLKAMMER aufgeräumt.
B₂: Nein. Die ABSTELLKAMMER hat er nur aufgeräumt.
B₃: Ja. Er hat sogar die ABSTELLKAMMER aufgeräumt.
B₄: Ja. Die ABSTELLKAMMER hat er sogar aufgeräumt.
- A₂: Hat Simon die KÜCHE aufgeräumt?
B₅: Ja. Und er hat auch die ABSTELLKAMMER aufgeräumt.
B₆: Ja. Und die ABSTELLKAMMER hat er AUCH aufgeräumt.

29. A₁: Hat die Geschäftsleitung des Unternehmens MEHRERE Angestellte entlassen?

B₁: Nein. Sie hat nur den BEREICHSLEITER entlassen.

B₂: Nein. Den BEREICHSLEITER hat sie nur entlassen.

B₃: Ja. Sie hat sogar den BEREICHSLEITER entlassen.

B₄: Ja. Den BEREICHSLEITER hat sie sogar entlassen.

A₂: Hat die Geschäftsleitung den ABTEILUNGSLEITER entlassen?

B₅: Ja. Und sie hat auch den BEREICHSLEITER entlassen.

B₆: Ja. Und den BEREICHSLEITER hat sie AUCH entlassen.

30. A₁: Hat Mona MEHRERE Computerspiele gespielt?

B₁: Nein. Sie hat nur ‚COUNTER-STRIKE‘ gespielt.

B₂: Nein. ‚COUNTER-STRIKE‘ hat sie nur gespielt.

B₃: Ja. Sie hat sogar ‚COUNTER-STRIKE‘ gespielt.

B₄: Ja. ‚COUNTER-STRIKE‘ hat sie sogar gespielt.

A₂: Hat Mona das Computerspiel ‚Die SIMS‘ gespielt?

B₅: Ja. Und sie hat auch ‚COUNTER-STRIKE‘ gespielt.

B₆: Ja. Und ‚COUNTER-STRIKE‘ hat sie AUCH gespielt.

II. Statistics

Parameters of the final model of overall analysis:

Linear mixed model fit by maximum likelihood [lmerMod']

Formula: rating ~ wo * type + (wo * type | vp) + (wo * type | item)

Data: d

AIC	BIC	logLik	deviance	df.resid
6182.5	6460.7	-3042.2	6084.5	2111

Scaled residuals:

Min	1Q	Median	3Q	Max
-4.155	-0.502	0.209	0.512	4.436

Random effects:

Groups	Name	Variance	Std.Dev.	Corr				
vp	(Intercept)	0.094	0.307					
	wo1	0.040	0.199	-0.31				
	type1	0.031	0.177	-0.51	0.65			
	type2	0.025	0.160	0.63	0.09	-0.66		
	wo1:type1	0.031	0.176	0.37	-0.99	-0.76	0.06	
	wo1:type2	0.007	0.081	-0.39	0.70	0.99	-0.57	-0.79
item	(Intercept)	0.025	0.156					
	wo1	0.005	0.062	0.03				
	type1	0.002	0.042	-0.99	0.09			
	type2	0.019	0.137	0.44	0.91	-0.34		
	wo1:type1	0.009	0.096	0.48	-0.87	-0.57	-0.58	
	wo1:type2	0.003	0.050	-0.53	-0.86	0.43	-1.00	0.49
	Residual	0.887	0.941					

Number of obs: 2160, groups: vp, 36; item, 30

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	5.742	0.062	92.63
wol	0.777	0.041	19.15
type1	0.754	0.041	18.04
type2	-0.281	0.047	-6.03
wol:type1	-0.814	0.045	-18.26
wol:type2	0.181	0.033	5.50

Correlation of Fixed Effects:

	(Intr)	wol	type1	type2	wl:ty1
wol	-0.205				
type1	-0.382	0.379			
type2	0.407	0.177	-0.514		
wol:type1	0.289	-0.628	-0.391	-0.100	
wol:type2	-0.200	0.169	0.309	-0.283	-0.440

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	5.620	5.863
wol	0.697	0.856
type1	0.672	0.836
type2	-0.372	-0.189
wol:type1	-0.902	-0.727
wol:type2	0.117	0.246

III. Parameters of the final model of the analysis of *nur* and *sogar* in non-canonical word order

Linear mixed model fit by maximum likelihood ['lmerMod']

Formula: rating ~ type * CAPS + (1 | vp) + (1 | item)

Data: d

AIC	BIC	logLik	deviance	df.resid
2455.7	2487.8	-1220.9	2441.7	713

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.601	-0.715	-0.058	0.693	2.923

Random effects:

Groups	Name	Variance	Std.Dev.
vp	(Intercept)	0.280	0.529
item	(Intercept)	0.023	0.152
	Residual	1.595	1.2627

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	4.181	0.104	40.29
type1	0.322	0.047	6.85

CAPS1	-0.147	0.047	-3.13
type1:CAPS1	0.094	0.047	2.01

Correlation of Fixed Effects:

	(Intr)	type1	expl
type1	0.000		
expl	0.000	0.000	
type1:CAPS1	0.000	0.000	0.000

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	3.977	4.384
type1	0.230	0.414
expl	-0.239	-0.055
type1:CAPS1	0.002	0.187

B.4 Materials of German follow-up study 3: Comparison between *nur*, *sogar*, and *auch* with auditory stimuli

I. Intonation contours for all items per condition

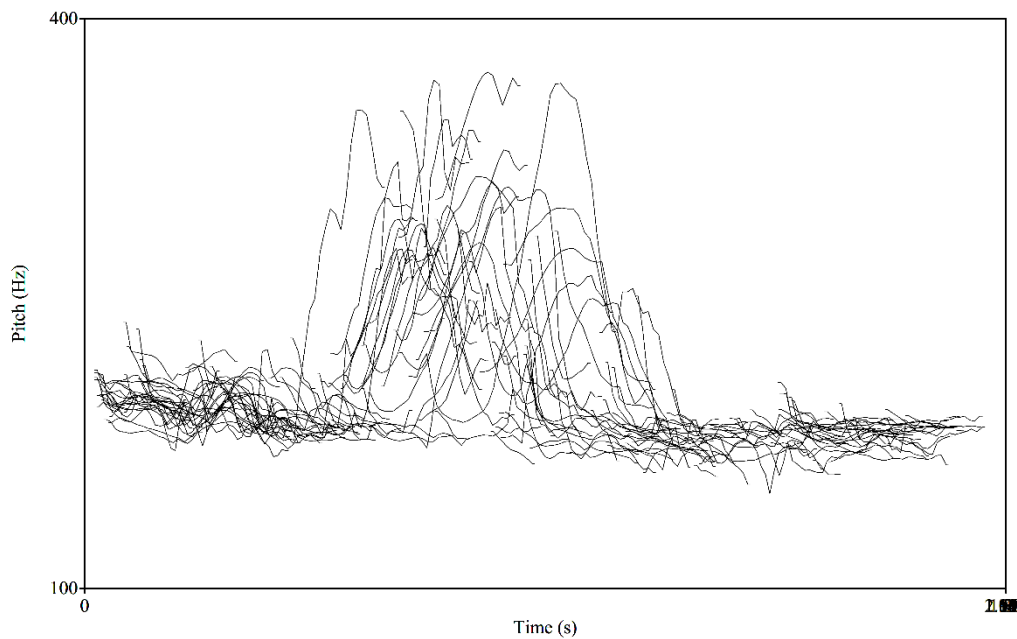


Figure 1: Intonation contours for items of condition 1 (nur-XP)

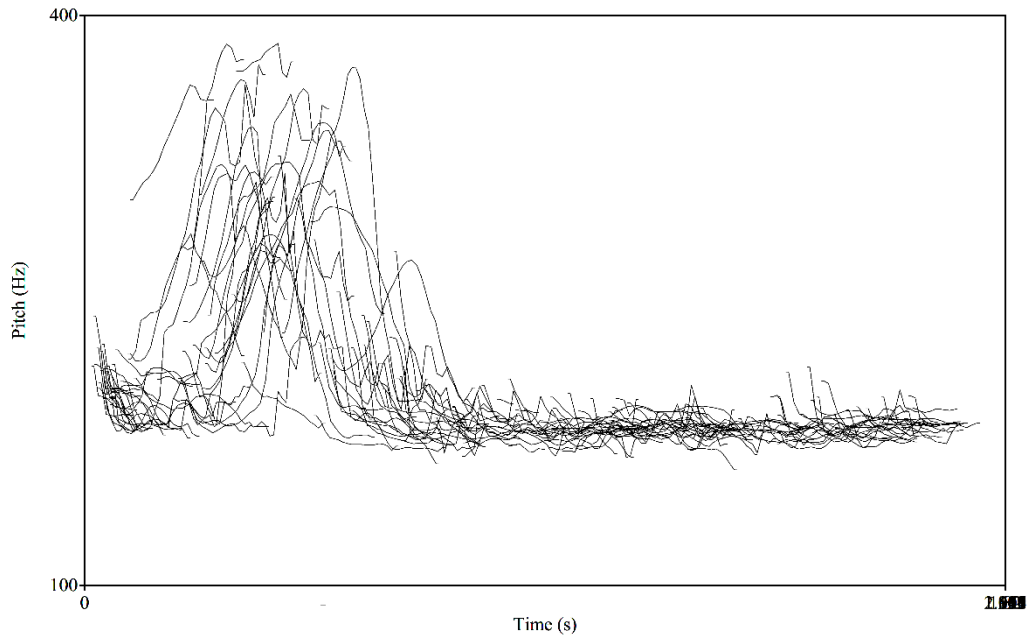


Figure 2: Intonation contours for items of condition 2 (XP-nur)

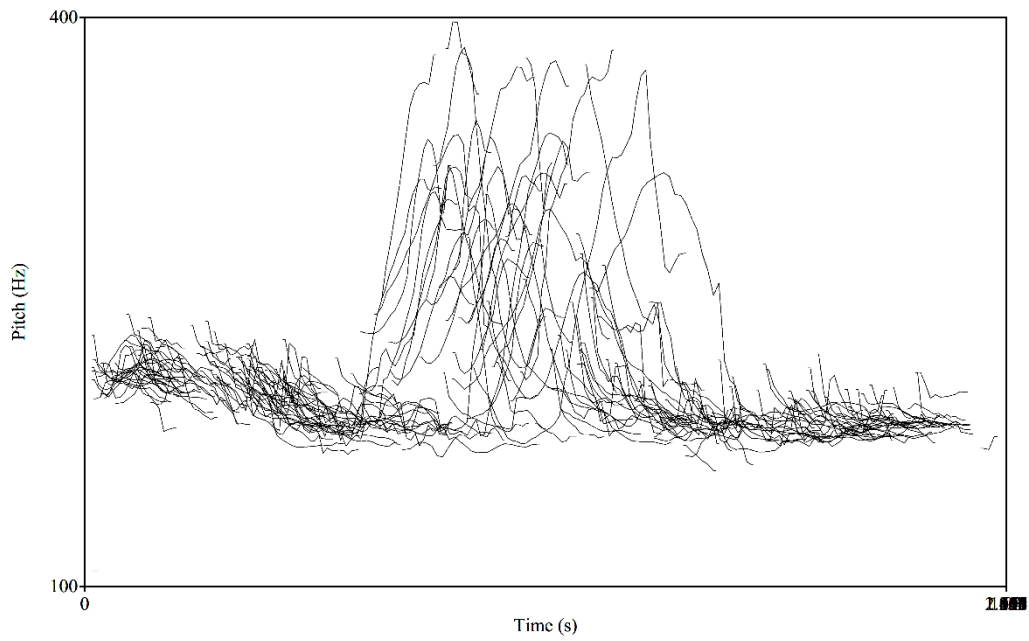


Figure 3: Intonation contours for items of condition 3 (sogar-XP)

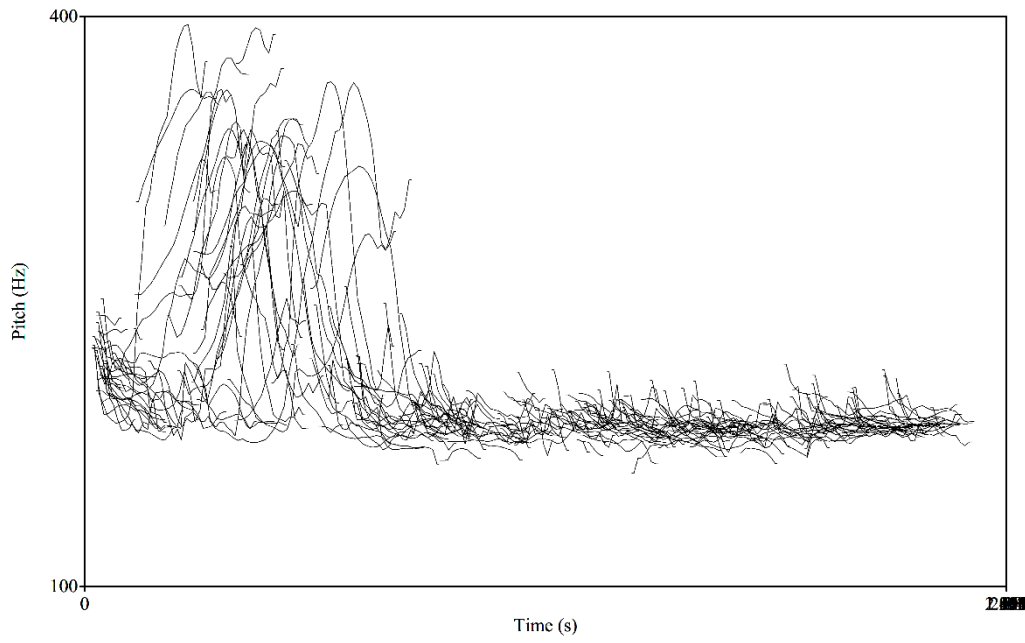


Figure 4: Intonation contours for items of condition 4 (XP-sogar)

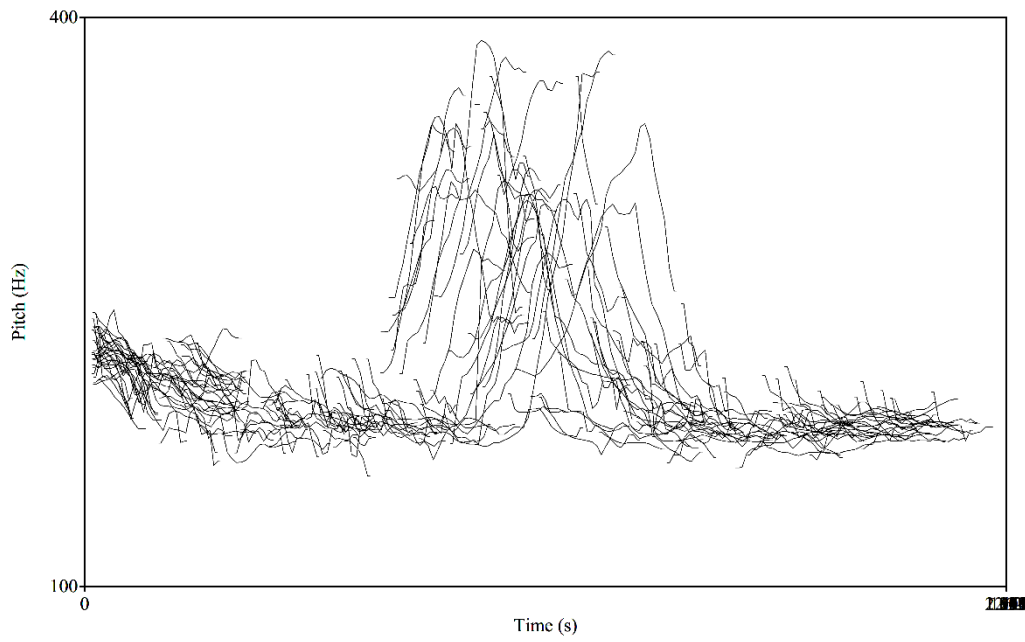


Figure 5: Intonation contours for items of condition 5 (auch-XP)

