

Prosodic Correlates of Linguistic and Extra-Linguistic Information in Dutch

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Abstract

In this paper, we discuss the interplay of factors that influence the intonational marking of contrast in Dutch. In particular, we examine how prominence is expressed at the prosodic level when semantically abnormal information conflicts with contrastive information. For this purpose, we conducted a production experiment in Dutch in which speakers described scenes containing fruits with unnatural colors. We found that semantically abnormal information invokes cognitive prominence which corresponds to intonational prominence. Moreover, the results show that abnormality may overrule the accentual marking of information structural categories such as contrastive focus. If semantically abnormal information becomes integrated into the larger discourse context, its prosodic prominence decreases in favor of the signaling of information structural categories such as contrastive focus.

Keywords: contrastive information; semantic abnormality; information structure; prosody; discourse.

Introduction

West Germanic languages such as Dutch, English and German are claimed to signal information structure by means of intonation, i.e. through a defined set (or combinations) of pitch accents, prosodic boundaries and accent distribution. The one-to-one correspondence between a particular information structural category such as *focus* and a particular phonological feature such as type of pitch accent has been questioned in the literature. Nevertheless, there is a general consensus that speakers express more salient information by means of more prominent intonation patterns so that listeners can easily detect and interpret the informativeness of the message.

From an information structural view, the more salient information is referred to as *focus*, e.g. the most informative part of the message which is also most likely to code novelty. In the case that focus does not project to the whole message (e.g. like in an all focus structure), a further distinction between *contrastive* and *presentational* focus has

been made (Selkirk, 2002). We adopt the semantic distinction between contrastive and non-contrastive information within the *focus* domain. We assume that any *contrast* presupposes the existence of an alternative set. From a semantic point of view, contrastive focus represents the selection of an element from a limited set of similar yet different items. Consider (1-2):

1. [Maria bought a red dress]_{ALL F.}
- 2a. *Did Maria buy a blue dress?*
- 2b. Maria bought a [red]_{CONTR F} dress.

In terms of information structure, the examples (1-2) differ regarding their information structure as they represent distinct *focus domains* (denoted here in brackets) depending on the preceding discourse context (indicated by a dialogue question such as (2a)). Thus, the noun phrase “a red dress” may be realized as (i) an all focus structure when (1) is uttered out of the blue; and (ii) a narrow contrastive focus structure when it adds new information evoking contrast to the preceding discourse (2b). The *contrastive focus type* in (2b) arises from the yes/no question (2a) to which it provides an answer. In other words, a contrastive interpretation of focus is dependent on the presence of an alternative set in the preceding discourse and on the larger context to which it belongs.

Discourse, Prosody and Contrast

The assumption that contrastive focus emerges as a result of the existence of an alternative set in the preceding discourse context has been questioned in the literature. According to Bolinger (1972), *every* focus establishes a contrast relation to a set of alternatives irrespective of the discourse context. Moreover, it is semantic unpredictability that gives rise to a contrastive interpretation (i.e., words that are unpredictable in a particular discourse context are the most likely to be contrastive). After all, the position of prosodic prominence

does not evoke contrastiveness because nuclear accents are syntactically unrestricted.

In contrast, according to Chomsky (1971), it is the accent distribution violating the Nuclear Stress Rule which gives rise to contrastive focus. This assumption is further supported by experimental findings on Dutch (Krahmer & Swerts, 2001): the perception of contrastive information must be attributed to the occurrence of pitch accents in a *non-default position*¹ in the utterance. Furthermore, Swerts (2007) found that Dutch speakers take various discourse factors into account when they assign prosodic prominence to contrastive elements in an utterance. These findings provide the basis for the current experiment and will be discussed in more detail in the next section. We claim that contrastive focus arises as a result of the presence of an alternative set in the preceding discourse. Furthermore, we argue that contrastively focused constituents are produced and perceived as prosodically most prominent.

Semantic Abnormality, Contrast and Prosody

Contrastive focus is not the only factor that attracts prosodic prominence in an utterance. For instance, Pan, McKeown, and Hirschberg (2001) found that semantically unexpected words can also bear an accent when their occurrence in a particular discourse context is unusual. In the current study, we investigate the consequences of a prominence competition between semantically abnormal information and contrastive focus information for their expression at the prosodic level. We define *semantic abnormality* as referring to an information unit (e.g., a noun phrase (NP) such as a *blue* banana) whose properties do not match with its conceptual representation (e.g., a *yellow* banana). In other words, semantically abnormal elements in our study correspond to a particular unnatural property introduced by a NP modifier.

