Information Status and Prosody: Production and Perception in German*

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In a production experiment and two follow-up perception experiments on read German we investigated the (de-)coding of discourse-new, inferentially and textually accessible and given discourse referents by prosodic means. Results reveal that a decrease in the referent's level of givenness is reflected by an increase in its prosodic prominence (expressed by differences in the status and type of accent used) providing evidence for the relevance of different intermediate types of information status between the poles given and new. Furthermore, perception data indicate that the degree of prosodic prominence can serve as the decisive cue for decoding a referent's level of givenness.

Keywords: prosody, information status, discourse referent, degree of givenness, cognitive activation, prominence, pitch accent, perception

1 Introduction

This paper concentrates on investigations of a referent's level of *givenness* (also called *information status*) within a discourse context and (a) its prosodic marking in the production as well as (b) its decoding by prosodic means in the perception of read German.

The aim is to find evidence for the basic assumption that changes in a referent's level of givenness are reflected in corresponding changes in its prosodic marking. In addition to discourse-new and immediately evoked (given) referents, we distinguish referents that are accessible due to implicit (inferentially accessible) and non-immediate explicit (textually accessible)

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previous mention. The status[1] and type of accent used as prosodic marker is supposed to differ in its degree of prominence as follows: the 'newer' the referent, the higher the produced prominence. We expect that the listener in turn is able to interpret the referent's information status by means of its degree of prosodic prominence.

Several studies on English and German (see section 2) have shown that differences in a referent's level of givenness cannot adequately be described by a simple accented vs. unaccented dichotomy. Instead, they provide evidence that the tonal configuration on a referent is important for encoding its givenness.

The following section 2 provides a more detailed account of the notion of givenness and the relation between a discourse referent's information status and its prosodic marking in German and English. The resulting research questions and hypotheses were tested in three carefully controlled experiments on read German. These are a production study (section 3) and two follow-up perception experiments (section 4). A summary of the main results and final conclusions are given in the last section 5.

2 Information Structure and Accentuation

In a conversation participants usually exchange information via propositions, which represent specific states of affairs. The set of propositions being valid in a communicative situation are often referred to as *(shared) knowledge* (e.g. Clark & Haviland 1977) or *common ground* (e.g. Stalnaker 1974; Chafe 1976; Krifka 2007). Depending on the discourse context a proposition is said to be informative if it is not entailed by the common ground (cf. Büring 2007). To put it simply, *new* (informative) information is usually expressed with respect to information that is already *given* ('known' by the interlocutors). Accordingly,

[1] *Status* refers to an accent's status in the prosodic hierarchy.

the referents[2] of single sentence constituents that are usually encoded in argument categories such as NPs/DPs, PPs or pronouns, can be assigned a particular information status (cf. Prince 1992) or degree of givenness.

The dimension of *given* versus *new* information is a central part in the investigation of information structure. Nevertheless, the various approaches to givenness in the literature differ with respect to the level this notion applies to (see Prince 1981 for an overview). Since an analysis of givenness requires considering the position of both speaker and listener, our notion of givenness/information status is based on the (cognitive) *activation cost* approach proposed by Chafe (1976, 1994) and Lambrecht (1994). Chafe defines givenness as the degree of activation of a referent or proposition that the speaker assumes to be in the listener's consciousness at the time of utterance. Following Lambrecht (1994) the activation of a referent requires it to be *identifiable*, that is the listener is assumed to have a mental representation of it. As a consequence, a referent that is stored in the listener's long term memory needs to be activated in the listener's consciousness by the discourse context in order to be considered as given. The less activated or given an item is the more activation costs a speaker has to invest for its activation. Chafe and Lambrecht postulate three steps of cognitive activation that correspond to three levels of givenness. On the one hand information can be already fully activated or *given* and on the other hand information can still be inactive or so to speak *new*. They additionally propose an intermediate level of cognitive activation between these poles that can be referred to as *accessible* (semi-active) information.

