

The interaction of discourse markers and prosody in rhetorical questions in German¹

NICOLE DEHÉ

University of Konstanz

DANIELA WOCHNER

University of Konstanz

MARIEKE EINFELDT

University of Konstanz

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Recent research has shown that rhetorical questions (RQs) have certain prosodic characteristics in terms of voice quality, tempo, and intonation, which distinguish them from genuine, information-seeking questions (ISQs). This paper focuses on the interaction between prosodic cues to rhetorical meaning on the one hand, and lexical and morpho-syntactic means, on the other, in German. The production experiment reported on here addresses three research questions, in short: (i) do speakers prefer a specific syntactic construction for an RQ, (ii) do they make use of specific lexical and morpho-syntactic means to signal rhetorical meaning, and (iii) what is the interaction between those means and prosodic cues. The answers are: (i) yes (*wh*-questions), (ii) yes (especially discourse markers (DiPs)), and (iii) we find an additive effect enforcing the rhetorical message. When lexical (or morpho-syntactic) cues to rhetorical meaning are used, we do not observe a reduction in or lack of prosodic means at the same time. For example, when a DiP is present, an RQ will still have a typical nuclear accent and edge tone, i.e., cues are used in an additive, rather than an exclusive way. There are, however, RQs that are marked only in the prosody, without any lexical or morpho-syntactic cues present.

KEYWORDS: discourse markers, prosody, prosody interfaces, rhetorical questions

1. INTRODUCTION

This paper studies the interplay between the prosodic and the morpho-syntactic and lexical make-up of rhetorical questions (RQs) and information-seeking questions

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(ISQs) in German. Specifically, we address the questions of which lexical and morpho-syntactic means speakers use to signal whether a question is rhetorical or information-seeking (Research Questions I and II, see below), and whether the prosody of RQs remains the same regardless of the simultaneous use of lexical or morpho-syntactic cues (Research Question III). The current section briefly surveys semantic/pragmatic, lexical, morpho-syntactic, and prosodic characteristics of RQs (in comparison to ISQs) with a focus on German and formulates the research questions addressed by the experiment reported on in the next section.

RQs are interrogatives that do not elicit an answer. Instead, the answer is already entailed in the discourse and thus obvious to and known by all discourse participants, including the speaker (Caponigro & Sprouse 2007; Biezma & Rawlins 2017); this includes a possible accommodation of the common ground by the interlocutors in cases where the answer is not known by all addressees. The purpose of an RQ is to make a point and to extract commitment from the interlocutors (Biezma & Rawlins 2017). A genuine ISQ, in contrast, is used to elicit information, i.e., to receive an answer that resolves a knowledge gap on the part of the speaker. Lexically as well as morpho-syntactically, German RQs may be identical to ISQs, both within the interrogative mode (Altmann 1987, 1993). They may generally occur as verb-first (V1) interrogative sentences (polar questions, see (1)), *wh*-interrogatives (constituent questions, see (2)), or other interrogative structures. Semantically, the meaning of both ISQs and RQs is defined by the set of propositions that pose possible answers to the question, with one proposition being its true answer (e.g., Hamblin 1973; Karttunen 1977). This means that both polar and *wh*-questions may have either an RQ or an ISQ interpretation, depending on their situational (and linguistic) context.

- (1) Mag jemand Limonen?
Likes anybody limes
'Does anybody like limes?'
- (2) Wer mag Limonen?
Who likes limes
'Who likes limes?'

The rhetorical meaning of a question is thus not incorporated in its morpho-syntactic make-up. Instead, rhetoricity is added on the pragmatic level (see Brandt et al. 1993). Pragmatically, RQs are commonly described to behave similar to assertions (e.g., Bartels 1999; Han 2002) or have an assertive-like feel or function (Caponigro & Sprouse 2007; Biezma & Rawlins 2017). However, while ISQs and RQs may be string-identical, there are certain lexical and morpho-syntactic means that facilitate RQ interpretation. These include negative polarity items (NPIs; e.g., *zur Hölle* 'to the hell': *Wer zur Hölle soll das alles essen?* 'Who the hell should eat all this?'; *einen Finger krümmen*, 'lift a finger': *Hat er je einen Finger gekrümmt um dir zu helfen?* 'Did he ever lift a finger to help you?') and discourse particles (DiPs). Relevant DiPs include *schon* (Zaefferer 1984; Thurmair 1989; Bayer & Obenauer 2011;

lit.: temporal ‘already’) and *auch* (Thurmair 1989; lit.: additive ‘also’). In their non-literal meaning, certain DiPs have been shown to trigger an RQ interpretation (Zaefferer 1984; Meibauer 1986; Brandt et al. 1993), e.g., *Wer zahlt schon gerne Steuern?* ‘Who likes to pay taxes?’ (Bayer & Obenauer 2011: 457), *Wer geht auch sonntags einkaufen?* ‘Who goes shopping on a Sunday, after all?’² Morpho-syntactic means to facilitate RQ interpretation further include the combination of the imperfect subjunctive and the negation *nicht* (‘not’), see (3), from Grésillon (1980: 284), and comparative structures as in (4), from Meibauer (1986: 142).

- (3) Aber hieße das nicht Satan durch Belzebug zu beschwören?
but mean.3SG.SBJV that not Satan by Belzebug to summon
‘But wouldn’t that mean to summon Satan by Beelzebug?’
- (4) Gibt es einen günstigeren Moment als jetzt?
gives it a better moment than now
‘Is there a better moment than now?’

Naturally, since ISQs and RQs may be string-identical, the occurrence of lexical or morpho-syntactic means including DiPs is not obligatory in German RQs. Along with lexical and morpho-syntactic means, prosody distinguishes RQs from ISQs (Braun et al. 2019; Braun et al. 2020 for German; see the cross-linguistic overview in Dehé et al. 2022). Relevant prosodic parameters include temporal cues (constituent duration, speaking rate), voice quality, and intonational markers (nuclear accents, edge tones). Specifically, (i) constituent duration is longer and speaking rate slower in RQs than in ISQs, (ii) sentence-initially there is more breathy voice quality in RQs than in ISQs, and (iii) RQs and ISQs differ in terms of the intonational contour. Polar RQs often terminate in a mid-high plateau contour (H-% in GToBI), i.e., the nuclear part of the intonation contour rises to a mid-high level where it stays until the end of the utterance without rising further (see Figure 1).³ Polar ISQs, however, typically have a high-rising edge tone (H-^H%), i.e., the contour rises continually until the end of the utterance.⁴ *Wh*-RQs almost exclusively terminate in a fall (L-%; see Figure 2), whereas a large number of *wh*-ISQs also allow rising movements. In terms of nuclear accents, *wh*-RQs often have a specific rising pitch accent, (L+H)*, where both the low (L) and the high

[2] DiPs are notoriously difficult to translate which is why in the glosses they appear as ‘DiP’. We do give explanations where a DiP has both a lexical and a discourse meaning (e.g., additional *auch* ‘also’, temporal *schon* ‘already’) and we add the discourse meaning the DiPs contribute to the respective examples. Note that Viesel & Freitag (2019: 243) translate *denn* ‘I wonder’, and *schon* ‘against expectations’ (see also Thurmair 1989). Research on the meaning contribution of DiPs in RQs is still ongoing (see Zimmermann 2011 for a more general overview of their distribution and interpretation and interaction with sentence type). The present paper contributes to this research by focusing on the interaction between DiPs and intonation in RQs versus ISQs.

[3] GToBI is the German-specific prosodic annotation system (Grice, Baumann & Benz Müller 2005). It is used here to annotate nuclear accents and edge tones.

[4] At the right edge of the utterance, we refer to L- and H- as phrase accents, to just L% and H% as boundary tones, and to the combinations of phrase accent and boundary tone as edge tones. The nuclear accent followed by edge tone is the nuclear contour.

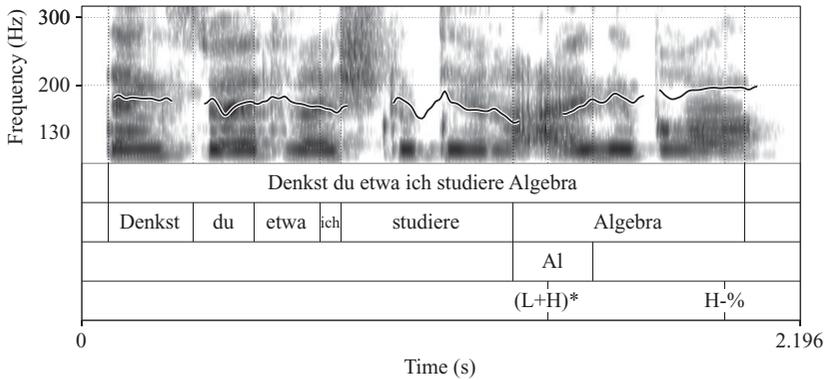


Figure 1
Spectrogram and f0 contour of the polar RQ *Denkst du etwa ich studiere Algebra?* ('Do you really think I study algebra?') with an H-% edge tone, produced by a female speaker.

