CONTRAST AND GIVENNESS IN BIASED DECLARATIVE QUESTIONS

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ABSTRACT

The prosodic marking of information structure (IS) in German polar questions with an interrogative syntax has been observed to differ from that in assertions, which might be due to different final contours (falling, rising), different semantic-pragmatic restrictions, or a general inertness of questions to IS. In a production study, we investigated whether German declarative questions show similar deviations. We tested transitive structures where the object and the lexical verb were either both given, both new, or one was contrastive while the other was given, and found a strong adherence to default prosody across conditions (inertness). The association of contrast with high, and givenness with low, prosodic prominence familiar from assertions could be observed but it was modulated by speech-act-specific characteristics. Overall, there was substantial inter-individual variation.

Keywords: prosody, biased declarative question, givenness, contrast, focus

1. INTRODUCTION

In intonation languages like German, information structure (IS) influences the prosodic prominence of the corresponding expression. In assertions, givenness is associated with prominence reduction in terms of deaccentuation, the choice of less prominent accent types, shorter duration or lower pitch (F0) [1, 4, 5, 6]. Narrow non-contrastive focus and contrastive focus are associated with a gradual increase in prominence, relative to newness, for instance in terms of fewer H+!H* accents and more L+H* accents, greater intensity, longer duration and higher mean and maximum F0 for narrow vs. broad focus [2, 11, 12, 13, 15]. Whether or not there are IS effects in the prenuclear region is controversial: in sentences with corrective focus there may be deaccentuation and reduced gradient prominence [3], yet [19] suggest that there is at most slight compression. Prenuclear prominence reduction arguably increases the prominence difference with a contrastive element, as does post-focal compression. [19, 32].

Non-assertive speech acts have been found to show deviations from these prosody-IS associations [24, 25, 29]. To wit, different final contours—falling vs. rising—, which are linked to (but not determined by) the speech act type, may interact with IS marking: In rising polar questions with an interrogative syntax (PQs), contrast-associated prominence increase in the final part of the utterance has been observed to be realized by lower, rather than higher F0, arguably because lower F0 is a prominent deviation from a rising baseline [20, 24, 29]. Another reflex of contrast marking in PQs is a prominence decrease in the prenuclear region by deaccentuation [23, 29]. In other languages, there are other differences between questions and assertions, e.g. Russian questions do not seem to show the subtle prominence distinctions for different focus types known from assertions, and have been suggested to be IS-inert [22]. Then again, in Swedish, questions seem to show regular contrast marking [27].

Turning to givenness marking, German PQs seem to lack prominence reduction in certain IS configurations, compared to assertions. In all-given assertions where the truth of the denoted proposition is highlighted, the nuclear accent is not realized in its default position but occurs on the finite verb, indicating VERUM focus [17, 31]. The rest of the utterance is deaccented. In questions, VERUM signals either a previous speaker belief [26] or impatience [7, 8]. If such signals are not appropriate in a discourse, there is no deaccentuation in all-given PQs, and the nuclear accent occurs in its default position, which has been argued to ensure the headedness of the intonational phrase [29]. Interestingly, [29] found no phonetic reduction in all-given PQs, either.

This paper aims at broadening the empirical picture of IS marking in *yes/no*-questions by studying DQs in German. DQs come with a contextual *bias*: their declarative syntax signals that there is contextual evidence supporting the truth of the questioned proposition [16, 28, 30, 33]. The speaker uses a DQ to double-check the evidence, possibly because of a conflicting previous belief and concomitant amazement. [23] show that the latter aspect, if implemented as a surprised vs. matter-of-fact attitude of the speaker, plays a role for the prosody of DQs in terms of declination, speaking rate and voice quality.

[23] also observe that DQs have fewer prenuclear accents than comparable assertions, which they adduce to the function of DQs: DQs tend to contain mostly given material because speakers double-check the truth of a proposition that has just been asserted or implicated. However, DQs are actually quite flexible regarding their IS. The information in a DQ can be all given (if all the information was just mentioned) but it can also be all new (if the proposition denoted by the DQ can be plausibly deduced from the context but was not mentioned). It is also possible that some of the information is given whereas other information is in contrastive focus. Consider the DQ *Jana wants to hunt deer?*. A speaker might use this DQ to double-check that it is deer that Jana wants to hunt because a plausible alternative was mentioned in the context, or, alternatively, that it is hunting that Jana wants to involve the deer in rather than for instance examining it. Thus, the speaker is considering contrastive alternatives so that the material that is double-checked is in contrastive focus.