Prince's model (1981, *Assumed Familiarity Scale*) also acts on the speaker's assumption about the listener's level of knowledge and differentiates a middle category of givenness, namely *inferable* information. A referent is

[2] The (non linguistic) mental representation of objects, persons and abstractions.

inferable, when it is accessible from the preceding discourse (by logical reasoning). An anaphora 'the driver' is for example inferable from an antecedent 'a bus', since it is common knowledge that buses have drivers. Following Clark (1977) this implicit reference involves cognitive *bridging* between a non-coreferring antecedent and an anaphora referred to as *bridging inference*. Generally the accessibility of a referent is indicated by its morphosyntactic marking as a definite NP. Concerning *new* information Prince distinguishes between *unused* referents, marked as definite, and non accessible *brand-new* referents, marked as indefinite. As opposed to brand-new information, unused information is assumed by the speaker to be known to the hearer but has not yet been introduced in the current discourse. Although an unused referent is 'discourse-new' (cf. Prince 1992) it is marked as definite in order to indicate its *identifiability* (see also Lambrecht 1994).

A referent's level of givenness has often been shown to be marked by prosodic means. For West Germanic languages like German and English it is commonly assumed that new referents are marked by pitch accents and given referents are not accented or more precisely are deaccented[3] (e.g. Cruttenden 2006). However, there is evidence that given referents are often accented in prenuclear/prefocal position (e.g. Terken & Hirschberg 1994) when they are a second focus element (SOF, Féry & Ishihara 2009) or due to rhythmical reasons (see Baumann, Becker, Grice & Mücke 2007; Féry & Kügler 2008).

Furthermore, several studies on English (e.g. Brazil 1975; Gussenhoven 1984, 2002; Pierrehumbert & Hirschberg 1990; Chen, den Os & de Ruiter 2007) and German (e.g. Kohler 1991; Baumann 2006; Baumann & Grice 2006) provide evidence that variations in the tonal configuration also mark important differences concerning an item's information status. In particular, Pierrehumbert

[3] *Deaccentuation* indicates the absence of a pitch accent on a word that is expected to be accented in an analogous unmarked 'all-new' utterance (cf. Ladd 1980).

& Hirschberg's study suggests a ternary distinction between high accents for new, low accents for accessible and no accents for given referents. Kohler's perception experiments reveal a categorical change in perception indicating an interrelation between medial/late peaks and some kind of *new* information on the one hand and between early peaks and *established* information on the other. The relation between higher pitch accents and later accentual pitch peaks to the expression of 'newness' is also reflected in Gussenhoven's (2002) *Effort Code*. In addition these differences in pitch have been shown to lead to an increase in perceived prominence (cf. Gussenhoven 2002, 2004; Ladd & Morton 1997).

Moreover, there is evidence that different accent types are used to discriminate between different types of accessible information. Baumann & Grice (2006) found a significant preference for H+L* accents over H* accents and deaccentuation in whole-part-relations and scenario conditions whereas deaccentuation was preferred over H+L* and H* accents in relations such as converseness, part-whole, synonymy and hypernym-hyponym (in either order).

To sum up, the results of the presented studies are indicative of the following relation: The higher the pitch on a lexically stressed syllable and the later the pitch peak, the higher the perceived prominence and the 'newer' the discourse referent. Furthermore, accessible information cannot be treated as just one uniform intermediate category between the poles *given* and *new* and, different types of more or less activated information demand different accent types as linguistic markers with the degree of prominence being the determining factor (Baumann 2006; Bauman & Grice 2006; Schumacher & Baumann 2010).

In order to find further evidence for this tendency we conducted a production experiment (see section 3; Röhr & Baumann 2010) and two follow-up perception experiments (see section 4; Röhr & Baumann 2011) on carefully controlled read data in German (Baumann, Röhr & Grice, submitted). The concept of givenness is actually understood to be potentially continuous. Since

the experimental setup does not guarantee absolute continuity of *degrees* of givenness, we rather distinguish different *levels* of semantic-cognitve activation. We investigated four classes of definite discourse referents that differ in their level of givenness, due to a varied salience in a text-internal discourse: On the one hand the referents are discourse-*new* or *unused*, referring to items that are generally known and that are identifiable from their own linguistic description. On the other hand the referents are *given* since they corefer to an antecedent in the immediately preceding discourse. In addition two types of accessible information are distinguished: One class of referents is textually accessible due to previous mentioning that is non-immediate or *displaced* (cf. Yule 1981). The other class of referents is inferentially accessible from a previously introduced scenario involving cognitive *bridging*.