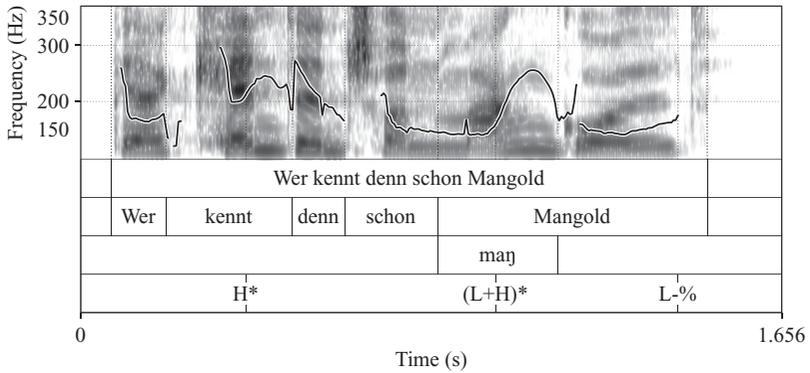


Figure 2
Spectrogram and f0 of the *wh*-RQ *Wer kennt denn schon Mangold?* ('Who is likely to know mangel?') with an (L+H)* nuclear accent (target syllable: *man*), produced by a female speaker.

(H) targets are aligned within the accented syllable; see Figures 1, 2. (L+H)* has not been observed in ISQs at all. *Wh*-ISQs, however, mainly have nuclear L+H*, in which L is aligned either with the pre-nuclear syllable or at the very beginning of the stressed syllable. See Braun et al. (2019) and Zahner-Ritter et al. (2022) for details and further illustrations.⁵

[5] Note that in Braun et al. (2019), the (L+H)* nuclear accent was annotated L*+H, but the authors explain the special alignment of both tonal targets L and H within the nuclear syllable in RQs, unlike in ISQs, and unlike elsewhere in L*+H accents, where the peak is clearly aligned within the post-nuclear rather than the nuclear syllable; see Braun et al. (2019: 797–798). Zahner-Ritter et al. (2022) report on two experiments (imitation task, free association task) providing initial evidence for (L+H)* as a member of the tonal inventory of German along with L*+H and L+H*.

While Braun et al.'s (2019) results stem from a carefully designed production experiment, they receive support from German spontaneous speech data (Braun et al. 2020). Moreover, Braun et al.'s (2020) results already suggest that the use of lexical material signalling rhetorical interpretation does not go along with a reduction or loss of prosodic cues, but that instead different cues co-occur in the same utterance. To consolidate these results, we designed the experiment reported on here. The experimental materials are borrowed from Braun et al. (2019), but unlike in their production experiment, participants in the present study were not provided with complete sentences on the screen, but were asked to combine sentence fragments to full grammatical utterances. They were allowed to add material not given as sentence fragments as well as to choose the syntactic make-up of their utterances. Of the prosodic parameters tested in Braun et al. (2019) and related work on the prosody of RQs, only intonation (edge tones and nuclear accents) and speaking rate were included in the present study, because the quality of the sound files elicited in the online setting did often not allow for an analysis of voice quality. We address the following research questions:

- I. Do speakers prefer a specific syntactic structure (e.g., *wh*, polar) when producing RQs in German?
- II. Do speakers use specific lexical or morpho-syntactic means to highlight the rhetorical meaning of the question?
- III. Does the use of lexical and/or morpho-syntactic cues to rhetorical meaning go along with the use of prosodic cues, or does the use of prosody become less important or even redundant? If the latter, are all prosodic parameters affected in the same way?

2. THE EXPERIMENT

In this section, we report on the production experiment designed to address the research questions given above.

2.1. Methodology

The material consisted of 44 context situations triggering either a rhetorical or an information-seeking reading of the questions (Table 1; cf. Braun et al. 2019). Contexts for ISQs were created such that the answers to the questions were unknown by the speaker (i.e., they were not obvious from the context) and that the speaker's intention was to elicit information. Contexts for RQs entailed the answer, i.e., the answer was obvious to all discourse participants and thus known by the speaker (i.e., the participant of the experiment). Contexts were the same for polar and *wh*-questions.

Target questions in Braun et al. (2019) had the following form: (i) polar questions: verb DiP(*denn*) subject(*anyone*) object, e.g., *Mag denn jemand Limonen?* 'Does DiP anybody like limes?'; (ii) *wh*-questions: *wh*-word(*wer* 'who') verb DiP(*denn*) object,

RQ: <i>wh</i> in Braun et al. (2019)	ISQ: polar in Braun et al. (2019)
<i>Deine Freundin serviert bei einem Fest Garnelen als Vorspeise. Doch es ist offensichtlich, dass sich all eure Freunde vor dem gummiartigen Zeug eckeln. Du fragst deine Freundin:</i>	<i>Auf einer Dinnerparty servierst du Garnelen. Du möchtest wissen, ob deine Freunde das essen und davon möchten oder nicht. Du fragst deine Freunde:</i>
<i>wer mögen Garnelen</i>	<i>mögen Garnelen</i>
At a party, your friend is serving shrimp as an appetizer. But it is obvious that all of your friends are disgusted by the rubbery stuff. You ask your friend:	At a dinner party you serve shrimps. You would like to know which of your friends like this and whether they want some of it or not.
who like shrimps	like shrimps

Table 1

Example contexts and sentence fragments presented on screen.

e.g., *Wer mag denn Limonen* ‘Who likes DiP limes?’. The current experiment set out to test which syntactic structures participants would use if entire sentences were not available and if participants were free in their syntactic choice, thus sentence fragments were used, which participants had to combine to form complete grammatical questions (see Table 1).⁶ The sentence fragments for half of the material (corresponding to polar questions in Braun et al. 2019) were a verbal infinitive (e.g., *mögen* ‘like’) and the object noun (e.g., *Garnelen* ‘shrimps’). For the other half (corresponding to *wh*-questions in Braun et al. 2019), the *wh*-word *wer* ‘who’ was also given. Participants were free to add more material to their utterances and while *wh*-words were given in half of the stimuli, participants were generally free to choose their preferred syntactic structure for their utterances. Fragments were thus used to be maximally explorative with respect to the use of syntactic structure and DiPs. At the same time, we used the same materials as in Braun et al. (2019), including the verb along with the object noun and the *wh*-word for half of the materials for the two studies (Braun et al. 2019 and the current one) to be maximally comparable.

Participants were told that the goal of the study was to understand the structure of German RQs in comparison to ISQs, but they were not primed with respect to syntactic structure (polar, *wh*, other). A short explanation and examples of RQs (*The speaker does not expect an answer because she believes it to be obvious*) and ISQs (*The speaker expects an answer because she does not know it*) were provided before the experiment started to ensure that participants knew the difference between the

[6] The methodology of sentence fragment arrangement has been used in psycholinguistic research before, e.g., to test whether there is a default order in English particle verb constructions (give up the job vs. give the job up; Dehé 2002), and more recently to explore the reading of indefinite objects in German depending on their position in a sentence (Gauza 2018) and to explore speakers’ preferences for stressed or unstressed German focus particles (Reimer & Dimroth *To appear*). The difference is that speakers in our experiments were allowed to add material, which was necessary in order to find out about the use of extra linguistic material.

two. The study was web-based and conducted using the platform SoSci Survey (<https://www.sosicisurvey.de>; Leiner 2019). During the experiment, participants were presented with 44 test items: 22 verb/noun and 22 *wh*-word/verb/noun. Participants were asked to use the sentence fragments displayed on the screen but were allowed to add as much linguistic material as they needed to formulate a question – RQ or ISQ – as they thought was appropriate given the context. There were four experimental lists, each of which contained 44 items. The items were pseudo-randomized such that there were at least four other items between two items of the same pair (i.e., between ISQ and RQ containing the same object noun). The lists were balanced such that each context was used for stimuli with and without *wh*-word with equal frequency. They were randomly assigned to participants by the SoSci Survey platform. Participants used their own equipment. Their productions were recorded in .wave format using the built-in microphone of their laptops/headsets.

2.2. Data treatment and analyses

The data set contained 748 utterances produced by 17 speakers. A total of 93 utterances had to be excluded due to technical issues. The remaining 655 utterances were analysed using Praat (Boersma & Weenink 2018). All utterances were orthographically transcribed on a tier of the respective TextGrid by student assistants who were native speakers of German. On another tier, the transcribers broadly classified the sentence type (e.g., *wh*, polar) and annotated the occurrence of DiPs. There were 471 *wh*-questions, 171 polar questions, 12 V2-structures, and one alternative question. The syntactic structure was later analysed in a more fine-grained way by the second and third authors. Each utterance was phonologically annotated by the second author following GToBI. Speaking rate was operationalized as the assumed number of syllables per second (disregarding phonological processes, e.g., word-final schwa elision), with the actual duration of the sentence as the frame of reference, to which the number of syllables for each sentence was set in relation.

