

The Phonology of Second Occurrence Focus¹

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This paper investigates the question of whether and how ‘Second Occurrence Focus’ (SOF) is realized phonetically in German. The apparent lack of phonetic marking on SOF has raised much discussion on the semantic theory of focus (Partee, 1991; Rooth, 1992). Some researchers have reported the existence of phonetic marking of SOF (Rooth, 1996; Beaver et al., 2007), claiming that SOF is not marked by pitch, but by duration, although it is very subtle at best. In these studies for English, however, SOF always appears at a postnuclear position, where no pitch accent can appear for an independent reason. That is, the lack of pitch accent on SOF is not due to the lack of F-marking, but rather to the phonological condition where SOF appears. In our experimental study with German sentences, we examined both sentences with prenuclear SOF and with postnuclear SOF, comparing with their first occurrence focus (FOF) and non-focus counterparts. The results show that the phonetic prominence of focus (higher pitch/longer duration) is realized differently according to the type of focus as well as according to the position of the target expression. We account for these differences by considering several phonetic effects, those that are information structure-related and those that are phonologically motivated.

Keywords: Second Occurrence Focus (SOF), German, prosody

1 Introduction

The phonetic realization of SOF is related to the question of the interface between LF and PF in grammar. In this paper, we investigate the question whether and how ‘Second Occurrence Focus’ (SOF) is realized phonetically in

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German. We show that the best place to look for phonetic correlates of SOF in sentences is the prenuclear location: there, accents are realized with an increase in pitch.

After an overview of the theoretical issues of SOF and a discussion of the problems that it presents for the model of grammar in the next section, the experiments are discussed in sections 3 to 5. In sections 3 and 4, the production experiment is addressed, and in section 5, the perception experiment. A discussion follows in section 6. The paper ends with a conclusion in section 7.

2 Theoretical Background

The phenomenon of second occurrence focus (SOF) was first described by Partee (1999:215-216) in the following terms:

If *only* is a focus sensitive operator (i.e., needs an intonationally prominent element in its scope) then the two occurrences of *only eats vegetables* in [(1)] should have the same analysis. However, if there is no phonological reflex of focus in the second occurrence of *vegetables* then this leads to the notion of “phonologically invisible focus.” The notion of inaudible foci “at best would force the recognition of a multiplicity of different notions of ‘focus’ and at worst might lead to a fundamentally incoherent notion of focus.

- (1) a. Everyone already knew that Mary only eats [vegetables]_F
- b. If even [Paul]_F knew that Mary only eats [vegetables]_{SOF}, then he should have suggested a different restaurant.

Partee indirectly assumes an obligatory phonetic realization of focus. If there are foci without accents, no coherent notion of focus can be obtained. As Krifka (2004:190) puts it (his Hypothesis I): “If an operator is analyzed as focus-

sensitive (i.e., associated with a focus) in one type of use, it must be analyzed as focus-sensitive (associated with a focus) in all types of use.” Association with focus, an expression coined by Jackendoff (1972), means explicitly that certain expressions have a focus in their syntactic domain, where focus is specified by a syntactic feature *F*, which in turn is realized by intonational prominence. The conclusion one has to draw from Partee’s comment is that if there is no phonological correlate on a SOF, then there is also no focus.

Following Rooth (1992, 1999), Beaver et al. (2007), as well as Bartels (2004), von Stechow (2004), and Krifka (2004) distinguish (though not necessarily with the same terminology) between two types of theories of focus: ‘weak’ grammaticized theories of focus, which need both a focus-marking *F* and a phonological (and phonetic) realization of focus, and ‘strong’ theories of focus, in which the relationship between focus and grammatical functions is in a laxer manner, and resolution of focus is pragmatic. In the latter view, the quantificational domains of some operators may be restricted contextually or situationally. This model predicts that focus can be left phonetically unrealized, since focus does not need to be grammatically marked. All the authors assume that the phonetic realization of focus is crucial for deciding between the semantic theories. Krifka (2004) takes for granted Partee’s claim that SOF is ‘inaudible’, but other authors, like Rooth (1996), Bartels (2004) and Beaver et al. (2007) answer Partee’s challenge by proving that SOF is phonetically realized. The different opinions correlate with different views about strong and weak interpretations of focus.

Rooth, Bartels and Beaver et al. have conducted experiments to investigate whether SOF expressions are realized phonetically. An example of the experimental material used by Beaver et al. to show the phonetic realization of SOF appears in (2) and (3).

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- (2) a. Both Sid and his accomplices should have been named in this morning's court session.
- b. But the defendant only named [Sid]_F in court today.
- c. Even [the state prosecutor]_F only named [Sid]_{SOF} in court today.
- (3) a. Defense and Prosecution had agreed to implicate Sid both in court and on television.
- b. Still, the defense attorney only named Sid [in court]_F today.
- c. Even [the state prosecutor]_F only named Sid [in court]_{SOF} today.

In the examples above, the areas of interest are both the first and the second postverbal phrases (NP *Sid* and PP *in court*) of the last sentence in a discourse. The (a) sentence first introduces a context in which both phrases are new. Then the (b) sentence introduces a context in which one of the phrases is a first occurrence focus (FOF)—*Sid* in (2), and *in court* in (3)—and the other one is in the background. In (c), the FOF in (b) is now SOF and the other phrase is still part of the background. The SOF effect is obtained by realizing a new focus in (c) (*the state prosecutor*) with a nuclear pitch accent, and by simply repeating the postverbal phrases. But, since one of them is still in the restrictor of the ‘old’ focus operator *only*, it is also focused. The phonetic realization of this focus, however, is much more subtle than that of FOF in the (b) examples, and hence, raises the question formulated by Partee. The researchers mentioned above (Rooth 1996, Bartels 2004, Beaver et al. 2007) all find some phonetic correlates of focus, though no pitch accent.

In the remainder of this section, we first address the question of the phonetic correlates of SOF. The second question has to do with the impact of the phonetic facts for the model of grammar, and more specifically, whether it is

correct to base a semantic theory on the presence or absence of phonetic correlates of SOF.

2.1 Phonetic Correlates of SOF

In an utterance like (2c), the SOF *Sid* is a focus by virtue of being associated with a focus operator, but crucially, it is embedded in a larger expression which is itself discourse-given, and which is usually realized in a lower pitch than discourse-new material (cf. Sugahara 2003, Ishihara 2004 for similar claims for Japanese). The question which all experiments on SOF have explicitly or implicitly attempted to answer, is whether the correlates of focus associated with a focus operator can override the lowered pitch contour observed in a given string of words. Our answer to this question is different: we claim that the phonetic correlates SOF results first from the combination of being focused and being given, and second differ according to its position in the sentence.

Rooth (1996), Bartels (2004) and Beaver et al (2007) find no or only a very slight increase in pitch on the SOF as compared to the counterparts in the minimal pair examples. They find instead other phonetic correlates, like a small increase in duration (an average of 6ms in Beaver et al.). On the basis of such results, all the authors conclude that the prominence on SOF is different from a plain pitch accent. Rooth calls it a ‘metrical accent’, and Beaver et al. a ‘phrasal stress’, which differs formally from pitch accent. According to them, focus is marked both by phrasal stress and a nuclear pitch accent, whereas SOF is marked only by phrasal stress.

There is, however, another important factor that has to be considered in the discussion. The seeming difference between the kind of accent needed for FOF and the one needed for SOF is a consequence of the fact that the prominence on SOF was searched for at a suboptimal place, namely in a postnuclear position. Postnuclear material is subject to a *deaccenting* effect that

is independent of its information structural status. We will show below that in a prenuclear position, there is pitch prominence on SOF as compared to its non-focused counterpart. Our experiment was conducted with German data, but we expect that our general conclusions are valid for English as well, since those aspects of intonation which bear on SOF are similar in both languages.

There are also a few other pieces of evidence showing that SOF is phonologically marked. Von Stechow (2004), Rooth (1996) and Krifka (2004) mention the absence of weak pronouns in a SOF location as another important clue for the special status of these items.² Second Occurrence Focus on a pronoun blocks cliticization. Compare the data in (5). The sentences in (b) and (c) are SOF. As shown in (5c) the cliticized rendition of the pronoun is not possible in this context. This set of data is relevant for the discussion of whether SOF is accented or not, despite the absence of pitch accent, and seems to indicate that it is.