3 Production Study

Our working hypothesis is based on the assumption that new, accessible and given information differs in the degree of cognitive activation in the listener's consciousness, which leads to differences in the activation effort by the speaker. For the two types of accessible information we assume that inferentially accessible information (due to the bridging inference) probably requires more activation cost than the explicit repetition of a referent, however displaced. Different reading comprehension tasks provide evidence for this. Haviland & Clark (1974) and Clark & Haviland (1977) showed in psycholinguistic experiments that accessible referents that require inferential bridging take longer to process than given ones. Furthermore, Clark & Sengul (1979) found referents that have not been previously mentioned within two or three preceding sentences to be significantly less activated than referents whose previous mention is immediate. Recent neurolinguistic experiments using event-related

brain potentials (ERPs) provide further support for an activation cost model (Burkhardt 2006, 2007; Burkhardt & Roehm 2007).

Since the speaker's activation effort is expected to be encoded by variations in the prosodic prominence we hypothesize that prosodic prominence produced increases with an increase in a referent's newness. This means, the less given or activated a discourse referent is:

(i) (a) the more likely it is to be marked by a pitch accent.
(b) the more likely it is to be accented with a *nuclear*[4] pitch accent. (The prominence of prenuclear accents is only secondary in relation to nuclear accents (cf. Jagdfeld & Baumann 2011; Ladd 2008))
(c) the more likely it is that the accent's (relative) pitch is higher and the accentual peak later in relation to the accented syllable.

3.1 Method

The reading material is composed of ten different target words denoting discourse referents. Each of them is embedded in four target sentences in three different contexts in order to elicit four different types of information status of the target words (new, bridging, given-displaced, given). The target words are bi- and tri-syllabic nouns in feminine gender (*Ballade* 'ballad', *Banane* 'banana', *Dame* 'lady', *Lawine* 'avalanche', *Rosine* 'raisin') and proper names (*Janina, Nina, (Dr.) Bahber/Bieber, Romana*), always with stress on the penultimate syllable and a comparable segmental structure. The structure of the target sentences and their NP are simple and kept constant in all contexts: That is, each target sentence starts with a pronominal subject followed by the finite part of the separable verb and the target word and ends with the verbal particle

[4] A *nuclear* pitch accent is defined as the last pitch accent in an intonation unit (e.g. Crystal 1996; Ladd 2008). It constitutes the only obligatory element in the phrase and is considered to be the *structurally* (phonologically) most important element determining the interpretation of the phrase's information structure.

(i.e. the prefix of the separable verb). The target word is always encoded with a **definite** direct object which is supposed to indicate its *identifiability* (cf. Lambrecht 1994). An example for the target word 'banana' is given in table 1.

Table 1: Sample reading material for the target word 'banana' in English translation. The target sentences are printed in bold face and the target words are underlined.

CONTEXT 1: (a) new / unused (b) given-displaced
(a) ***Ich*** [***nehme die Banane mit.***] Focus
(b) ***Er*** [***steckt sich die Banane ein.***] Focus
"What would you like?" **(a) "I'll take the banana (along)"**, says Thomas to the fruit merchant. He usually eats very unhealthily and he is always eating sweets between meals. He hardly ever plays sport, and if he does he prefers mini golf. **(b) He pockets the banana.** The banana looks delicious. Maybe he'll buy them more often in future.
CONTEXT 2: (c) inferentially accessible / bridging
(c) ***Er*** [***steckt sich die Banane ein.***] Focus
Today Thomas is allowed to feed his favourite monkey in the zoo. With great anticipation he's about to set off (for the zoo). **(c) He pockets the banana.** He's just been to the green grocer's at the market especially to get one.
CONTEXT 3: (d) given
(d) ***Er*** [***steckt sich***]Focus ***die Banane*** [***ein***.] Focus
Thomas has just bought a banana at the market. **(d) He pockets the banana.** In the future he wants to eat much more healthily.