For the statistical analysis of the occurrence of DiPs (DiP or no DiP), we ran a general linear mixed effect regression model with ILLOCUTION TYPE (RQ and ISQ) and SYNTAX (sentence type) as fixed factors, and PARTICIPANTS and ITEMS as crossed random effects. The variable SYNTAX consisted of only two levels (*wh*, polar), i.e., only those items entered the statistical analysis. As shown in the subsequent section, some structural variation was observed within polar and *wh*-questions (e.g., extended *wh*-phrase, embedded clauses), however, without changing the syntactic type. The binary partition into *wh*- and polar questions without further divisions kept the statistical models manageable. The twelve V2 utterances and one alternative question were excluded for the following reasons, which may result in Type2 errors (Columb & Atkinson 2016): (i) their infrequency in the data set, (ii) the fact that they were exclusively realized within one illocution type (all twelve V2 sentences were rhetorical), and (iii) the rare occurrence of DiPs ($N = 2$). Models

with and without random slopes were compared using the *anova()* function in R-studio. If the model fit improved, random slopes were added and kept in the model (Bates et al. 2015; Matuschek et al. 2017). In backward selection, non-significant ($p > 0.05$) interactions were removed from the models if this did not deteriorate the fit of the models.

For the statistical analysis of the effect of DiPs on speaking rate, we ran a linear mixed effect regression model with ILLOCUTION TYPE (RQ vs. ISQ), the OCCURRENCE OF DiPs (DiP vs. no DiP) and SYNTAX (*wh* vs. polar) as fixed factors and PARTICIPANTS and ITEMS as crossed-random factors.

All p -values were calculated using the Satterthwaite approximation in the R package lmerTest (Kuznetsova, Brockhoff & Christensen 2017) and were adjusted by means of the Benjamini–Hochberg correction (Benjamini & Hochberg 1995).

2.3. Results

2.3.1. Question match and sentence structure

The contexts and sentence fragments presented to participants suggested the production of polar and *wh*-questions. However, participants were free to use other syntactic structures too, and they did (see Figure 3). Figure 3 is divided by stimuli

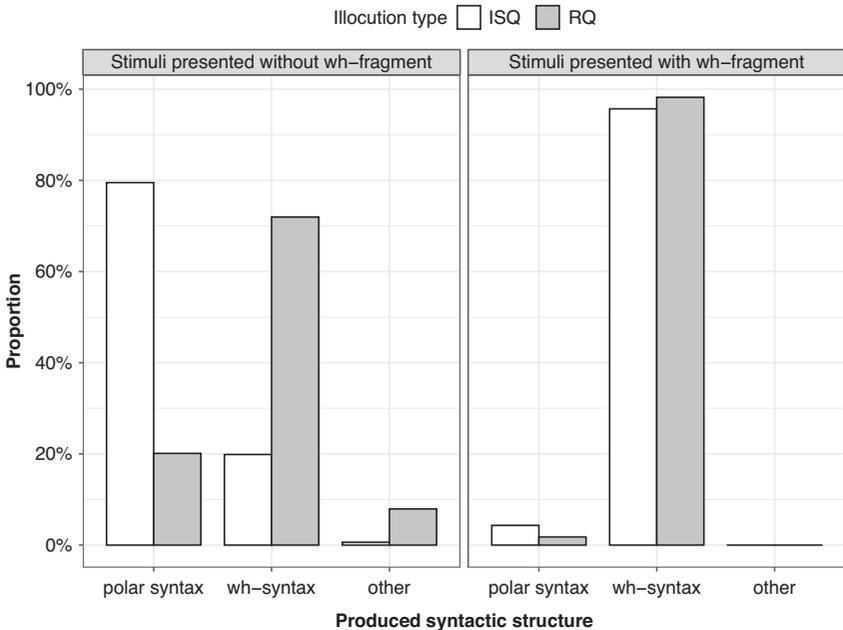


Figure 3

Produced syntactic structure; left panel: stimuli presented without *wh*-fragment, right panel: stimuli presented with *wh*-fragment; white: ISQs, grey: RQs.

without *wh*-word and stimuli with *wh*-word. Participants generally preferred *wh*-questions ($N = 471$, 72% of utterances) over polar questions ($N = 171$, 26% of utterances). This tendency was observed for RQs in particular, which were predominantly realized as *wh*-interrogatives. As Figure 3 shows, if no *wh*-word was given, ISQs were in most cases ($N = 178$, 80%), realized as polar questions, but RQs were mostly realized as *wh*-questions ($N = 130$, 80%). In contrast, when a *wh*-word was given, utterances were almost exclusively produced as *wh*-questions. Within RQs, 165 (out of 168, 98%) of targets were realized as *wh*-questions. Within ISQs, 155 (96%) of the 162 targets were produced with *wh*-syntax. Twelve utterances, all RQs with no *wh*-fragment, were produced with V2-declarative syntax (2%); one ISQ with no *wh*-fragment was produced as an alternative question; these are summarized as ‘other’ in Figure 3.

Figure 4 shows lexical and morpho-syntactic details within the four produced syntactic types. Explanations and examples for each pattern listed on the y-axis are given in the Appendix; the most frequent ones are addressed here. Within produced polar questions, the preferred syntactic structure for an ISQ was a simple V1-interrogative without any additional lexical material or further syntactic complexity ($N = 58$, 43%; ‘polar’ in Figure 4; see (1)). The second most frequent realization of polar ISQs ($N = 41$, 31%) had an extended subject pronoun (*jemand*

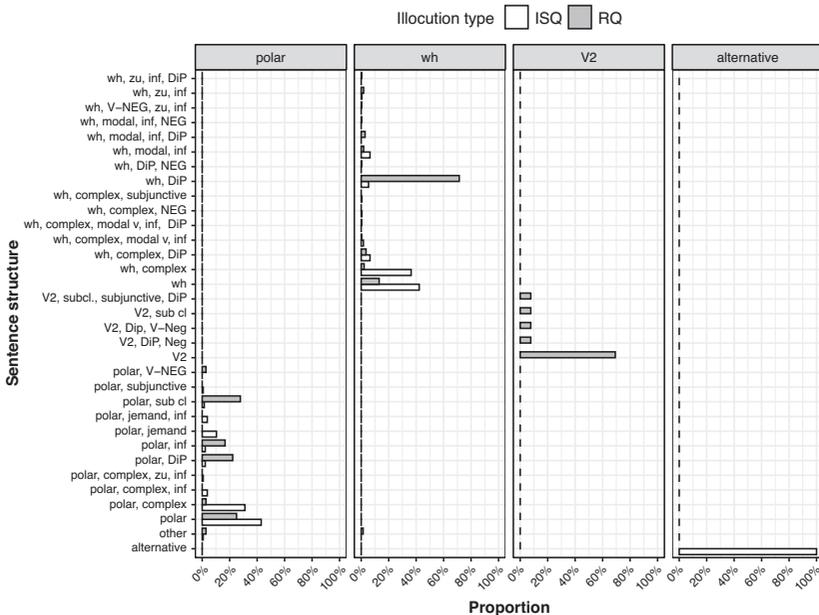


Figure 4

Details of syntactic structures across illocution types (ISQs white, RQ grey) in (from left to right) produced polar questions, *wh*-questions, V2 constructions, alternative question; syntactic patterns are explained in the Appendix.

von euch/einer von euch ‘anybody/one of you’; ‘polar complex’ in Figure 4). The most frequent realization of polar RQs ($N = 10$, 28%) was a V1-interrogative with the intended RQ as an embedded clause (‘polar, sub cl’ in Figure 4). The second most frequent polar RQ realization was a V1-interrogative containing a DiP (‘polar DiP’ in Figure 4; $N = 8$, 22%) and a simple polar question (‘polar’, $N = 8$, 22%), i.e., the same that was the most frequent one for polar ISQs.

Within *wh*-questions, participants preferred simple *wh*-structures without any additional lexical material when producing an ISQ (‘*wh*’ in Figure 4; $N = 77$, 42%; see (2)). The second most frequent *wh*-ISQ structure had an extended *wh*-phrase (‘*wh*, complex’ in Figure 4; $N = 68$, 36%, e.g., *Wer von euch* ‘Who of you’). By contrast, the most common *wh*-RQ realization contained a DiP (‘*wh*, DiP’ in Figure 4; $N = 202$, 71%). Within V2 constructions, all rhetorical, the most frequent structure was a simple V2 sentence with a finite main verb (‘V2’ in Figure 4; $N = 9$, 69%). The alternative question did not contain a DiP.

2.3.2. Discourse particles (DiPs)

The most frequent non-prosodic means to signal RQs were DiPs. In twelve cases, participants also used initial discourse markers, such as *Hallo* (‘Hello’; *Hallo, wer isst denn schon Rosenkohl?* ‘Hello, who eats DiP DiP brussels sprouts?’) or interjections such as *Ieh* (‘Ugh’; *Ieh, wer mag schon Lebertran?* ‘Ugh, who likes DiP cod-liver oil?’). Nine of the twelve were RQs. The three ISQs were produced in one case with an initial *Entschuldigung* ‘excuse me’ and in two cases with *So* ‘so’. Comparative structures or structures with the combination of subjunctive and negation as described in Section 1 (see (3), (4)) did not occur.