In order to successfully examine the effect of semantic abnormality on intonation, we replicated Swerts' (2007) production experiment on contrast and accentuation in Dutch and Romanian. In that study, speakers described the movements of differently colored geometrical figures in consecutive scenes presented on a computer screen. Swerts varied various factors in order to investigate the prosodic prominence of contrastive information: (i) *contrasted NP element* (adjective vs. noun); (ii) *contrast direction* (forward vs. backward, i.e. contrasted target element is the first or the last mentioned element in a contrastive pair respectively); (iii) *syntactic status* (subject vs. object); (iv) *discourse distance* (contrast within vs. across the sentence boundary). Swerts' (2007) results suggest that the prosodic prominence of contrast depends on which NP element has been contrasted: adjectives are generally more likely to be associated with a single matching pitch accent than nouns.

¹ Note that this finding is inconsistent with the compositional approach to intonational meaning (Pierrehumbert & Hirschberg, 1990) which assigns a particular meaning to a definite set of pitch accents. According to the authors, it is the L+H* pitch contour that conveys a contrastive meaning of the corresponding lexical item.

In addition to the correlation between contrast and accent on the one hand, and non-contrast and no accent on the other, Swerts (2007) identified various discourse factors that influence the prosodic marking of contrast in Dutch. NP elements which are contrasted within the sentence boundary and occur in a backward contrast direction are most often introduced by a single matching pitch accent as opposed to elements contrasted across the sentence boundary and in a forward contrast direction. These single pitch accents are perceived as prosodically most prominent and are further used to enhance the prominence of contrasted elements in a nuclear position. Finally, NPs containing contrasted nouns are realized more often with double accents (on both NP items) which suggests that contrasted nouns are prosodically less prominent than contrasted adjectives.

In the current experiment, we used Swerts' (2007) experimental paradigm as it was, and only manipulated the 'semantic load' of the stimuli: target referents and their modifiers were replaced with fruits with unnatural colors. In this way our results are directly comparable to Swerts' findings which serve as a baseline for our experiment. By generating semantically abnormal stimuli (i.e., *blue* bananas), we created a prominence conflict between contrast and abnormal information that were assigned to each of the NP elements in the target NP respectively. Due to the fact that both semantic abnormality and contrastive focus have been found to trigger prosodic prominence, we intend to examine how the prominence conflict is resolved by means of accentuation. The discussed previous findings do not allow us to make any predictions about the category which would be more likely to elicit stronger prosodic prominence marking.

The following terminological distinctions are made in the current study: regarding the type of perceptually and prosodically outstanding information, *prominence* is used to refer to contrast at the linguistic level, whereas *salience* indicates what we will call "semantic abnormality" at the extra-linguistic, conceptual level. Hence, contrastive focus is assumed to represent an element for which an alternative set is present in the immediate discourse context. In contrast, semantically abnormal information refers to an element whose features (i.e., *color* in the current experiment) violate its conceptual representation. We examine the accentuation patterns for cases of conflicting co-occurring prominence and salience in the NP domain.

Method

Participants

Ten native speakers of Dutch (age 22-35; 7 female) were paid for participation in a production experiment that partially replicates Swerts' (2007) study. Subjects were unaware of the aim of the experiment and had no phonetic background. The experiment lasted for approximately 15 minutes.

Procedure

All recordings were made in a soundproof studio at the University of Groningen. Participants were presented with various consecutive scenes on a computer screen consisting of three successive movements. In each scene, four pairs of fruits (bananas, lemons, cherries, and raspberries) moved towards each other. For each pair of fruits, the color was varied, such that all target NPs were displayed with an unnatural color (e.g., *blue* bananas). The fruits always appeared and acted as a pair (or trio, in some cases).

In each scene, three consecutive actions were displayed, such that one pair of fruits moved towards another one, touched it and returned to its original position. Participants initiated the change to a successive action of a scene by a mouse click. Movement directions were randomized.

Prior to the experiment, participants took part in two trial sessions. Participants were asked to describe the actions of each scene by naming both color and shape of the moving objects and by producing sentences with a fixed SVO word order such as “The red bananas touch the blue bananas on the screen” (Dutch – “De rode bananen raken de blauwe bananen op het beeldscherm”). We asked the participants to produce a prepositional phrase after the object NP in order to allow for a direct comparison between pitch accents in initial and final sentence positions. By doing so, we were able to rule out a possible prominence increase of nuclear pitch accents in sentence final positions that might have arisen due to a combination with a prominent break tone.