In target sentence (a), the target word is mentioned for the first time and is not derivable from the previous context sentence. The target referent is identifiable, but at this point still inactive in the minds of speaker and listener and can therefore be classified as (discourse-)*new* or *unused* (cf. Prince 1992). After two or three intervening context sentences with a change in topic, the target word is repeated in target sentence (b). Due to the displacement of the target word (antecendent) in sentence (a) from the centre of attention, the target word (anaphora) in sentence (b) is no longer fully activated (cf. Clark & Sengul 1979; see also *Centering Theory*: Grosz, Aravind & Weinstein 1995) but textually accessible. The target word's information status will be classified as *given-*

displaced. The second context sets up a scenario, from which the target word in target sentence (c) is *inferentially accessible.* That is, the target word has not been explicitly mentioned before but is derivable from the preceding contextual frame via a *bridging* process (e.g. the banana is inferable from a zoo-monkey-food context). In sentence (d), the target word is a repetition of an antecedent in the immediately preceding context sentence. In contrast to sentence (b), this target word is already fully activated and thus *given*. Furthermore, only in sentence (d) the target word is part of the background due to its immediate previous mention. In target sentences (a), (b) and (c), the target words are part of a broad focus domain.

We recorded nine native speakers of Standard German (six female, three male), aged between 22 and 31 (mean = 25, SD = 2.7). All of them originated from the area around Cologne and Düsseldorf. Before the acoustic recordings, each subject was asked to read through the material quietly in order to guarantee full comprehension. After that, their task was to read out the reading material (three times in randomised order) in a contextually appropriate manner to a potential hearer as for example in a role-play. A total of 120 target sentences per speaker entered into the analysis.

We annotated the F0 minima and maxima relating to pitch accents **on the target words** and classified them according to GToBI (cf. Grice & Baumann 2002; Grice, Baumann & Benzmüller 2005). In addition we distinguished whether a pitch accent on the target word occupies a prenuclear or nuclear 'position' which indicates its *status* in the prosodic hierarchy. The structure of the target sentences, with the argument in non-final position, allows the nuclear accent either to fall on the target word or on the sentence-final verbal particle. In the latter case the target word is either deaccented (marked by 'Ø'), or receives a prenuclear accent (marked by 'PN', e.g. in *Er steckt sich die BaNAne EIN.*). In

the following the results concerning the accent's *status* on a target word refer to the distinction between nuclear, prenuclear and no accents.

3.2 Results and Discussion

The results of the production study prove a significantly different distribution of nuclear pitch accent types, prenuclear accents and no accents depending on the target word's information status (chi-square test: $p<0.001$) as shown in figure 1. We do not distinguish different prenuclear accent *types* since 96% of all prenuclear accents exhibit a low starred element. The results are presented in order of the hypotheses starting with the analysis of accent status followed by the analysis of different nuclear accent types.

