

The focus and prosodic structure of German Right Node Raising and Gapping¹

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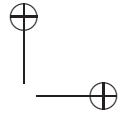
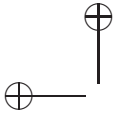
Abstract

Right Node Raising and Gapping consist of parallel sentential conjuncts, one of them being elliptical. The ellipsis is in the first conjunct in Right Node Raising and in the last conjunct in Gapping. We analyze ellipsis as the result of radical deaccentuation, to avoid superfluous repetition of phonetic material. In order to be well-formed, these constructions rely on a symmetric syntax, as well as on symmetrically accented material in the remnants, which we claim to be the result of contrastive focus (see Hartmann 2000). The new claim is that these constructions also need a special prosodic phrasing. Correlates of phrasing, like downstep, upstep and register scaling highlight the place of the ellipsis, especially in Right Node Raising where the ellipsis is at the end of the first conjunct. In this case, the hearer has to wait until the end of the second conjunct to be able to fill the gap. Much weaker correlates of phrasing are found in Gapping, since the ellipsis is in the second conjunct. There, the elided material has already been processed in the first conjunct, and the processing load is not so heavy. Our claims are supported by the results of production experiments.

1. Introduction

In this article we analyze the focus and prosodic structures of two types of coordination in German, *Right Node Raising* (RNR) and *Gapping*. Without

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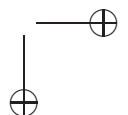
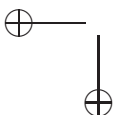
discussing alternative theories, we assume that both constructions are elliptical. Our understanding of ellipsis in RNR and Gapping is that the conjuncts of these bisentential coordinations contain certain elements which lack a phonetic matrix as a consequence of deletion, but which otherwise have complete syntactic and semantic content. The purpose of this article is to investigate the focus and prosodic structures of German RNR and Gapping, which we take to license PF-deletion. We will show that the prosodic structures of elliptical constructions are determined by syntax, semantics and pragmatics.

Two important results emerge from our investigation. Firstly, we show that the prosodic structures of RNR and Gapping are heavily influenced by the specific focus structure of the coordinations. We proceed as follows: We start to analyze the parallel syntactic structure of the coordinations in question. We then look at the predictions which a standard focus theory such as Selkirk's (1984; 1995) makes for these parallel constructions. We argue that coordinations are special in that one conjunct contributes to the determination of the focus structure of the other conjunct. In other words, while it is usually taken for granted that the focus structure of a simple clause is determined by the linguistic (and non-linguistic) context which precedes this clause, coordination differs in that such a context may be provided by the coordination itself.

Secondly, we look at independent prosodic restrictions constraining RNR and Gapping. We conclude that the specific prosodic structures of RNR and Gapping indicate ellipsis in these constructions. The prosodic structure is characterized by the fact that elliptical coordinations in general contain contrastive elements in the respective conjuncts. In RNR, these are (at least) the elements immediately preceding the ellipsis site at the right periphery of the first conjunct and its counterpart in the second conjunct. When the shared constituent, or part of it, forms its own phonological phrase, it is accented, but if it is integrated into an independently existing phonological phrase, it is unaccented. In Gapping, each remnant, i.e. each constituent left behind after PF-deletion in the second conjunct, generally contrasts with its counterpart in the first conjunct.

We also propose that the different directionality of deletion in RNR and in Gapping correlates with the prosodic organization of the respective constructions. The deleted element is in the left conjunct in RNR and in the right one in Gapping. The shared constituent is at the right edge of an Intonation Phrase in RNR, but not in Gapping. In RNR, a boundary tone signals the missing material, while this is not the case in Gapping.