Materials

Figure 1 displays an experimental scene with three consecutive movements as indicated by the numbers. Note that for illustration purposes, a greyscale is used to indicate the color differences in the actual experiment.

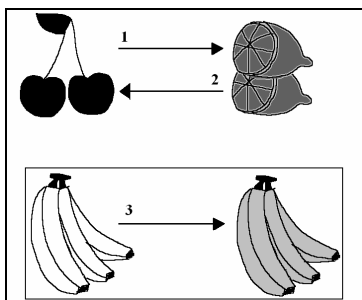


Figure 1: Experimental scene with three consecutive movements. The target action is displayed in a box.

As mentioned earlier, we modified Swerts’ (2007) experimental paradigm by replacing the geometrical figures in his experiment by pairs of fruits and by interchanging the original colors. In this way, we created two sets of abnormal (i.e., blue bananas, grey lemons, etc.) and normal objects (i.e., red cherries).

The first two actions of a scene (see Figure 1, arrows 1 and 2) set up a discourse context for the target sentence

which is defined as the third (and last) movement in a scene. In each target sentence, a contrast relation is established, either between the *color* of identical fruits (*blue* bananas vs. *red* bananas) or between the *shape* of identically colored fruits (blue *bananas* vs. blue *lemons*). Furthermore, in target sentences there is only one target NP (“blue lemons” and “grey bananas” in the current experiment). Target NPs occur either in *subject* or in *object* position and consist of only one contrasted element, either the *adjective* or the *noun*. Moreover, contrast relations hold either between two NPs *within* (within-contrast in the target sentence) or *across* the sentence boundary (e.g., between the target NP and a NP in the preceding second sentence). Note that across-contrasts apply only to NPs in the *second* and *third* movement of a scene. All these discourse factors are assumed to influence the accentuation of contrasted elements (Swerts, 2007)..

In order to avoid terminological confusion, we adopt Swerts’ (2007) terms for forward- and backward contrast direction. As in the original experiment, we included scenes with double contrasts where one NP element in the target NP (the adjective) is contrasted within, while the other (the noun) is contrasted across the sentence boundary and *vice versa*. Table 1 summarizes provides examples for the experimental conditions. Target NPs are underlined, and both contrasted elements are italicized.

Table 1: Experimental conditions.

3 Contrast direction (forward (a) vs. backward (b))
a <u>The <i>grey</i> bananas</u> touch the <i>red</i> bananas on the screen.
b The <i>red</i> lemons touch <u>the <i>blue</i> lemons</u> on the screen.
4 Syntactic status (subject (a) vs. object (b))
a The <i>blue</i> bananas touch the green lemons on the screen. <u>The <i>grey</i> bananas</u> touch the green lemons on the screen.
b The green lemons touch the <i>grey</i> cherries on the screen. The green lemons touch <u>the <i>grey</i> bananas</u> on the screen.
5 Discourse distance (within (a) vs. across (b) sentence)
a <u>The <i>grey</i> bananas</u> touch the <i>grey</i> lemons on the screen.
b The <i>grey</i> lemons touch the green bananas on the screen. <u>The <i>blue</i> lemons</u> touch the green bananas on the screen.
6 Double contrast (A within, N across the sentence)
The green lemons touch the <i>grey</i> cherries on the screen.
The <i>red</i> bananas touch <u>the <i>grey</i> bananas</u> on the screen.

As can be inferred from the conditions, semantic abnormality applies to adjectives only, e.g. it may increase or decrease the prosodic prominence of focus depending on the contrast domain. In the case of contrasted *adjectives*, contrast and abnormality coincide; therefore, an enhancement of their prosodic correlates is expected. However, for contrasted *nouns*, contrastive focus causes prominence of the noun, whereas the semantically abnormal modifier triggers salience of the adjective. It is these cases that should provide insights in the interactions between discourse context and more general cognitive principles.

Analysis

From all 240 targets (24 target sentences x 10 subjects) which were cut out from the collected material, 16 (6.6%) were excluded from further analysis due to corrections, errors, and hesitations. Target NPs were not cut out from the sentence, but were rather analyzed in their sentence context because contrastiveness is assumed to be coded in the whole pitch contour (Krahmer & Swerts, 2001). Two intonation experts (the first author and one independent intonation researcher) performed an auditory analysis of the target sentences. The labelers judged the *prosodic prominence* of the elements within both NPs in a sentence, i.e., annotated the item that stood out perceptually as most prominent due to a pitch movement or higher intensity. Three observations led us to choose for such analysis: (i) deaccentuation was highly uncommon for repeated words that appeared as background information (1.1% of all NPs); (ii) prominence judgments are reliable cues for the perception of intonation patterns and contrast (Swerts, Krahmer & Avesani, 2002); (iii) accents on contrastive information have been reported to be perceptually most prominent in Dutch (Krahmer & Swerts, 2001).