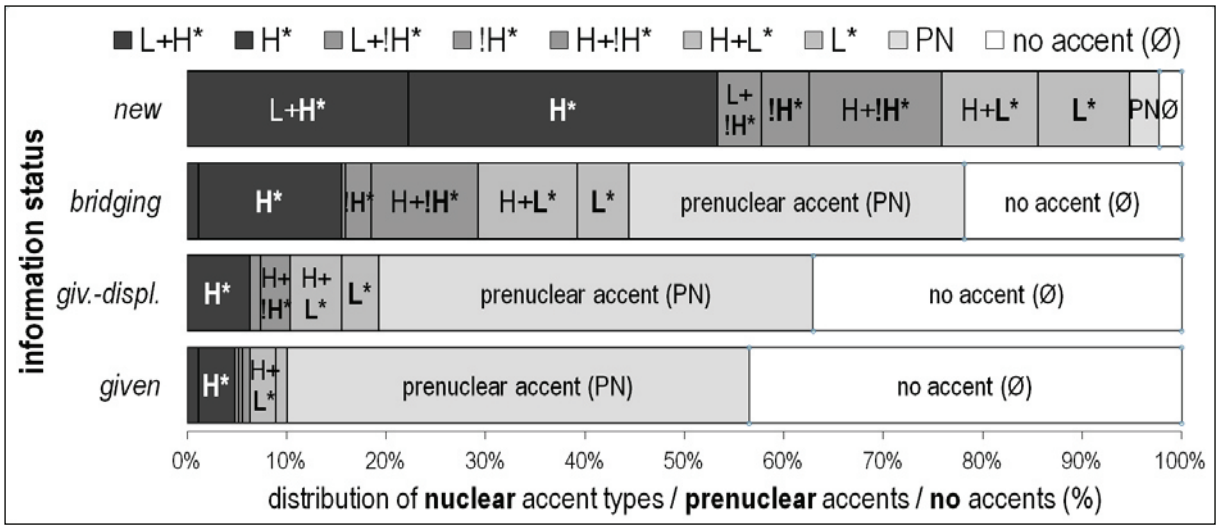

Figure 2: Relative distribution of nuclear accent types, prenuclear accents (PN) and no accents (Ø) on all target words per information status (all speakers).

Generally the analysis of accent status shows that the target words are preferably marked by pitch accents (nuclear and prenuclear, always over 56%)) rather than being not accented at all. Nevertheless, a target word is more frequently deaccented, as it increases in givenness (cf. Hypothesis (i)/(a)). As for the accented material, the number of nuclear pitch accents progressively increases,

the newer a target word is (cf. Hypothesis (i)/(b)), while the number of prenuclear pitch accents decreases.

Thus discourse-new information is primarily marked by nuclear pitch accents (94.8%) (cf. Gussenhoven 1983; Selkirk 1984). Given target words rarely receive a nuclear accent (10.0%) but are realized almost equally often with prenuclear accents (46.5%) or no accents (43.5%). The two types of accessible information take an intermediate but significantly distinct position: Given-displaced target words predominantly exhibit prenuclear accents (43.7%) or no accents (37.0%), whereas inferentially accessible (bridging) target words more frequently bear a nuclear accent (44.4%).

Collapsing accent categories into three groups, depending on the starred tone, the results show that the proportion of all three *nuclear* accent groups (H*, !H*, L*) increases from given to new information. This increase is particularly clear for accents with an H* element, since high accents with a medial (H*) or late peak (L+H*) are most commonly used to mark new information (53.5%). For accessible and given information, lower accent types are more important, in particular accent types with an early peak (H+!H*, H+L*). Thereby a relative tendency towards L* accents as opposed to !H* accents becomes apparent the more given a target word is. (cf. Hypothesis (i)/(c))

The results generally confirm that changes in a referent's level of givenness are reflected in corresponding changes in its prosodic marking: The distribution of accent types (including differences in accent status) reveal a progressive increase in the prosodic prominence from given through textually accessible to inferentially accessible and finally to new referents. This indicates an increase in the *likelihood* of particular accent types on the respective types of information status (cf. Calhoun 2010).

4 Perception Studies

In order to verify the results of the production study (see section 3) from the perspective of the hearer, we aimed to test whether variations in prosodic prominence have an effect on the perception of a referent's information status. Therefore we conducted two perception experiments on a selection of target sentences of the production study, both in sentences in isolation (section 4.1, perception *without context*) and in context (section 4.2, perception *with context*).

For each information status (new, bridging, given-displaced, given) we selected seven target sentences (and their original corresponding contexts) of the production study that differed in the status and type of accent realised **on the target words**. That is, we tested five nuclear pitch accents H*, !H*, H+!H*, L*, H+L*; one low prenuclear pitch accent (PN) and no accent (Ø). In order to keep the variation in the prosodic realisation of the 28 test sentences to a minimum, they all showed a prenuclear rising accent on the finite part of the separable verb with a peak in medial (H*) or late position (L+H*) and a sentence-final low boundary tone (L-%). In test sentences with a prenuclear or no accent on the target word the nuclear accent falls on the sentence-final verbal particle and is realized with an H+L* accent.[5] No adjustments of the original utterances were made, except for an equalization of the sound level of the test material.

The web-based perception experiments were developed by means of a software package named "oFB - der *onlineFragebogen*" (SoSciSurvey 2011). Each experiment was provided via an open URL. 83 native German speakers (no experts in speech analysis) took part in each experiment (*without context*: 65% female; *with context*: 61% female). [6] They were aged between 19 and 75

[5] For sample pitch contours see Röhr & Baumann (2011) and Baumann et al. (submitted).