Overall, 358 utterances contained a DiP and 296 did not. The statistical analysis did not yield an interaction between ILLOCUTION TYPE (RQ vs. ISQ) and SYNTACTIC REALIZATION (*wh* vs. polar) ($p = 0.6$), i.e., their joint effect is not greater or smaller than possible main effects. For example, it is not the case that *wh*-RQs show stronger effects than polar RQs (or vice versa). Two main effects were found: (i) RQs contained DiPs significantly more often than ISQs (RQ: $N = 260$ vs. ISQ: $N = 36$; $\beta = 4.80$, $SE = 0.66$, $z = 7.25$, $p < 0.001$), and (ii) *wh*-questions showed a significantly higher number of DiPs than polar questions (*wh*: $N = 280$ vs. polar: $N = 14$; $\beta = 2.84$, $SE = 0.41$, $z = 7.0$, $p < 0.001$). Of all *wh*-RQs, 247 (87%) contained a DiP and 36 (13%) did not. A total of 33 (18%) *wh*-ISQs contained a DiP and 155 (82%) did not. Of all polar RQs, 11 (31%) were produced with a DiP and 25 (69%) without, and only three polar ISQs (2%) had a DiP while 132 (98%) did not. Two (17%) of the twelve V2 sentences used as RQs contained a DiP.

Figure 5 shows the distribution of DiPs for *wh*- and polar ISQs and RQs. The most common DiP in *wh*-RQs was *denn* ($N = 98$, 35%). Other common DiPs in *wh*-RQs were *denn* in combination with another DiP (‘*denn x*’ in Figure 5); e.g., *denn schon*, *denn auch* ($N = 66$, 23%) and *schon* on its own ($N = 66$, 23%). The most common DiP in polar RQs was *etwa* ($N = 9$, 25%). The most common DiP in

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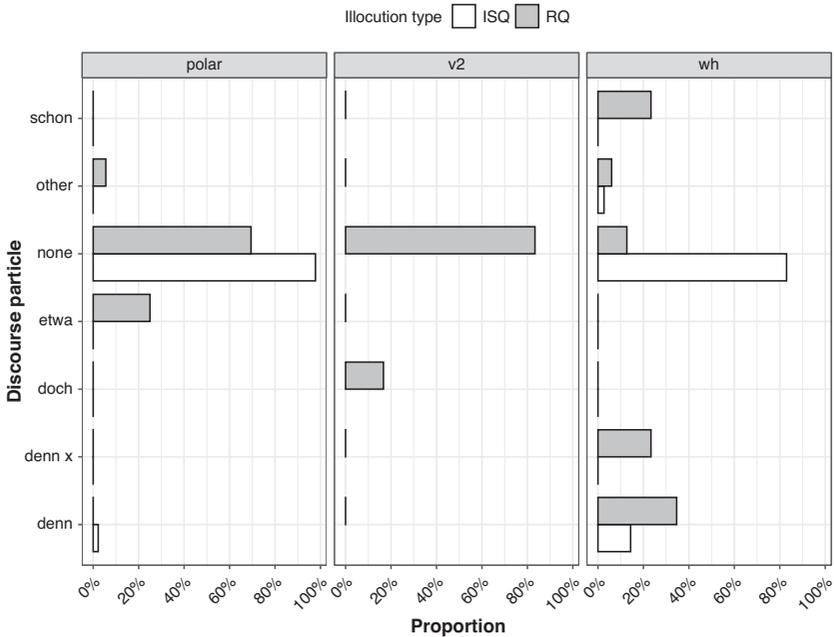


Figure 5

Distribution of DiPs in produced polar questions (left panel), V2 sentences (center panel), and *wh*-questions (right panel); white: ISQ, grey: RQs; x represents any second DiP in a sequence.

wh-ISQs was *denn* ($N = 27$, 14%). *Denn* was also the only DiP occurring in polar ISQs ($N = 3$, 2%). Two V2 sentences contained *doch*.

Since DiPs turned out to be the most (and, in our data, only) frequent non-prosodic marker of rhetorical interpretation, we investigate the relation between their occurrence and prosodic cues.

2.3.3. Prosodic parameters

In this section, we report the results for each prosodic parameter in turn. For edge tones and nuclear accents results are reported by DiPs.

2.3.3.1. Speaking rate

For the variable SPEAKING RATE, there was no significant interaction between the predictor variables ILLOCUTION TYPE (ISQ vs. RQ), SYNTAX (*wh* vs. polar) and OCCURRENCE OF DiP (DiP vs. no DiP) ($p = 0.93$). However, there were main effects for ILLOCUTION TYPE and SYNTAX. The average speaking rate at which RQs were produced (4.7 syllables per second) was significantly slower than that of ISQs (5.2 syllables per second) ($\beta = -0.47$, $SE = 0.07$, $t = -6.36$, $p < 0.001$). Regarding

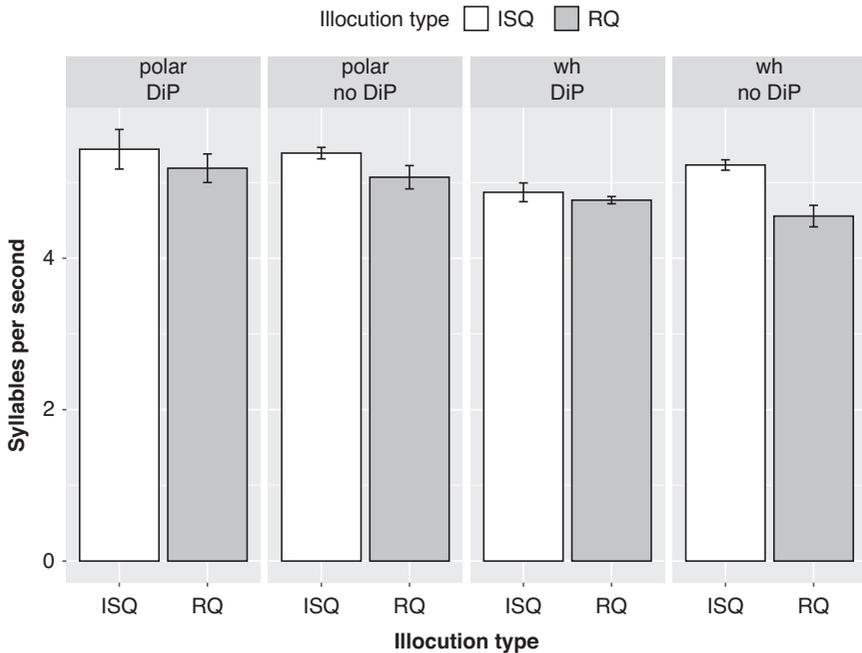


Figure 6

Average speaking rate in produced polar and *wh*-RQs (gray) and ISQs (white) with and without DiP; left two panels: polar questions; right two panels: *wh*-questions.

syntax, the average speaking rate at which *wh*-questions were produced (4.9 syllables per second) was significantly slower than that of polar questions (5.3 syllables per second) ($\beta = -0.27$, $SE = 0.09$, $t = -2.89$, $p < 0.05$). The presence of DiPs in any of the syntax/illocution types increased the speaking rate, except for *wh*-ISQs. On average, questions without DiP had a slower speaking rate (4.8 syllables per second) than questions with DiP (5.2 syllables per second). V2-utterances without DiP had a slower average speaking rate (4.4 syllables per second) than those with DiP (5.1 syllables per second). However, the effect of DiP was not significant ($p > 0.05$). Figure 6 shows the average speaking rate for polar and *wh*-RQs and ISQs with and without DiP.

2.3.3.2. DiPs and edge tones

Polar ISQs were predominantly produced with the high rise H- \wedge H% ($N = 97$, 89%), polar RQs with the mid-high plateau H-% ($N = 17$, 47%), *wh*-ISQs with H- \wedge H% ($N = 95$, 51%), and *wh*-RQs with low terminus L-% ($N = 268$, 95%). See Figure 7 for edge tones in relation to DiPs. We present the results for each DiP separately.