Results

Mean percentages *Accentuation* (accent on adjective vs. on noun vs. on both) were calculated in each of the four major sets of conditions: 1) contrast direction, 2) syntactic status of contrasted element, 3) discourse distance between contrasted elements, and 4) double contrasts. See Table 2 for actual percentages (based on participant means) in all (sub-) conditions.

We conducted Repeated Measures ANOVAs for the four major condition sets separately, each with three within-subjects factors: *Accented Element* (Accent on Adjective vs. Noun vs. Both); *Contrasted Element* (Adjective vs. Noun), together with one of the following factors that are unique to a given condition set: *Direction* (Forward vs. Backward), *Syntactic Status* (Subject vs. Object), *Discourse Distance* (Within Sentence vs. Across Sentence), and *Double Contrast* (Subject Within vs. Object Within).

Contrast Direction

The factor *Direction* did not give rise to significant (interaction) effects. There was a main effect of *Accented Element* ($F(2,18)=50.81, p<0.001$), indicating that in general there were significantly more accents on the adjective (76.25%; $SE=4.7$) than on the noun (13.75%; $SE=3.9$) or on both elements (10.0%; $SE=4.1$); the number of accents on noun or both elements did not differ significantly. This effect was qualified by an interaction between *Accented Element* and *Contrasted Element* ($F(2,18)=10.87, p<0.005$). Post-hoc tests showed that adjectives differed from nouns with respect to every type of accentuation: 90% ($SE=4.1$) vs. 62.5% ($SE=7.7$), for single accents on the adjectives; 5% ($SE=3.3$) vs. 22.5% ($SE=5.8$), for single accents on the nouns; and 5% ($SE=3.3$) vs. 15% ($SE=5.5$), for accents on both elements (all p -values $< .05$).

Table 2: Percentages (plus SE) of marking of contrast in all (sub-)conditions in each of the four major conditions.

		Contrast on:		Accent on: (in %)		
		A/N	sub-condition	adjective	noun	both
contrast direction	A	forward		85 (7.6)	10 (6.7)	5 (5.0)
		backward		95 (5.0)	0 (0.0)	5 (5.0)
	N	forward		65 (13.0)	15 (10.7)	20 (11.1)
		backward		60 (12.5)	30 (11.1)	10 (6.7)
syntactic status	A	subject		85 (7.6)	0 (0.0)	15 (7.6)
		object		85 (7.6)	5 (5.0)	10 (6.6)
	N	subject		25 (8.3)	40 (12.5)	35 (13.0)
		object		15 (10.7)	65 (15)	20 (11.1)
discourse distance	A	within		95 (5.0)	0 (0.0)	5 (5.0)
		across		85 (7.6)	5 (5.0)	10 (6.7)
	N	within		60 (12.5)	30 (11.1)	10 (6.7)
		across		15 (10.7)	65 (15.0)	20 (11.1)
double contrast	A	subject		75 (13.4)	20 (13.3)	5 (5.0)
		in object		90 (6.7)	0 (0.0)	10 (6.7)
	N	subject		75 (13.4)	10 (10.0)	15 (10.7)
		in object		60 (12.5)	35 (13.0)	5 (5.0)

Syntactic Status

The factor *Grammatical Role* does not have a significant effect on the prosodic marking of contrast, either alone or in interaction. As in the previous condition set, we did find a main effect of *Accented Element* ($F(2,18)=5.25, p<0.05$), as a result of there being significantly more accents on the adjectives (52.5%; $SE=4.9$) than on other elements (nouns: 27.5%, $SE=6.7$; both: 20.0%; $SE=6.5$; final two conditions do not differ). Again, there was an interaction between *Accented Element* and *Contrasted Element* ($F(2,18)=21.39, p<0.001$), due to significant differences between contrasted adjectives on the one hand, and contrasted nouns on the other hand in terms of percentage single accents on the adjective (85.0%, $SE=6.7$ vs. 20.0%, $SE=7.3$), on the noun (2.5%, $SE=2.5$ vs. 52.5%, $SE=12.6$); there was no statistically reliable difference between contrasted adjectives and contrasted nouns (12.5%, $SE=5.6$ vs. 27.5%, $SE=9.5$; $p>.10$). This pattern of interaction indicates that the preference for accenting adjectives is not present, and indeed, is reversed, where contrasted nouns are concerned.