[6] The group of subjects for the perception experiment *without context* partly overlaps with the group of subjects for the perception experiment *with context*.

(*without context*: mean = 30.6, SD = 13.7; *with context*: mean = 29.1, SD = 12.5) and grew up in 14 different German Federal States.

4.1 Perception *without Context*

If no context is provided, we assume that a referent's prosodic marking has an effect on its perceived degree of givenness. With regard to the results of the production study we hypothesize the following:

(ii) An increase in a referent's prosodic prominence by (a) the presence of an accent, (b) a nuclear accent status and (c) a (nuclear) accent type with a higher pitch and later pitch peak all trigger a decrease in its perceived degree of givenness.

4.1.1 Method

In this experiment the target sentences were tested in isolation, no context was given. The participants' task was to evaluate whether the target word in a test sentence sounded as if it was (rather) known or unknown. A test sentence was automatically played twice, separated by a pause of one second, without being presented orthographically.

Subjects gave their judgements by placing a roll bar on a continuous line between two end-points and without apparent scaling (visual analogue scale (VAS)). The responses on this *givenness scale* are encoded as interval data[7] with the lowest numerical value (1%) at the left pole 'known' and the highest numerical value (100%) at the right pole 'new'. The evaluation was carried out for each test sentence separately three times in randomised order (a total of 84 stimuli for evaluation in the main part of the experiment).

[7] However, VAS does not guarantee that the differences between the points of measurement are equally distant and that they are interpreted similarly by different subjects. In order to eliminate subject effects relating to the use of VAS we therefore used a repeated measures ANOVA for statistical analysis.

4.1.2 Results and Discussion

As an overall result, the responses on the *givenness scale* were significantly influenced by the *status* of accent as well as the nuclear accent *type* on a target word (repeated measures ANOVA (RMAOV): accent status $F(2,83) = 24.406$, $p<0.001$; nuclear accent type $F(4,83) = 13.458$, $p<0.001$).

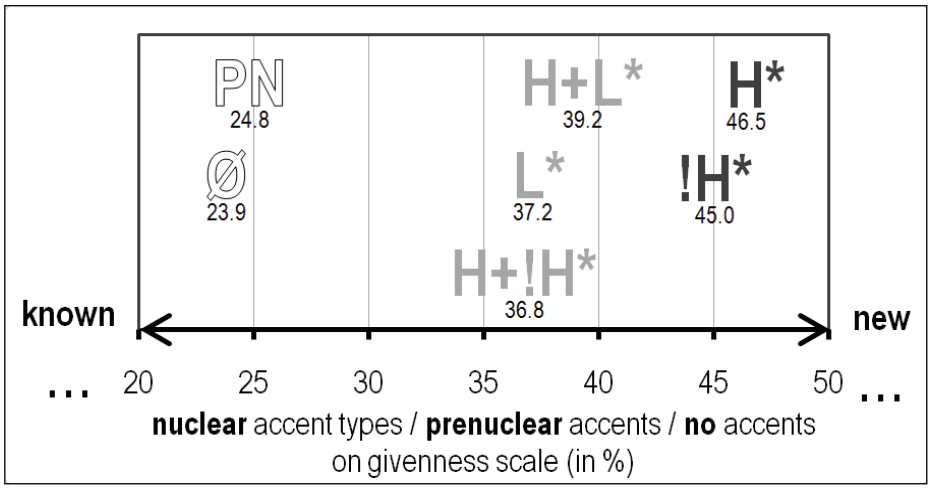

Figure 2: Distribution of nuclear accent types, prenuclear accents (PN) and no accents (Ø) on the givenness scale according to their mean response values.

As shown in figure 2 the results reveal that a target word realized with no accent or a low prenuclear accent (mean = 24.4%, SD = 24.6) is most likely to be perceived as known, or *given*, whereas target words that show a local F0 rise to the accentual peak (H*, !H*) are perceived as least given (mean = 45.8%, SD = 31.5). Low accents and early peak accents (L*, H+L*, H+!H*) with a predominant falling part onto the accented syllable take an intermediate but significantly distinct position (mean = 37.3%, SD = 28.0). Thus, hypothesis (ii) is generally confirmed: A referent is perceived as less given the more prominent it is prosodically marked. However, the significant difference between accent types is not necessarily reflected by the relative pitch height of the starred element but by the tonal movement before the accented syllable (cf. Grice, Mücke & Ritter 2012; Ritter, Riester & Grice 2012).