THE INTERACTION OF DISCOURSE MARKERS

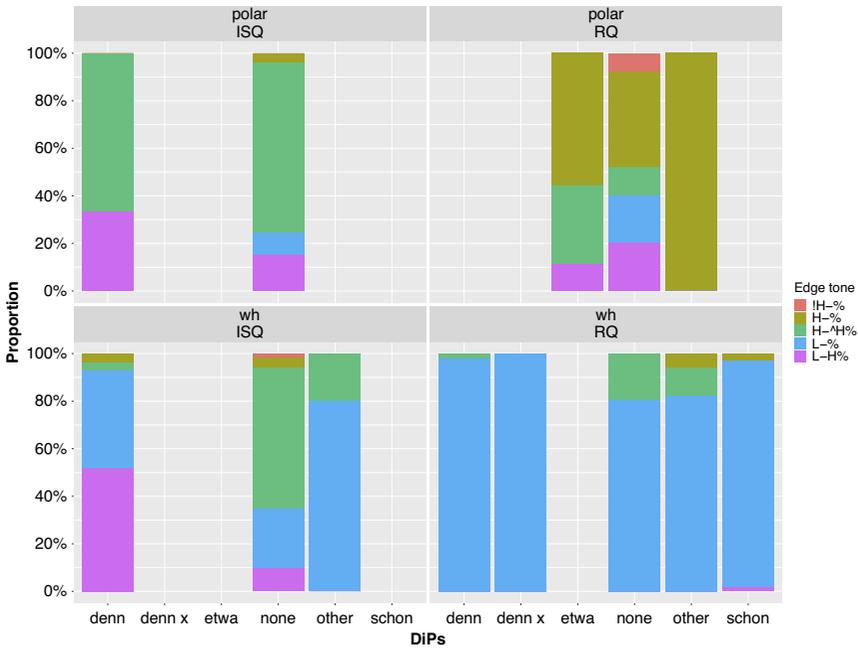


Figure 7

Distribution of DiPs and edge tones (!H-%: red, H-%: olive green, H-^H%: green, L-%: blue, L-H%: pink) in RQs and ISQs. Top: polar questions; bottom: *wh*-questions, right: ISQs; left: RQs.

none (no DiP): Polar questions typically did not contain a DiP ($N = 157$, 92%). Polar ISQs without DiP were mostly realized with a high rise H-^H% ($N = 95$, 72%) followed by low-rise L-H% ($N = 20$, 15%), fall L-% ($N = 12$, 9%), and plateau H-% ($N = 5$, 5%). Polar RQs without DiP most often ended in H-% ($N = 10$, 40%), followed by L-% ($N = 5$, 20%) and L-H% ($N = 5$, 20%). Three polar RQs without DiP ended in H-^H% (12%) and two in a down-stepped plateau !H-% (8%). Of all *wh*-questions, 191 (41%) did not contain a DiP. *Wh*-ISQs without DiP mostly terminated in H-^H% ($N = 93$, 60%), followed by L-% ($N = 39$, 25%), L-H% ($N = 15$, 9%), H-% ($N = 6$, 4%), and !H-% ($N = 3$, 2%). Within *wh*-RQs, 29 utterances without DiP were realized with L-% (81%) and seven (19%) with H-^H%.

denn: Of the three polar ISQs which contained *denn*, two terminated in H-^H% (67%) and one in L-H% (33%). There were no polar RQs with *denn*. *Wh*-ISQs with *denn* were mostly realized with L-H% ($N = 14$, 52%), followed by L-% ($N = 11$, 40%), H-^H% ($N = 1$, 4%), and H-% ($N = 1$, 4%). *Wh*-RQs with *denn* were mainly realized with L-% ($N = 98$, 98%). Two *wh*-RQs with *denn* terminated in H-^H% (2%).

denn x (denn + additional DiP): This combination of DiPs only occurred in *wh*-RQs ($N = 66$, e.g., *Wer tanzt denn bitte Lambada?* Lit.: Who dances DiP DiP lambada ‘Oh please, who dances lambada?’). All occurrences terminated in a low edge tone (L-%).

etwa: This DiP only occurred in polar RQs ($N = 9$; e.g., *Magst du etwa Kamille?* Lit.: Like you DiP chamomile ‘Do you really like chamomile?’). Five of them (56%) terminated in H-% (see Figure 1), three in H-^H% (33%), and one in L-H% (11%).

schon: The DiP *schon* only occurred in *wh*-RQs ($N = 66$, e.g., *Wer mag schon Sellerie?* Lit.: Who likes DiP celery ‘Who likes celery?’). Of these 66, 63 (95%) terminated in L-% (see Figure 2), two (3%) in H-% and one (2%) in L-H%.

other: Several other DiPs occurred only sporadically, such as, for instance, *überhaupt* (lit.: actually, at all), *jetzt* (lit. now), and *wohl* (lit. possibly, perhaps). They were subsumed under the category ‘other’. Within polar questions, two polar RQs contained ‘other’ DiPs, and both terminated in H-%. Within *wh*-questions, five *wh*-ISQs contained other DiPs; four of them (80%) terminated in L-% and one (20%) in H-^H%. Other DiPs were most frequent in *wh*-RQs, where they mostly co-occurred with an L-% edge tone ($N = 14$, 82%). Two *wh*-RQs terminated in H-^H% (12%), and one in H-% (6%).

2.3.3.3. DiPs and nuclear accents

The most common nuclear accents in polar ISQs were L* ($N = 94$, 71%) and L+H* ($N = 20$, 18%), in polar RQs it was (L+H)* ($N = 19$, 53%). *Wh*-ISQs also were mostly realized with L* ($N = 94$, 50%) and L+H* ($N = 33$, 16%). *Wh*-RQs were mostly realized with (L+H)* ($N = 166$, 59%; see Figure 2) and L+H* ($N = 44$, 16%). See Figure 8 for nuclear accents in relation to DiPs.

none: Polar ISQs without DiP often had a L* nuclear accent ($N = 94$, 71%), followed by L+H* ($N = 20$, 15%), L*+H ($N = 9$, 7%), L+!H* ($N = 3$, 6%), H* ($N = 3$, 6%) and (L+H)* ($N = 3$, 6%). Polar RQs without DiP were most often produced with (L+H)* ($N = 13$, 52%), followed by L* ($N = 5$, 20%), L*+H ($N = 4$, 16%), L+!H* ($N = 2$, 8%) and H* ($N = 1$, 4%). Within *wh*-questions, *wh*-ISQs without DiP were mainly realized with L* ($N = 92$, 59%), followed by L+H* ($N = 25$, 15%), H+!H* ($N = 15$, 10%), H* ($N = 6$, 4%), (L+H)* ($N = 4$, 3%), L*+H ($N = 4$, 3%) and L+!H* ($N = 4$, 3%). *Wh*-RQs without DiP most often contained (L+H)* nuclear accents ($N = 21$, 58%), followed by L* ($N = 6$, 17%), L+!H* ($N = 3$, 8%), and L+H* ($N = 2$, 6%), H* ($N = 1$, 3%), H+!H* ($N = 1$, 3%), H+L* ($N = 1$, 3%), and L*+H ($N = 1$, 3%).

denn: Within polar questions, *denn* only occurred in three polar ISQs; two of them had a L* nuclear accent and one a down-stepped rising accent L+!H*. Within *wh*-questions, 27 *wh*-ISQs and 98 *wh*-RQs contained *denn*. The most frequent nuclear accent in *wh*-ISQs with *denn* was L+!H* ($N = 8$, 37%), followed by L+H* ($N = 8$, 30%), (L+H)* ($N = 4$, 14%), H* ($N = 3$, 11%), H+L* ($N = 1$, 4%), and

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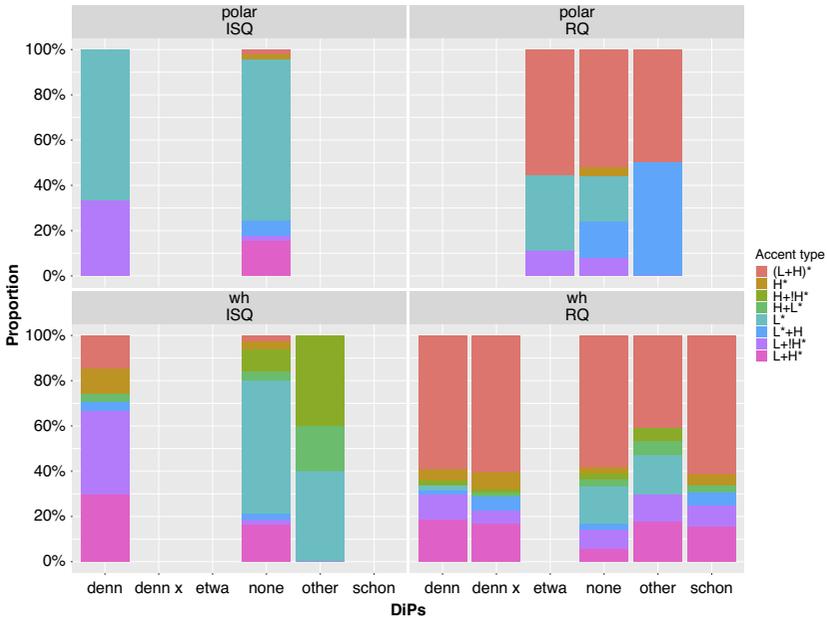


Figure 8

Distribution of nuclear accents ((L+H)*: red, H*: orange, H+!H*: olive green, H+L*: green, L*: turquoise, L*+H: blue, L+!H*: purple, L+H*: pink) in RQs and ISQs, top: polar questions; bottom: *wh*-questions, right: ISQs; left: RQs.