(5) Pronouns

- a. Mary's boyfriend only likes her
- b. Even her boss only likes her
- c. # Even her boss only liker

As discussed most forcefully by Rooth (2004:480), the SOF sentences are to be considered in their context. They involve two foci embedded in each other (see also Büring 2006 for this observation), and a phonetically repeated sentence. Rooth shows, with sentences like those in (6), that SOF is not just a matter of syntactic parallelism, involving repeated phonetic material. New material in

² Rooth attributes this observation to Susanne Tunstall.

(6B) can stand for first occurrence focused constituents in (6A). The point is important because it eliminates analyses relying on the mere copying of phonological material.

(6) A: The provost and the dean aren't taking any candidates other than Susan and Harold seriously.

B: Even the [CHAIRman]_F is only considering [younger]_{SOF} candidates.

2.2 Can Phonetic Facts decide between Semantic Theories?

It is important to pin down the phonetic and phonological correlates of SOF, since the argument of its being accented or not has been crucial in the discussion about the best interpretation of focus. The accent status of SOF has been considered a major argument for deciding between weak and strong theories of semantic focus. In weak versions, *only* is a focus operator (in the same way as *even*, *also* or some adverbs), and as such, it is expected to be associated with an element bearing an accent. If there is no accent on the element on which it takes scope, two solutions are possible. The first one is to claim that *only* has at least two interpretations, one associated with focus, and the other one not. This is the worst case, which no researcher has been willing to defend (see Partee's comment). The other interpretation implies giving up the obligatoriness of association with focus, and endorsing the view that it is optional. In this latter solution, the domain of quantification is based on pragmatic reasoning, like letting contextual factors play a role. A sentence like (7), for example, does not mean that there is no sunshine on earth, but has to be understood as a comment on a contextually given place in which the speaker is located, or on which she has some knowledge. In other words, the restrictor of the quantifier *no sunshine* is further restricted by the context of utterance.

(7) There is no sunshine.

The ‘strong’ theory of focus assumes that focus operators are like quantifiers and that their domain can be restricted by context and only by context. Rooth shows with the help of examples like (8a) that the domain of *only* can be fixed by the context variable of the preceding expression. As a result, accents on elements in the scope of a focus operator may be absent. In (8a), *rice* in the main clause is expected to be focused because it is associated with *only*. Thus it should have an accent. But instead, an accent is present on *eat* because of the contrast with *grow*. The explanation for the absence of an accent on *rice* is that the domain of quantification is pragmatically driven. This happens entirely without the help of focus. The context of *grow rice* and the context of *eat rice* are anaphorically related, and define a given environment for each other. Rooth assumes that there is no focus on *rice*, and takes this fact as evidence that focus-sensitive effects are optional.

- (8) a. People who [grow]_F rice usually only [eat]_F rice.
 b. People who [grow]_F rice that absorbs a lot of water usually only [eat]_F rice that absorbs a lot of water.

The discussion regarding the strong/weak theories of focus is based on a tacit assumption that focus is *always* phonetically marked. Given this assumption, if no phonetic marking is found on a phrase, it has to be treated as a non-focused element. Association with focus, or the lack thereof, has been judged based on the existence/absence of phonetic marking (in most cases, pitch accent) on the phrase that is in the quantificational domain of focus operators. It should be noted, however, that the phonetic marking of focus can be masked by independent phonetic/phonological effects. Rooth’s explanation for the absence

of accent on *rice* predicts that if this noun is expanded with a relative clause like *that absorbs a lot of water*, as in (8b), the entire complex noun phrase should be deaccented in both clauses, since the anaphoric effect he postulates on the context should be observed in the larger NP as well. This does not seem to be true though, since the first occurrence of *water* is preferably accented. In our opinion, there is an alternative explanation for the absence of accent on *rice* in a sentence like (8a), as there could be in the sentences (2) and (3), which has nothing to do with contextual or anaphoric quantification. *Rice* could be deaccented on prosodic grounds (see Féry & Samek-Lodovici 2006 for such an explanation). In (8a), an accent on *rice* would compete with the adjacent accent on *eat*, and the latter one wins because it has an additional contrast value that *rice* does not have. Furthermore, the SOF expressions in (2) could be deaccented because they are found in a postnuclear environment, in which no pitch accent can be realized. We find that deaccenting, or at least a strong reduction of pitch accents, is a consequence of postnuclearity, a phonological effect that is independent of the focus or non-focus status of SOF, an effect compatible with Rooth's and Beaver et al.'s results. But we also find that SOF expressions are accented when they are prenuclear. As soon as SOF expressions are in a phonological environment where they can be accented, they are accented. This is demonstrated in the next section.

3 Production Experiment

3.1 Stimuli and Hypotheses

All the experiments on SOF we are aware of investigate the occurrence of focus in a postnuclear environment. Our experience of intonation, however, is that postnuclear environments are not the best place to look for differences in pitch as a consequence of prominence. Reliable occurrences of non-nuclear accents in

German and in English are on prenuclear material, in other words, on the material located before the main focus of the sentence (Féry & Kügler 2008). Therefore, in our material, we investigated realizations of SOF in a prenuclear position as well as those in a postnuclear position.

Six expressions, underlined in (9), were chosen as the target expressions. Three of the target expressions (1–3) were inserted in the subject position, and three (4–6) in the object position. Hereafter, we will call the former group the *subject set* and the latter *object set*. Three different focus operators were used in our stimuli: *nur* ‘only’, *auch* ‘also’ and *sogar* ‘even,’ as shown in (9).

(9) Stimulus expressions (see appendix for all conditions)

- (1) Nur Peter hat eine Krawatte getragen.
only Peter has a tie worn
‘Only Peter wore a tie.’
- (2) Auch Melina hat beim Aufbau mitgeholfen.
also Melina has at.the assembly helped
‘Also Melina helped at the assembly.’
- (3) Sogar Monika hat Mailand geliebt.
even Monika has Milan loved
‘Even Monika loved Milan.’
- (4) Eva hat nur ihren Bruder eingeladen.
Eva has only her brother invited
‘Eva only invited her brother.’
- (5) Ingo hat auch einen Jaguar gekauft.
Ingo has also a jaguar bought
‘Ingo also bought a jaguar.’
- (6) Michael hat sogar ein Lied gesungen.
Michael has even a song sung
‘Michael even sang a song.’

Each expression is inserted in five different contexts, illustrated in (10): (a) FOF, (b) prenuclear SOF, (c) postnuclear SOF, (d) prenuclear Non-Focus, and (e) postnuclear Non-Focus context. Thanks to the V2 property of German, we can place SOF and Non-Focus expressions in different locations, either sentence-initially (prefield) or sentence-medially (middle field). When SOF and Non-Focus are in the sentence-initial position, they are followed by a nuclear pitch accent in the middle field. We call them ‘prenuclear SOF’ and ‘prenuclear Non-Focus,’ respectively. When they are in the sentence-medial position, they are preceded by a nuclear accent in the sentence-initial position, hence becoming the ‘postnuclear SOF/Non-Focus.’

Notice that the context eliciting SOF is identical to the FOF sentence (10a). The SOF in (10b) is located in a prenuclear position, while that of (10c) is located postnuclearly. The (d) and (e) sentences are pre-/postnuclear Non-Focus contexts, respectively, where the target words are already mentioned in the preceding wh-questions, and no focus operator is involved.

(10) Contexts for one sentence of the subject set ((1a)–(1e) in the appendix)

a. FOF

Die meisten unserer Kollegen waren beim Betriebsausflug
 The most our_{Gen} colleagues were at-the staff outing
 lässig angezogen.
 casually dressed
 ‘Most of our colleagues were dressed casually at the staff outing.’

Nur Peter hat eine Krawatte getragen.
 Only Peter has a tie worn
 ‘Only Peter wore a tie.’

b. SOF: Prenuclear

Die meisten unserer Kollegen waren beim Betriebsausflug lässig
 angezogen. Nur Peter hat eine Krawatte getragen.