Strikingly, the perceptual differences solely reside in the first half of the evaluation scale which belongs to the side of the 'known' pole. This may be due to the definite article, which marks the target word as being identifiable/known (see section 2) and affects the perception of newness.

4.2 Perception *with Context*

Based on the assumption that a referent's information status can be marked and interpreted by means of prosody we hypothesize that the appropriateness of a prosodic marking varies depending on the referent's degree of activation by the discourse context as follows:

(iii) An increase in a referent's prosodic prominence by (a) the presence of an accent, (b) a nuclear accent status and (c) a (nuclear) accent type with a higher pitch and later pitch peak is perceived as contextually more appropriate for referents with a decreasing level of givenness.

4.2.1 Method

In this experiment, the test sentences were rated in relation to their corresponding contexts. For this, the entire context (including the target sentence) was presented orthographically and automatically played once. The task was to evaluate how well the melody of the test sentence fits into the context. The scale used for evaluation was the same as in the perception experiment *without context* (VAS, see section 4.1) but with the left pole (1%) labelled as 'not at all', meaning not appropriate, and the right pole (100%) labelled as 'very well', meaning appropriate (*acceptability scale*).

The experiment consisted of four parallel sub-experiments. That is, in a sub-experiment we only tested test sentences with the same type of information status originating from the same single context type. Each test stimulus had to be evaluated separately three times in randomised order adding up to 21 stimuli for

evaluation in the main section of each sub-experiment. Since the four sub-experiments are provided randomly by selecting the open URL the sub-experiment with the *given-displaced* condition has 23 participants, 20 subjects participated in the other three sub-experiments each.

4.2.2 Results and Discussion

The results reveal differences in the appropriateness of the *status* of an accent used with respect to its role as prosodic marker of different types of information status as shown in figure 3.

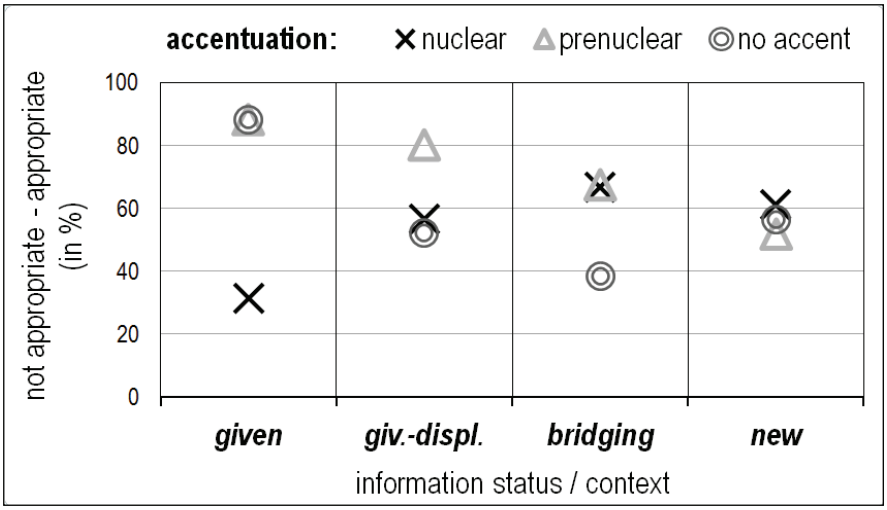

Figure 3: Distribution of nuclear accents (all accent types pooled), prenuclear accents (PN) and no accents (Ø) on the acceptability scale according to their mean response values in the four sub-experiments.

The prosodic marking by nuclear accents is increasingly more appropriate, the *less* given a target word is, whereas the appropriateness of prenuclear accents and deaccentuation increases the *more* given a target word is (with the exception of new information). In the following the results are presented in more detail from given through given-displaced and bridging to new target words.