L*+H ($N = 1, 4\%$). *Wh*-RQs with *denn* were mostly realized with (L+H)* ($N = 58, 59\%$), followed by L+H* ($N = 18, 18\%$), L+!H* ($N = 11, 11\%$), H* ($N = 5, 5\%$), L*+H ($N = 2, 2\%$), L* ($N = 2, 2\%$), and H+!H* ($N = 2, 2\%$).

denn x (*denn* + additional DiP): The combination of *denn* with another DiP did not occur in polar questions and not in *wh*-ISQs, but it did in 66 *wh*-RQs. Of these, 40 (61%) were realized with (L+H)*, followed by L+H* ($N = 11, 17\%$), H* ($N = 5, 8\%$). There were four instances of L*+H and four of L+!H* (6% each) and single cases of H+!H* and H+L*.

etwa: The DiP *etwa* only occurred in polar RQs ($N = 9$). Five of them (56%) were realized with the (L+H)* nuclear accent (see Figure 1), followed by L* ($N = 3, 33\%$) and L+!H* ($N = 1, 11\%$).

schon: The DiP *schon* only occurred in *wh*-RQs ($N = 65$). The respective utterances were mostly realized with (L+H)* ($N = 40, 62\%$; see Figure 2), followed by L+H* ($N = 10, 15\%$), L+!H* ($N = 6, 9\%$), L*+H ($N = 4, 6\%$), H* ($N = 3, 5\%$), and H+L* ($N = 2, 3\%$).

other: There were two polar RQs with DiPs that were allotted to ‘other’, occurring with (L+H)* and L*+H, respectively. Regarding *wh*-questions, the five ISQs in this category were H+!H* ($N = 2$), L* ($N = 2$), and H+L* ($N = 1$). RQs realized

with other DiPs mostly had an (L+H)* accent ($N = 7$, 41%), followed by L+H* ($N = 3$, 18%), L* ($N = 3$, 18%), L+!H* ($N = 2$, 12%), H+L* ($N = 1$, 6%), and H+!H* ($N = 1$, 6%).

3. DISCUSSION

The current study set out to investigate the relation between lexical and morpho-syntactic means to signal rhetorical meaning, on the one hand, and prosodic means, on the other. The current section discusses the research questions given at the end of [Section 1](#) in turn against the background of the experimental results.

RESEARCH QUESTION I is concerned with whether or not speakers prefer a specific syntactic construction when producing RQs. The answer is that they do. Our results show that when speakers are free to choose the morpho-syntactic form and lexical material (here, only infinitives, object nouns, and *wh*-words were presented as sentence fragments instead of giving a full utterance, lexical additions and any syntactic structure were allowed), they prefer *wh*-questions to polar questions (as well as to any other syntactic structure) for RQs. This preference can possibly be accounted for by the presence of the *wh*-word as a segment fragment, but this explanation would only account for one half of the stimuli. The assumption of a general bias toward *wh*-questions triggered by the presence of the *wh*-fragment would not account for the fact that when a *wh*-word was not among sentence fragments in the stimuli, only RQs are to a high extent produced as *wh*-questions, but not ISQs. Indeed, 80% of RQ targets without *wh*-fragment were also produced as *wh*-questions, in contrast to 20% of ISQ-targets without *wh*-fragment. We do therefore not assume a general bias of the occurrence of the *wh*-word, but instead conclude that when speakers have the choice (and in the experimental setting only little lexical material was given), they prefer *wh*-interrogative syntax for RQs but polar interrogative syntax for ISQs. Interestingly, twelve RQs without *wh*-fragment in the stimulus were produced not as polar or *wh*-questions, but with V2 declarative surface syntax, a syntactic form that did not occur in any of the other conditions. These twelve cases deserve mention because of the pragmatic closeness of RQs and declaratives (or: assertions). The use of a V2 structure may thus be due to the illocution of an RQ, which is essentially assertive (e.g., Meibauer 1986; Han 2002). The ultimate goal of an RQ is that its propositional content becomes part of the common ground of all discourse participants (Caponigro & Sprouse 2007; Biezma & Rawlins 2017). In that regard, RQs have a high resemblance to (V2) assertions (see Farkas & Bruce 2010 for assertions). Hence, it is conceivable that in some cases speakers opted for a V2 construction, which is commonly used for assertions (e.g., Glück 2010), when intending rhetorical meaning, instead of an interrogative form. The fact that V2 syntax was never observed for RQ stimuli with *wh*-fragments is perhaps a consequence of the presence of the *wh*-word: participants did not ignore these *wh*-words but formed *wh*-questions almost throughout. The fact that there were only twelve instances of V2 may well be a task effect, since instructions only introduced RQs and ISQs (i.e., only interrogative structures). Against this

background, we cannot exclude that some of the V2 sentences were intended as V2 interrogatives rather than declaratives, thus not assertions but non-neutral questions of some kind (Gunlogson 2003; Krifka 2011). However, while we have evidence for the affinity of RQs to assertions, we have to leave the issue of potential V2 interrogatives with rhetorical meaning to future research. In any case, the occurrence of V2 syntax is a unique feature of (polar) RQs in our data, marking a possible syntactic difference between rhetorical and information-seeking meaning. Whether V2 (declarative or interrogative) would be more frequent in another experimental setting and how common it is in spontaneous speech is another interesting question for future research.

Syntactic differences between ISQs and RQs were also observed within question types. Within polar questions, most ISQs were simple questions, or simple questions with an extended pronominal subject (together 75% of all polar ISQs), while RQs were simple in this sense only in 22% of the cases and made use of embedded clauses as well as DiPs. This takes us to RESEARCH QUESTION II, which asked whether speakers use specific lexical or morpho-syntactic means to signal rhetorical meaning. Again, the answer is clearly yes, especially as far as DiPs are concerned. DiPs occurred significantly more frequently in RQs than in ISQs. Given that the provided sentence fragments were the same for ISQs and RQs, we take this result as strong evidence that DiPs, particularly *denn* + another DiP, *etwa* and *schon*, provide an important lexical cue to rhetorical meaning. The most frequent DiP, *denn*, occurred in both ISQs and RQs and in both polar and *wh*-questions, although it did not occur in polar RQs. We therefore consider *denn* neutral regarding illocution type, which fits in with prior research on DiPs in RQs stating that *denn* does not favour one or the other reading of a question (Thurmair 1989; Viesel & Freitag 2019) and is equally possible in both interrogative sentence types (Theiler 2021). However, we found that DiPs *etwa*, *denn* + *x* and *schon* occurred in RQs, only, and we therefore consider them markers of rhetorical meaning. This is in line with the literature on use of DiPs to signal rhetorical meaning, remember Bayer & Obenauer's (2011) example of *schon* given in Section 1 (see also Zaefferer 1984; Meibauer 1986).

Other lexical or morpho-syntactic means, such as the use of the subjunctive in combination with negation, comparative structures, or NPIs, which have been argued to occur with RQs (see Section 1), were non-existent in the current data set. This may be an effect of the experimental environment or their general infrequency and markedness in contrast to DiPs. In the experimental environment, participants added some lexical material, but they did not complicate things by using non-canonical sentence structures or negate sentences. Different methodology, including corpus analyses, will shed more light on this issue in future research. In any case, since DiPs were frequently added especially to RQs, even though they were nowhere given as sentence fragments, we conclude that they are the main lexical means of choice for speakers to mark a question as rhetorical.

RESEARCH QUESTION III was concerned with whether or not the use of lexical and/or morpho-syntactic cues to rhetorical meaning has an effect on the prosodic realization of RQs. Previous research on the prosody of German RQs has shown that

in comparison to ISQs, RQs show certain distinct prosodic features: slower speaking rates, frequent occurrence of the rising-falling pitch accent (L+H)*, an almost obligatory fall to L-% in *wh*-RQs, and frequent occurrence of the H-% mid-high plateau edge tone in polar RQs (Braun et al. 2019; Braun et al. 2020). The current data fully supports these observations. First, RQs were generally produced with slower speaking rates than ISQs. Second, we predominantly find high-rising edge tones (H-^H%) with polar ISQs, but H-% with polar RQs and L-% in *wh*-RQs, all irrespectively of the presence of a DiP. And third, we found the typical rhetorical (L+H)* nuclear accent in RQs.

So how do lexical and morpho-syntactic means interact with prosody? Given our data, we focus on the interaction of DiPs with prosodic cues. First, regarding speaking rate, RQs were slower than ISQs, and *wh*-questions were slower than polar questions. There is a tendency for the presence of DiPs to increase the speaking rate. However, this tendency did not reach significance and, more importantly, there was no interaction with any of the other factors, including illocution type. In other words, the effect holds for RQs and ISQs alike. It is therefore not possible to conclude, for example, that the presence of a DiP would reduce the necessity of a slower speaking rate in RQs because a DiP already signals rhetorical meaning. Moreover, the tendency applies to all DiPs, including *denn*, which is neutral with respect to illocution type. Relating to RESEARCH QUESTION III, we therefore conclude that speaking rate may be affected by the presence of a DiP, but not in any illocution type specific way.