Nur Peter hat sogar einen Anzug getragen.
 ‘Only Peter even wore a suit.’

- c. SOF: Postnuclear
 Die meisten unserer Kollegen waren beim Betriebsausflug lässig
 angezogen. Nur Peter hat eine Krawatte getragen.

Sogar einen Anzug hat nur Peter getragen.

- d. Non-Focus: Prenuclear
 Wen hat Peter geküsst? ‘Who did Peter kiss?’
 Who_{Acc} has Peter kissed
Peter hat Maria geküsst. ‘Peter kissed Maria.’

- e. Non-Focus: Postnuclear
 Wen hat Peter geküsst?
 Maria hat Peter geküsst.

As for the FOF context, the (a) sentences in the subject set (1a–3a in the appendix) contain FOF expressions in a sentence-initial position, while those in the object set (4a–6a in the appendix) contain FOF expressions in the sentence-medial position. In both cases, FOF bears a nuclear accent since no accent follows in the sentence. One of the sentence-medial FOF examples (i.e., (a) examples in the object set) is given in (11).

(11) FOF context for one of the object sets ((4a) in the appendix)

- a. FOF
 Viele Frauen haben mehrere Verwandte zum Dorffest eingeladen.
 many women have several relatives to the village fair invited
 ‘Many women have invited several relatives to the village fair.’

Aber Eva hat nur ihren Bruder eingeladen.
 But Eva has only her brother invited
 ‘But Eva only invited her brother.’

In sum, our material has six different conditions, with two factors being alternated: position in the sentence (pre- and postnuclear, or sentence-initial and medial) and focus type (FOF, SOF, Non-Focus). Since our design is not a complete 2×3 factorial design (because the subject set lacks postnuclear FOF data, and the object set lacks the prenuclear FOF data), we need to separate the data set into two groups when we compare the FOF conditions with others.

With this material, we will examine the following two hypotheses in (12). First, we expect to find a three-way difference between FOF, SOF, and Non-Focus, FOF being the most prominent and Non-Focus the least (Hypothesis 1). Second, we also expect different realizations according to location in a sentence, the sentence-initial expressions being more prominent than the sentence-medial counterparts (Hypothesis 2). This is expected to hold for FOF, SOF and Non-Focus. We use the term ‘prominence’ as a cover word for both pitch and duration.

(12) Hypotheses

- a. Hypothesis 1: FOF words are more prominent than SOF words which are themselves more prominent than Non-Focus words.
- b. Hypothesis 2: Sentence-initial words are more prominent than sentence-medial ones.

3.2 Recordings

Recordings were made in a sound-proof booth on a DAT recorder. A short set of instructions familiarized the subjects with the procedure and made them practice with a few examples. The contexts and answers were presented in a PowerPoint presentation, in a series of two slides per stimulus. On the first slide, the context was presented both acoustically and visually, and the target sentence appeared

on the second slide. The informant read the sentences as naturally as possible. The experiment was self-paced and the speakers were instructed to repeat the sentences if they felt that they had made a mistake.

The 30 sentences used for this experiment were part of a larger production experiments, including 200 sentences altogether. Each context was organized in one block of the 6 different sentences. The blocks were separated from each other by 17 or 20 other sentences.

Our speakers were 29 female students at the University of Potsdam. They were reimbursed for their time. They were monolingual speakers of German in their twenties, coming from the Northern area of Germany.

3.3 Measurements

The recordings were analyzed using the acoustic speech analysis software Praat© (Boersma and Weenink 1994–2006). The sound waves were manually divided into labeled sub-strings with the help of spectrograms. The divisions assigned one or two domains of measurements, depending on whether there was an article (or a possessive) preceding the target noun. In (13a) only one domain was defined, whereas in (13b), two were needed. The measurement on the article was necessary because in many cases, the falling nuclear accent started on the syllable preceding the accented syllable, a phenomenon called ‘early peak.’ This is well documented in the literature on German intonation (Kohler 1990), and it is visible in Fig. 1-ii below.

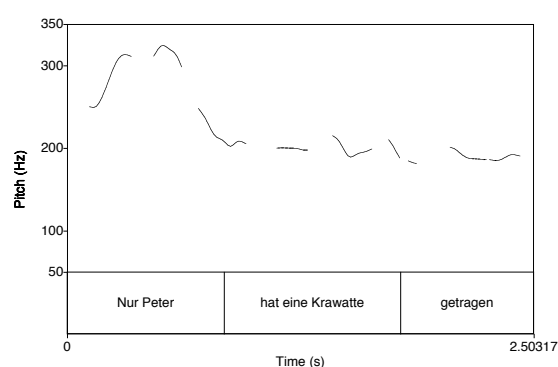
- (13) a. Nur # Peter # hat sogar einen Anzug getragen.
b. Auch Eva hat nur # ihren # Bruder # eingeladen.

Two values were measured. First, the highest peak of the domain defined by the target noun (plus the preceding article when present), and second, the duration

of the target noun (not including the article). The values were assigned by a script in Praat, but the authors manually verified all the sentences. In approximately 30% of the cases, changes were necessary because of microprosodic distortions in the pitch-tracks (especially in the noun *Peter* and *Monika*). Statistic analyses were done using the statistical computing environment R.

4 Results

Figure 1 illustrates examples of realizations for the six contexts: (i) sentence-initial FOF, (ii) sentence-medial FOF, (iii) prenuclear SOF, (iv) postnuclear SOF, (v) prenuclear Non-Focus, and (vi) postnuclear Non-Focus. From these pitch tracks one can see that sentence-initial/medial FOF (i.e., nuclear elements) (i, ii) as well as prenuclear SOF/Non-Focus (iii, v) preserve accents of the target expression (*Peter*, *Bruder*), but that this is not true for postnuclear SOF/Non-Focus (iv, vi).



(1-i) FOF: Sentence-initial



(1-ii) FOF: Sentence-medial

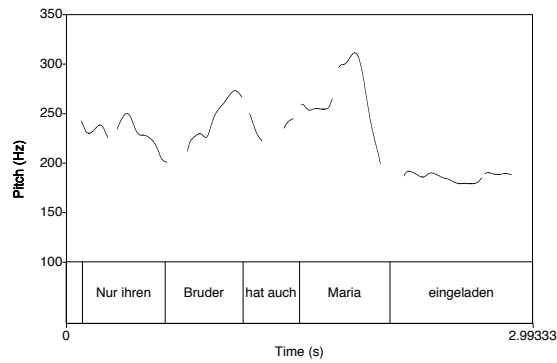


Figure 1-iii: SOF: Prenuclear

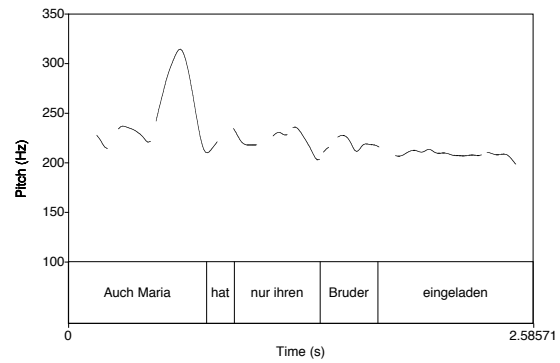


Figure 1-iv: SOF: Postnuclear

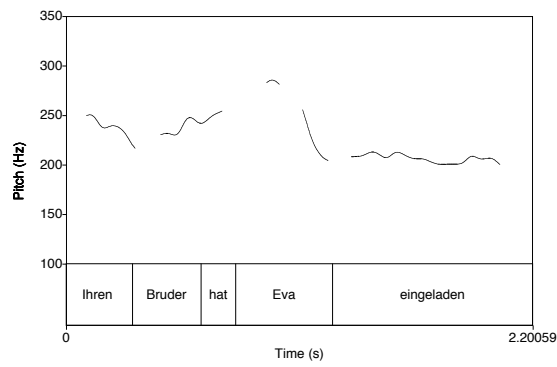


Figure 1-v: Non-Focus: Prenuclear

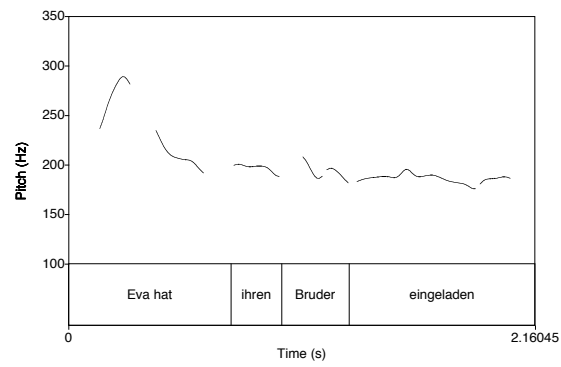


Figure 1-vi: Non-Focus: Postnuclear

Figure 1: Pitch tracks of the six conditions (1a, 4a–e in the appendix)
by one speaker