In this paper we present a production study on matter-of-fact DQs investigating the prosodic reflexes of contrast and givenness vs. newness. We hypothesized that DQs would show assertion-like IS-prosody associations as well as deviations. Specifically, we expected, on the one hand, increased prominence for contrast (possibly with prenuclear reduction, certainly with post-nuclear reduction), and decreased prominence for givenness (similar to assertions). On the other hand, we expected contrast in the final part of the utterance to be marked by lower rather than higher F0 due to a rising baseline (similar to PQs). For all-given DQs, we expected reduced or even a lack of givenness marking and thus default accentuation: in matter-of-fact DQs VERUM is inappropriate because there is no strong speaker belief or impatience. In view of [29]'s findings for all-given PQs, there might not even be phonetic prominence reduction for all-given DQs in comparison to DQs with some new material. In other words, DQs with given vs. new material might be prosodically identical, suggesting some IS-inertness.

2. METHOD

The materials of our study consisted of dialogues between three speakers who chat about various friends. The first two speakers (prerecorded; presented in written and auditory form) set the scene, and speaker 2 utters a speculation which may be taken to suggest the truth of a proposition p concerning the expected action of a friend. Speaker 3 (= participant) then asks a DQ, *p?*, which double-checks the truth of p, e.g.,

Jana will da dann Rehe jagen? (lit. `Jana wants.to there then deer hunt`; 'Jana wants to hunt deer there then?'; Structure: subject-auxiliary-adverb-adverb-object-verb). The DQ is followed by an assertion, also uttered by speaker 3.

There were 12 dialogues in 4 IS conditions each, disambiguated by the left and right context of the target DQ. Condition [$O_N V_N$]: object and verb of the DQ are new, the follow-up assertion is neutral, e.g. *That sounds interesting*; [$O_G V_G$]: object and verb are given in the left context, the follow-up is neutral; [$O_C V_G$]: contrastively focused object and given verb, with a focus alternative for the object (e.g. *Hasen* 'hare') in the left context and in the follow-up; [$O_G V_C$]: given object and contrastive verb, with a focus alternative for the verb (e.g. *erforschen*, 'examine') in the left context and the follow-up. In all conditions, the subject and the auxiliary are given. In addition to the experimental items, there were 4 filler dialogues in 4 sentence types each (*wh*-question, *wh*-exclamative, negative declarative, polar question). All participants saw all items.

24 native speakers of German (2 male; aged 19-30, mean: 24.4) participated in the experiment. They were students of the University of Cologne and were paid for their participation or received course credit. Most of the participants (16) were from North Rhine-Westphalia. The recordings were annotated in Praat [9] by trained research assistants (GToBI guidelines [14]).

3. RESULTS

The DQs produced by the participants overwhelmingly ended with a high or rising boundary tone: 94%. There were 845 high rises (L* H-^H%) (79% of rising contours) and 226 low rises (L+H* L-H%) (21%). 1.8% of DQs had a low boundary tone, while 4.3% had other contours, e.g. (mid-)high, level plateaus ($\approx$ H-%) or incomplete falls.

For the analysis of the dependent variables reported below we fitted one model (using `lmerTest` [18]) comparing all four factor levels using treatment coding with the $O_N V_N$ condition as the baseline for every dependent variable, and one model that compared $O_G V_G$ to $O_C V_G$ and to $O_G V_C$. We also investigated utterance-level measures, which for space reasons we only mention in passing. Absolute F0 values (i.e. mean, maximum and minimum) were converted to semitones relative to each speaker's median F0 value. Relative F0 values (excursion) are given in semitones. The raw data was imported into R using rPraat [10].

3.1. Accent placement and accent type

Fig. 1 shows the distribution of accents and accent types for the accentable syllable of each word by condition. Since the object was accented extremely often across conditions, a model could not be fitted. Yet we can observe that there was *some* deaccentuation of given objects in the presence of a contrastive verb: 86.6% object accentuation in $O_G V_C$ vs. 97.5% in $O_N V_N$, 99% in $O_G V_G$, 100% in $O_C V_G$. The verb was accented in 9.5% of $O_N V_N$ utterances, 43.3% in $O_G V_C$, 6% in $O_G V_G$, and 2.5% in $O_C V_G$. The increase in $O_G V_C$ compared to $O_N V_N$ is significant ($b = 2.91, SE = 0.3, z = 9.4, p < 0.001$), as is the decrease in $O_C V_G$ vs. $O_N V_N$ ($b = -1.6, SE = 0.47, z = -3.4, p < 0.01$). There were no significant differences concerning the presence of a prenuclear accent on the subject or any other elements.
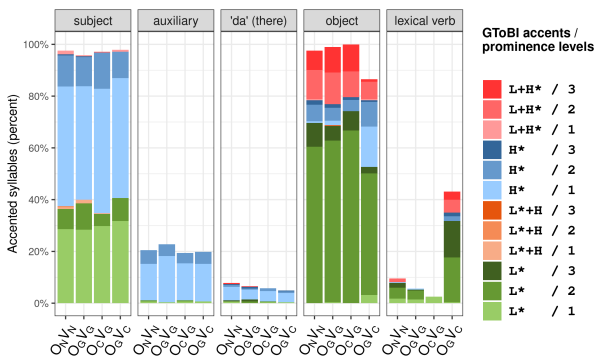
Figure 1: GToBI accent types [14] and prominence levels [21] for the accentable syllable of each word by experimental condition