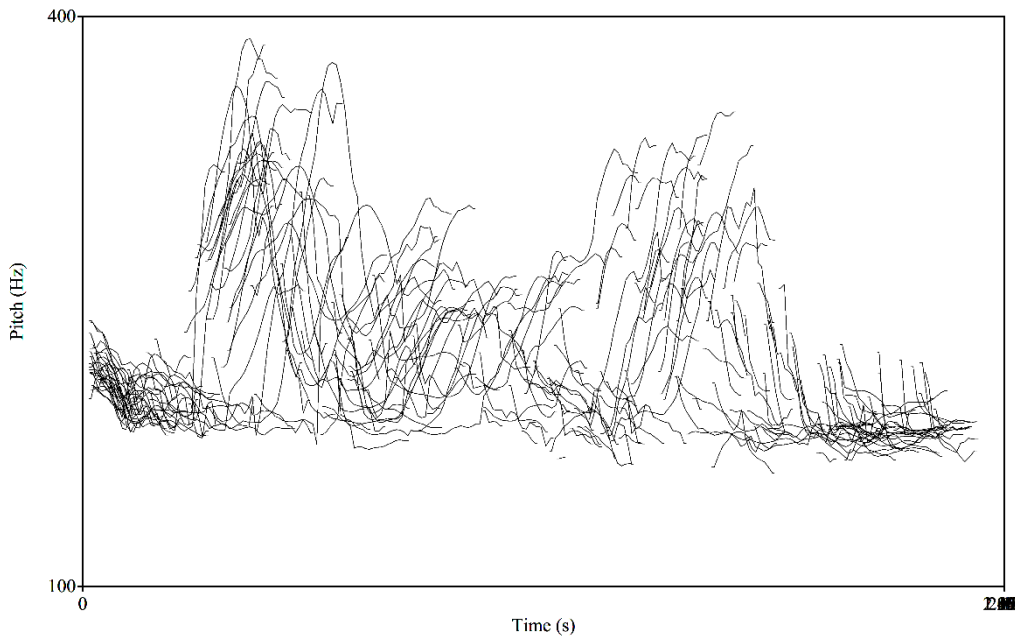


Figure 6: Intonation contours for items of condition 6 (XP-auch)

II. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood ['lmerMod']

Formula: rating ~ wo * type + (wo * type | vp)

Data: d

AIC	BIC	logLik	deviance	df.resid
5035.8	5189.7	-2489.9	4979.8	1772

Scaled residuals:

Min	1Q	Median	3Q	Max
-5.705	-0.434	0.103	0.508	3.468

Random effects:

Groups	Name	Variance	Std.Dev.	Corr				
vp	(Intercept)	0.571	0.755					
	wo1	0.097	0.311	0.01				
	type1	0.086	0.293	-0.25	-0.62			
	type2	0.037	0.193	0.19	-0.41	-0.28		
	wo1:type1	0.076	0.276	0.20	0.67	-0.98	0.10	
	wo1:type2	0.021	0.147	0.06	0.69	0.07	-0.84	0.03
	Residual	0.751	0.867					

Number of obs: 1800, groups: vp, 60

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	5.832	0.100	58.52
wo1	0.522	0.045	11.57

type1	-0.350	0.048	-7.35
type2	-0.130	0.038	-3.40
wo1:type1	0.4667	0.046	10.17
wo1:type2	0.0267	0.035	0.77

Correlation of Fixed Effects:

	(Intr)	wo1	type1	type2	w1:ty1
wo1	0.011				
type1	-0.196	-0.441			
type2	0.120	-0.241	-0.377		
wo1:type1	0.150	0.464	-0.603	0.052	
wo1:type2	0.035	0.340	0.031	-0.304	-0.250

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	5.633	6.031
wo1	0.433	0.610
type1	-0.452	-0.251
type2	-0.223	-0.035
wo1:type1	0.376	0.559
wo1:type2	-0.042	0.093

B.5 Material of German experiment 2: Comparison between *nur*, *sogar*, and *auch* with subject association

I. Items

- A₁: Haben in der Diskussionsrunde viele Politiker der Moderatorin zugestimmt?
 B₁: Nein. Nur der Bildungsminister hat ihr zugestimmt.
 B₂: Nein. Der Bildungsminister hat ihr nur zugestimmt.
 B₃: Ja. Sogar der Bildungsminister hat ihr zugestimmt.
 B₄: Ja. Der Bildungsminister hat ihr sogar zugestimmt.

A₂: Hat in der Diskussionsrunde der Finanzminister der Moderatorin zugestimmt?
 B₅: Ja. Und auch der Bildungsminister hat ihr zugestimmt.
 B₆: Ja. Und der Bildungsminister hat ihr auch zugestimmt.
- A₁: Haben alle Teilnehmer der Safari das Elefantenbaby gesehen?
 B₁: Nein. Nur Thea hat es gesehen.
 B₂: Nein. Thea hat es nur gesehen.
 B₃: Ja. Sogar Thea hat es gesehen.
 B₄: Ja. Thea hat es sogar gesehen.

A₂: Hat Paul auf Safari das Elefantenbaby gesehen?
 B₅: Ja. Und auch Thea hat es gesehen.
 B₆: Ja. Und Thea hat es auch gesehen.

3. A₁: Haben alle Schüler der Klasse die Mathe-Hausaufgaben gemacht?
B₁: Nein. Nur Malte hat sie gemacht.
B₂: Nein. Malte hat sie nur gemacht.
B₃: Ja. Sogar Malte hat sie gemacht.
B₄: Ja. Malte hat sie sogar gemacht.
- A₂: Hat Pia die Mathe-Hausaufgaben gemacht?
B₅: Ja. Und auch Malte hat sie gemacht.
B₆: Ja. Und Malte hat sie auch gemacht.
4. A₁: Haben alle Seminarteilnehmer das Drama ‚Kabale und Liebe‘ gelesen?
B₁: Nein. Nur Tabea hat es gelesen.
B₂: Nein. Tabea hat es nur gelesen.
B₃: Ja. Sogar Tabea hat es gelesen.
B₄: Ja. Tabea hat es sogar gelesen.
- A₂: Hat Heike das Drama ‚Kabale und Liebe‘ gelesen?
B₅: Ja. Und auch Tabea hat es gelesen.
B₆: Ja. Und Tabea hat es auch gelesen.
5. A₁: Haben alle Teilnehmer der Städtereise das Technikmuseum besucht?
B₁: Nein. Nur Leonie hat es besucht.
B₂: Nein. Leonie hat es nur besucht.
B₃: Ja. Sogar Leonie hat es besucht.
B₄: Ja. Leonie hat es sogar besucht.
- A₂: Hat Klara in Berlin das Technikmuseum besucht?
B₅: Ja. Und auch Leonie hat es besucht.
B₆: Ja. Und Leonie hat es auch besucht.
6. A₁: Haben gestern alle Fahrschüler die Fahrprüfung bestanden?
B₁: Nein. Nur Philipp hat sie bestanden.
B₂: Nein. Philipp hat sie nur bestanden.
B₃: Ja. Sogar Philipp hat sie bestanden.
B₄: Ja. Philipp hat sie sogar bestanden.
- A₂: Hat Hanna gestern die Fahrprüfung bestanden?
B₅: Ja. Und auch Philipp hat sie bestanden.
B₆: Ja. Und Philipp hat sie auch bestanden.
7. A₁: Haben alle Kinder im Streichelzoo die Dromedare gestreichelt?
B₁: Nein. Nur Egon hat sie gestreichelt.
B₂: Nein. Egon hat sie nur gestreichelt.
B₃: Ja. Sogar Egon hat sie gestreichelt.
B₄: Ja. Egon hat sie sogar gestreichelt.
- A₂: Hat Marcel im Streichelzoo die Dromedare gestreichelt?
B₅: Ja. Und auch Egon hat sie gestreichelt.
B₆: Ja. Und Egon hat sie auch gestreichelt.
8. A₁: Haben mehrere Fans bei der Filmpremierre den Hauptdarsteller berührt?
B₁: Nein. Nur Jasmin hat ihn berührt.
B₂: Nein. Jasmin hat ihn nur berührt.

B₃: Ja. Sogar Jasmin hat ihn berührt.

B₄: Ja. Jasmin hat ihn sogar berührt.

A₂: Hat Sina bei der Film Premiere den Hauptdarsteller berührt?

B₅: Ja. Und auch Jasmin hat ihn berührt.

B₆: Ja. Und Jasmin hat ihn auch berührt.

9. A₁: Haben alle Mitglieder des englischen Königshauses den Premierminister begrüßt?

B₁: Nein. Nur Prinz Harry hat ihn begrüßt.

B₂: Nein. Prinz Harry hat ihn nur begrüßt.

B₃: Ja. Sogar Prinz Harry hat ihn begrüßt.

B₄: Ja. Prinz Harry hat ihn sogar begrüßt.

A₂: Hat Prinz Charles den Premierminister begrüßt?

B₅: Ja. Und auch Prinz Harry hat ihn begrüßt.

B₆: Ja. Und Prinz Harry hat ihn auch begrüßt.

10. A₁: Haben mehrere Jugendliche die Touristen beklaut?

B₁: Nein. Nur Manuel hat sie beklaut.

B₂: Nein. Manuel hat sie nur beklaut.

B₃: Ja. Sogar Manuel hat sie beklaut.

B₄: Ja. Manuel hat sie sogar beklaut.

A₂: Hat David die Touristen beklaut?

B₅: Ja. Und auch Manuel hat sie beklaut.

B₆: Ja. Und Manuel hat sie auch beklaut.

11. A₁: Haben mehrere Akrobaten den Zirkus verlassen?

B₁: Nein. Nur die Seiltänzerin hat ihn verlassen.

B₂: Nein. Die Seiltänzerin hat ihn nur verlassen.

B₃: Ja. Sogar die Seiltänzerin hat ihn verlassen.

B₄: Ja. Die Seiltänzerin hat ihn sogar verlassen.

A₂: Hat der Jongleur den Zirkus verlassen?

B₅: Ja. Und auch die Seiltänzerin hat ihn verlassen.

B₆: Ja. Und die Seiltänzerin hat ihn auch verlassen.

12. A₁: Haben mehrere Personen den Mörder identifiziert?

B₁: Nein. Nur der Hobbydetektiv hat ihn identifiziert.

B₂: Nein. Der Hobbydetektiv hat ihn nur identifiziert.

B₃: Ja. Sogar der Hobbydetektiv hat ihn identifiziert.

B₄: Ja. Der Hobbydetektiv hat ihn sogar identifiziert.

A₂: Hat der Kriminalbeamte den Mörder identifiziert?

B₅: Ja. Und auch der Hobbydetektiv hat ihn identifiziert.

B₆: Ja. Und der Hobbydetektiv hat ihn auch identifiziert.

13. A₁: Haben viele Journalisten den Bürgermeister zu der Krise befragt?

B₁: Nein. Nur der ARD-Reporter hat ihn befragt.

B₂: Nein. Der ARD-Reporter hat ihn nur befragt.

B₃: Ja. Sogar der ARD-Reporter hat ihn befragt.

B₄: Ja. Der ARD-Reporter hat ihn sogar befragt.

A₂: Hat der Radio-Moderator den Bürgermeister zu der Krise befragt?
B₅: Ja. Und auch der ARD-Reporter hat ihn befragt.
B₆: Ja. Und der ARD-Reporter hat ihn auch befragt.

14. A₁: Haben mehrere Umweltorganisationen den Ölkonzern verklagt?
B₁: Nein. Nur Greenpeace hat ihn verklagt.
B₂: Nein. Greenpeace hat ihn nur verklagt.
B₃: Ja. Sogar Greenpeace hat ihn verklagt.
B₄: Ja. Greenpeace hat ihn sogar verklagt.

A₂: Hat Greenpeace den Ölkonzern verklagt?
B₅: Ja. Und auch WWF hat ihn verklagt.
B₆: Ja. Und WWF hat ihn auch verklagt.

15. A₁: Haben am 1. April alle Erstklässler die Klassenlehrerin reingelegt?
B₁: Nein. Nur Ole hat sie reingelegt.
B₂: Nein. Ole hat sie nur reingelegt.
B₃: Ja. Sogar Ole hat sie reingelegt.
B₄: Ja. Ole hat sie sogar reingelegt.

A₂: Hat Jana am 1. April die Klassenlehrerin reingelegt?
B₅: Ja. Und auch Ole hat sie reingelegt.
B₆: Ja. Und Ole hat sie auch reingelegt.

16. A₁: Haben alle Angeklagten im Prozess den Richter angelogen?
B₁: Nein. Nur der Hauptangeklagte hat ihn angelogen.
B₂: Nein. Der Hauptangeklagte hat ihn nur angelogen.
B₃: Ja. Sogar der Hauptangeklagte hat ihn angelogen.
B₄: Ja. Der Hauptangeklagte hat ihn sogar angelogen.

A₂: Hat der Nebenangeklagte den Richter angelogen?
B₅: Ja. Und auch der Hauptangeklagte hat ihn angelogen.
B₆: Ja. Und der Hauptangeklagte hat ihn auch angelogen.

17. A₁: Haben nach der Party alle Mitbewohner die Wohnung aufgeräumt?
B₁: Nein. Nur Simon hat sie aufgeräumt.
B₂: Nein. Simon hat sie nur aufgeräumt.
B₃: Ja. Sogar Simon hat sie aufgeräumt.
B₄: Ja. Simon hat sie sogar aufgeräumt.

A₂: Hat Sarah nach der Party die Wohnung aufgeräumt?
B₅: Ja. Und auch Simon hat sie aufgeräumt.
B₆: Ja. Und Simon hat sie auch aufgeräumt.

18. A₁: Haben vor dem Spiel alle Fußballer die Nationalhymne gesungen?
B₁: Nein. Nur der Torwart hat sie gesungen.
B₂: Nein. Der Torwart hat sie nur gesungen.
B₃: Ja. Sogar der Torwart hat sie gesungen.
B₄: Ja. Der Torwart hat sie sogar gesungen.

A₂: Hat vor dem Fußballspiel der Stürmer die Nationalhymne gesungen?
B₅: Ja. Und auch der Torwart hat sie gesungen.
B₆: Ja. Und der Torwart hat sie auch gesungen.

19. A₁: Haben mehrere Ärzte den Patienten untersucht?
B₁: Nein. Nur der Oberarzt hat ihn untersucht.
B₂: Nein. Der Oberarzt hat ihn nur untersucht.
B₃: Ja. Sogar der Oberarzt hat ihn untersucht.
B₄: Ja. Der Oberarzt hat ihn sogar untersucht.
- A₂: Hat der Assistenzarzt den Patienten untersucht?
B₅: Ja. Und auch der Oberarzt hat ihn untersucht.
B₆: Ja. Und der Oberarzt hat ihn auch untersucht.
20. A₁: Haben mehrere Vereinsmitglieder das Tennisturnier organisiert?
B₁: Nein. Nur Steffen hat es organisiert.
B₂: Nein. Steffen hat es nur organisiert.
B₃: Ja. Sogar Steffen hat es organisiert.
B₄: Ja. Steffen hat es sogar organisiert.
- A₂: Hat Max das Tennisturnier organisiert?
B₅: Ja. Und auch Steffen hat es organisiert.
B₆: Ja. Und Steffen hat es auch organisiert.
21. A₁: Haben viele Mitglieder des Orchesters den Probentermin vergessen?
B₁: Nein. Nur der Pianist hat ihn vergessen.
B₂: Nein. Der Pianist hat ihn nur vergessen.
B₃: Ja. Sogar der Pianist hat ihn vergessen.
B₄: Ja. Der Pianist hat ihn sogar vergessen.
- A₂: Hat der Flötist den Probentermin des Orchesters vergessen?
B₅: Ja. Und auch der Pianist hat ihn vergessen.
B₆: Ja. Und der Pianist hat ihn auch vergessen.
22. A₁: Haben alle Geburtstagsgäste den regionalen Rotwein probiert?
B₁: Nein. Nur Klaus hat ihn probiert.
B₂: Nein. Klaus hat ihn nur probiert.
B₃: Ja. Sogar Klaus hat ihn probiert.
B₄: Ja. Klaus hat ihn sogar probiert.
- A₂: Hat Olga beim Geburtstagsfest den regionalen Rotwein probiert?
B₅: Ja. Und auch Klaus hat ihn probiert.
B₆: Ja. Und Klaus hat ihn auch probiert.
23. A₁: Hat die ganze Wandergruppe die Bergspitze bestiegen?
B₁: Nein. Nur Florian hat sie bestiegen.
B₂: Nein. Florian hat sie nur bestiegen.
B₃: Ja. Sogar Florian hat sie bestiegen.
B₄: Ja. Florian hat sie sogar bestiegen.
- A₂: Hat Sabine bei der Wanderung die Bergspitze bestiegen?
B₅: Ja. Und auch Florian hat sie bestiegen.
B₆: Ja. Und Florian hat sie auch bestiegen.
24. A₁: Haben alle Familienmitglieder den Weihnachtsbaum geschmückt?
B₁: Nein. Nur Julian hat ihn geschmückt.
B₂: Nein. Julian hat ihn nur geschmückt.