4.1 Pitch (F0)

Let us first consider Hypothesis 1, which claims that FOF is more prominent than SOF, which itself is more prominent than Non-Focus ($\text{FOF} > \text{SOF} > \text{Non-Focus}$). As mentioned in section 3.1, only the subject set has the sentence-initial FOF data, while only the object set has the sentence-medial FOF data. Therefore, comparison of the FOF conditions with SOF/Non-Focus is done by using the subject set data for sentence-initial FOF, and the object set for sentence-medial FOF. Figure 2-i and 2-ii show the mean highest log-transformed F0 on the target expression in the sentence-initial contexts (the

subject set data) and in the sentence-medial contexts (the object set data), respectively.³

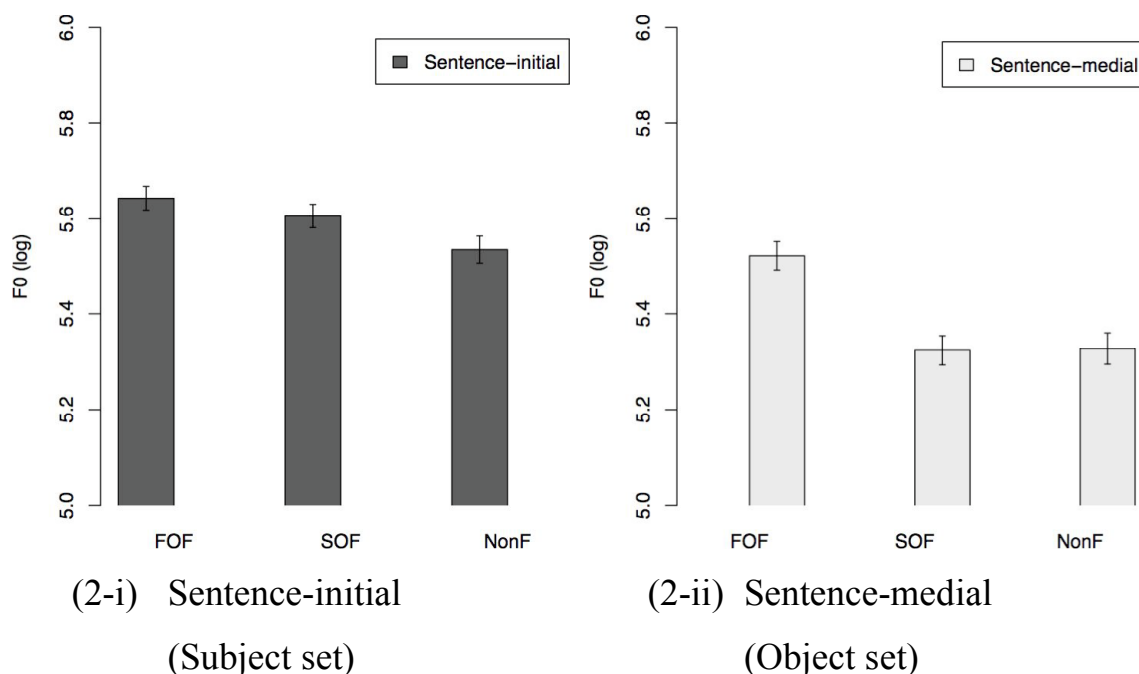


Figure 2: Mean log-transformed F0 for FOF/SOF/Non-Focus in sentence-initial/medial conditions (with 95% CI)

Both sentence-initially (Figure 2-i) and sentence-medially (2-ii), FOF is realized significantly higher than SOF (Sentence-initial: two-sided t-test, $t(166) = 2.1382$, $p\text{-value} < 0.05$; Sentence-medial: $t(166) = 9.1975$, $p\text{-value} < 0.001$). Note, however, that the difference between FOF and SOF are much larger sentence-medially.

SOF and Non-Focus can be compared using the entire data set, that is from the subject and the object sets together, as displayed in Figure 3. the difference between SOF and Non-Focus is statistically significant both sentence-

³ Note that we measured only the target expression in each sentence. Therefore the results in Figure 2 do NOT indicate the relative height between FOF and SOF in the same sentence (e.g., *Anzug* and *Peter* in (10b,c)), or the one between FOF and Non-Focus (e.g., *Maria* and *Peter* in (10d,e)).

initially and medially (sentence-initial: $t(334) = 5.2528$, $p < 0.001$; sentence-medial: $t(334) = 2.1601$, $p < 0.05$).⁴

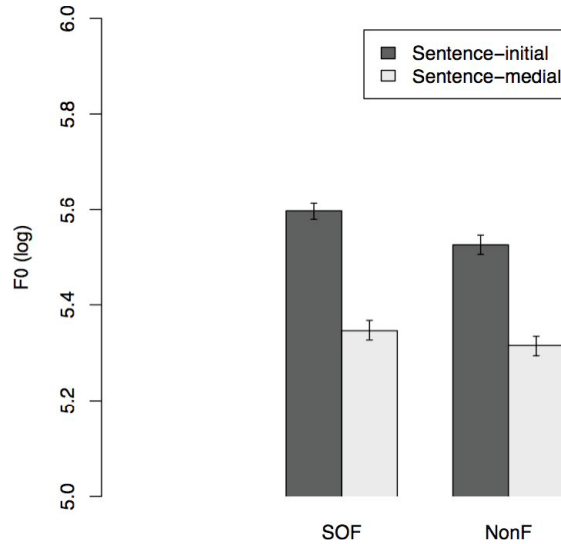


Figure 3: Mean log-transformed F0 for SOF/Non-Focus in sentence-initial/medial conditions (with 95% CI)

This means that Hypothesis 1 is confirmed both sentence-initially and medially. However, the clear difference in the realization between the sentence-initial and the sentence-medial SOF still needs to be explained, because this very low realization of SOF has been the very origin of the discussion of SOF. This will be taken up in section 6.

In the next step, Hypothesis 2 (sentence-initial > sentence-medial) is examined for SOF and Non-Focus context, using the entire data, as shown in Figure 3. We see that Hypothesis 2 is confirmed: In SOF and Non-Focus conditions, sentence-initial expressions are realized higher than their sentence-medial counterparts. Both for the SOF and the Non-Focus contexts, the mean difference between pre- and postnuclear SOF is statistically significant (SOF:

⁴ In Figure 2-ii (data from the object set), this difference is not significant ($t(166) = -0.1608$, $p\text{-value} = 0.8724$).

$t(320.263) = 18.0173$, $p < 0.001$; Non-Focus: $t(334) = 14.372$, $p < 0.001$). The two FOF conditions cannot be compared statistically since they are composed of different sentences. However, a glance at the values of FOF in sentence-initial and sentence-medial position in Figure 2 suggests that the sentence-initial FOF is realized higher than the sentence-medial FOF.

In sum, we have found the following for pitch:

(15) Summary for pitch

- a. Hypothesis 1 (focus type):
 In a sentence-initial/prenuclear position, the focus type hierarchy (FOF > SOF > Non-Focus) was established for pitch.
 In a sentence-medial/postnuclear position, the contrast between SOF and Non-Focus is radically reduced.
- b. Hypothesis 2 (sentence position):
 Prenuclear SOF/Non-Focus is realized higher than postnuclear SOF/Non-Focus.
 Sentence-initial FOF is expected to be realized higher than sentence-medial FOF.