This article is structured as follows. In the second section, we describe the characteristic properties of the two elliptical constructions from a syntactic and pragmatic perspective. The third section analyzes the complex focus structure, which is partly characterized by the need for semantic contrast between the conjuncts. In the fourth section we discuss the condition that some element of one conjunct in RNR and Gapping must semantically contrast with its counter-



part in the other conjunct. In section five, we present the theoretical framework of the accentual and phrasal patterns of the elliptical constructions. Sections six and seven summarize our experimental results and discuss some illustrations. In short, we show that speakers realized the accentual pattern characteristic to RNR and Gapping as predicted by our theoretical claims. Each contrasting element forms its own Phonological Phrase, each conjunct its own Intonation Phrase (IP) and the whole sentence a higher, recursive IP. We concentrate on the tonal properties and on the phrasing correlates and show that register scaling between the two IPs is the most stable indicator of ellipsis. Section 8 concludes.

2. Right Node Raising and Gapping

The terms ‘Right Node Raising’ and ‘Gapping’ refer to coordinations which lack some elements in one of their sentential conjuncts. The missing parts in one conjunct have obligatory phonetically overt counterparts in the same structural position in the other conjunct. We use the following terminological convention. We refer to the *target* of RNR and Gapping when talking about an elided part in one conjunct and its overt counterpart in the other conjunct. The *remnant* is the non-elided part, i.e., the part left behind after PF-deletion.

In RNR,² the phonetically overt target appears at the right periphery of the conjuncts, thus at the end of the second conjunct. Ellipsis takes place in the first conjunct. This is illustrated in the examples in (1). The target of (1a) is the DP-complement of the prepositions, *vier Buben* (‘four jacks’). In (1b) it is the clausal complement *dass Maria mit diesem Blatt ein Null-Ouvert gewinnen kann* (‘that Maria can win a null ouvert with this hand’). The remnants in (1a) are *Hans reizt mit, und Peter reizt ohne* (‘Hans bids with and Peter bids without’) and in (1b) *Hans ist überzeugt, aber Peter bezweifelt* (‘Hans is convinced but Peter doubts’).

- (1) a. *Hans reizt mit, und Peter reizt ohne vier Buben.*
 Hans bids with and Peter bids without four jacks
 ‘Hans is bidding with and Peter is bidding without four jacks.’

2. Right Node Raising is a construction whose analysis has evolved along with generative theory. The term, which reflects the old assumption that an element is raised from both conjuncts to the right periphery of the coordinated structure, is due to Postal (1974). The raising analysis is also propagated by Williams (1990) and Larson (1990). The first to propose a phonological reduction theory of RNR were Wexler and Culicover (1980). Further arguments against the raising analysis were advanced by Levine (1984), van Oirsouw (1987), (1993), and Phillips (1996). The phonological reduction theory was applied to German by Wilder (1994), (1997), and Hartmann (2000).

70 Caroline Féry and Katharina Hartmann

- b. *Hans ist überzeugt, aber Peter bezweifelt, dass Maria mit diesem Blatt ein Null-Ouvert gewinnen kann.*
 Hans is convinced but Peter doubts that Maria with this hand a null ouvert win can
 ‘Hans is convinced, but Peter doubts, that Maria can win a null ouvert with this hand.’

We represent the PF-deleted elements with crossed-out letters as in (1’).

- (1’) a. *Hans reizt mit ~~vier Buben~~, und Peter reizt ohne vier Buben.*
 b. *Hans ist überzeugt, ~~dass Maria mit diesem Blatt ein Null-Ouvert gewinnen kann~~, aber Peter bezweifelt, dass Maria mit diesem Blatt ein Null-Ouvert gewinnen kann.*

In Gapping,³ ellipsis takes place in the second conjunct. The ellipsis obligatorily includes the finite verb; in addition to this, further elements of the second conjunct may be phonetically empty. Gapping examples are given in (2). In (2a), the verb and the reflexive pronoun are gapped; in (2b), the verb and the PP *über Pasolini* are missing. Like the targets of RNR constructions, the targets of Gapping do not have to be constituents.⁴

3. Most of the many authors working on Gapping assume that Gapping involves some kind of ellipsis, cf. Harris (1957), Ross (1970), Jackendoff (1971), Hankamer (1973), (1979), Sag (1976), Kuno (1976), Neijt (1979), van Oirsouw (1983), (1987), and Wilder (1994), (1997). Two alternatives to the reduction approaches are presented in Chao (1988), and Johnson (1994).