The second prosodic parameter we looked at was edge tones (Figure 7). Here we compare RQs with ISQs, as well as different DiPs within RQs, because given that DiP *denn* is neutral in terms of illocution type, we cannot generalize across all DiPs. Comparing polar ISQs with polar RQs, they do not share a DiP; we observe *denn* in ISQs, but *etwa* and ‘other’ DiPs in RQs. Within polar RQs, none (i.e., no DiP) is more frequent than the two occurring DiPs *etwa* and ‘other’ DiPs. Polar RQs without DiPs show the greatest variety with respect to edge tones, while the two polar RQs containing ‘other’ DiPs both ended in the plateau H-% typical of polar RQs, and the percentage of H-% is also higher for polar RQs with *etwa* than with no DiP. While numbers are low, if anything, the presence of a DiP in polar RQs reinforced the use of the RQ-typical utterance-final plateau.

Wh-RQs mostly ended in L-%, as opposed to more variation in *wh*-ISQs (in line with Braun et al. 2019; Braun et al. 2020). This pattern is the same across DiPs. Within *wh*-RQs, we do not observe meaningful differences between utterances containing neutral *denn*, on the one hand, and utterances containing DiPs that only occur in RQs, i.e., *denn x* and *schon*, on the other. Again, the predominant edge tone is L-%, suggesting no effect of the DiP such that a DiP signalling rhetorical meaning would allow more variation in terms of edge tones. Consequently, like with polar RQs, we find simultaneous rhetorical marking by both DiP and edge tone.

The third prosodic parameter was the use of nuclear accents in relation to the use of DiPs (Figure 8), again comparing RQs and ISQs, but also DiPs within RQs, for the same reasons as for edge tones. Like for edge tones, no comparison is

possible between polar ISQs and polar RQs, because they do not share specific DiPs. Nuclear accents in utterances without DiPs ('none' in Figure 8) are in line with earlier results for the prosody of German RQs (Braun et al. 2019; Braun et al. 2020), in particular, we observe the occurrence of the (L+H)* nuclear accent in more than 50% of polar RQs. Since neutral *denn* does not occur in our set of polar RQs, no comparison is possible within polar RQs between *denn* and other DiPs. What we do observe is the occurrence of (L+H)* to approximately the same extent as in RQs without DiP, thus we conclude that the presence of a DiP signalling rhetorical meaning (*etwa* in particular) does not prevent speakers from also using the nuclear accent typical of RQs, again suggesting independent contributions of lexicon and prosody.

Comparing *wh*-ISQs with *wh*-RQs, again we clearly find more use of the nuclear accent typical of RQs across question types, (L+H)*, irrespective of the presence or absence of a DiP, and also, within *wh*-RQs, irrespective of which DiP was used. So, as for polar questions, we conclude that the use of DiP does not alter the prosodic pattern.

Taken together, and in reply to the second part of RESEARCH QUESTION III, we conclude that all types of prosodic cues to RQs under scrutiny here (speaking rate, edge tones, nuclear accents) are used regardless of the presence of DiPs already signalling rhetorical meaning. This may be interpreted as an additive effect, which may suggest reinforcement of the rhetorical message: the more markers, from more than one area of the grammar, the clearer the rhetorical meaning. Whether this is the case or not will best be tested in a perception experiment including all versus some or none of these parameters. Alternatively, lexicon and prosody (as well as syntax) may all be considered independent of one another. Prosody may simply not be 'interested' in whether an RQ is already marked as such by a lexical marker, or it may not have access to that kind of information because the different areas of the grammar proceed in parallel.

Future research will shed more light on these open questions. In any case, we can safely conclude that there is no such thing as 'reduction of prosody' or 'lack of prosodic marking' of an RQ due to the presence of cues to rhetorical meaning from other areas of the grammar.

4. CONCLUSION

Participants preferred *wh*-questions over polar questions when producing RQs and used certain DiPs to lexically signal rhetorical meaning. Prosodically, RQs were found to show typical features already identified in previous research. There was no interaction between prosodic and lexical features of RQs, meaning that the different means did not replace one other or make each another superfluous. Instead, speakers combined DiPs with prosodic features to mark rhetorical meaning. Whether or not RQs that combine both strategies are perceived as stronger or as less ambiguous in meaning than RQs with only lexical or only prosodic marking will have to be investigated in future perception experiments.

APPENDIX: SYNTACTIC STRUCTURES AS LABELED IN FIGURE 4

Category labels do not list all sentence constituents, but were chosen such that they were minimally distinctive.

wh, zu, inf: *wh*-word, INF ‘to’, infinitival verb (*wh*-question with embedded infinitive)

Wer hat Lust Limonenkuchen zu essen?

Who has desire lime.cake to eat

‘Who would like to eat lime cake?’

wh, V-NEG, zu, inf: *wh*-word, V, NEG, INF ‘to’, infinitival verb (negated *wh*-clause with infinitival complement)

Wer freut sich nicht darüber Beerdigungslilien zum Geburtstag geschenkt zu bekommen?

Who rejoices self not about funeral.lilies to birthday given to get

‘Who wouldn’t be happy to be presented with funeral lilies for their birthday?’

wh, modal v, inf, NEG: *wh*-word, AUX, NEG-object, infinitival verb

Wer mag keine Limonen essen?

Who likes no limes eat

‘Who does not want to eat limes?’

wh, modal v, inf, DiP: *wh*-word, AUX, infinitival verb, DiP

Wer soll denn den Limburger essen?

Who should DiP the Limburger eat

‘Who (do you think) will eat the Limburger cheese?’

wh, modal, inf: *wh*-word, AUX, infinitival verb

Wer möchte die Schnittchen mit Limburger essen?

Who wants the sandwiches with Limburger eat

‘Who wants to eat the sandwiches with Limburger cheese?’

wh, DiP, NEG: *wh*-word, DiP, NEG-object

Wer mag denn keine Leber zu Kaffee und Kuchen?

Who likes DiP no liver to coffee and cake

‘Who does not like liver with coffee and cake?’

wh, DiP: *wh*-word, DiP

Wer trägt denn Angora?

Who carries DiP angora

‘Who wears (clothes made of) angora?’

wh, complex, subjunctive: extended *wh*-phrase, SBJV

Wer von euch würde Angora tragen?

Who of you would angora carry

‘Who of you would wear angora?’

wh, complex, NEG: extended *wh*-phrase, NEG

Wer von euch mag keine Bolognese?

Who of you likes no Bolognese

‘Who of you does not like Bolognese?’

wh, complex, modal, inf, DiP: extended *wh*-phrase, AUX, DiP, infinitival verb

Wer hier am Tisch mag wohl Rindfleischbolognese haben?

Who here at.the table likes DiP beef.bolognese have

Who at this table would possibly like bolognese with beef?

wh, complex, modal, inf: extended *wh*-phrase, AUX, infinitival verb

Wer von euch will mit ins Museum kommen?

Who of you wants with in.the museum come

‘Who of you would like to come to the museum?’

wh, complex, DiP: extended *wh*-phrase, DiP

Wer von denen isst denn Bolognese?

Who of them eats DiP bolognese?

‘Who of them eats bolognese?’

wh, complex: extended *wh*-phrase

Wer von euch will Kamillentee?

Who of you wants camomile.tea?

‘Who of you would like camomile tea?’

wh: simple *wh*-question

Wer isst Limonen?

Who eats limes

‘Who eats limes?’

V2, sub cl: V2 with embedded clause

Du erwartest, dass Vegetarier Bolognese mögen.

You.2SG expect that vegetarians bolognese like

‘You expect that vegetarians like bolognese.’

V2, subcl., subjunctive, DiP: V2 declarative with clausal complement in subjunctive

Du denkst doch wirklich wir hätten die Zeit Romane zu lesen.

You.2SG think DiP really we would.have the time novels to read

‘You really think we have the time to read novels.’

V2, DiP, V-NEG: V2 syntax with DiP and negation

Du isst doch nicht etwa Limonen.

You.2SG eat DiP not DiP limes

‘You don’t honestly eat limes.’

V2, DiP, NEG: V2 syntax with DiP and negated object

Hier mag doch keiner Bolognese.

Here likes DiP nobody bolognese
 ‘After all, nobody here likes Bolognese.’

V2: V2 declarative syntax
 Du isst Rosenkohl.
 You.2SG eat brussels.sprouts
 ‘You eat brussels sprouts.’

Polar V-NEG: negated polar question (finite main verb)
 Magst du nicht etwas Lebertran?
 Like you.2SG not some cod.liver.oil
 ‘Don’t you want some cod-liver oil?’