Discourse distance

Here we found a significant three-way interaction of *Accented Element* x *Contrasted Element* x *Discourse Distance* ($F(2,18)=3.62, p=0.05$). Follow-up analyses

showed a main effect of *Accented Element* (and no interaction with *Discourse Distance*) for all items where contrast was realized between *adjectives*, regardless of whether this contrast was within or across sentences ($F(2,18)=73.98$, $p<0.001$), reflecting a general preference for putting a single accent on the adjectives (adjectives: 90.0%, $SE=5.5$ vs. nouns: 2.5%, $SE=2.5$ vs. both: 7.5%, $SE=5.3$). When *nouns* were contrasted, however, we did find a significant interaction between *Accented Element* and *Discourse Distance* ($F(2,18)=7.27$, $p<0.01$), showing that adjectives are preferentially accented when nouns are contrasted within a sentence (adjectives: 60.0%, $SE=12.5$ vs. nouns: 30.0%, $SE=11.1$ vs. both: 10.0%, $SE=6.7$), but not when the contrast goes across sentence boundaries (adjectives: 15.0%, $SE=10.7$ vs. nouns: 65.0%, $SE=15.0$ vs. both: 20.0%, $SE=11.1$); thus, we found the same reversal of the adjective accentuation preference as in the previous set of analyses (i.e., regarding *Syntactic Status*).

Double Contrast

In the final set of *Double Contrast* conditions, only *Accented Element* had a significant effect ($F(2,18)=24.38$, $p<0.001$), again reflecting a strong preference for accenting the adjective in all sub-conditions (adjectives: 75.0%, $SE=7.5$ vs. nouns: 16.25%, $SE=5.6$ vs. both: 8.75%, $SE=4.6$; the final two conditions did not differ significantly).

In summary, then, we found consistent evidence for a strong preference to place single accents on the adjective of the contrasted NP, regardless of whether it is adjectives or nouns that are contrasted, and regardless of manipulations of discourse factors that have been shown to produce significant effects in earlier research (e.g., Swerts, 2007). The only exceptions are the cases where nouns are contrasted across sentence boundaries. Here, participants prefer to accent the nouns instead of the adjectives. In the next section we will discuss these findings in more detail.

Discussion

Semantic Abnormality Overrides Discourse

In this study we investigated how the prominence competition between semantically abnormal information and contrastive information is reflected in prosody. Unlike Swerts' (2007) findings, our results show that the discourse factors tested do not have a significant impact on the accentuation of contrastive focus, except for discourse distance. Moreover, we found that adjectives are realized most often as the single prosodically prominent NP element regardless of the contrasted item or discourse factors.

One might argue that our findings are brought about by the adjectives being varied more frequently in our experiment than the nouns, which might have led the participants to interpret them as inherently contrastive. However, this conclusion appears implausible for at least two reasons: (i) colors were varied as frequently as in the original experiment (Swerts, 2007) which failed to provide

evidence for such a correlation; and (ii) an intrinsic contrastive interpretation of adjectives does not arise from the presence of a modifier in the NP *per se*, but is triggered rather by a corresponding L+H* pitch accent (Weber, Braun & Crocker, 2006). We suggest that the highest prosodic prominence of adjectives must be attributed to the effect of semantic abnormality.

A further support for this assumption comes from the fact that the prosodic prominence of contrast remains mostly unaffected by discourse factors. As for *contrast direction*, Swerts (2007) found that backward contrasts increase the likeliness of both nouns and adjectives to bear a single matching pitch accent. In contrast, in our experiment adjectives were realized as the prosodically most prominent NP elements regardless of their occurrence in a forward or backward contrast relation and regardless of whether they belong to the contrastive focus domain or not. Therefore we assume that the strong prominence of modifiers arises from the need for a prosodic marking of semantic abnormality which overrules that of contrast. In the *syntactic status* condition, however, the semantic abnormality of modifiers does not decrease the prosodic prominence of contrasted nouns: pitch accents are assigned to the corresponding contrasted NP element, even though the effect does not reach significance. Moreover, and in accordance to Swerts (2007), the prosodic prominence of contrasted elements is not influenced by their occurrence in subject or object position. We suppose that the lack of a semantic abnormality effect on the realization of contrastive nouns in subject and object position may be related to the fact that contrast is established here *across* the sentence boundary. This assumption is further supported by the significant effect of *discourse distance*. Firstly, the overall semantic abnormality of adjectives does not diminish the prosodic prominence of contrasted nouns *across* the sentence boundary. In other words, the conflict between *salience* (i.e., semantic abnormality of the adjective) and *prominence* (i.e., contrastive focus on the noun) within a single target NP is solved in favor of a prosodic prominence due to contrast. Secondly, contrast relations between adjectives within the sentence boundary do not enhance their likelihood for a single matching pitch accent. In contrast to the results of the original experiment (Swerts, 2007), discourse distance does influence the prosodic prominence of nouns that are contrasted across the sentence boundary. This result is contrary to the assumption that prosodic prominence is exclusively triggered by semantic abnormality.