B₃: Ja. Sogar Julian hat ihn geschmückt.

B₄: Ja. Julian hat ihn sogar geschmückt.

A₂: Hat Sophia den Weihnachtsbaum geschmückt?

B₅: Ja. Und auch Julian hat ihn geschmückt.

B₆: Ja. Und Julian hat ihn auch geschmückt.

25. A₁: Haben alle Lehrer den Direktor im Krankenhaus besucht?

B₁: Nein. Nur die Referendare haben ihn besucht.

B₂: Nein. Die Referendare haben ihn nur besucht.

B₃: Ja. Sogar die Referendare haben ihn besucht.

B₄: Ja. Die Referendare haben ihn sogar besucht.

A₂: Haben die Lehrer den Direktor im Krankenhaus besucht?

B₅: Ja. Und auch die Referendare haben in besucht.

B₆: Ja. Und die Referendare haben in auch besucht.

26. A₁: Haben alle Nachbarn dem Rentner beim Umzug geholfen?

B₁: Nein. Nur Marco hat ihm geholfen.

B₂: Nein. Marco hat ihm nur geholfen.

B₃: Ja. Sogar Marco hat ihm geholfen.

B₄: Ja. Marco hat ihm sogar geholfen.

A₂: Hat Kim dem Rentner beim Umzug geholfen?

B₅: Ja. Und auch Marco hat ihm geholfen.

B₆: Ja. Und Marco hat ihm auch geholfen.

27. A₁: Haben mehrere Leute den Diebstahl beobachtet?

B₁: Nein. Nur Regina hat ihn beobachtet.

B₂: Nein. Regina hat ihn nur beobachtet.

B₃: Ja. Sogar Regina hat ihn beobachtet.

B₄: Ja. Regina hat ihn sogar beobachtet.

A₂: Hat Ralf den Diebstahl beobachtet?

B₅: Ja. Und auch Regina hat ihn beobachtet.

B₆: Ja. Und Regina hat ihn auch beobachtet.

28. A₁: Haben alle Vorgesetzten dem Mitarbeiter des Monats gratuliert?

B₁: Nein. Nur der Bereichsleiter hat ihm gratuliert.

B₂: Nein. Der Bereichsleiter hat ihm nur gratuliert.

B₃: Ja. Sogar der Bereichsleiter hat ihm gratuliert.

B₄: Ja. Der Bereichsleiter hat ihm sogar gratuliert.

A₂: Hat der Abteilungsleiter dem Mitarbeiter des Monats gratuliert?

B₅: Ja. Und auch der Bereichsleiter hat ihm gratuliert.

B₆: Ja. Und der Bereichsleiter hat ihm auch gratuliert.

29. A₁: Haben alle Schauspieler den Regisseur kritisiert?

B₁: Nein. Nur die Nebendarsteller haben ihn kritisiert.

B₂: Nein. Die Nebendarsteller haben ihn nur kritisiert.

B₃: Ja. Sogar die Nebendarsteller haben ihn kritisiert.

B₄: Ja. Die Nebendarsteller haben ihn sogar kritisiert.

A₂: Haben die Hauptdarsteller den Regisseur kritisiert?
 B₅: Ja. Und auch die Nebendarsteller haben ihn kritisiert.
 B₆: Ja. Und die Nebendarsteller haben ihn auch kritisiert.

30. A₁: Hat die ganze Schiffsbesatzung den neuen Matrosen gelobt?
 B₁: Nein. Nur der Kapitän hat ihn gelobt.
 B₂: Nein. Der Kapitän hat ihn nur gelobt.
 B₃: Ja. Sogar der Kapitän hat ihn gelobt.
 B₄: Ja. Der Kapitän hat ihn sogar gelobt.

A₂: Hat der Schiffsoffizier den Matrosen gelobt?
 B₅: Ja. Und auch der Kapitän hat ihn gelobt.
 B₆: Ja. Und der Kapitän hat ihn auch gelobt.

II. Statistics

Parameters of the final model of overall analysis:

Linear mixed model fit by maximum likelihood ['lmerMod']

Formula: rating ~ wo * type + (wo * type | vp) + (wo * type | item)

Data: d

AIC	BIC	logLik	deviance	df.resid
9842.9	10145.4	-4872.5	9744.9	3491

Scaled residuals:

Min	1Q	Median	3Q	Max
-5.4251	-0.4253	0.1201	0.5372	3.2777

Random effects:

Groups	Name	Variance	Std.Dev.	Corr				
vp	(Intercept)	0.238	0.488					
	wo1	0.125	0.354	-0.32				
	type1	0.158	0.398	-0.10	0.78			
	type2	0.104	0.323	0.18	-0.43	0.58		
	wo1:type1	0.158	0.398	0.58	-0.77	-0.76	0.45	
	wo1:type2	0.080	0.284	-0.46	0.39	0.56	-0.94	-0.60
item	(Intercept)	0.030	0.173					
	wo1	0.005	0.068	-0.25				
	type1	0.011	0.104	-0.24	1.00			
	type2	0.035	0.189	0.91	-0.56	-0.55		
	wo1:type1	0.007	0.085	0.52	-0.40	-0.39	0.48	
	wo1:type2	0.012	0.107	-0.78	0.57	0.56	-0.90	-0.75
	Residual	0.701	0.837					

Number of obs: 3540, groups: vp, 117; item, 30

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	5.629	0.057	99.09
wo1	0.669	0.037	17.72
type1	0.392	0.046	8.54
type2	-0.201	0.050	-4.04

wo1:type1	-0.863	0.045	-19.33
wo1:type2	0.299	0.038	7.79

Correlation of Fixed Effects:

	(Intr)	wo1	type1	type2	w1:ty1
wo1	-0.268				
type1	-0.119	-0.119			
type2	0.436	0.353	-0.522		
wo1:type1	0.479	-0.597	-0.561	0.339	
wo1:type2	0.475	0.331	0.424	-0.703	-0.590

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	5.517	5.740
wo1	0.595	0.743
type1	0.302	0.482
type2	-0.299	-0.104
wo1:type1	-0.950	-0.775
wo1:type2	0.223	0.374

B.6 Material of German experiment 3: The role of scalarity

I. Items

- A: Stimmt es, dass kaum jemand Anna zur Beförderung gratuliert hat?
 B₁: Ja, das stimmt. Nur drei Kollegen haben ihr gratuliert.
 B₂: Ja, das stimmt. Drei Kollegen haben ihr nur gratuliert.
 B₃: Ja, das stimmt. Nur Michael hat ihr gratuliert.
 B₄: Ja, das stimmt. Michael hat ihr nur gratuliert.
- Stimmt es, dass kaum jemand den Bürgermeister wiedergewählt hat?
 B₁: Ja, das stimmt. Nur hundert Leute haben ihn wiedergewählt.
 B₂: Ja, das stimmt. Hundert Leute haben ihn nur wiedergewählt.
 B₃: Ja, das stimmt. Nur der Gemeinderat hat ihn wiedergewählt.
 B₄: Ja, das stimmt. Der Gemeinderat hat ihn nur wiedergewählt.
- A: Stimmt es, dass bei der Vereinsversammlung kaum jemand deinen Vorschlag abgelehnt hat?
 B₁: Ja, das stimmt. Nur fünf Vereinsmitglieder haben ihn abgelehnt.
 B₂: Ja, das stimmt. Fünf Vereinsmitglieder haben ihn nur abgelehnt.
 B₃: Ja, das stimmt. Nur der Kassenwart hat ihn abgelehnt.
 B₄: Ja, das stimmt. Der Kassenwart hat ihn nur abgelehnt.
- A: Stimmt es, dass sich im letzten halben Jahr kaum Hotelgäste beschwert haben?
 B₁: Ja, das stimmt. Nur acht Rentner haben sich beschwert.
 B₂: Ja, das stimmt. Acht Rentner haben sich nur beschwert.
 B₃: Ja, das stimmt. Nur die Rentnergruppe hat sich beschwert.
 B₄: Ja, das stimmt. Die Rentnergruppe hat sich nur beschwert.

5. A: Stimmt es, dass sich kaum jemand für die Vorlesung angemeldet hat?
B₁: Ja, das stimmt. Nur sechs Studenten haben sich angemeldet.
B₂: Ja, das stimmt. Sechs Studenten haben sich nur angemeldet.
B₃: Ja, das stimmt. Nur Paulina hat sich angemeldet.
B₄: Ja, das stimmt. Paulina hat sich nur angemeldet.
6. A: Stimmt es, dass kaum jemand Tom im Krankenhaus besucht hat?
B₁: Ja, das stimmt. Nur zwei Leute haben ihn besucht.
B₂: Ja, das stimmt. Zwei Leute haben ihn nur besucht.
B₃: Ja, das stimmt. Nur seine Cousine hat ihn besucht.
B₄: Ja, das stimmt. Seine Cousine hat ihn nur besucht.
7. A: Stimmt es, dass kaum jemand dem Straßenakrobaten zugeschaut hat?
B₁: Ja, das stimmt. Nur vier Passanten haben ihm zugeschaut.
B₂: Ja, das stimmt. Vier Passanten haben ihm nur zugeschaut.
B₃: Ja, das stimmt. Nur die Reisegruppe hat ihm zugeschaut.
B₄: Ja, das stimmt. Die Reisegruppe hat ihm nur zugeschaut.
8. A: Stimmt es, dass bei der Betriebsfeier kaum jemand das Jubiläumslied mitgesungen hat?
B₁: Ja, das stimmt. Nur sieben Mitarbeiter haben es mitgesungen.
B₂: Ja, das stimmt. Sieben Mitarbeiter haben es nur mitgesungen.
B₃: Ja, das stimmt. Nur die Abteilungsleiter haben es mitgesungen.
B₄: Ja, das stimmt. Die Abteilungsleiter haben es nur mitgesungen.
9. A: Stimmt es, dass kaum jemand dem alten Otto beim Umzug geholfen hat?
B₁: Ja, das stimmt. Nur zwei Nachbarn haben ihm geholfen.
B₂: Ja, das stimmt. Zwei Nachbarn haben ihm nur geholfen.
B₃: Ja, das stimmt. Nur sein Nachbar hat ihm geholfen.
B₄: Ja, das stimmt. Sein Nachbar hat ihm nur geholfen.
10. A: Stimmt es, dass bei der Hochzeit kaum jemand den edlen Rotwein probiert hat?
B₁: Ja, das stimmt. Nur zwölf Gäste haben ihn probiert.
B₂: Ja, das stimmt. Zwölf Gäste haben ihn nur probiert.
B₃: Ja, das stimmt. Nur die Trauzeugen haben ihn probiert.
B₄: Ja, das stimmt. Die Trauzeugen haben ihn nur probiert.
11. A: Stimmt es, dass aus Klasse 5a kaum jemand die Deutsch-Hausaufgaben gemacht hat?
B₁: Ja, das stimmt. Nur sechs Schüler haben sie gemacht.
B₂: Ja, das stimmt. Sechs Schüler haben sie nur gemacht.
B₃: Ja, das stimmt. Nur Tobias hat sie gemacht.
B₄: Ja, das stimmt. Tobias hat sie nur gemacht.
12. A: Stimmt es, dass auf der Beerdigung des Musikers kaum jemand geweint hat?
B₁: Ja, das stimmt. Nur fünf Verwandte haben geweint.
B₂: Ja, das stimmt. Fünf Verwandte haben nur geweint.
B₃: Ja, das stimmt. Nur die Witwe hat geweint.
B₄: Ja, das stimmt. Die Witwe hat nur geweint.
13. A: Stimmt es, dass gestern im Streichelzoo kaum jemand das Pony gestreichelt hat?
B₁: Ja, das stimmt. Nur drei Kinder haben es gestreichelt.
B₂: Ja, das stimmt. Drei Kinder haben es nur gestreichelt.
B₃: Ja, das stimmt. Nur Josefine hat es gestreichelt.
B₄: Ja, das stimmt. Josefine hat es nur gestreichelt.

14. A: Stimmt es, dass im Supermarkt kaum jemand den maskierten Dieb gesehen hat?
B₁: Ja, das stimmt. Nur drei Kunden haben ihn gesehen.
B₂: Ja, das stimmt. Drei Kunden haben ihn nur gesehen.
B₃: Ja, das stimmt. Nur die Ladendetektivin hat ihn gesehen.
B₄: Ja, das stimmt. Die Ladendetektivin hat ihn nur gesehen.
15. A: Stimmt es, dass in der Diskussionsrunde kaum jemand der Moderatorin zugestimmt hat?
B₁: Ja, das stimmt. Nur zwei Politiker haben ihr zugestimmt.
B₂: Ja, das stimmt. Zwei Politiker haben ihr nur zugestimmt.
B₃: Ja, das stimmt. Nur der Bildungsminister hat ihr zugestimmt.
B₄: Ja, das stimmt. Der Bildungsminister hat ihr nur zugestimmt.
16. A: Stimmt es, dass bei dem Marathon kaum jemand den verkleideten Promi erkannt hat?
B₁: Ja, das stimmt. Nur vier Läufer haben ihn erkannt.
B₂: Ja, das stimmt. Vier Läufer haben ihn nur erkannt.
B₃: Ja, das stimmt. Nur der ARD-Reporter hat ihn erkannt.
B₄: Ja, das stimmt. Der ARD-Reporter hat ihn nur erkannt.
17. A: Stimmt es, dass beim Mathe-Abi am Schiller-Gymnasium kaum jemand die letzte Aufgabe gelöst hat?
B₁: Ja, das stimmt. Nur zehn Abiturienten haben sie gelöst.
B₂: Ja, das stimmt. Zehn Abiturienten haben sie nur gelöst.
B₃: Ja, das stimmt. Nur der Jahrgangsbeste hat sie gelöst.
B₄: Ja, das stimmt. Der Jahrgangsbeste hat sie nur gelöst.
18. A: Stimmt es, dass auf der Kreuzfahrt während des EM-Spiels kaum jemand die Abendshow angeschaut hat?
B₁: Ja, das stimmt. Nur zehn Passagiere haben sie angeschaut.
B₂: Ja, das stimmt. Zehn Passagiere haben sie nur angeschaut.
B₃: Ja, das stimmt. Nur das Ehepaar Schmidt hat sie angeschaut.
B₄: Ja, das stimmt. Das Ehepaar Schmidt hat sie nur angeschaut.
19. A: Stimmt es, dass sich bei der Olympiade kaum jemand verletzt hat?
B₁: Ja, das stimmt. Nur fünfzehn Athleten haben sich verletzt.
B₂: Ja, das stimmt. Fünfzehn Athleten haben sich nur verletzt.
B₃: Ja, das stimmt. Nur Leonie Adams hat sich verletzt.
B₄: Ja, das stimmt. Leonie Adams hat sich nur verletzt.
20. A: Stimmt es, dass kaum jemand die Einladung zu Roberts 50. Geburtstag angenommen hat?
B₁: Ja, das stimmt. Nur acht Personen haben sie angenommen.
B₂: Ja, das stimmt. Acht Personen haben sie nur angenommen.
B₃: Ja, das stimmt. Nur seine Stammtischfreunde haben sie angenommen.
B₄: Ja, das stimmt. Seine Stammtischfreunde haben sie nur angenommen.

II. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood t-tests use Satterthwaite approximations to degrees of freedom [lmerMod]

Formula: rating ~ wo + asso + wo:asso + (wo * asso | vp) + (1 | item)

Data: d

AIC	BIC	logLik	deviance	df.resid
1466.8	1538.6	-717.4	1434.8	640

Scaled residuals:

Min	1Q	Median	3Q	Max
-3.5017	-0.4479	0.1042	0.4128	5.5626

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
vp	(Intercept)	0.286	0.535	
	wo1	0.424	0.651	-0.89
	asso1	0.018	0.134	-0.10 0.08
	wo1:asso1	0.020	0.140	0.11 -0.21 -0.97
item	(Intercept)	0.012	0.108	
	Residual	0.367	0.606	-0.25

Number of obs: 656, groups: vp, 41; item, 16

Fixed effects:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	5.553	0.091	45.310	< 2e-16 ***
wo1	1.236	0.104	40.83	8.88e-15 ***
asso1	0.257	0.032	50.8	8.134 9.22e-11 ***
wo1:asso1	-0.234	0.032	48.67	-7.282 2.52e-09 ***

Correlation of Fixed Effects:

	(Intr)	wo1	asso1
wo1	-0.795		
asso1	-0.060	0.053	
wo1:asso1	0.070	-0.139	-0.435

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	5.375	5.732
wo1	1.031	1.441
assp1	0.195	0.319
wo1:asso1	-0.297	-0.171

B.7 Material of German experiment 4: The role of emphasis

I. Items

		With emphasis	Without emphasis
1.	A:	Mensch, stimmt es, dass Paul diese Woche kaum Süßigkeiten gegessen hat?	Stimmt es, dass Paul diese Woche kaum Süßigkeiten gegessen hat?
	B ₁ :	Ja, voll gut. Stell dir vor: Er hat nur drei Kekse gegessen!	Ja, das stimmt. Er hat nur drei Kekse gegessen.
	B ₂ :	Ja, voll gut. Stell dir vor: Drei Kekse hat er nur gegessen!	Ja, das stimmt. Drei Kekse hat er nur gegessen.
2.	A :	Wow, stimmt es, dass Frank diese Woche keine ganze Zigarettenschachtel geraucht hat?	Stimmt es, dass Frank diese Woche keine ganze Zigarettenschachtel geraucht hat?
	B ₁ :	Ja, total gut. Stell dir vor: Er hat nur fünf Zigaretten geraucht!	Ja, das stimmt. Er hat nur fünf Zigaretten geraucht.
	B ₂ :	Ja, total gut. Stell dir vor: Fünf Zigaretten hat er nur geraucht!	Ja, das stimmt. Fünf Zigaretten hat er nur geraucht.
3.	A:	Krass, stimmt es, dass euer griesgrämiger Chef heute kaum jemanden kritisiert hat?	Stimmt es, dass euer Chef heute kaum jemanden kritisiert hat?
	B ₁ :	Ja, echt der Hammer. Stell dir vor: Er hat nur drei Azubis kritisiert!	Ja, das stimmt. Er hat nur drei Azubis kritisiert.
	B ₂ :	Ja, echt der Hammer. Stell dir vor: Drei Azubis hat er nur kritisiert!	Ja, das stimmt. Drei Azubis hat er nur kritisiert.
4.	A:	Mensch, stimmt es, dass Jan für seine Masterarbeit keine zwei Monate gebraucht hat?	Stimmt es, dass Jan für seine Masterarbeit keine zwei Monate gebraucht hat?
	B ₁ :	Ja, echt der Hammer. Stell dir vor: Er hat nur sechs Wochen gebraucht!	Ja, das stimmt. Er hat nur sechs Wochen gebraucht.
	B ₂ :	Ja, echt der Hammer. Stell dir vor: Sechs Wochen hat er nur gebraucht!	Ja, das stimmt. Sechs Wochen hat er nur gebraucht.
5.	A:	Wow, stimmt es, dass Ole auf dem Oktoberfest kaum Alkohol getrunken hat?	Stimmt es, dass Ole auf dem Oktoberfest kaum Alkohol getrunken hat?
	B ₁ :	Ja, voll krass. Stell dir vor: Er hat nur ein Bier getrunken!	Ja, das stimmt. Er hat nur ein Bier getrunken.
	B ₂ :	Ja, voll krass. Stell dir vor: Ein Bier hat er nur getrunken!	Ja, das stimmt. Ein Bier hat er nur getrunken.
6.	A:	Krass, stimmt es, dass Cro beim Konzert nicht mal sein ganzes Album gesungen hat?	Stimmt es, dass Cro beim Konzert nicht sein ganzes Album gesungen hat?
	B ₁ :	Ja, voll die Enttäuschung. Stell dir vor: Er hat nur sieben Lieder gesungen!	Ja, das stimmt. Er hat nur sieben Lieder gesungen.
	B ₂ :	Ja, voll die Enttäuschung. Stell dir vor: Sieben Lieder hat er nur gesungen!	Ja, das stimmt. Sieben Lieder hat er nur gesungen.
7.	A:	Mensch, stimmt es, dass Claudia für die große Party kaum Getränke gekauft hat?	Stimmt es, dass Claudia für die große Party kaum Getränke gekauft hat?
	B ₁ :	Ja, echt krass. Stell dir vor: Sie hat nur vier Weinflaschen gekauft!	Ja, das stimmt. Sie hat nur vier Weinflaschen gekauft.
	B ₂ :	Ja, echt krass. Stell dir vor: Vier Weinflaschen sie nur gekauft!	Ja, das stimmt. Vier Weinflaschen sie nur gekauft.

8.	A:	Mensch, stimmt es, dass eure neue Putzfrau nicht die ganze Wohnung geputzt hat?	Stimmt es, dass eure Putzfrau nicht die ganze Wohnung geputzt hat?
	B ₁ :	Ja, echt krass. Stell dir vor: Sie hat nur zwei Zimmer geputzt!	Ja, das stimmt. Sie hat nur zwei Zimmer geputzt.
	B ₂ :	Ja, echt krass. Stell dir vor: Zwei Zimmer hat sie nur geputzt!	Ja, das stimmt. Zwei Zimmer hat sie nur geputzt.
9.	A:	Oh nein, stimmt es, dass Tina den Marathon nicht geschafft hat?	Stimmt es, dass Tina den Marathon nicht geschafft hat?
	B ₁ :	Ja, echt schade. Stell dir vor: Sie hat nur zwanzig Kilometer geschafft!	Ja, das stimmt. Sie hat nur zwanzig Kilometer geschafft.
	B ₂ :	Ja, echt schade. Stell dir vor: Zwanzig Kilometer hat sie nur geschafft!	Ja, das stimmt. Zwanzig Kilometer hat sie nur geschafft.
10.	A:	Krass, stimmt es, dass der Millionär seinem Sohn voll wenig Geld vererbt hat?	Stimmt es, dass der Millionär seinem Sohn kaum Geld vererbt hat?
	B ₁ :	Ja, voll krass. Stell dir vor: Er hat ihm nur tausend Euro vererbt!	Ja, das stimmt. Er hat ihm nur tausend Euro vererbt.
	B ₂ :	Ja, voll krass. Stell dir vor: Tausend Euro hat er ihm nur vererbt!	Ja, das stimmt. Tausend Euro hat er ihm nur vererbt.
11.	A:	Haha, stimmt es, dass kaum jemand der zickigen Anna zu ihrer Beförderung gratuliert hat?	Stimmt es, dass kaum jemand Anna zur Beförderung gratuliert hat?
	B ₁ :	Ja, voll gut. Stell dir vor: Nur drei Kollegen haben ihr gratuliert!	Ja, das stimmt. Nur drei Kollegen haben ihr gratuliert.
	B ₂ :	Ja, voll gut. Stell dir vor: Drei Kollegen haben ihr nur gratuliert!	Ja, das stimmt. Drei Kollegen haben ihr nur gratuliert.
12.	A:	Haha, stimmt es, dass kaum jemand den arroganten Bürgermeister wiedergewählt hat?	Stimmt es, dass kaum jemand den Bürgermeister wiedergewählt hat?
	B ₁ :	Ja, voll gut. Stell dir vor: Nur hundert Leute haben ihn wiedergewählt!	Ja, das stimmt. Nur dreißig Leute haben ihn wiedergewählt.
	B ₂ :	Ja, voll gut. Stell dir vor: Hundert Leute haben ihn nur wiedergewählt!	Ja, das stimmt. Dreißig Leute haben ihn nur wiedergewählt.
13.	A:	Wow, stimmt es, dass bei der Vereinsversammlung kaum jemand deinen Vorschlag abgelehnt hat?	Stimmt es, dass bei der Vereinsversammlung kaum jemand deinen Vorschlag abgelehnt hat?
	B ₁ :	Ja, echt super. Stell dir vor: Nur fünf Vereinsmitglieder haben ihn abgelehnt!	Ja, das stimmt. Nur fünf Vereinsmitglieder haben ihn abgelehnt.
	B ₂ :	Ja, echt super. Stell dir vor: Fünf Vereinsmitglieder haben ihn nur abgelehnt!	Ja, das stimmt. Fünf Vereinsmitglieder haben ihn nur abgelehnt.
14.	A:	Wow, stimmt es, dass sich im letzten halben Jahr kaum Kunden beim Chef beschwert haben?	Stimmt es, dass sich im letzten halben Jahr kaum Kunden beim Chef beschwert haben?
	B ₁ :	Ja, voll gut. Stell dir vor: Nur zehn Kunden haben sich beschwert!	Ja, das stimmt. Nur zehn Kunden haben sich beschwert.
	B ₂ :	Ja, voll gut. Stell dir vor: Zehn Kunden haben sich nur beschwert!	Ja, das stimmt. Zehn Kunden haben sich nur beschwert.
15.	A:	Mensch, stimmt es, dass sich kaum jemand für die interessante Vorlesung angemeldet hat?	Stimmt es, dass sich kaum jemand für die Vorlesung angemeldet hat?

	B ₁ :	Ja, echt ärgerlich. Stell dir vor: Nur acht Studenten haben sich angemeldet!	Ja, das stimmt. Nur acht Studenten haben sich angemeldet.
	B ₂ :	Ja, echt ärgerlich. Stell dir vor: Acht Studenten haben sich nur angemeldet!	Ja, das stimmt. Acht Studenten haben sich nur angemeldet.
16.	A:	Oje, stimmt es, dass kaum jemand Tom im Krankenhaus besucht hat?	Stimmt es, dass kaum jemand Tom im Krankenhaus besucht hat?
	B ₁ :	Ja, echt übel. Stell dir vor: Nur zwei Leute haben ihn besucht!	Ja, das stimmt. Nur zwei Leute haben ihn besucht.
	B ₂ :	Ja, echt übel. Stell dir vor: Zwei Leute haben ihn nur besucht!	Ja, das stimmt. Zwei Leute haben ihn nur besucht.
17.	A:	Mensch, stimmt es, dass kaum jemand dem tollen Straßenakrobaten zugeschaut hat?	Stimmt es, dass kaum jemand dem Straßenakrobaten zugeschaut hat?
	B ₁ :	Ja, der Arme. Stell dir vor: Nur vier Passanten haben ihm zugeschaut!	Ja, das stimmt. Nur vier Passanten haben ihm zugeschaut.
	B ₂ :	Ja, der Arme. Stell dir vor: Vier Passanten haben ihm nur zugeschaut!	Ja, das stimmt. Vier Passanten haben ihm nur zugeschaut.
18.	A:	Mensch, stimmt es, dass bei der Betriebsfeier kaum jemand das Jubiläumslied mitgesungen hat?	Stimmt es, dass bei der Betriebsfeier kaum jemand das Jubiläumslied mitgesungen hat?
	B ₁ :	Ja, echt krass. Stell dir vor: Nur sieben Mitarbeiter haben es mitgesungen!	Ja, das stimmt. Nur sieben Mitarbeiter haben es mitgesungen.
	B ₂ :	Ja, echt krass. Stell dir vor: Sieben Mitarbeiter haben es nur mitgesungen!	Ja, das stimmt. Sieben Mitarbeiter haben es nur mitgesungen.
19.	A:	Oje, stimmt es, dass kaum jemand dem alten Otto beim Umzug geholfen hat?	Stimmt es, dass kaum jemand dem alten Otto beim Umzug geholfen hat?
	B ₁ :	Ja, voll krass. Stell dir vor: Nur zwei Nachbarn haben ihm geholfen!	Ja, das stimmt. Nur zwei Nachbarn haben ihm geholfen.
	B ₂ :	Ja, voll krass. Stell dir vor: Zwei Nachbarn haben ihm nur geholfen!	Ja, das stimmt. Zwei Nachbarn haben ihm nur geholfen.
20.	A:	Oje, stimmt es, dass bei der Hochzeit kaum jemand die Hochzeitstorte probiert hat?	Stimmt es, dass bei der Hochzeit kaum jemand die Hochzeitstorte probiert hat?
	B ₁ :	Ja, echt bitter. Stell dir vor: Nur zwölf Gäste haben sie probiert!	Ja, das stimmt. Nur zwölf Gäste haben sie probiert.
	B ₂ :	Ja, echt bitter. Stell dir vor: Zwölf Gäste haben sie nur probiert!	Ja, das stimmt. Zwölf Gäste haben sie nur probiert.

II. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood [lmerMod']

Formula: rating ~ wo * asso + exp + wo:exp + (wo * asso | vp) + (1 | item)

Data: dat

AIC	BIC	logLik	deviance	df.resid
1886.9	1970.3	-925.5	1850.9	742

Scaled residuals:

Min	1Q	Median	3Q	Max
-5.5159	-0.3834	0.1088	0.4123	2.8752

Random effects:

Groups	Name	Variance	Std.Dev.	Corr		
vp	(Intercept)	0.191	0.438			
	wol	0.111	0.333	-0.38		
	asso1	0.015	0.123	0.30	0.27	
	wol:asso1	0.029	0.171	0.20	-0.45	-0.63
item	(Intercept)	0.004	0.066			
	Residual	0.528	0.726			

Number of obs: 760, groups: vp, 38; item, 20

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	5.864	0.077	75.91
wol	0.769	0.060	12.78
asso1	-0.028	0.036	-0.76
expl	-0.098	0.073	-1.34
wol:asso1	0.071	0.038	1.85
wol:expl	0.151	0.057	2.62

Correlation of Fixed Effects:

	(Intr)	wol	asso1	expl	wol:asso1
wol	-0.313				
asso1	0.152	0.131			
expl	-0.050	0.015	0.000		
wol:asso1	0.133	0.293	-0.251	0.001	
wol:expl	0.016	-0.050	0.001	-0.317	0.000

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	5.713	6.016
wol	0.651	0.886
asso1	-0.098	0.043
expl	-0.242	-0.046
wol:asso1	-0.004	0.146
wol:expl	0.038	0.263

B.8 Materials of English experiment 1: Comparison between *only* and *even* in short and long topicalization structures

I. Items

Items with *only*:

- (1) A₁: Do you think that Lilian visited all the museums of New York City?
 B₁: No. I think that she only visited the Brooklyn Museum.
 B₂: No. The Brooklyn Museum I think that she only visited.

A₂: Did Lilian visit all the museums of New York City?
 B₃: No. She only visited the Brooklyn Museum.
 B₄: No. The Brooklyn Museum she only visited.

- (2) A₁: Do you think that Robert read all the books of the reading list?
B₁: No. I think that he only read 'Macbeth'.
B₂: No. 'Macbeth' I think that he only read.
- A₂: Did Robert read all the books of the reading list?
B₃: No. He only read 'Macbeth'.
B₄: No. 'Macbeth' he only read.
- (3) A₁: Do you think that Peter bought all the vegetables on the list?
B₁: No. I think that he only bought asparagus.
B₂: No. Asparagus I think that he only bought.
- A₂: Did Peter buy all the vegetables on the list?
B₃: No. He only bought asparagus.
B₄: No. Asparagus he only bought.
- (4) A₁: Do you think that Lucy ate all the candy from the cupboard?
B₁: No. I think that she only ate the sticks of licorice.
B₂: No. The sticks of licorice I think that she only ate.
- A₂: Did Lucy eat all the candy from the cupboard?
B₃: No. She only ate the sticks of licorice.
B₄: No. The sticks of licorice she only ate.
- (5) A₁: Do you think that Claire saw all the big cats on the safari tour in Africa?
B₁: No. I think that she only saw lions.
B₂: No. Lions I think that she only saw.
- A₂: Did Claire see all the big cats on the safari tour in Africa?
B₃: No. She only saw lions.
B₄: No. Lions she only saw.
- (6) A₁: Do you think that Jake tried out many different martial arts?
B₁: No. I think that he only tried out taekwondo.
B₂: No. Taekwondo I think that he only tried out.
- A₂: Did Jake try out many different martial arts?
B₃: No. He only tried out taekwondo.
B₄: No. Taekwondo he only tried out.
- (7) A₁: Do you think that Nicole visited all Scandinavian countries?
B₁: No. I think that she only visited Iceland.
B₂: No. Iceland I think that she only visited.
- A₂: Did Nicole visit all Scandinavian countries?
B₃: No. She only visited Iceland.
B₄: No. Iceland she only visited.
- (8) A₁: Do you think that Jessica played many musical instruments?
B₁: No. I think that she only played the harmonica.
B₂: No. The harmonica I think that she only played.