4.2 Duration

In order to render the duration of target expressions comparable to each other, we performed a regression analysis to factor out the effect of the different word lengths in the target expressions. Figure 4-i and 4-ii show the mean residual durations of the target expression in the sentence-initial contexts (obtained from the subject set) and in the sentence-medial contexts (obtained from the object set), respectively. A higher residual value indicates longer duration (i.e., negative values indicate shorter duration than positive ones).

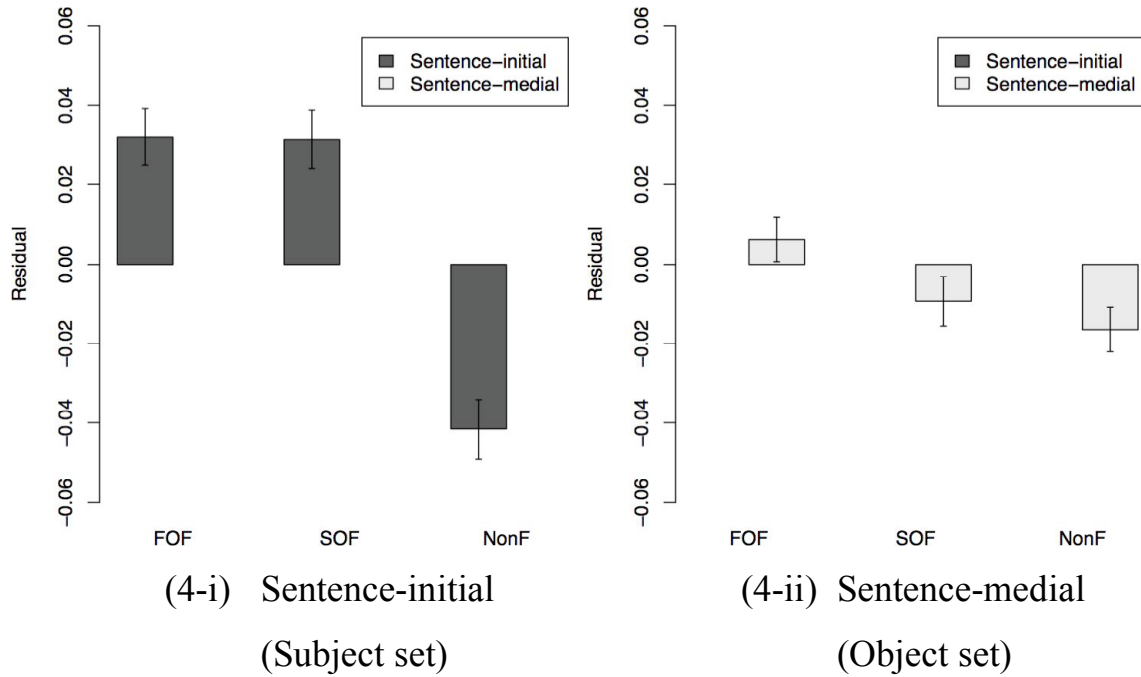


Figure 4: Mean residual duration for FOF/SOF/Non-Focus in sentence-initial/medial contexts (with 95% CI)

Let us first consider the result in terms of Hypothesis 1 (i.e., FOF > SOF > Non-Focus hierarchy). Sentence-initially, there is no significant difference between FOF and SOF ($t(166) = 0.1175$, $p\text{-value} = 0.9066$), while the difference between them is significant sentence-medially ($t(166) = 3.704$, $p < 0.001$). Not surprisingly, the difference between FOF and Non-Focus is significant both sentence initially and sentence medially. The difference in duration between SOF and Non-Focus, which is analyzed based on a comparison involving all data shown in Figure 5, is significant both sentence-initially and medially (Sentence-initial: $t(334) = 9.4808$, $p < 0.001$; sentence-medial: $t(334) = 7.0647$, $p = 9.416e-12$). In sum, the lack of significant difference between sentence-initial FOF and SOF requires an explanation. Otherwise, Hypothesis 1 holds for duration.

Consider next the results of Hypothesis 2 (sentence-initial > sentence-medial) for duration. Figure 5 shows the mean residual duration of SOF and

Non-Focus obtained from the entire data set. Once again, the FOF data cannot be compared as they consist of different sentences.

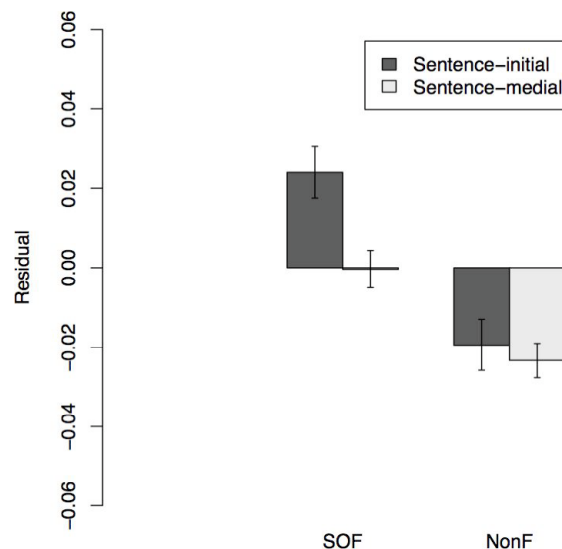


Figure 5: Mean residual duration for SOF/Non-Focus in sentence-initial/medial contexts (with 95% CI)

The contrast is significant in the SOF conditions ($t(307.259) = 6.0713$, $p < 0.001$), but not in the Non-Focus conditions ($t(294.307) = 1.0052$, $p = 0.3156$).

In sum, we have found the following for duration:

(18) Summary for duration

- a. Hypothesis 1 (focus type):
Sentence-initially, no significant difference between FOF and SOF could be found, but they are both longer than Non-Focus.
Sentence-medially, there is a significant difference between FOF and SOF, as well as between SOF and Non-Focus.
- b. Hypothesis 2 (sentence position):
SOF is longer sentence-initially than sentence-medially.
Non-Focus does not show any difference between the positions.

5 Perception experiment

A perception experiment bearing on the grammaticality of our context-answer pairs was conducted in order to verify whether the sentences with SOF (and thus two focus operators) are accepted by German native speakers.⁵

5.1 Method

36 students at the University of Potsdam participated to the experiment on acceptability judgment. The sentences in (9), in the contexts exemplified in (10b-e), had been pre-recorded in the accent structure shown in Fig.1. A native speaker spoke the context sentences and another one the target sentences. The context-answer pairs were then inserted into a perception experiment containing a large amount of fillers, run with an adapted version of Doug Rhodes' program Linger, which randomized the order of presentation of the sentences for each participant. The sentences were presented acoustically only, over headphones. Each participant had 8 sentences to rate, two versions of each sentence, in a Latin Square design. Altogether, 4 different sets of sentences were presented. The aim of this experiment was to compare the acceptability of the SOF sentences with straightforwardly well-formed sentences. We chose to compare them with the non-focus versions of the same sentences, instead of the FOF version, since the existence of pairs of sentences in both cases (pre-nuclear and sentence-medially) allowed a symmetry in the design of the experiment. The judgments were established on a scale from 1 to 7, 7 being the best and 1 the worst.

5.2 Results

The results are displayed in Fig. 6.

⁵ This experiment was conducted as an answer to a reviewer's comment who questioned the felicity of the pre-nuclear SOF sentences.