For the accent type on the object we analyzed the proportion of L* among all accents, and the proportion of L+H* among accents with high starred-tones (L+H*, H*). The proportion of L* on the object was smaller in $O_G V_C$ than in $O_N V_N$ and than in $O_G V_G$ ($O_N V_N$: $b = -1.3, SE = 0.27, z = -4.7, p < 0.001 \parallel O_G V_G$: $b = -0.5, SE = 0.13, z = -3.9, p < 0.001$). The proportion of L+H* was smaller in $O_G V_C$ than in $O_N V_N$ and than in $O_G V_G$ ($b = -2.2, SE = 0.42, z = -5.2, p < 0.001 \parallel b = -1.2, SE = 0.22, z = -5.7, p < 0.001$).

3.2. Acoustic measures for accented syllables of object and lexical verb

For the **F0-related measures** of the object, we pooled objects with high starred tones (H*, L+H*), as they were characterized by comparable contour shapes. L* accents were treated separately but they showed no F0-related significant differences. For objects with high starred tones, mean F0 was lower in $O_G V_C$ than in $O_N V_N$ and than in $O_G V_G$ ($b = -1.42, SE = 0.25, t = -5.7, p < 0.001 \parallel b = -0.8, SE = 0.12, t = -6.7, p < 0.001$). Maximum F0 was also lower in $O_G V_C$ than in $O_N V_N$ and $O_G V_G$ ($b = -2.4, SE = 0.37, t = -6.5, p < 0.001 \parallel b = -1.4, SE = 0.2, t = -6.9, p < 0.001$). Minimum F0 did not show significant differences after correction for multiple comparisons. F0 excursion on the accented syllable of the object showed the same pattern as mean and maximum F0: it was smaller in $O_G V_C$ than in $O_N V_N$ and $O_G V_G$ ($b = -2, SE = 0.42, t = -4.8, p < 0.001 \parallel b = -1.15, SE = 0.3, t = -3.7, p < 0.01$). Thus, objects with high starred tones showed reduced prominence in terms of F0 mean, maximum and excursion, if the object was given and the verb was contrastive in comparison to the new and the all-given conditions. The latter two conditions neither differed from each other nor from $O_C V_G$. Overall, there thus were significant differences for accented objects only for one of the nuclear contours—(L+)H* L-H%—, and these effects were prominence-reducing effects that verb contrast had on the object.

For the F0-related measures of the verb, we pooled all accented verbs regardless of accent type. The only significant difference with a reasonable sample size is that the F0 excursion was larger in $O_G V_C$ than in $O_N V_N$ ($b = 1.3, SE = 0.4, t = 2.9, p < 0.05$). Maximum F0 on the verb was significantly lower in $O_C V_G$ than in $O_N V_N$ but the $O_C V_G$ condition had a sample size of 7.

For the **duration analysis**, we follow [2] and take the foot as the relevant domain for IS marking (= entire object; entire verb). Also, since the utterance-level speech rate was significantly higher in the contrastive conditions, we analyzed relative duration, i.e. the proportion of the utterance taken up by the relevant foot. The relative duration of accented objects was longer in $O_C V_G$ than in $O_N V_N$ ($b = 0.006, SE = 0.002, t = 3.1, p < 0.01$), and it was shorter in $O_G V_C$ than in $O_N V_N$ and $O_G V_G$ ($b = -0.007, SE = 0.002, t = -4, p < 0.001 \parallel b = -0.004, SE = 0.002, t = -3.3, p < 0.01$).

Syllable-level mean intensity of objects was non-significantly lower in $O_G V_C$ than in $O_N V_N$. Maximum intensity was significantly lower in $O_G V_C$ than in $O_N V_N$ ($b = -0.7, SE = 0.27, t = -2.6, p < 0.05$). There were no differences on the verb.