- A₂: Did Jessica play many musical instruments?
B₃: No. She only played the harmonica.
B₄: No. The harmonica she only played.
- (9) A₁: Do you think that Nora did all the homework for today?
B₁: No. I think that she only did the math homework.
B₂: No. The math homework I think that she only did.
- A₂: Did Nora do all the homework for today?
B₃: No. She only did the math homework.
B₄: No. The math homework she only did.
- (10) A₁: Do you think that Harry fed all the animals at the petting zoo?
B₁: No. I think that he only fed the kangaroos.
B₂: No. The kangaroos I think that he only fed.
- A₂: Did Harry feed all the animals at the petting zoo?
B₃: No. He only fed the kangaroos.
B₄: No. The kangaroos he only fed.
- (11) A₁: Do you think that Monica saw all the leading actors at the premiere of ‘Pirates of the Caribbean’?
B₁: No. I think that she only saw Orlando Bloom.
B₂: No. Orlando Bloom I think that she only saw.
- A₂: Did Monica see all the leading actors at the premiere of ‘Pirates of the Caribbean’?
B₃: No. She only saw Orlando Bloom.
B₄: No. Orlando Bloom she only saw.
- (12) A₁: Do you think that the cook oversalted all the meals on his first day of work?
B₁: No. I think that he only oversalted the steaks.
B₂: No. The steaks I think that he only oversalted.
- A₂: Did the cook oversalt all the meals on his first day of work?
B₃: No. He only oversalted the steaks.
B₄: No. The steaks he only oversalted.
- (13) A₁: Do you think that the school principal invited all the teachers to his party?
B₁: No. I think that he only invited the interns.
B₂: No. The interns I think that he only invited.
- A₂: Did the school principal invite all the teachers to his party?
B₃: No. He only invited the interns.
B₄: No. The interns he only invited.
- (14) A₁: Do you think that Veronica sold all the furniture of her grandma?
B₁: No. I think that she only sold the rocking chair.
B₂: No. The rocking chair I think that she only sold.
- A₂: Did Veronica sell all the furniture of her grandma?
B₃: No. She only sold the rocking chair.
B₄: No. The rocking chair she only sold.

- (15) A₁: Do you think that the painter painted the whole house on Tuesday?
B₁: No. I think that he only painted the balcony.
B₂: No. The balcony I think that he only painted.
- A₂: Did the painter paint the whole house on Tuesday?
B₃: No. He only painted the balcony.
B₄: No. The balcony he only painted.
- (16) A₁: Do you think that Mary stole many cosmetic products at the shop?
B₁: No. I think that she only stole mascara.
B₂: No. Mascara I think that she only stole.
- A₂: Did Mary steal many cosmetic products at the shop?
B₃: No. She only stole mascara.
B₄: No. Mascara she only stole.
- (17) A₁: Do you think that the journalist asked many politicians about the crisis?
B₁: No. I think that he only asked the secretary of state.
B₂: No. The secretary of state I think that he only asked.
- A₂: Did the journalist ask many politicians about the crisis?
B₃: No. He only asked the secretary of state.
B₄: No. The secretary of state he only asked.
- (18) A₁: Do you think that Carla forgot all her valuables in the hotel room?
B₁: No. I think that she only forgot her gold necklace.
B₂: No. Her gold necklace I think that she only forgot.
- A₂: Did Carla forget all her valuables in the hotel room?
B₃: No. She only forgot her gold necklace.
B₄: No. Her gold necklace she only forgot.
- (19) A₁: Do you think that the Greenpeace activist freed all the animals from the laboratory?
B₁: No. I think that he only freed the rabbits.
B₂: No. The rabbits I think that he only freed.
- A₂: Did the Greenpeace activist free all the animals from the laboratory?
B₃: No. He only freed the rabbits.
B₄: No. The rabbits he only freed.
- (20) A₁: Do you think that the cleaning lady cleaned the entire hall?
B₁: No. I think that she only cleaned the windows.
B₂: No. The windows I think that she only cleaned.
- A₂: Did the cleaning lady clean the entire hall?
B₃: No. She only cleaned the windows.
B₄: No. The windows she only cleaned.

Items with *even*:

1. A₁: Do you think that Lilian visited a lot of museums in New York City?
B₁: Yes. I think that she even visited the Brooklyn Museum.
B₂: Yes. The Brooklyn Museum I think that she even visited.

A₂: Did Lilian visit a lot of museums in New York City?
B₃: Yes. She even visited the Brooklyn Museum.
B₄: Yes. The Brooklyn Museum she even visited.
2. A₁: Do you think that Robert read all the books of the reading list?
B₁: Yes. I think that he even read 'Macbeth'.
B₂: Yes. 'Macbeth' I think that he even read.

A₂: Did Robert read all the books of the reading list?
B₃: Yes. He even read 'Macbeth'.
B₄: Yes. 'Macbeth' he even read.
3. A₁: Do you think that Peter bought all the vegetables on the list?
B₁: Yes. I think that he even bought asparagus.
B₂: Yes. Asparagus I think that he even bought.

A₂: Did Peter buy all the vegetables on the list?
B₃: Yes. He even bought asparagus.
B₄: Yes. Asparagus he even bought.
4. A₁: Do you think that Lucy ate all the candy from the cupboard?
B₁: Yes. I think that she even ate the sticks of licorice.
B₂: Yes. The sticks of licorice I think that she even ate.

A₂: Did Lucy eat all the candy from the cupboard?
B₃: Yes. She even ate the sticks of licorice.
B₄: Yes. The sticks of licorice she even ate.
5. A₁: Do you think that Claire saw all the big cats on the safari tour in Africa?
B₁: Yes. I think that she even saw leopards.
B₂: Yes. Leopards I think that she even saw.

A₂: Did Claire see all the big cats on the safari tour in Africa?
B₃: Yes. She even saw leopards.
B₄: Yes. Leopards she even saw.
6. A₁: Do you think that Jake tried out many different martial arts?
B₁: Yes. I think that he even tried out taekwondo.
B₂: Yes. Taekwondo I think that he even tried out.

A₂: Did Jake try out many different martial arts?
B₃: Yes. He even tried out taekwondo.
B₄: Yes. Taekwondo he even tried out.
7. A₁: Do you think that Nicole visited many Scandinavian countries?
B₁: Yes. I think that she even visited Iceland.
B₂: Yes. Iceland I think that she even visited.

- A₂: Did Nicole visit many Scandinavian countries?
B₃: Yes. She even visited Iceland.
B₄: Yes. Iceland she even visited.
8. A₁: Do you think that Jessica played many musical instruments?
B₁: Yes. I think that she even played the harmonica.
B₂: Yes. The harmonica I think that she even played.
- A₂: Did Jessica play many musical instruments?
B₃: Yes. She even played the harmonica.
B₄: Yes. The harmonica she even played.
9. A₁: Do you think that Nora did all the homework for today?
B₁: Yes. I think that she even did the math homework.
B₂: Yes. The math homework I think that she even did.
- A₂: Did Nora do all the homework for today?
B₃: Yes. She even did the math homework.
B₄: Yes. The math homework she even did.
10. A₁: Do you think that Harry fed all the animals at the petting zoo?
B₁: Yes. I think that he even fed the kangaroos.
B₂: Yes. The kangaroos I think that he even fed.
- A₂: Did Harry feed all the animals at the petting zoo?
B₃: Yes. He even fed the kangaroos.
B₄: Yes. The kangaroos he even fed.
11. A₁: Do you think that Monica saw all the leading actors at the premiere of ‘Pirates of the Caribbean’?
B₁: Yes. I think that she even saw Orlando Bloom.
B₂: Yes. Orlando Bloom I think that she even saw.
- A₂: Did Monica see all the leading actors at the premiere of ‘Pirates of the Caribbean’?
B₃: Yes. She even saw Orlando Bloom.
B₄: Yes. Orlando Bloom she even saw.
12. A₁: Do you think that the cook oversalted all the meals on his first day of work?
B₁: Yes. I think that he even oversalted the steaks.
B₂: Yes. The steaks I think that he even oversalted.
- A₂: Did the cook oversalt all the meals on his first day of work?
B₃: Yes. He even oversalted the steaks.
B₄: Yes. The steaks he even oversalted.
13. A₁: Do you think that the school principal invited all the teachers to his party?
B₁: Yes. I think that he even invited the interns.
B₂: Yes. The interns I think that he even invited.
- A₂: Did the school principal invite all the teachers to his party?
B₃: Yes. He even invited the interns.
B₄: Yes. The interns he even invited.

14. A₁: Do you think that Veronica sold all the furniture of her grandma?
B₁: Yes. I think that she even sold the rocking chair.
B₂: Yes. The rocking chair I think that she even sold.
- A₂: Did Veronica sell all the furniture of her grandma?
B₃: Yes. She even sold the rocking chair.
B₄: Yes. The rocking chair she even sold.
15. A₁: Do you think that the painter painted the whole house on Tuesday?
B₁: Yes. I think that he even painted the balcony.
B₂: Yes. The balcony I think that he even painted.
- A₂: Did the painter paint the whole house on Tuesday?
B₃: Yes. He even painted the balcony.
B₄: Yes. The balcony he even painted.
16. A₁: Do you think that Mary stole many cosmetic products at the shop?
B₁: Yes. I think that she even stole mascara.
B₂: Yes. Mascara I think that she even stole.
- A₂: Did Mary steal many cosmetic products at the shop?
B₃: Yes. She even stole mascara.
B₄: Yes. Mascara she even stole.
17. A₁: Do you think that the journalist asked many politicians about the crisis?
B₁: Yes. I think that he even asked the secretary of state.
B₂: Yes. The secretary of state I think that he even asked.
- A₂: Did the journalist ask many politicians about the crisis?
B₃: Yes. He even asked the secretary of state.
B₄: Yes. The secretary of state he even asked.
18. A₁: Do you think that Carla forgot all her valuables in the hotel room?
B₁: Yes. I think that she even forgot her gold necklace.
B₂: Yes. Her gold necklace I think that she even forgot.
- A₂: Did Carla forget all her valuables in the hotel room?
B₃: Yes. She even forgot her gold necklace.
B₄: Yes. Her gold necklace she even forgot.
19. A₁: Do you think that the Greenpeace activist freed all the animals from the laboratory?
B₁: Yes. I think that he even freed the rats.
B₂: Yes. The rats I think that he even freed.
- A₂: Did the Greenpeace activist free all the animals from the laboratory?
B₃: Yes. He even freed the rats.
B₄: Yes. The rats he even freed.
20. A₁: Do you think that the cleaning lady cleaned the entire hall?
B₁: Yes. I think that she even cleaned the windows.
B₂: Yes. The windows I think that she even cleaned.

A₂: Did the cleaning lady clean the entire hall?

B₃: Yes. She even cleaned the windows.

B₄: Yes. The windows she even cleaned.

II. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood ['lmerMod']

Formula: rating ~ wo + embed + type + type:wo + (1 + wo | vp) + (1 + wo | item)

Data: d

AIC	BIC	logLik	deviance	df.resid
3041.4	3103.3	-1508.7	3017.4	1268

Scaled residuals:

Min	1Q	Median	3Q	Max
-5.638	-0.537	0.058	0.537	4.394

Random effects:

Groups	Name	Variance	Std.Dev.	Corr
vp	(Intercept)	0.296	0.544	
	wo1	0.312	0.558	-0.67
item	(Intercept)	0.007	0.084	
	wo1	0.017	0.131	-0.52
	Residual	0.521	0.7212	

Number of obs: 1280, groups: vp, 32; item, 20

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	4.776	0.100	47.74
wo1	1.682	0.105	16.04
complex1	-0.145	0.02	-7.16
type1	0.049	0.02	2.44
wo1:type1	-0.120	0.02	-5.92

Correlation of Fixed Effects:

	(Intr)	wo1	compl1	type1
wo1	-0.636			
complex1	0.00	0.00		
type1	0.00	0.00	0.00	
wo1:type1	0.00	0.00	0.00	0.00

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	4.580	4.972
wo1	1.476	1.888
complex1	-0.184	-0.105
type1	0.010	0.089
wo1:type1	-0.159	-0.080

B.9 Materials of English follow-up study 1: Comparison between *only* and *even* with capital letters

I. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood [lmerMod]

Formula: rating ~ wo * embed + type + type:wo + (1 + wo + type | vp)

AIC	BIC	logLik	deviance	df.resid
3236.7	3303.7	-1605.4	3210.7	1267

Scaled residuals:

Min	1Q	Median	3Q	Max
-5.708	-0.418	0.081	0.463	4.063

Random effects:

Groups	Name	Variance	Std.Dev.	Corr	
vp	(Intercept)	0.468	0.684		
	wo1	0.441	0.664	-0.68	
	type1	0.017	0.132	-0.38	-0.15
	Residual	0.606	0.779		

Number of obs: 1280, groups: vp, 32

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	4.935	0.123	40.17
wo1	1.528	0.119	12.79
complex1	-0.021	0.022	-0.98
type1	0.008	0.032	0.25
wo1:complex1	-0.072	0.022	-3.31
wo1:type1	0.091	0.022	4.20

Correlation of Fixed Effects:

	(Intr)	wo1	compl1	type1	
wo1	-0.657				
complex1	0.000	0.000			
type1	-0.271	-0.105	0.001		
wo1:complex1	0.000	0.000	0.000	0.001	
wo1:type1	0.000	0.000	0.001	0.000	0.002

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	4.694	5.176
wo1	1.294	1.762
complex1	0.0639	- 0.021
type1	-0.0547	0.070
wo1:type1	-0.115	-0.029

B.10 Materials of English follow-up study 2: Topicalization with and without *only***I. Items:**

- 1)
 1. I like herb teas, not fruit teas.
 2. Herb teas I like, not fruit teas.
 3. I only like herb teas, not fruit teas.
 4. Herb teas I only like, not fruit teas.

- 2)
 1. I will buy alcopops, not champagne.
 2. Alcopops I will buy, not champagne.
 3. I will only buy alcopops, not champagne.
 4. Alcopops I will only buy, not champagne.

- 3)
 1. I will order smoked salmon, not tuna.
 2. Smoked salmon I will order, not tuna.
 3. I will only order smoked salmon, not tuna.
 4. Smoked salmon I will only order, not tuna.

- 4)
 1. I read crime novels, not love stories.
 2. Crime novels I read, not love stories.
 3. I only read crime novels, not love stories.
 4. Crime novels I only read, not love stories.

- 5)
 1. I wear skirts, not jeans.
 2. Skirts I wear, not jeans.
 3. I only wear skirts, not jeans.
 4. Skirts I only wear, not jeans.

- 6)
 1. I hate spinach, not broccoli.
 2. Spinach I hate, not broccoli.
 3. I only hate spinach, not broccoli.
 4. Spinach I only hate, not broccoli.

- 7)
 1. I will call my brother, not my sister.
 2. My brother I will call, not my sister.
 3. I will only call my brother, not my sister.
 4. My brother I will only call, not my sister.

- 8)
 1. I will bake strawberry pies, not chocolate cookies.
 2. Strawberry pies I will bake, not chocolate cookies.
 3. I will only bake strawberry pies, not chocolate cookies.
 4. Strawberry pies I will only bake, not chocolate cookies.

- 9)
 1. I will watch horror movies tonight, not romantic movies.
 2. Horror movies I will watch tonight, not romantic movies.
 3. I will only watch horror movies tonight, not romantic movies.
 4. Horror movies I will only watch tonight, not romantic movies.