4. A major difference between RNR and Gapping concerns the question whether the remnants, i.e., the elements which are not the target, must be constituents or not. While this question can be negatively answered for RNR, as illustrated in (i), Gapping remnants must be constituents. Moreover, they must even be major constituents in the sense of Hankamer (1973: Fn. 2) who claims that “a major constituent of a given sentence S_0 is a constituent either immediately dominated by S_0 or immediately dominated by VP, which is immediately dominated by S_0 .” Thus, in the Gapping example in (ii), the remnants in the second conjunct are the DP *Peter* and the PP *vor einem Auto*, which are both major constituents. In (iii), however, the remnant *einem Auto* is not a major constituent, thus the sentence is ungrammatical.

- (i) *Peter jagte ~~einen schwarzen Elch~~ und Martin schoss einen schwarzen Elch.*
 Peter hunted a black moose and Martin shot a black moose
 ‘Peter hunted and Martin shot a black moose.’
- (ii) *Karl versteckt sich hinter einer Mülltonne und Peter ~~versteckt sich~~ vor einem Auto.*
 Karl hides REFL behind a garbage.can and Peter hides REFL in.front.of a car
 ‘Karl is hiding behind a garbage can and Peter in front of a car.’

The focus and prosodic structure of RNR and Gapping 71

- (2) a. *Alf streitet sich mit Inge, und Susanne ~~streitet~~*
 Alf quarrels REFL with Inge and Susanne quarrels
~~sich~~ mit Frank.
 REFL with Frank
 ‘Alf is quarreling with Inge and Susanne with Frank.’
- b. *Claus hat eine Reportage über Pasolini gedreht, und*
 Claus has a report on Pasolini shot and
Roland ~~hat~~ einen Spielfilm ~~über Pasolini gedreht.~~
 Roland has a movie on Pasolini shot
 ‘Claus shot a report on Pasolini, and Roland a movie.’

We assume that RNR and Gapping constructions have the structures given in (3). Both types of coordination are syntactically bisentential, therefore the conjuncts are CPs. PF-deletion applies upon the bisentential structure.⁵

(iii) **Karl versteckt sich hinter einer Mülltonne und Peter ~~versteckt sich hinter~~ einem Auto.*

5. Right Node Raising can also apply to complex words, as first shown in Höhle (1982). Example (i) is taken from Booij (1984).

(i) *Frühlings- und Herbstblumen*
 ‘springtime and autumn flowers’

The fact that RNR applies word-internally does not in principle exclude a bisentential underlying structure for these examples. Note that Example (ii) could possibly be derived from the structure in (iii). The first ellipsis (*Blumen*) is RNR, while the second ellipsis (*Philip säte*) would result from Gapping. For such a proposal, cf. Wilder (1994) and (1997).

(ii) *Philip säte Frühlings- und Herbstblumen.*
 ‘Philip sowed springtime and autumn flowers.’

(iii) *Philip säte Frühlings~~blumen~~ und ~~Philip säte~~ Herbstblumen.*

Since even ellipsis within complex words can be traced back to an underlying bisentential base, we assume that RNR is always syntactically bisentential (cf. (3a)). As for Gapping, Neijt (1979:24) claims that the domain of Gapping is either CP, IP, or VP. The latter is illustrated by the following example (her 52b):

(iv) *John both tried to put his car in the garage and ~~tried to put~~ his bike in the barn.*

However, it is a theoretical assumption which is hard to prove that (iv) involves VP-coordination and Gapping. Example (iv) is also compatible with a Larsonian verb raising analysis (Larson 1988, 1990). Following Larson, (iv) contains coordinated VPs whose heads raise across-the-board to a higher verb position. Thus, unquestionable Gapping constructions need an overt subject in each conjunct. We therefore stick to our assumption that Gapping, as well as RNR, are underlyingly bisentential.