Deaccentuation (88%, SD = 11.6) and low prenuclear accents (88%, SD = 12.4) turned out to be best qualified to mark given target words, while nuclear accents (31.1%, SD = 29.3) are least qualified as their prosodic marker

(RMAOV: $F(2,20) = 107.118$, $p<0.001$). Low prenuclear accents (80.1%, SD = 14.4) also seem to be an appropriate prosodic marker for given-displaced target words while the appropriateness of no accents (52.2%, SD = 30.5) and nuclear accents (56.4%, SD = 24.4) takes an intermediate position on the acceptability scale (RMAOV: $F(2,23) = 12.126$, $p<0.001$). In the bridging condition, nuclear (66.6%, SD = 27.9) as well as prenuclear accents (67.4%, SD = 22.6) were both judged rather appropriate and deaccentuation rather inappropriate (38.4%, SD = 32.0) (RMAOV: $F(2,20) = 11.039$, $p<0.01$). As an exception, we did not find significantly different ratings attributed to the status of accent for new target words: nuclear, prenuclear and no accents take an intermediate position on the acceptability scale. This is probably due to the preceding context question eliciting a broad focus in the target sentence that is exclusively composed of discourse-new items, which leaves room for a wide variety of possible prosodic realizations of the target sentence. [8]

Hypothesis (iii) was confirmed in terms of accent *status*, even for the two types of accessible information: The less given a referent is the more appropriate is a prosodic marking with a higher prominence (no accent < prenuclear accent < nuclear accent). Concerning the acceptability of different nuclear accent types we found no significant differences depending on the target word's information status.

5 Summary and Conclusions

In a production experiment and two follow-up perception experiments on read German we investigated the (de-)coding of discourse-new, inferentially accessible, textually accessible and given discourse referents by different

[8] In the perception experiment with the new condition the whole context after the target sentence was not presented. This might have led to a different interpretation of the informativeness of the target sentence/word than in the production experiment.

nuclear accent types, prenuclear accents and deaccentuation. We found that changes in a referent's level of givenness are reflected in changes in its production (differences in *status* and *type* of accent used) and perception (*acceptability* of differences in the *status* of accentuation *within context*): The 'newer' the referent (from given through accessible to new), the more appropriate is an increase in the pronounced prosodic prominence. As expected, inferentially accessible items involve a higher degree of prosodic prominence than textually accessible items. This seems to confirm that a bridging inference between an anaphora and its antecedent involves more activation cost than the explicit repetition of a displaced referent (e.g. Haviland & Clark 1974; Clark & Haviland 1977) providing further evidence for the relevance of **different** intermediate levels of (cognitive) *activation/givenness* between the poles *active /given* and *inactive/new*.

Deaccentuation and (low) prenuclear accents were mostly interpreted as encoding given items, and turned out to be best qualified to mark given referents. In these cases the nuclear accent falls on the following verbal particle leading to a weaker prominence of the target word's accent in relation to the nuclear accent (cf. Jagdfeld & Baumann 2011; Ladd 2008). Accordingly, referents with nuclear accents were perceived as least given. They are also more frequently used and perceived as more appropriate the newer a referent is.

These results show that the relation between a referent's information status and its (de-)coding by prosodic means is primarily reflected by differences in the prosodic *status* of accentuation on the referent (cf. Baumann & Riester, submitted). Furthermore, they confirm that given information does not necessarily need to be deaccented (e.g. Baumann et al. 2007; Féry & Kügler 2008). Thus an appropriate account of the (de-)coding of a referent's givenness requires a more fine-grained differentiation of prosodic prominence by means of differences in the *status* of accent.

In terms of the form and function of different accent types the perception study (*without context*) suggests that the determining factor for the decoding of a referent's information status is the tonal movement onto the accented syllable (cf. Grice et al. 2012; Ritter et al. 2012): Falling accents with an F0 minimum (L*) and/or an early peak (H+L*, H+!H*) lead to the perception of a higher degree of givenness than rising accents with a high or downstepped accentual peak (H*, !H*).This is also reflected by trend in the results of the production study and will be further investigated in future work.

To sum up, we finally showed that a referent's prosodic marking *can* serve as an important cue for the interpretation of its information status or level of givenness. For future work the investigation of the interplay between prosody and other (lexicogrammatical) markers of information status will lead to a better understanding of how prosody contributes to the structuring of information.

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