- 10) 1. I smoke cigarettes, not cigars.
2. Cigarettes I smoke, not cigars.
3. I only smoke cigarettes, not cigars.
4. Cigarettes I only smoke, not cigars.
- 11) 1. I drink hot chocolate, not coffee.
2. Hot chocolate I drink, not coffee.
3. I only drink hot chocolate, not coffee.
4. Hot chocolate I only drink, not coffee.
- 12) 1. I will try kitesurfing, not water skiing.
2. Kitesurfing I will try, not water skiing.
3. I will only try kitesurfing, not water skiing.
4. Kitesurfing I will only try, not water skiing.
- 13) 1. I repair motorcycles, not cars.
2. Motorcycles I repair, not cars.
3. I only repair motorcycles, not cars.
4. Motorcycles I only repair, not cars.
- 14) 1. I saw lions on the safari tour, not cheetahs.
2. Lions I saw on the safari tour, not cheetahs.
3. I only saw lions on the safari tour, not cheetahs.
4. Lions I only saw on the safari tour, not cheetahs.
- 15) 1. I study physics, not chemistry.
2. Physics I study, not chemistry.
3. I only study physics, not chemistry.
4. Physics I only study, not chemistry.
- 16) 1. I will visit New Orleans, not Boston.
2. New Orleans I will visit, not Boston.
3. I will only visit New Orleans, not Boston.
4. New Orleans I will only visit, not Boston.
- 17) 1. I learn Spanish in school, not Swedish.
2. Spanish I learn in school, not Swedish.
3. I only learn Spanish in school, not Swedish.
4. Spanish I only learn in school, not Swedish.
- 18) 1. I passed the math exam, not the biology exam.
2. The math exam I passed, not the biology exam.
3. I only passed the math exam, not the biology exam.
4. The math exam I only passed, not the biology exam.
- 19) 1. I fed the donkeys in the petting zoo, not the llamas.
2. The donkeys I fed in the petting zoo, not the llamas.
3. I only fed the donkeys in the petting zoo, not the llamas.
4. The donkeys I only fed in the petting zoo, not the llamas.

- 20) 1. I oversalted the soup, not the salad.
2. The soup I oversalted, not the salad.
3. I only oversalted the soup, not the salad.
4. The soup I only oversalted, not the salad.
- 21) 1. I invited the neighbors to the party, not my relatives.
2. The neighbors I invited to the party, not my relatives.
3. I only invited the neighbors to the party, not my relatives.
4. The neighbors I only invited to the party, not my relatives.
- 22) 1. I sold the rocking chair, not the bench.
2. The rocking chair I sold, not the bench.
3. I only sold the rocking chair, not the bench.
4. The rocking chair I only sold, not the bench.
- 23) 1. I painted the balcony, not the whole house.
2. The balcony I painted, not the whole house.
3. I only painted the balcony, not the whole house.
4. The balcony I only painted, not the whole house.
- 24) 1. I stole mascara in the shop, not lipstick.
2. Mascara I stole in the shop, not lipstick.
3. I only stole mascara in the shop, not lipstick.
4. Mascara I only stole in the shop, not lipstick.
- 25) 1. I interviewed the secretary of state, not the president.
2. The secretary of state I interviewed, not the president.
3. I only interviewed the secretary of state, not the president.
4. The secretary of state I only interviewed, not the president.
- 26) 1. I forgot the necklace in the hotel, not the earrings.
2. The necklace I forgot in the hotel, not the earrings.
3. I only forgot the necklace in the hotel, not the earrings.
4. The necklace I only forgot in the hotel, not the earrings.
- 27) 1. I cleaned the bathroom, not the kitchen.
2. The bathroom I cleaned, not the kitchen.
3. I only cleaned the bathroom, not the kitchen.
4. The bathroom I only cleaned, not the kitchen.
- 28) 1. I broke the cheekbones in the accident, not the jawbones.
2. The cheekbones I broke in the accident, not the jawbones.
3. I only broke the cheekbones in the accident, not the jawbones.
4. The cheekbones I only broke in the accident, not the jawbones.
- 29) 1. I played basketball, not football.
2. Basketball I played, not football.
3. I only played basketball, not football.
4. Basketball I only played, not football.
- 30) 1. I planted tulips in the garden, not roses.
2. Tulips I planted in the garden, not roses.

3. I only planted tulips in the garden, not roses.
 4. Tulips I only planted in the garden, not roses.
- 31)
 1. I admire my English teacher, not my geography teacher.
 2. My English teacher I admire, not my geography teacher.
 3. I only admire my English teacher, not my geography teacher.
 4. My English teacher I only admire, not my geography teacher.
- 32)
 1. I will prepare the desserts, not the appetizers.
 2. The desserts I will prepare, not the appetizers.
 3. I will only prepare the desserts, not the appetizers.
 4. The desserts I will only prepare, not the appetizers.
- 33)
 1. I collect stamps, not coins.
 2. Stamps I collect, not coins.
 3. I only collect stamps, not coins.
 4. Stamps I only collect, not coins.
- 34)
 1. I witnessed the robbery, not the murder.
 2. The robbery I witnessed, not the murder.
 3. I only witnessed the robbery, not the murder.
 4. The robbery I only witnessed, not the murder.
- 35)
 1. I write novels, not short stories.
 2. Novels I write, not short stories.
 3. I only write novels, not short stories.
 4. Novels I only write, not short stories.
- 36)
 1. I own an iPhone, not an iPad.
 2. An iPhone I own, not an iPad.
 3. I only own an iPhone, not an iPad.
 4. An iPhone I only own, not an iPad.
- 37)
 1. I teach children, not adults.
 2. Children I teach, not adults.
 3. I only teach children, not adults.
 4. Children I only teach, not adults.
- 38)
 1. I booked the Four Seasons, not the Venetian.
 2. The Four Seasons I booked, not the Venetian.
 3. I only booked the Four Seasons, not the Venetian.
 4. The Four Seasons I only booked, not the Venetian.
- 39)
 1. I drive convertibles, not SUVs.
 2. Convertibles I drive, not SUVs.
 3. I only drive convertibles, not SUVs.
 4. Convertibles I only drive, not SUVs.
- 40)
 1. I met the director, not the actress.
 2. The director I met, not the actress.
 3. I only met the director, not the actress.
 4. The director I only met, not the actress.

II. Statistics**Parameters of the final model:**

Linear mixed model fit by maximum likelihood ['lmerMod']
 Formula: rating ~ wo * type + (wo * type | vp) + (wo * type | item)
 Data: d

AIC BIC logLik deviance df.resid
 6933.5 7059.0 -3441.7 6883.5 1095

Scaled residuals:

Min 1Q Median 3Q Max
 -7.132 -0.378 0.025 0.387 7.468

Random effects:

Groups	Name	Variance	Std.Dev.	Corr		
vp	(Intercept)	26.910	5.188			
	wo1	13.435	3.665	0.53		
	type1	0.024	0.154	0.99	0.61	
	wo1:type1	0.340	0.583	-0.76	-0.95	-0.83
item	(Intercept)	0.902	0.950			
	wo1	0.544	0.738	0.73		
	type1	0.099	0.315	0.42	0.35	
	wo1:type1	0.261	0.511	0.32	0.54	0.92
	Residual	19.397	4.404			

Number of obs: 1120, groups: vp, 56; item, 40

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	28.717	0.721	39.81
wo1	5.078	0.520	9.76
type1	0.456	0.142	3.21
wo1:type1	-0.422	0.173	-2.44

Correlation of Fixed Effects:

	(Intr)	wo1	type1
wo1	0.510		
type1	0.169	0.111	
wo1:type1	-0.300	-0.346	0.096

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	27.303	30.131
wo1	4.058	6.098
type1	0.178	0.735
wo1:type1	-0.761	-0.083

B.11 Materials of English follow-up study 3: Comparison between *only* and *even* in items with more specific context

I. Items:

1.

Harry visited his grandparents on Saturday. His grandparents live on a farm and own a lot of animals. Harry has always liked the cats and the rabbits but he was afraid of the bigger animals. Back home, he proudly told his mother that he had fed the donkeys and the llamas. But he wasn't completely honest.

- a. **He had fed the donkeys but not the llamas.**
- b. **The donkeys he had fed but not the llamas.**
- c. **He had only fed the donkeys but not the llamas.**
- d. **The donkeys he had only fed but not the llamas.**

Harry visited his grandparents on Saturday. His grandparents live on a farm and own a lot of animals. Harry has always liked the cats and the rabbits but he was afraid of the bigger animals. Back home, he proudly told his mother that he had fed all the big animals this time. And this was indeed the case.

- e. **He had even fed the llamas, although he was most afraid of them.**
- f. **The llamas he had even fed, although he was most afraid of them.**

2.

Jacob and Amanda are siblings and they both like to eat candy. Their mother keeps chocolate bars and sticks of licorice in the cupboard. Every day after school, Jacob and Amanda are allowed to eat one piece of candy. One day, Jacob told his mother that Amanda had eaten all the chocolate bars and sticks of licorice from the cupboard. But he was lying.

- a. **She had eaten the chocolate bars but not the sticks of licorice.**
- b. **The chocolate bars she had eaten but not the sticks of licorice.**
- c. **She had only eaten the chocolate bars but not the sticks of licorice.**
- d. **The chocolate bars she had only eaten but not the sticks of licorice.**

Jacob and Amanda are siblings and they both like to eat candy. Their mother keeps chocolate bars and sticks of licorice in the cupboard. Every day after school, Jacob and Amanda are allowed to eat one piece of candy. One day, Jacob told his mother that Amanda had eaten all the candy from the cupboard. And this was indeed the case.

- e. **She had even eaten the sticks of licorice, although she didn't like them.**
- f. **The sticks of licorice she had even eaten, although she didn't like them.**

3.

Nora is in fifth grade. She likes school, but she doesn't like to do her homework. Her parents want her to do all the homework before she can meet friends in the afternoon. On Wednesday, Nora told her parents that she had already finished the math homework and the biology homework in school. But she was lying.

- a. **She had finished the math homework but not the biology homework.**
- b. **The math homework she had finished but not the biology homework.**
- c. **She had only finished the math homework but not the biology homework.**
- d. **The math homework she had only finished but not the biology homework.**

Nora is in fifth grade. She likes school, but she doesn't like to do her homework. Her parents want her to do all the homework before she can meet friends in the afternoon. On Wednesday, Nora told her parents that she had already finished all her homework in school. And this was indeed the case.

- e. **She had even finished the math homework, although she doesn't like math at all.**
- f. **The math homework she had even finished, although she doesn't like math at all.**

4.

Lilian is from England and travels a lot. Last summer, she went to New York City. Her friend Chuck recommended her to visit New York's big museums. Back in England, Lilian told Chuck that she had visited the Brooklyn Museum and the Guggenheim-Museum. But she wasn't completely honest.

- a. **She had visited the Brooklyn Museum but not the Guggenheim-Museum.**
- b. **The Brooklyn Museum she had visited but not the Guggenheim-Museum.**
- c. **She had only visited the Brooklyn Museum but not the Guggenheim-Museum.**
- d. **The Brooklyn Museum she had only visited, but not the Guggenheim-Museum.**

Lilian is from England and travels a lot. Last summer, she went to New York City. Her friend Chuck recommended her to visit New York's big museums. Back in England, Lilian told Chuck that she had visited several museums. And this was indeed the case.

- e. **She had even visited the Brooklyn Museum, although she's not interested in art.**
- f. **The Brooklyn Museum she had even visited, although she's not interested in art.**

5.

Jessica has two kids and she wants them to have great hobbies. She is very proud that her son Bill takes piano lessons once a week. Her daughter Bridget, however, refuses to learn to play an instrument. In order to impress her daughter, Jessica once told Bridget that she had played the flute and the trumpet when she was her age. But she wasn't completely honest.

- a. **She had played the flute but not the trumpet.**
- b. **The flute she had played but not the trumpet.**
- c. **She had only played the flute but not the trumpet.**
- d. **The flute she had only played but not the trumpet.**

Jessica has two kids and she wants them to have great hobbies. She is very proud that her son Bill takes piano lessons once a week. Her daughter Bridget, however, refuses to learn to play an instrument. In order to impress her daughter, Jessica once told Bridget that she had played several instruments when she was her age. And this was indeed the case.

- e. **She had even played the trumpet, although she had a hard time learning it.**
- f. **The trumpet she had even played, although she had a hard time learning it.**

6.

David is a criminal. He robbed several banks last year and had to go to prison. He wanted the other inmates to respect him and show them that nobody can mess with him. On his first day of prison, he told them that he had insulted the jurors and the judge in the courtroom. But he was lying.

- a. **He had insulted the jurors but not the judge.**
- b. **The jurors he had insulted but not the judge.**
- c. **He had only insulted the jurors but not the judge.**
- d. **The jurors he had only insulted but not the judge.**

David is a criminal. He robbed several banks last year and had to go to prison. He wanted the other inmates to respect him and show them that nobody can mess with him. On his first day of prison, he told them that he had insulted everyone in the courtroom. And this was indeed the case.

- e. **He had even insulted the judge, although he knew this would lead to a higher penalty.**
- f. **The judge he had even insulted, although he knew that this would lead to a higher penalty.**

7.

Last year, Paul spent his summer vacation in Alaska. He wanted to have some adventures there. His boss told him about the great mountains of Alaska. After the holidays, Paul told his boss that he had climbed Mount Russel and Mount Blackburn. But he was lying.

- a. **He had climbed Mount Russel but not Mount Blackburn.**
- b. **Mount Russel he had climbed but not Mount Blackburn.**
- c. **He had only climbed Mount Russel but not Mount Balckburn.**
- d. **Mount Russel he had only climbed but not Mount Blackburn.**

Last year, Paul spent his summer vacation in Alaska. He wanted to have some adventures there. His boss told him about the great mountains of Alaska. After the holidays, Paul told his boss that he had climbed some of the highest mountains of Alaska. And this was indeed the case.

- e. **He had even climed Mount Blackburn, although he was not experienced in climbing such high mountains.**
- f. **Mount Blackburn he had even climbed, although he was not experienced in climbing such high mountains.**

8.

Veronica lives in an old house. Most of the furniture belonged to her grandparents. One day, Veronica decided to refurnish her home. She wanted to sell the couch and the rocking chair to an antiques dealer. But then she changed her mind.

- a. **She sold the couch but not the rocking chair.**
- b. **The couch she sold but not the rocking chair.**
- c. **She only sold the couch but not the rocking chair.**
- d. **The couch she only sold but not the rocking chair.**

Veronica lives in an old house. Most of the furniture belonged to her grandparents. One day, Veronica decided to refurnish her home. She wanted to sell some of the old furniture pieces to an antiques dealer. And this is what she did.

- e. **She even sold the rocking chair, although it was her grandpa's most favorite piece of furniture.**
- f. **The rocking chair she even sold, although it was her grandpa's most favorite piece of furniture.**

9.

George is 82 years old. He is pretty fit and still does a lot of work around the house. His only problem is that his memory is getting worse and he keeps forgetting what he did during a day. Yesterday, he told his wife that he had painted the balcony and the garage in the morning. But he didn't remember it correctly.

- a. **He had painted the balcony but not the garage.**
- b. **The balcony he had painted but not the garage.**
- c. **He had only painted the balcony but not the garage.**
- d. **The balcony he had only painted but not the garage.**

George is 82 years old. He is pretty fit and still does a lot of work around the house. His only problem is that his memory is getting worse and he keeps forgetting what he did during a day. Yesterday, he told his wife that he had painted the balcony and the garage in the morning. But that's not everything.

e. **He had even painted the balcony, although a professional painter did that a few weeks ago.**

f. **The balcony he had even painted, although a professional painter did that a few weeks ago.**

10.

Mary was 14 years old when her family moved to a new city. In her new school, she wanted to belong to a group of cool girls. One day, the cool girls promised her that she can join the group if she steals some cosmetic products at a shop nearby. The next day, Mary told them that she had stolen a mascara and an eyeliner and showed them the products. But she wasn't completely honest.

a. **She had stolen the mascara but not the eyeliner.**

b. **The mascara she had stolen but not the eyeliner.**

c. **She had only stolen the mascara but not the eyeliner.**

d. **The mascara she had only stolen but not the eyeliner.**

Mary was 14 years old when her family moved to a new city. In her new school, she wanted to belong to a group of cool girls. One day, the cool girls promised her that she can join the group if she steals some cosmetic products at a shop nearby. The next day, Mary told them that she had stolen cosmetic products before school. And this is what she did.

e. **She had even stolen a mascara, although the shop assistant was watching her.**

f. **A mascara she had even stolen, although the shop assistant was watching her.**

11.