Polar, subjunctive: polar question, SBJV
 Würdet ihr auch Novellen lesen?
 Would you.2PL also novellas read
 ‘Would you also read novellas?’

Polar, sub cl: V1 polar question (finite main verb) with embedded clause
 Denkst du, die mag Rosen?
 think you.2SG she likes roses
 ‘Do you think she likes roses?’

Polar, jemand, inf: polar question with indefinite subject and infinitive
 Möchte jemand von euch noch Limburger essen?
 Wants anybody of you still Limburger eat
 ‘Does anybody of you still want to eat Limburger cheese?’

Polar, jemand: simple polar question (finite main verb) with indefinite subject
 Trägt jemand Angora?
 Carries somebody angora
 ‘Does anybody wear angora?’

Polar, inf
 Willst Du eine Novelle lesen?
 Want you.2SG a novella read
 ‘Do you want to read a novella?’

Polar DiP: simple polar question with DiP (finite main verb)
 Brauchen wir denn Schablonen?
 Need we DiP stencils
 ‘Do we actually need stencils?’

Polar, complex, zu, inf: polar, extended pronominal subject, infinitival sub-
 clause
 Hat jemand von euch Lust Limonen zu essen?
 Has someone of you.2PL desire limes to eat?
 ‘Does anybody of you enjoy eating limes?’

Polar, complex, inf: polar, extended pronominal subject, infinitival main verb
 Kann jemand von euch Lambada tanzen?
 Can someone of you Lambada dance
 ‘Can anybody of you dance Lambada?’

Polar, complex: polar question with extended pronominal subject
 Braucht einer von euch Schablonen?
 Needs one of you.2PL stencils
 ‘Does anybody of you need stencils?’

Polar: simple polar question
 Isst du Limburger?
 Eat you.2SG Limburger
 ‘Do you eat Limburger cheese?’

Other
 Mag wer eine Rose?
 Likes who a rose?
 ‘Does anybody want a rose?’

Alternative
 Mag einer von euch Lebertran oder soll ich es wegwerfen?
 Likes one of you cod.liver.oil or shall I it throw.away
 ‘Does anybody of you like cod-liver oil or can I throw it away?’

REFERENCES

- Altmann, Hans. 1987. Zur Problematik der Konstitution von Satzmodi als Formtypen. In Jörg Meibauer (ed.), *Satzmodus zwischen Grammatik und Pragmatik*, 22–56. Tübingen: Niemeyer.
- Altmann, Hans. 1993. Satzmodus. In Joachim Jacobs (ed.), *Syntax*, 1006–1029. Berlin: De Gruyter.
- Bartels, Christine. 1999. *The intonation of English statements and questions: A compositional approach*. New York, London: Garland.
- Bates, Douglas, Reinhold Kliegl, Shrawan Vasishth and Harald R. Baayen. 2015. Parsimonious mixed models. *arXiv: Methodology*, arXiv:1506.04967.
- Bayer, Joseph & Hans-Georg Obenauer. 2011. Discourse particles, clause structure, and question types. *Linguistic Review* 28.4, 449–491.
- Benjamini, Yoav & Yocef Hochberg. 1995. Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society, Series B* 57, 289–300.
- Biezma, María & Kyle Rawlins. 2017. Rhetorical questions: Severing asking from questioning. In Dan Burgdorf, Jacob Collard, Sireemas Maspong & Brynhildur Stéfansdóttir (eds.), *Proceedings of the 27th Semantics and Linguistic Theory Conference (SALT 27)*, 302–322. College Park: University of Maryland.
- Boersma, Paul & David Weenink. 2018. Praat: Doing phonetics by the computer. www.praat.org (accessed 17 July 2021)
- Brandt, Margareta, Marga Reis, Inger Rosengren & Ilse Zimmermann. 1993. Satztyp, Satzmodus und Illokution. In Inger Rosengren (ed.), *Satz und Illokution*, vol. 1, 1–90. Tübingen: Niemeyer.

- Braun, Bettina, Nicole Dehé, Jana Neitsch, Daniela Wochner and Katharina Zahner. 2019. The prosody of rhetorical and information-seeking questions in German. *Language and Speech* 62.4, 779–807.
- Braun, Bettina, Marieke Einfeldt, Gloria Esposito & Nicole Dehé. 2020. The prosodic realization of rhetorical questions and information-seeking questions in German spontaneous speech. *Proceedings of the 10th International Conference on Speech Prosody* (Speech Prosody 2020), 342–346.
- Caponigro, Ivano & Jon Sprouse. 2007. Rhetorical questions as questions. *Proceedings of the 11th Annual Meeting of the Gesellschaft für Semantik* (Sinn und Bedeutung 11), 121–133.
- Columb, Malachy & Matthew Atkinson. 2016. Statistical analysis: Sample size and power estimations. *BJA Education* 16.5, 159–161.
- Dehé, Nicole. 2002. *Particle verbs in English: Syntax, information structure and intonation*. Amsterdam, Philadelphia: John Benjamins.
- Dehé, Nicole, Bettina Braun, Marieke Einfeldt, Daniela Wochner & Katharina Zahner-Ritter. 2022. The prosody of rhetorical questions: A cross-linguistic view. *Linguistische Berichte* 269, 3–42.
- Farkas, Donka & Kim B. Bruce. 2010. On reaction to assertions and polar questions. *Journal of Semantics* 27.1, 81–118.
- Gauza, Holger. 2018. *Position und Verarbeitung VP-interner Adjunkte*. Doctoral dissertation, University of Tübingen.
- Glück, Helmut. 2010. Assertion. In Helmut Glück (ed.), *Metzler Lexikon Sprache*, 64–65. Stuttgart: J. B. Metzler.
- Grésillon, Almuth. 1980. Zum linguistischen Status rhetorischer Fragen. *Zeitschrift für Germanistische Linguistik* 8.3, 273–289.
- Grice, Martine, Stefan Baumann & Ralf Benz Müller. 2005. German intonation in autosegmental-metrical phonology. In Sun-Ah Jun (ed.), *Prosodic typology: The phonology of intonation and phrasing*, 55–83. Oxford: Oxford University Press.
- Gunlogson, Christine. 2003. *True to form: Rising and falling declaratives as questions in English*. New York: Routledge.
- Hamblin, Charles L. 1973. Questions in Montague English. *Foundation of Languages* 10.1, 41–53.
- Han, Chung-hye. 2002. Interpreting interrogatives as rhetorical questions. *Lingua* 112.3, 201–229.
- Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1.1, 3–44.
- Krifka, Manfred. 2011. Questions. In Von Heusinger et al. (eds.), 1742–1785.
- Kuznetsova, Alexandra, Per B. Brockhoff & Rune H. B. Christensen. 2017. lmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software* 82.1, 1–26.
- Leiner, Dominik J. 2019. SoSci Survey (Version 3.1.06) [Computer software]. Available at <https://www.soscisurvey.de>
- Matuschek, Hannes, Reinhold Kliegl, Shravan Vasishth, Harald R. Baayen & Douglas Bates. 2017. Balancing Type I error and power in linear mixed models. *Journal of Memory and Language* 94, 305–315.
- Meibauer, Jörg. 1986. *Rhetorische Fragen*. Tübingen: Niemeyer.
- Reimer, Laura & Christine Dimroth. To appear. Unstressed versus stressed German additive ‘auch’ – What determines a speaker’s choice? *Linguistics Vanguard*.
- Theiler, Nadine. 2021. Denn as a highlighting-sensitive particle. *Linguistics and Philosophy* 44(2): 323–362.
- Thurmain, Maria. 1989. *Modalpartikeln und ihre Kombinationen*. Tübingen: Niemeyer.
- Viesel, Yvonne & Constantin Freitag. 2019. Wer kann denn schon ja sagen? Natural and experimental data on German discourse particles in rhetorical questions. *Zeitschrift für Sprachwissenschaft* 38.2, 243–298.
- Zaefferer, Dietmar. 1984. *Frageausdrücke und Fragen im Deutschen: Zu ihrer Syntax, Semantik und Pragmatik*. Munich: Fink.
- Zahner-Ritter, Katharina, Marieke Einfeldt, Daniela Wochner, Angela James, Nicole Dehé & Bettina Braun. 2022. Three kinds of rising-falling contours in German wh-questions: Evidence from form and function. *Frontiers in Communication* 7. <https://www.frontiersin.org/articles/10.3389/fcomm.2022.838955/full>
- Zimmermann, Malte. 2011. Discourse particles. In Von Heusinger et al. (eds.), 2011–2038.

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Authors' addresses: (Dehé)

*Department of Linguistics, University of Konstanz, Fach 186, 78457 Konstanz,
Germany
nicole.dehe@uni-konstanz.de*

(Wochner)

*Department of Linguistics, University of Konstanz, Fach 186, 78457 Konstanz,
Germany
daniela.wochner@uni-konstanz.de*

(Einfeldt)

*Department of Linguistics, University of Konstanz, Fach 186, 78457 Konstanz,
Germany
marieke.einfeldt@uni-konstanz.de*