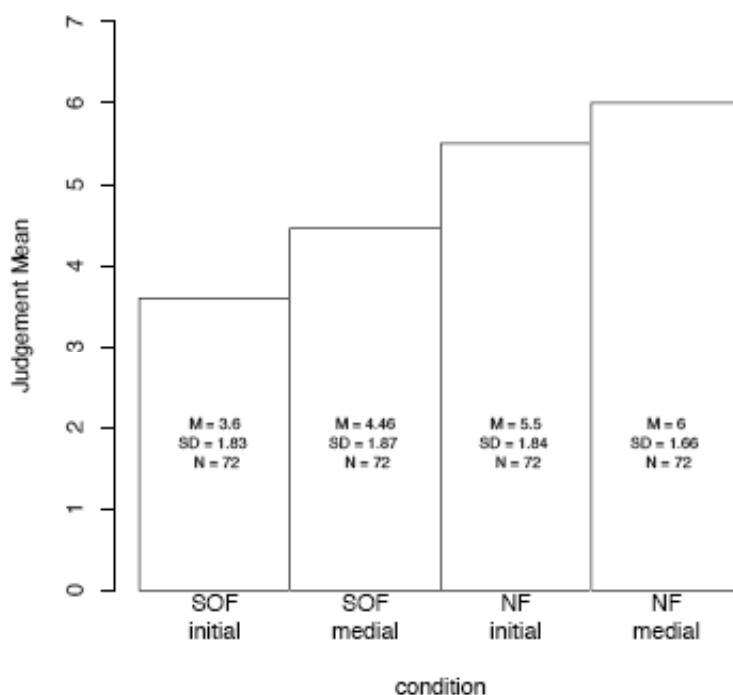


Figure 6: Mean judgment ratings in the scale of 1 (completely ungrammatical) to 7 (perfectly grammatical)

As expected, the non-focus sentences got very high ratings (5.5 and 6), and can thus serve as a point of comparison.⁶ As for the SOF sentences, both of them got scores above 3.5, an indication that they are accepted by German speakers, even though their markedness may render them difficult to process. The postnuclear version was rated higher (4.5) than the prenuclear one (3.6). We assume that the presence of two focus operators in a single sentence renders the semantic processing rather difficult, and that a side effect of the increase of processing effort reduces their acceptability (see for instance Fanselow & Frisch 2005 for this effect).

⁶ The side result that postnuclear non-focus had been judged better than the prenuclear ones with half a point difference can be due to the fact that a postnuclear non-focus is unambiguously unaccented, whereas a prenuclear one gets a prenuclear accent.

6 Discussion

6.1 Interpretation of the experimental results

Hypothesis 1 claims that the focus hierarchy $\text{FOF} > \text{SOF} > \text{Non-Focus}$ is implemented by means of the phonetic correlates of pitch and duration. Hypothesis 2 expects pitch and duration to have a greater effect sentence-initially than sentence-medially. The experimental results generally confirm these hypotheses despite cases where the expected differences were not found. These cases are explained below.

Beaver et al. (2007), who only studied postnuclear SOF, find that duration exhibits more reliable cues for SOF than pitch. We find, however, that, prenuclearly, pitch is more reliable, since pitch height in a SOF expression is lower than in a FOF but higher than in a Non-Focus one. On the other hand, postnuclearly, pitch can be considered as less reliable, as the difference found was minimal. This observation is in line with Rooth's and Beaver et al.'s results. Additionally, we find that, prenuclearly, duration only contrasts focused items with non-focused ones — the former are longer than the latter — and does not distinguish between FOF and SOF. But postnuclearly, we find the $\text{FOF} > \text{SOF} > \text{Non-Focus}$ hierarchy again. We also find an effect of duration depending on the position in the sentence. Early focused items are longer than late ones. This result does not apply for Non-Focus. Clearly, a new interpretation is needed.

As shown in the results, pitch and duration were implemented differently in our target expressions, but both covaried with the information structure as well as with the phonology. We thus propose to distinguish two types of effects that affect the realization of FOF/SOF/Non-Focus: information structure-driven effects on the one hand, and purely phonological effects on the other hand. The information structure-driven effect yields the focus type hierarchy in Hypothesis 1 both in sentence-initial and medial contexts. However, phonological effects,

some of which yield the effects related to the sentence position hierarchy in Hypothesis 2, interfere with the realization of the information structure-driven effects, and suppress or overwrite them in certain contexts.

The information structural effects are summed up in (19).

(19) Information structure-driven effects

- a. Focus boosts prominence (higher pitch/longer duration).
- b. Givenness weakens prominence (lower pitch/shorter duration).

In effect, information-structure driven effects create the FOF > SOF > Non-Focus hierarchy. Focused material (FOF/SOF) is realized with higher pitch and longer duration than Non-Focus. On the other hand, given material (SOF/Non-Focus) gets a weaker prominence. FOF, being only focus, is the most prominent of all conditions, and Non-Focus, being only given, is the least prominent. SOF, being both focused and given, underlies both effects. As a result, it is realized more prominently than Non-Focus, but less so than FOF.

In addition to these effects, pitch and duration are also affected by purely phonological factors:

(20) Phonologically-driven effects

- a. Downstep decreases the height of non-initial accents.
- b. Postnuclear deaccenting suppresses postnuclear accents.
- c. Final lengthening in phonological phrases increases duration.

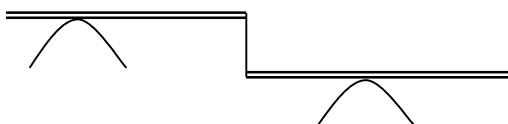
These factors obliterate or enhance the information structure-related effects in different contexts, creating more variety in the phonetic realization than we would expect if only information structure-driven effects were at play. The next two subsections discuss how the information structure-driven effects and the phonologically-driven effects interact in pitch and duration realization.

6.2 Pitch

If we think of sentences with a neutral focus structure (in which the whole sentence is presentational or ‘all-new’) as having a default pitch contour, we can draw an idealized tonal top line of registers like the one in (21). In the course of a sentence, accents are downstepped relatively to immediately preceding ones (see Pierrehumbert 1980 for English, Féry & Kügler 2008 for German). A pitch accent later in a sentence is therefore realized lower than a sentence-initial pitch accent. Accordingly, sentence-initial FOF is expected to be realized higher than sentence-medial FOF, because the latter is not the first accented element in its sentence, and is subject to downstep (see Fig.2).

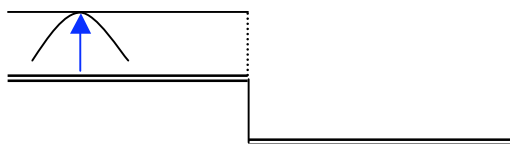
In the illustrations hereafter, the continuous double lines show the highest value of the default intonation contour, i.e., the level of high accentual peaks. Note that the form of the accents in the illustrations can stand for both a rise (LH) and a fall (HL). The only important point is the accentual H, which is involved in downstep.

(21) Downstep on non-initial pitch accents (= (20a))



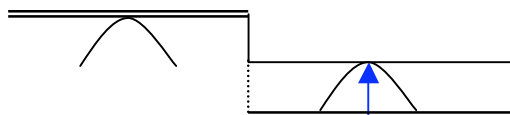
Considering the pitch configuration (21) as the default case, we can now show the effect of narrow focus on pitch as raising the top line, see (19a). In (22), this is illustrated first for a sentence-initial accent. The continuous double line shows the same value as in (21), but now the high tone of a focus accent is higher than in a sentence without narrow focus, as indicated by the single line. Such a configuration was visible in Figure 1-i above, with a sentence-initial FOF, where there is an early narrow focus.

- (22) Sentence-initial raising due to narrow focus (= (19a)), see Figure 1-i:
sentence-initial FOF



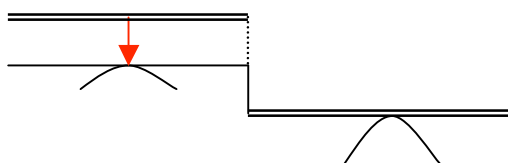
Top line raising because of narrow focus can also take place sentence-medially, as shown in (23). Such a configuration arose in our data in the sentences with sentence-medial FOF (see Fig. 1-ii). The second accent was still clearly lower relative to the first one, under the influence of downstep. Notice that our data do not contain neutral sentences such as illustrated in (21), so that we cannot show the raising. But we rely on other studies on German which establish the raising effect of narrow focus on a late accent (see Uhmann 1991, Féry & Kügler 2008 among others).