Frida is a young journalist. One day, she found out about a meeting of politicians in her city. She decided to go there and was very excited to interview some important people after their meeting. Afterwards, she posted on Facebook that she had asked the secretary of state and the governor about the crisis. But she wasn't completely honest.

a. **She had asked the secretary of state but not the governor.**

b. **The secretary of state she had asked but not the governor.**

c. **She had only asked the secretary of state but not the governor.**

d. **The secretary of state she had only asked but not the governor.**

Frida is a young journalist. One day, she found out about a meeting of politicians in her city. She decided to go there and was very excited to interview some important people after their meeting. Afterwards, she posted on Facebook that she had asked several politicians about the crisis. And this was indeed the case.

e. **She had even asked the governor, although he was surrounded by people.**

f. **The governor she had even asked, although he was surrounded by people.**

12.

Last Wednesday, Brad went abroad for a business meeting. He left his house in a hurry as he had to catch his plane. In the plane, he got the feeling that he was missing something. He was afraid that he forgot the shirt and the jacket he wanted to wear at the business meeting. But he didn't forget both.

a. **He forgot the jacket but not the shirt.**

b. **The jacket he forgot but not the shirt.**

c. **He only forgot the jacket but not the shirt.**

d. **The jacket he only forgot but not the shirt.**

Last Wednesday, Brad went abroad for a business meeting. He left his house in a hurry as he had to catch his plane. In the plane, he got the feeling that he was missing something. He was afraid that he forgot important things that he needed for the business meeting. And he indeed forgot some things.

e. **He even forgot his business jacket, although his wife reminded him about it in the morning.**

f. **His business jacket he even forgot, although his wife reminded him about it in the morning.**

13.

Eric is a Greenpeace activist. One day, he heard about a company which did painful experiments with rodents. He wanted to do something against this cruelty. He planned to free the rabbits and the rats with other activists. But they didn't quite succeed.

a. **They freed the rabbits but not the rats.**

b. **The rabbits they freed but not the rats.**

c. **They only freed the rabbits but not the rats.**

d. **The rabbits they only freed but not the rats.**

Eric is a Greenpeace activist. One day, he heard about a company which did painful experiments with rodents. He wanted to do something against this cruelty. He planned to free all the rodents with other activists. And they succeeded.

e. **They even freed the rabbits, although there were hundreds of them.**

f. **The rabbits they even freed, although there were hundreds of them.**

14.

Rachel planned a party for her birthday on Saturday. On Saturday morning, she decorated the house. While decorating, she saw that some rooms were pretty dusty. She wanted to clean the living room and the kitchen before the guests arrived. But then she changed her mind.

a. **She cleaned the living room but not the kitchen.**

b. **The living room she cleaned but not the kitchen.**

c. **She only cleaned the living room but not the kitchen.**

d. **The living room she only cleaned but not the kitchen.**

Rachel planned a party for her birthday on Saturday. On Saturday morning, she decorated the house. While decorating, she saw that some rooms were pretty dusty. She wanted to clean the living room and the kitchen before the guests arrived. And she indeed managed to do so.

e. **She even cleaned the storeroom, although it was unlikely that any of the guests would go in there.**

f. **The storeroom she even cleaned, although it was unlikely that any of the guests would go in there.**

15.

Last year, Carla went to South Africa with her parents. They went on safari in the Kruger National Park. Back home, her school mates asked whether she saw any big cats. She told them that she had seen lions and cheetahs. But she wasn't completely honest.

a. **She had seen lions but not cheetahs.**

b. **Lions she had seen, but not cheetahs.**

c. **She had only seen lions but not cheetahs.**

d. **Lions she had only seen but not cheetahs.**

Last year, Carla went to South Africa with her parents. They went on safari in the Kruger National Park. Back home, her school mates asked whether she saw any big cats. She told them that she had seen several big cats. And this was indeed the case.

- e. **She had even seen cheetahs, although they were lying behind bushes.**
- f. **Cheetahs she had even seen, although they were lying behind bushes.**

16.

Robert studies English at Harvard. He has a crush on Sandra who is sitting next to him in a course about English literature. Robert prefers modern literature, but he knows that Sandra likes to read Shakespeare. On Monday, he told her that he had read "Macbeth" and "Hamlet" during the term break. But he wasn't quite honest.

- a. **He had read 'Macbeth' but not 'Hamlet'.**
- b. **'Macbeth' he had read but not 'Hamlet'.**
- c. **He had only read 'Macbeth' but not 'Hamlet'.**
- d. **'Macbeth' he had only read but not 'Hamlet'.**

Robert studies English at Harvard. He has a crush on Sandra who is sitting next to him in a course about English literature. Robert prefers modern literature, but he knows that Sandra likes to read Shakespeare. On Monday, he told her that he had read several books by Shakespeare during the term break. And this was indeed the case.

- e. **He had even read 'Macbeth', although he doesn't like to read tragedies.**
- f. **'Macbeth' he had even read, although he doesn't like to read tragedies.**

17.

When Andy was 34 years old, he ate fast food every day. His family was concerned about his health and told him to go see a doctor. After his doctor appointment, Andy decided to eat healthier. He wanted to buy carrots and broccoli at the shop. But he changed his mind in the shop.

- a. **He bought carrots but not broccoli.**
- b. **Carrots he bought but not broccoli.**
- c. **He only bought carrots but not broccoli.**
- d. **Carrots he only bought but not broccoli.**

When Andy was 34 years old, he ate fast food every day. His family was concerned about his health and told him to go see a doctor. After his doctor appointment, Andy decided to eat healthier. He wanted to buy vegetables at the shop. And this is what he did.

- e. **He even bought broccoli, although he had never eaten broccoli before.**
- f. **Broccoli he even bought, although he had never eaten broccoli before.**

18.

Nick lives in Washington. He always goes to work by bike. One day, he was hit by a car and fell on the ground. He was in pain and it felt as if he had broken his right arm and his right leg. But it wasn't as bad.

- a. **He had broken the arm but not the leg.**
- b. **The arm he had broken but not the leg.**
- c. **He had only broken the arm but not the leg.**
- d. **The arm he had only broken but not the leg.**

Nick lives in Washington. He always goes to work by bike. One day, he was hit by a car and fell on the ground. He was in pain and it felt as if he had broken several bones. And this was indeed the case.

- e. **He had even broken the arm, although he was wearing a thick jacket.**
- f. **The arm he had even broken, although he was wearing a thick jacket.**

19.

Michelle likes driving cars. Her husband Andrew doesn't like her chaotic driving style. Yesterday, Michelle drove Andrew to the dentist. Afterwards, Andrew told her angrily that she had ignored a stop sign and all the speed limits. But it wasn't as bad.

- a. **She had ignored the speed limits but not the stop sign.**
- b. **The speed limits she had ignored but not the stop sign.**
- c. **She had only ignored the speed limits but not the stop sign.**
- d. **The speed limits she had only ignored but not the stop sign.**

Michelle likes driving cars. Her husband Andrew doesn't like her chaotic driving style. Yesterday, Michelle drove Andrew to the dentist. Afterwards, Andrew told her angrily that she had ignored several road signs. And this was indeed the case.

- e. **She had even ignored a stop sign, although the police was driving behind her.**
- f. **A stop sign she had even ignored, although the police was driving behind her.**

20.

Michael sells reptiles. He has loved reptiles ever since his parents took him to the zoo as a little kid. Now he sells snakes, exotic frogs, lizards and turtles. Yesterday, he tried to impress a pretty woman and told her that he breeds Corn Snakes and dangerous Rattlesnakes. But he wasn't completely honest.

- a. **He breeds Corn Snakes but not Rattlesnakes.**
- b. **Corn Snakes he breeds but not Rattlesnakes.**
- c. **He only breeds Corn Snakes but not Rattlesnakes.**
- d. **Corn Snakes he only breeds but not Rattlesnakes.**

Michael sells reptiles. He has loved reptiles ever since his parents took him to the zoo as a little kid. Now he sells snakes, exotic frogs, lizards and turtles. Yesterday, he tried to impress a pretty woman and told her that he breeds dangerous snakes. And this is indeed the case.

- e. **He even breeds Rattlesnakes, although they belong to the world's most venomous snakes.**
- f. **Rattlesnakes he even breeds, although they belong to the world's most venomous snakes.**

21.

Adam loves gardening. Last year, he bought a small house with a huge garden. He wanted to plant a lot of trees in the garden. At first, he thought about planting apple trees and mango trees. But then he changed his mind.

- a. **He planted apple trees but not mango trees.**
- b. **Apple trees he planted but not mango trees.**
- c. **He only planted apple trees but not mango trees.**
- d. **Apple trees he only planted but not mango trees.**

Adam loves gardening. Last year, he bought a small house with a huge garden. He wanted to plant a lot of trees in the garden. He thought about planting different fruit trees. And this is what he did.

- e. **He even planted mango trees, although they need a more tropical climate.**
- f. **Mango trees he even planted, although they need a more tropical climate.**

22.

Henry owns a hotel in a small city close to the beach. Two years ago, a famous hotel chain built a big hotel in the same city. Last summer, most tourists stayed in the big hotel and the financial situation of Henry's hotel got worse. Henry had to save money and thought about firing the porter and one of the front desk clerks. But then he changed his mind.

- a. **He fired the porter but not the front desk clerk.**
- b. **The porter he fired but not the front desk clerk.**
- c. **He only fired the porter but not the front desk clerk.**
- d. **The porter he only fired but not the front desk clerk.**

Henry owns a hotel in a small city close to the beach. Two years ago, a famous hotel chain built a big hotel in the same city. Last summer, most tourists stayed in the big hotel and the financial situation of Henry's hotel got worse. Henry had to save money and thought about firing some of the employees. And this is what he did.

- e. **He even fired the porter, although he had been working for the hotel for more than twenty years.**
- f. **The porter he even fired, although he had been working for the hotel for more than twenty years.**

23.

Jane has just started her modelling career. She wants to become a famous top model someday. Last week, she took part in a big fashion show and got to wear fancy dresses. She proudly told her friends that she had worn a Gucci dress and a Prada dress at the fashion show. But she wasn't completely honest.

- a. **She had worn a Gucci dress but not a Prada dress.**
- b. **A Gucci dress she had worn but not a Prada dress.**
- c. **She had only worn a Gucci dress but not a Prada dress.**
- d. **A Gucci dress she had only worn but not a Prada dress.**

Jane has just started her modelling career. She wants to become a famous top model someday. Last week, she took part in a big fashion show and got to wear fancy dresses. She proudly told her friends that she had worn dresses from the most famous fashion labels. And this was indeed the case.

- e. **She had even worn a Gucci dress, although she is an inexperienced model.**
- f. **A Gucci dress she had even worn, although she is an inexperienced model.**

24.

Ethan and his wife Gloria live in a house near the forest. Last month, a raccoon got into the house through an open window. It destroyed a lot of things in the living room. Ethan tried to repair the TV screen and the stereo. But he didn't manage to fix both.

- a. **He repaired the TV screen but not the stereo.**
- b. **The TV screen he repaired but not the stereo.**
- c. **He only repaired the TV screen but not the stereo.**
- d. **The TV screen he only repaired but not the stereo.**

Ethan and his wife Gloria live in a house near the forest. Last month, a raccoon got into the house through an open window. It destroyed a lot of things in the living room. Ethan tried to repair all the damaged electronic devices. And he indeed managed to do so.

- e. **He even fixed the TV screen, although it was severely damaged.**
- f. **The TV screen he even fixed, although it was severely damaged.**

II. Statistics

Parameters of the final model:

Linear mixed model fit by maximum likelihood ['lmerMod']

Formula: rating ~ wo * type + (wo * type | vp) + (1 | item)

AIC	BIC	logLik	deviance	df.resid
4379.3	4530.7	-2160.7	4321.3	1339

Scaled residuals:

Min	1Q	Median	3Q	Max
-4.668	-0.462	0.110	0.579	3.105

Random effects:

Groups	Name	Variance	Std.Dev.	Corr				
vp	(Intercept)	0.533	0.730					
	wo1	0.299	0.547	-0.40				
	type1	0.080	0.283	-0.09				
					0.71			
	type2	0.055	0.236	0.26	-0.41	-0.40		
	wo1:type1	0.038	0.196	0.00	-0.14	-0.44	0.47	
	wo1:type2	0.022	0.149	0.27	0.12	0.42	-0.40	0.24
item	(Intercept)	0.033	0.182					
	Residual	1.051	1.025					

Number of obs: 1368, groups: vp, 57; item, 24

Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	5.096	0.107	47.53
wo1	0.876	0.078	11.28
type1	0.211	0.054	3.89
type2	-0.250	0.050	-4.98
wo1:type1	-0.135	0.047	-2.87
wo1:type2	0.084	0.045	1.91

Correlation of Fixed Effects:

	(Intr)	wo1	type1	type2	wo1:ty1
wo1	-0.340				
type1	-0.058	0.457			
type2	0.145	-0.238	-0.453		
wo1:type1	-0.001	-0.070	-0.167	0.160	
wo1:type2	0.111	0.049	0.132	-0.112	-0.314

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	4.886	5.306
wo1	0.724	1.028
type1	0.105	0.318
type2	-0.348	-0.151
wo1:type1	-0.227	-0.043
wo1:type2	-0.002	0.170

III. Comments by participants regarding experimental items

- Comment: The order of the first clause is backwards for natural English, although the meaning is OK. ‘He had even insulted the judge’ would be correct. (Participant A)

Item: Topicalization + even:

... **The judge he had even insulted, although he knew that this would lead to a higher penalty.**

- Comment: As in other previous examples, the order of the first clause is not so good for natural English. ‘He had even climbed Mount Blackburn’ would be much better. (Participant B)

Item: Topicalization + even

... **Mount Blackburn he had even climbed, although he was not experienced in climbing such high mountains.**

- Comment: Sounds like German word order at the beginning of the sentence. ‘She had only eaten the chocolate bars’ would be natural English. (Participant B)

Item: Topicalization + only

... **The chocolate bars she had only eaten but not the sticks of licorice.**

- Comment: The first clause has a poor word order for natural English (as in previous examples). ‘He even forgot his business jacket’ would be a natural English word order. (Participant B)

Item: Topicalization + even

... **His business jacket he even forgot, although his wife reminded him about it in the morning.**

- Comment: Target sentence sounds like a trace of German word order. ‘She only cleaned the living room but not the kitchen’ would be the way we say it here in South Carolina. (Participant B)

Item: Topicalization + only:

... **The living room she only cleaned but not the kitchen.**

- Comment: The target sentence sounds like German word order again ‘She only sold the couch’ would be natural English. (Participant B)

Item: Topicalization + only

... **The couch she only sold but not the rocking chair.**

- Comment: The grammatical structure is odd and confusing - it would make sense if she ‘had only seen lions but not cheetahs’. (Participant C)

Item: Topicalization + only

... **Lions she had only seen but not cheetahs.**

- Comment: It's pretty natural but it would be far better if stated as 'They even freed the rabbits.' (Participant D)

Item: Topicalization + even

... **The rabbits they even freed, although there were hundreds of them.**

- Comment: But better to say, 'He had even fed the llamas...' (Participant D)

Item: Topicalization + even

... **The llamas he had even fed, although he was most afraid of them.**

B.12 English Experiment 2: Comparison between *only* and *even* with subject association

I. Items

		Short context	Long context
1.	A:	Will all of the students in my study group pass the Algebra exam tomorrow?	My friends Marc, Chris and Jeff study math. They have studied hard for the Algebra exam that takes place tomorrow but I think that Chris and Jeff feel more confident than Marc. Will all of them pass the exam?
	B ₁ :	No. Only Chris will pass it.	
	B ₂ :	No. Chris will only pass it.	
	B ₃ :	Yes. Even Marc will pass it.	
	B ₄ :	Yes. Marc will even pass it.	
2.	A:	Will several football players leave our college football team after this season?	Our college football team is pretty good. I heard the rumor that Joey, Danny and also the best player Brad are thinking about leaving the team. Will all of them really leave the team?
	B ₁ :	No. Only Brad will leave the team.	
	B ₂ :	No. Brad will only leave the team.	
	B ₃ :	Yes. Even Brad will leave the team.	
	B ₄ :	Yes. Brad will even leave the team.	
3.	A:	Will all the members of my book club read my favorite book "Macbeth"?	I recently joined a book club. Martha, Rachel, Linda and Marshall, who are the other members, agreed to read my favorite book "Macbeth", even though Linda doesn't really like Shakespeare. Will all the book club members read "Macbeth"?
	B ₁ :	No. Only Rachel will read it.	
	B ₂ :	No. Rachel will only read it.	
	B ₃ :	Yes. Even Linda will read it.	
	B ₄ :	Yes. Linda will even read it.	
4.	A:	Will all of my nieces pet the kangaroos at the petting zoo this afternoon?	This afternoon, my parents are going to the petting zoo with my little nieces Danielle, Joy and Jane. The girls are excited that there are kangaroos at the petting zoo but I think they are also a bit scared of them, especially Jane. Will all of my nieces pet the kangaroos?