Information Structure Matters

In fact, semantic abnormality cannot fully account for the observed distribution of accentual prominence. Therefore, we went back to the experimental stimuli in order to investigate if there exist differences between the scene's discourse contexts with respect to the underlying information structure. Indeed, there were two types of discourse contexts across the experimental conditions which we list in (7-8).

Contrasted adjectives within the sentence boundary

- 7a. The grey bananas touch the green cherries on the screen.
7b. The green cherries touch the grey bananas on the screen.
7c. The *blue* lemons touch the *red* lemons on the screen.

Contrasted nouns across the sentence boundary

- 8a. The red cherries touch the blue raspberries on the screen.
8b. The red cherries touch the blue *bananas* on the screen.
8c. The red cherries touch the blue *lemons* on the screen.

These examples are representative for the discourse context of all experimental scenes. From an information structural view, target sentences in the within-contrast condition (7) have an underlying all focus structure, i.e. focus projects to the whole sentence, while the strongest accentual prominence appears in nuclear position (i.e., red lemons in (7c)). In contrast, target sentences in an across-contrast relation (8) have a narrow focus structure. They consist of mostly background elements, with the focused element being the only salient information within the sentence boundary while at the same time establishing a contrast relation to an element in the preceding sentence. Thus, elements contrasted across the sentence are entirely more prominent due to their underlying information structure. Therefore, adjectives and nouns in across-contrast relations appear most likely to become a single prosodically prominent item. Indeed, this is what we find for contrasted nouns. For contrasted adjectives, however, the prosodic prominence decreases across the sentence boundary. In other words, information structure fails to exclusively explain the prosodic prominence patterns.

Context Influences Concepts

We examined linguistic and extra-linguistic factors that interfere with each other in the determination of prominence. Nevertheless, one might disagree on the suggested existence of semantic abnormality because we cannot prove if there is a direct link between simple illustrations and mental representations.

Let us suppose that the fruit images we used generally do not undergo such a cognitive comparison-matching process but are rather perceived as pure illustrations of particular objects. If this is true, we might not expect to find any effect of semantic abnormality on intonation. Moreover, the prosodic prominence of fruits with unnatural colors will coincide with that of geometrical figures in Swerts' study (2007). Rather, the illustrations will follow the contextual requirements for accentuation in Dutch (e.g., accents for contrasted vs. lack thereof for non-contrasted repeated information). However, our findings do not support this line of argumentation: adjectives are processed as prosodically most prominent regardless of the contrastive focus domain because they indicate a semantically abnormal property which does not match a particular mental concept.

Since neither semantic abnormality nor information structure can fully account for the observed prosodic prominence patterns, we suggest that both factors must

belong to distinct levels which may interact at distinct processing stages. In terms of a successful communication process, we suppose that a lack of prosodic marking of a conceptual violation may indicate that the speaker marks this information as presupposed and integrates it into the common ground. However, such deaccenting may impede the listener's detection of a conceptual mismatch and lead to a communication failure. The prosodic marking of abnormal information, however, enables the listener to draw faster inferences because her attention is guided by accentuation.

In sum, abnormal information is prosodically most prominent within the sentence and regardless of contrast domain. The further the discourse context develops, the more decreased the prominence of abnormality. Repetition of abnormal information, for instance, does not evoke an increase of its typicality in memory and appropriateness in the context; on the contrary, cognitively abnormal information becomes integrated in the discourse. In so doing, the strong prosodic prominence of abnormality may be weakened by repetition in a larger discourse context and result in an increase of the accentual prominence due to contrastive focus instead of semantic abnormality. We aim to elaborate further on this relation in future experiments.

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