- (23) Sentence-medial raising due to narrow focus (= (19a)), see Figure 1-ii:
sentence-medial FOF



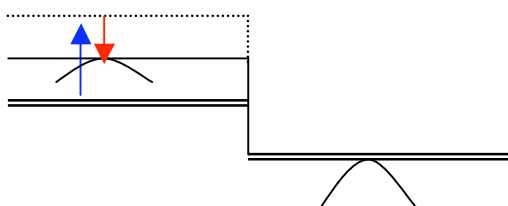
Counteracting the raising effect of focus, a lowering effect due to givenness (19b) is also identifiable, as in (24), which illustrates a prenuclear Non-Focus (cf. Fig.1-v).

- (24) Sentence-initial lowering due to givenness (= (19b)), see Figure 1-v:
prenuclear Non-Focus



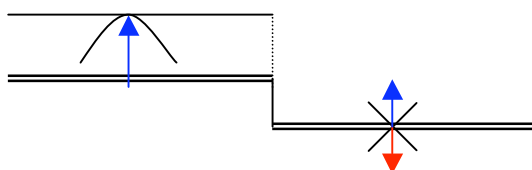
A prenuclear SOF is lower than a sentence-initial FOF because it is influenced by both the raising factor shown in (22) and the lowering effect shown in (24). But it is higher than a prenuclear Non-Focus, which undergoes only a lowering factor. (25) illustrates a prenuclear SOF (cf. Fig.1-iii).

- (25) Sentence-initial raising due to focus (= (19a)) and lowering due to givenness (= (19b)), see Figure 1-iii: prenuclear SOF



If the early accent is raised due to focus and bears the nuclear pitch accent, the potential late accent is suppressed due to postnuclear deaccenting (see (20b)).⁷ This is illustrated in (26). In our examples, the late accent is suppressed when the nuclear accent is in the sentence-initial position, i.e., sentence-initial FOF (Figure 1-i), sentence-medial/postnuclear SOF (Figure 1-iv), and sentence-medial/postnuclear Non-Focus (Figure 1-vi).

- (26) Postnuclear deaccenting after nuclear raising (cf. Figure 1-i, vi)



On the other hand, prenuclear accents are not suppressed, and may be realized in different ways: without changes (as in Figure 1-ii: first phrase in the sentence-

⁷ A similar phenomenon is also observed in Japanese. When a phrase receives a narrow focus interpretation, an F0-boosting is observed on the focused phrase, and pitch contour of all the following phrases are compressed. In the case of Japanese, however, pitch accents are still visible in the postnuclear region. Hence it may be better called post-focal reduction or compression rather than deaccenting. See Ishihara 2004 and references therein.

medial FOF condition, cf. (23)) both raised and lowered (as in Figure 1-iii: sentence-initial/prenuclear SOF, cf (24)), or only lowered (as in Figure 1-v: sentence-initial/prenuclear Non-Focus, cf. (25)).

In sum, as far as pitch is concerned, we discussed two information structure-driven effects on pitch: F0-raising due to focus (19a) and F0-lowering due to givenness (19b). These effects are fully realized in the sentence-initial context. As a result, we saw a three-way contrast among FOF/SOF/Non-Focus: FOF is subject to F0-raising, SOF to both raising and lowering, and Non-Focus to lowering only.

In the sentence-medial context, phonologically-driven effects affect the realization as well. Downstep (20a) lowers the non-initial pitch accents. As a result, sentence-initial FOF is realized lower than sentence-initial one, although both bear the nuclear pitch accent. Postnuclear deaccenting (20b) prohibits pitch accentuation after a nuclear pitch accent. This effect suppresses the information structure-driven effects in the postnuclear context. Hence postnuclear SOF and Non-Focus show only a minimal difference.

6.3 Duration

We saw that for duration, the FOF > SOF > Non-Focus hierarchy was observed sentence-medially, and FOF and SOF showed no significant difference sentence-initially. The best candidate for the source of this contrast appears to be prosodic phrasing and concomitant final lengthening.

As proposed for pitch, the effects for duration can be separated into information structure-driven (19a–b) and phonologically-driven ones (20c).

(19) Information structure-driven effects

- a. Focus boosts prominence (higher pitch/longer duration).
- b. Givenness weakens prominence (lower pitch/shorter duration).

(20) Phonologically-driven effects (duration)

c. Final lengthening in phonological phrases increases duration.

The information structure-driven effects amount to an increased duration for focused items, and a decreased duration for given items. We saw in the results for duration in section 4.2 that both FOF and SOF have a longer duration than a corresponding Non-Focus. The difference between FOF and SOF is only observed sentence-medially. Since SOF is at the same time focused and given, the absence of difference between FOF and SOF in sentence-initial position must be explained by phonological phrasing, the other source of difference in duration.

We follow the principles of prosodic phrase formation of Féry & Samek-Lodovici (2006) for German and English. A sentence-initial constituent forms its own prosodic phrase (p-phrase), but an argument and a following participle are united into a single phrase. Focused material (FOF and SOF) in the sentence-initial position tends to form a prosodic phrase of its own, because it is in the pre-auxiliary position (as one can see from Figure 1-i and 1-iii above). As a result, the duration of this sentence-initial material increases, due to phrase-final lengthening. It appears that this phrase-final lengthening masks the givenness effect expected on SOF and we do not find any significant difference in the sentence-initial position between FOF and SOF.

Sentence-medially, where FOF, SOF, and Non-Focus are all followed by the verb, the target expressions are not p-phrase-final. Focused material in the sentence-medial position is included into a larger prosodic phrase (cf. Figure 1-ii, 1-iv). In this case, we do not expect any final-lengthening effect. As a result, the information structure-driven effects can be fully observed: FOF is lengthened by focus, while SOF is both lengthened by focus and shortened by givenness.

As for Non-Focus phrases they are shortened due to givenness (cf. Figure 1-v, 1-vi).

In sum, duration is affected by both focus and phrasing. First, FOF is typically longer than Non-Focus, due to the sole effect of focus and givenness respectively. Second, SOF, being both focused, like FOF, and given, like Non-Focus, is also subject to an additional phrasing effect. If it is phrase-final, it is as long as FOF because of the phrase-final lengthening, while phrase-internally, it is longer than Non-Focus, but shorter than FOF.

6.4 Implications

In this last subsection, we return to the question of the relevance of phonological and phonetic cues for semantic interpretation. Our study participates to a series of studies which show the importance of considering the phonological and tonal system of a language in order to design experiments as well as to assess experimental results in relation to information structure.

In view of the data obtained, we are able to claim that FOF is phonologically and phonetically more prominent than SOF which is in turn more prominent than Non-Focus. Though the effects of this hierarchy on the two correlates examined, pitch and duration, were not parallel, this is due to independent factors of the intonational system of German, namely postnuclear deaccenting, downstep, and phrasing.

SOF expressions are realized by the phonetic means adequate for the positions in which they occur, and these are different in pre- and in postnuclear locations. Fine-grained differences between accents are realized by pitch and duration, but only prenuclearly in German. Experiments investigating only the postnuclear SOF realizations have no chance at arriving at this conclusion.

In view of the interest of SOF for the theory of focus, it is now possible to give a clear answer to the question whether SOF triggers phonological

prominence. The answer is positive, and confirms Beaver et al.'s findings: this prominence is less than a FOF accent, but more than a Non-Focus accent. It is only when independent phonological factors block pitch prominence that no accent can be realized, but this is independent of the intrinsic prominence of SOF.

Returning briefly to the remarks on semantic theories based on the phonetic presence of accents in section 2, our results are compatible with both a strong and a weak version of focus theories. Recall that the weak version is dependent on physical correlates of focus because it assumes the focus to be grammaticalized, both syntactically and phonologically. The strong theory of focus, on the other hand predicts that focus can be dissociated from accent, since it is triggered by contextual considerations. Common sense leads us to prefer a weak theory, since it is more constrained and relies on only one focusing device.

A further important conclusion of our experiments is that SOF must be interpreted in the phonology as arising from both the effect of focus (pitch raising, longer duration) and the effect of givenness (pitch lowering, shorter duration).