	B ₁ :	No. Only Joy will pet them.	
	B ₂ :	No. Joy will only pet them.	
	B ₃ :	Yes. Even Jane will pet them.	
	B ₄ :	Yes. Jane will even pet them.	
5.	A:	Will all of my brothers visit Grandma in the hospital?	Yesterday, I visited my grandma in the hospital. She told me that she would love for my brothers to visit her, too. However, my brothers Adam, Ethan and Richard are very busy, especially Adam. Will all of my brothers visit Grandma, nonetheless?
	B ₁ :	No. Only Ethan will visit her.	
	B ₂ :	No. Ethan will only visit her.	
	B ₃ :	Yes. Even Richard will visit her.	
	B ₄ :	Yes. Richard will even visit her.	
6.	A:	Will several members of the British Royal Family watch the next Super Bowl?	I read an interview with Prince Harry in a sports magazine. He told the journalist that he, Prince Charles and also Queen Elisabeth will watch the next Super Bowl on TV, but I guess he was joking. Will all of them really watch the Super Bowl?
	B ₁ :	No. Only Prince Harry will watch it.	
	B ₂ :	No. Prince Harry will only watch it.	
	B ₃ :	Yes. Even Queen Elisabeth will watch it.	
	B ₄ :	Yes. Queen Elisabeth will even watch it.	
7.	A:	Will all of my roommates clean the apartment this month?	I share an apartment with Jack, Max and Jesse. They are all pretty lazy when it comes to cleaning the apartment, especially Max. They promised that they will clean the apartment tomorrow. Will all of them really clean the apartment?
	B ₁ :	No. Only Jesse will clean it.	
	B ₂ :	No. Jesse will only clean it.	
	B ₃ :	Yes. Even Max will clean it.	
	B ₄ :	Yes. Max will even clean it.	
8.	A:	Will all of my closest friends own a fancy sports car some day?	Lucy, Jacob and I have been friends since kindergarten. All of us want to own a fancy sports car some day. I think chances are high that Jacob and I will own one, but Lucy has never been good at saving money. Will all of us own a sports car some day?
	B ₁ :	No. Only Jacob will own one.	
	B ₂ :	No. Jacob will only own one.	
	B ₃ :	Yes. Even Lucy will own one.	
	B ₄ :	Yes. Lucy will even own one.	
9.	A:	Will all of my aunts help Grandpa sell his house?	My grandpa Bill wants to move into a smaller apartment. He hopes that my aunts Brenda, Nora and Kate will help him sell his house, but they are all very attached to it, especially Brenda. Will all of them nevertheless help Grandpa to sell the house?
	B ₁ :	No. Only Aunt Nora will help him.	

	B ₂ :	No. Aunt Nora will only help him.	
	B ₃ :	Yes. Even Aunt Brenda will help him.	
	B ₄ :	Yes. Aunt Brenda will even help him.	
10.	A:	Will all of my fellow students invite me to their birthday parties this year?	My fellow students Jason, Angela, Emma and Steve are celebrating their birthdays next month. Jason, Emma and Steve each want to throw big parties while Angela doesn't want to invite a lot of people. Will all of them invite me to their birthday parties?
	B ₁ :	No. Only Jason will invite you.	
	B ₂ :	No. Jason will only invite you.	
	B ₃ :	Yes. Even Angela will invite you.	
	B ₄ :	Yes. Angela will even invite you.	
11.	A:	Will several members of my rock band miss the next band practice?	Luke, Sophia and Robin are members of my rock band. Sophia and Luke often miss band practice or they show up late. Will several members of my band miss the next band practice?
	B ₁ :	No. Only Luke will miss it.	
	B ₂ :	No. Luke will only miss it.	
	B ₃ :	Yes. Even Robin will miss it.	
	B ₄ :	Yes. Robin will even miss it.	
12.	A:	Will all the members of the supervising committee approve my Master's thesis proposal?	Last week, I submitted my Master's thesis proposal to the supervising committee which consists of three professors. Professor Brown and Professor Smith are very nice but Professor Miller is a strict man. Will all three of them approve my proposal?
	B ₁ :	No. Only Professor Smith will approve it.	
	B ₂ :	No. Professor Smith will only approve it.	
	B ₃ :	Yes. Even Professor Miller will approve it.	
	B ₄ :	Yes. Professor Miller will even approve it.	
13.	A:	Will several members of my family decorate the Christmas tree this year?	Most of my family members hate decorating the Christmas tree, especially Jenny and Adam. Usually, my mom or Ethan end up decorating it alone. Will several members of my family decorate the Christmas tree this year?
	B ₁ :	No. Only Ethan will decorate it.	
	B ₂ :	No. Ethan will only decorate it.	
	B ₃ :	Yes. Even Adam will decorate it.	
	B ₄ :	Yes. Adam will even decorate it.	
14.	A:	Will all of my cousins buy the new iPhone?	My cousins Tina, Logan and Carol talked about the new iPhone at the family dinner last week. Tina and Logan want to buy it, but Carol wasn't sure yet. Will all of them buy the new iPhone?
	B ₁ :	No. Only Tina will buy it.	
	B ₂ :	No. Tina will only buy it.	
	B ₃ :	Yes. Even Carol will buy it.	
	B ₄ :	Yes. Carol will even buy it.	

15.	A:	Will all the players of the college basketball team sing the national anthem at their next game?	The coach of the college basketball team wants all the players to sing the national anthem before the next game. Players Taylor and Seth don't like singing and Jim can't sing at all. Will the three of them sing the national anthem, nevertheless?
	B ₁ :	No. Only Seth will sing it.	
	B ₂ :	No. Seth will only sing it.	
	B ₃ :	Yes. Even Jim will sing it.	
	B ₄ :	Yes. Jim will even sing it.	
16.	A:	Will all the freshman students that I tutor in math do the assignment that I gave them?	I tutor four freshman students in math. Julia, Tom and Zoe did the assignment for last week but Emily didn't. Will all of them do the assignment that I gave them for next week?
	B ₁ :	No. Only Julia will do it.	
	B ₂ :	No. Julia will only do it.	
	B ₃ :	Yes. Even Emily will do it.	
	B ₄ :	Yes. Emily will even do it.	
17.	A:	Will at least thirty professors attend the charity event that the student representatives organized?	The student representatives organized a big charity event. They know for sure that seventy students are coming, but they hope that at least thirty professors will come, too. Will at least thirty professors attend the charity event?
	B ₁ :	No. Only five will attend it.	
	B ₂ :	No. Five will only attend it.	
	B ₃ :	Yes. Even sixty will attend it.	
	B ₄ :	Yes. Sixty will even attend it.	
18.	A:	Will at least forty people like my new profile picture on Facebook?	I want to update my profile picture on Facebook soon. I got forty likes for my current picture and I hope to get at least as many likes for the new one. Will at least forty people like my new profile picture?
	B ₁ :	No. Only seven will like it.	
	B ₂ :	No. Seven will only like it.	
	B ₃ :	Yes. Even ninety will like it.	
	B ₄ :	Yes. Ninety will even like it.	
19.	A:	Will at least fifteen tourists book my friend Scott's adventure tour for Sunday?	My friend Scott offers an adventure tour for tourists. He hopes that at least fifteen tourists will book his adventure tour for Sunday. Will at least fifteen tourists book the tour?
	B ₁ :	No. Only eleven will book it.	
	B ₂ :	No. Eleven will only book it.	
	B ₃ :	Yes. Even thirty-five will book it.	
	B ₄ :	Yes. Thirty-five will even book it.	
20.	A:	Will at least six investors fund my dad's startup-company?	My dad will present his plans for a startup company to potential investors on Thursday. He hopes that at least six investors will fund his startup. Will at least six investors fund it?
	B ₁ :	No. Only three will fund it.	

	B ₂ :	No. Three will only fund it.	
	B ₃ :	Yes. Even nine will fund it.	
	B ₄ :	Yes. Nine will even fund it.	
21.	A:	Will at least five hundred inhabitants of my hometown join the demonstration against the corrupt mayor?	Some journalist found out recently that the mayor of my hometown is corrupt. There will be a demonstration against him soon and organizers hope that at least five hundred inhabitants will join it. Will at least five hundred join the demonstration?
	B ₁ :	No. Only eighty will join it.	
	B ₂ :	No. Eighty will only join it.	
	B ₃ :	Yes. Even two thousand will join it.	
	B ₄ :	Yes. Two thousand will even join it.	
22.	A:	Will at least two boys ask my sister to prom next year?	My little sister Jenny is graduating from high school next year. She hopes that at least two boys will ask her to prom. Will at least two boys ask her to prom?
	B ₁ :	No. Only one will ask her.	
	B ₂ :	No. One will only ask her.	
	B ₃ :	Yes. Even four will ask her.	
	B ₄ :	Yes. Four will even ask her.	
23.	A:	Will at least five journalists interview my uncle about the crime he solved?	My uncle is a detective and solved a horrible crime this week. He hopes that a lot of newspapers are interested in this case and that at least five journalists will interview him about it. Will at least five journalists interview him?
	B ₁ :	No. Only two will interview him.	
	B ₂ :	No. Two will only interview him.	
	B ₃ :	Yes. Even eight will interview him.	
	B ₄ :	Yes. Eight will even interview him.	
24.	A:	Will at least four environmental organizations sue the chemical plant in Springfield?	I heard on the news that a chemical plant in Springfield polluted a nearby river. I hope they won't get away with this and that several environmental organizations will sue them. Will at least four environmental organizations sue the chemical plant?
	B ₁ :	No. Only one will sue it.	
	B ₂ :	No. One will only sue it.	
	B ₃ :	Yes. Even six will sue it.	
	B ₄ :	Yes. Six will even sue it.	
25.	A:	Will at least one thousand students sign the current petition against increased tuition fees?	My friends and I started a protest against the government's plan to raise tuition fees. We need at least one thousand students to sign the petition. Will that many students sign it?
	B ₁ :	No. Only one hundred will sign it.	
	B ₂ :	No. One hundred will only sign it.	
	B ₃ :	Yes. Even ten thousand will sign it.	
	B ₄ :	Yes. Ten thousand will even sign it.	

26.	A:	Will at least ten art critics praise my friend Paul's exhibition?	My friend Paul is an artist and the opening of his first exhibition is in two weeks. Many important people in the arts scene will be there and Paul hopes that at least eight art critics will praise the exhibition. Will at least eight critics praise the exhibition?
	B ₁ :	No. Only two will praise it.	
	B ₂ :	No. Two will only praise it.	
	B ₃ :	Yes. Even twelve will praise it.	
	B ₄ :	Yes. Twelve will even praise it.	
27.	A:	Will at least five politicians contradict the arrogant presidential candidate during the debate?	There will be a big political debate on TV on Monday with one of the presidential candidates. I hope that the other politicians will contradict the arrogant one. Will at least five politicians contradict him?
	B ₁ :	No. Only three will contradict him.	
	B ₂ :	No. Three will only contradict him.	
	B ₃ :	Yes. Even ten will contradict him.	
	B ₄ :	Yes. Ten will even contradict him.	
28.	A:	Will at least ten of my party guests notice my new hair cut?	I'm going to throw a little party this evening. There will be about twenty guests. Will at least ten of them notice my new hair cut?
	B ₁ :	No. Only five will notice it.	
	B ₂ :	No. Five will only notice it.	
	B ₃ :	Yes. Even fifteen will notice it.	
	B ₄ :	Yes. Fifteen will even notice it.	
29.	A:	Will at least twenty girls come to the barbecue on Saturday?	My roommate Jack and I invited all our friends and neighbors to our barbecue on Saturday. We hope that at least twenty girls will come to our party. Will at least twenty girls come to the barbecue?
	B ₁ :	No. Only nine will come.	
	B ₂ :	No. Nine will only come.	
	B ₃ :	Yes. Even thirty will come.	
	B ₄ :	Yes. Thirty will even come.	
30.	A:	Will at least sixty spectators enjoy my next band gig?	My band's last gig didn't go too well and I think a lot of people didn't like it. I hope that most spectators will enjoy our gig next week. Will at least sixty spectators enjoy our next gig?
	B ₁ :	No. Only twelve will enjoy it.	
	B ₂ :	No. Twelve will only enjoy it.	
	B ₃ :	Yes. Even eighty will enjoy it.	
	B ₄ :	Yes. Eighty will even enjoy it.	
31.	A:	Will at least thirty men wear a tie at the big conference tomorrow?	My friend Sam and I made a bet. Sam thinks that no more than ten men will wear a tie at the big conference tomorrow. I think at least thirty men

			will wear one. Will at least thirty men wear a tie at the conference?
	B ₁ :	No. Only four will wear one.	
	B ₂ :	No. Four will only wear one.	
	B ₃ :	Yes. Even forty-four will wear one.	
	B ₄ :	Yes. Forty-four will even wear one.	
32.	A:	Will at least fifty volunteers support my neighbors' new non-governmental organization?	My neighbors founded a new non-governmental organization. They hope that at least fifty volunteers will support them. Will at least fifty volunteers support their organization?
	B ₁ :	No. Only sixteen will support it.	
	B ₂ :	No. Sixteen will only support it.	
	B ₃ :	Yes. Even seventy will support it.	
	B ₄ :	Yes. Seventy will even support it.	

II. Statistics

Linear mixed model fit by maximum likelihood t-tests use Satterthwaite approximations to degrees of freedom [lmerMod]

Formula: rating ~ wo * type * asso + (wo + asso + type | vp) + (1 | item)

Data: d

AIC	BIC	logLik	deviance	df.resid
6651.7	6764.8	-3305.9	6611.7	2092

Scaled residuals:

Min	1Q	Median	3Q	Max
-4.1805	-0.5064	0.0841	0.5122	4.0028

Random effects:

Groups	Name	Variance	Std.Dev.	Corr		
vp	(Intercept)	0.381	0.617			
	wo1	0.091	0.301	-0.14		
	asso1	0.097	0.313	-0.63	0.17	
	type1	0.036	0.190	0.49	-0.27	-0.48
item	(Intercept)	0.008	0.092			
	Residual	1.129	1.063			

Number of obs: 2112, groups: vp, 66; item, 32

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	5.266	0.081	68.9	64.97	< 2e-16 ***
wo1	0.496	0.044	65.7	11.35	< 2e-16 ***
type1	-0.132	0.032	64.3	-4.00	0.000166 ***
asso1	0.536	0.048	61.0	11.23	2.22e-16 ***
wo1:type1	-0.348	0.023	1828.4	-15.03	< 2e-16 ***
wo1:asso1	0.052	0.023	1825.6	2.26	0.023741 *
type1:asso1	0.273	0.023	1827.6	11.82	< 2e-16 ***

wol:type1:asso1 0.132 0.023 1827.6 5.702 1.38e-08 ***

Correlation of Fixed Effects:

	(Intr)	wol	type1	asso1	wol:type1	typ1:asso1	wol:type1:asso1
wol	-0.112						
type1	0.325	-0.166					
asso1	-0.474	0.118	-0.278				
wol:type1	0.000	0.000	0.000	0.000			
wol:asso1	0.000	0.000	0.000	0.000	0.000		
type1:asso1	0.000	0.000	0.000	0.000	0.000	0.000	
wol:type1:asso1	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	5.107	5.425
wol	0.411	0.582
type1	-0.196	-0.067
asso1	0.442	0.630
wol:type1	0.393	-0.302
wol:asso1	0.007	0.098
type1:asso1	0.228	0.319
wol:type1:asso1	0.087	0.177