3.3. Pre- and postnuclear regions

Prenuclear region. For the F0 of the accented syllables of the subject (separate models for H* and L*) and the auxiliary (only models for H*) there were no significant differences. Neither were there differ-

ences for duration or intensity.

Postnuclear region. To (further) investigate the influence of IS on the postnuclear region, we investigated F0, duration and intensity across the whole verb when it was *unaccented* (for F0: in separate models split up by object accent type (L* vs. [L+]H*)). For F0 and duration, there were no significant differences (verbs tended to be longer in $O_G V_C$ than in $O_N V_N$ before multiple comparison adjustment). For intensity, we found that verbs were less loud in $O_C V_G$ than in $O_N V_N$ ($b = -0.8, SE = 0.2, t = -4.3, p < 0.001$). Thus there was postfocal reduction only in terms of intensity.

3.4. Inter-individual variation

There was substantial inter-individual variation in response to the experimental manipulations. While contrast on the verb led some speakers to shift the nuclear accent to the verb with attendant deaccentuation of the object, others kept the nuclear accent in its default position. The 'keepers' did not use more subtle, possibly continuous means of prosodic contrast marking: in extreme cases, they produced identical-sounding contours in all conditions. Interestingly, 'shifters' produced more clear-cut distinctions between objects in $O_C V_N$ vs. $O_N V_N$, even though the classification of a shifter is based on the $O_G V_C$ condition, where the object is *given*. In other words, their behavior regarding a fairly 'strong' experimental manipulation (location of the nuclear accent) predicted their behavior regarding a more subtle manipulation (new information vs. contrast on the object). There was no indication that the inter-individual variation was associated with regional provenance.

4. DISCUSSION

Overall, we found for DQs IS-prosody associations familiar from assertions, and we found deviations from these associations familiar from PQs. The most striking deviation is perhaps the quite pervasive reduced sensitivity to IS. As predicted, there was no prominence reduction in all-given DQs in comparison to DQs with a new object and verb. Both types of DQs had default prosody with the object as the carrier of the nuclear accent and there were no phonetic differences. The lack of accent shift plausibly results from the matter-of-fact nature of the DQs we tested: VERUM marking is not appropriate. It is nevertheless remarkable that there is no prominence reduction at all, which replicates the findings for PQs [29].

Regarding the contrastive conditions, we found substantial IS effects only for DQs with a given object and a contrastive verb. For DQs with a con-

trastive object and a given verb the effects were very small. Thus, the only IS constellation that led to a substantial departure from the default contour is the one where the nuclear accent may shift from its default position—the object—elsewhere: to the lexical verb (at least in a subpopulation of the speakers). This is a licit shift because the verb is contrastive. Still, note that speakers also produced double-accent structures with an accent on object and verb. In both cases, we have a clear case of contrast marking on the verb: new and given verbs are hardly ever accented.

The prominence reduction on the given object in utterances with a contrastive verb (less prominent accent types, phonetic measures) is difficult to interpret. It might 'directly' mark givenness on the object, but it might also be due to prenuclear reduction before the prominent contrastive verb (or a combination of both). Since all-given DQs seem to be inert in terms of IS marking, the observed reduction for given objects before contrastive verbs in comparison to new objects before new verbs might indeed be due to givenness marking on the object. However, we also observed that other prenuclear elements, which were always given—the subject and the auxiliary—showed no differences between the conditions. We therefore assume that the prominence reduction on a given object which is adjacent to a contrastive verb more likely serves to boost the prominence of the verb.

The finding that in DQs with a contrastive object the IS effects are very small, and there is hardly any post-focal reduction, which even in view of the general lack of accents on the verb in the new and all-given conditions might still have materialized clearer in the phonetic measures, seems to support the view that DQs generally have a tendency towards IS-inertness. Like [22] for Russian PQs, we did not find a difference between focus types.

As for the expected difference of prominence increase by higher vs. lower F0 depending on a falling vs. rising final pitch contour, the results are somewhat confirmative. While we did not find phonetic effects of contrast for either L* or (L+)H* accents, it is a new finding that L*—an accent that in assertions is considered not to be very prominent [5]—is compatible with contrastive focus: if it occurs within a rising final contour. That is, contrast is not inherently linked to high pitch or to L+H*, specifically.

In sum, DQs seem to display a reduced sensitivity to IS, which, however, is speaker-dependent. Future research directly comparing IS in assertions and *yes/no*-questions within speakers must show if the observed reluctance of some participants to prosodically mark IS in questions can be replicated.

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