7 Conclusion

In this paper Second Occurrence Focus was investigated for German. Until now, this phenomenon had been exclusively looked at from the point of view of its implications for theories of focus. Weak theories of focus, which require (pitch) accents on elements associated with a focus operator, have been thought to be jeopardized if SOF is realized without any prominence. Strong theories of focus, which propose that focus is modulated by contextual effects, cannot explain why SOF can be accented at all, since an accent is not necessary in order for the SOF to be correctly interpreted. In this paper, we have tackled the issue from a

different angle and discussed the phenomenon from the point of view of phonology.

The results of our experiments in German, bearing on the phonetic correlates of first occurrence focus (FOF), second occurrence focus (SOF) and unfocused (Non-Focus) expressions, both in sentence-initial/prenuclear and sentence-medial/postnuclear contexts, indicate that it is crucial to keep issues of semantic theories and the phonological realization of accents apart. Prenuclear SOF are realized with pitch accents, albeit weaker than those accompanying FOF, but stronger than Non-Focus. In a postnuclear context, SOF has a longer duration than Non-Focus, but the difference in height between pitch accents is much less than in the pre-nuclear position. We concluded that this difference is due to phonological factors only. This conclusion should have implications for the way phonological experiments bearing on other parts of grammar are designed.

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9 Appendix: Stimuli

(a) FOF

- (1a) Die meisten unserer Kollegen waren beim Betriebsausflug lässig angezogen.

‘Most of our colleagues were dressed casually at the staff outing.’

Nur Peter hat eine Krawatte getragen.

‘Only Peter wore a tie.’

- (2a) Die Fleissigsten haben bei der Theateraufführung etwas beigetragen.

Auch Melina hat beim Aufbau mitgeholfen.

‘Also Melina helped at the assembly.’

- (3a) Die Reisegesellschaft war von Italien ganz begeistert.

Sogar Monika hat Mailand geliebt.

‘Even Monika loved Milan.’

- (4a) Viele Frauen haben mehrere Verwandte zum Dorffest eingeladen.

‘Many women invited several relatives to the village fair.

Aber Eva hat nur ihren Bruder eingeladen.

‘But Eva only invited her brother.’

- (5a) Meine Brüder sammeln Autos, vor allem Mercedes und BMWs.

Ingo hat auch einen Jaguar gekauft.

‘Ingo also bought a jaguar.’

- (6a) Bei der Weihnachtsparty waren alle guter Laune.

‘At the Christmas party, everybody was in a good mood.’

Michael hat sogar ein Lied gesungen.

‘Michael even sang a song.’

- (b) SOF: Prenuclear

- (1b) Die meisten unserer Kollegen waren beim Betriebsausflug lässig
angezogen. Nur Peter hat eine Krawatte getragen.

‘Most of our colleagues were dressed casually at the staff outing. Only
Peter wore a tie.’

Nur Peter hat sogar einen Anzug getragen.

‘Only Peter even wore a suit.’

- (2b) Die Fleissigsten haben bei der Theateraufführung etwas beigetragen.

Auch Melina hat beim Aufbau mitgeholfen.

‘Also Melina helped at the assembly.’

Auch Melina hat sogar beim Getränkenverkauf geholfen.

‘Also Melina has helped with

- (3b) Die Reisegesellschaft war von Italien ganz begeistert. Sogar Monika hat
Mailand geliebt.

‘Even Monika loved Milan.’

Sogar Monika hat auch Venedig geliebt.

‘Even Monika also loved Venice.’

- (4b) Viele Frauen haben mehrere Verwandte zum Dorffest eingeladen. Aber Eva hat nur ihren Bruder eingeladen.

‘Many women invited several relatives to the village fair. But Eva only invited her brother.’

Nur ihren Bruder hat auch Maria eingeladen.

‘Also Maria only invited her brother.’

- (5b) Meine Brüder sammeln Autos, vor allem Mercedes und BMWs. Ingo hat auch einen Jaguar gekauft.

‘Ingo also bought a jaguar.’

Auch einen Jaguar hat sogar Markus gekauft.

‘Even Markus also bought a Jaguar.’

- (6b) Bei der Weihnachtsparty waren alle guter Laune. Michael hat sogar ein Lied gesungen.

‘At the Christmas party, everybody was in a good mood. Michael even sang a song.’

Sogar ein Lied hat auch Waldemar gesungen.

‘Also Waldemar even sang a song.’

- (c) SOF: Postnuclear

- (1c) Die meisten unserer Kollegen waren beim Betriebsausflug lässig angezogen. Nur Peter hat eine Krawatte getragen.

‘Most of our colleagues were dressed casually at the staff outing. Only Peter wore a tie.’

Sogar einen Anzug hat nur Peter getragen.

‘Only Peter even wore a suit.’

-
- (2c) Die Fleissigsten haben bei der Theateraufführung etwas beigetragen.
Auch Melina hat beim Aufbau mitgeholfen.
'Also Melina helped at the assembly.'
Sogar beim Getränkenverkauf hat auch Melina geholfen.
- (3c) Die Reisegesellschaft war von Italien ganz begeistert. Sogar Monika hat Mailand geliebt.
Auch Venedig hat sogar Monika geliebt.
'Even Monika also loved Venice.'
- (4c) Viele Frauen haben mehrere Verwandte zum Dorffest eingeladen. Aber Eva hat nur ihren Bruder eingeladen.
'Many women invited several relatives to the village fair. But Eva only invited her brother.'
Auch Maria hat nur ihren Bruder eingeladen.
'Also Maria only invited her brother.'
- (5c) Meine Brüder sammeln Autos, vor allem Mercedes und BMWs. Ingo hat auch einen Jaguar gekauft.
'Ingo also bought a jaguar.'
Sogar Markus hat auch einen Jaguar gekauft.
'Even Markus also bought a Jaguar.'
- (6c) Bei der Weihnachtsparty waren alle guter Laune. Michael hat sogar ein Lied gesungen.
'At the Christmas party, everybody was in a good mood. Michael even sang a song.'
Auch Waldemar hat sogar ein Lied gesungen.
'Also Waldemar even sang a song.'
- (d) Non-Focus: Prenuclear
- (1d) Wen hat Peter geküsst?

‘Who did Peter kiss?’

Peter hat Maria geküsst.

‘Peter kissed Maria.’

(2d) Was hat Melina gesehen?

‘What did Melina see?’

Melina hat einen Unfall gesehen.

‘Melina saw an accident.’

(3d) Wen hat Monika eingeladen?

‘Who did Monika invite?’

Monika hat ihren Vater eingeladen.

‘Monika invited her father.’

(4d) Wer hat ihren Bruder eingeladen?

‘Who has invited her brother?’

Ihren Bruder hat Eva eingeladen.

‘Eva has invited her brother.’

(5d) Wer hat einen Jaguar gekauft?

‘Who bought a Jaguar?’

Einen Jaguar hat der Lehrer gekauft.

‘The teacher bought a Jaguar.’

(6d) Wer hat ein Lied gesungen?

‘Who sang a song?’

Ein Lied hat der Knabenchor gesungen.

‘The boy choir sang a song.’

(e) Non-Focus: Postnuclear

(1e) Wen hat Peter geküsst?

‘Who did Peter kiss?’

Maria hat Peter geküsst.

‘Peter kissed Maria.’

(2e) Was hat Melina gesehen?

‘What did Melina see?’

Einen Unfall hat Melina gesehen.

‘Melina saw an accident.’

(3e) Wen hat Monika eingeladen?

‘Who did Monika invite?’

Ihren Vater hat Monika eingeladen.

‘Monika invited her father.’

(4e) Wer hat ihren Bruder eingeladen?

‘Who has invited her brother?’

Eva hat ihren Bruder eingeladen.

‘Eva has invited her brother.’

(5e) Wer hat einen Jaguar gekauft?

‘Who bought a Jaguar?’

Der Lehrer hat einen Jaguar gekauft.

‘The teacher bought a Jaguar.’

(6e) Wer hat ein Lied gesungen?

‘Who sang a song?’

Der Knabenchor hat ein Lied gesungen.

‘The boy choir sang a song.’

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