72 *Caroline Féry and Katharina Hartmann*

- (3) a. $[_{CP}[_{CP} \dots \alpha]]$ and $[_{CP} \dots \alpha]$ (RNR)
 b. $[_{CP}[_{CP} \dots V \dots]]$ and $[_{CP} \alpha \dots \forall \dots \beta \dots]$ (Gapping)
 c. $[_{CP}[_{CP} \dots V \dots \beta \dots]]$ and $[_{CP} \alpha \dots \forall \dots \beta \dots \gamma \dots]$ (Gapping)

Various syntactic and semantic arguments supporting the PF-deletion theory are presented in Hartmann (2000). We limit ourselves to present one of these arguments, which concerns RNR. Note that the classical analysis of RNR assumes that RNR involves raising of the target to the right periphery of the coordination. As shown in (4), however, the target of RNR need not be a syntactic constituent. The target consists of the dative NP *Mutter* ('mother') and the infinitival clause *in die Disko zu gehen* ('to go to the disco'), which do not form a constituent. The classical raising analysis cannot account for this example, because syntactic movement can only involve constituents.⁶ Example (4) is naturally explained under the PF-reduction theory, since the target stays in situ and is phonetically deleted at PF.⁷ It goes without saying that syntactic constituency is not a prerequisite for PF-deletion.

- (4) *Peter verspricht seiner Mutter in die Disko zu gehen, und*
 Peter promises his mother in the disco to go and
Maria verspricht ihrer Mutter in die Disko zu gehen.
 Maria promises her mother to the disco to go
 'Peter promises his, and Maria promises her mother to go to the disco.'

PF-deletion in RNR and Gapping takes place due to the parallel syntactic structure of the conjuncts. Elements which are potentially deletable at PF appear twice – once in each conjunct. In addition, they must appear in identical syntactic positions, as the examples in (5) illustrate. In none of these examples can the constituent, which appears in each of the conjuncts, be deleted (and the sentence meaning still be retained).

- (5) a. *Alf streitet sich mit Inge, und Inge / sie verlässt*
 Alf quarrels REFL with Inge and Inge / she leaves
die Wohnung.
 the apartment
 'Alf is quarreling with Inge, and Inge/she is leaving the apartment.'

6. That RNR targets do not have to be constituents was recognized by Gleitman (1965), Abbott (1976), Grosu (1976), Williams (1978), van Oirsouw (1983), (1987), McCloskey (1986) and Larson (1990) for English; and by Klein (1981), Wesche (1992), Wilder (1997), and Hartmann (2000) for German. For a contrary view, cf. Hankamer (1979), Postal (1974), and Reinhart (1991).

7. See Fanselow and Cavar (2001), (2002) for a deletion analysis of split constructions.

The focus and prosodic structure of RNR and Gapping 73

- a.' *Alf streitet sich mit Inge und ~~Inge~~/sie verlässt die Wohnung.
 a." *Alf streitet sich mit ~~Inge~~ und Inge/sie verlässt die Wohnung.
 b. Stefanie putzt jeden Samstag ihr Auto, aber Martin
 Stefanie cleans every Saturday her car but Martin
 fährt ihr Auto / es.
 drives her car / it
 'Stefanie cleans her car every Saturday, but Martin drives her
 car/it.'
 b'. *Stefanie putzt jeden Samstag ihr Auto, aber Martin fährt ~~ihr Auto~~/
 es.
 b." *Stefanie putzt jeden Samstag ~~ihr Auto~~, aber Martin fährt ihr Auto/
 es.

The examples in (5) show that constituent identity in the two conjuncts is not a sufficient condition for PF-deletion to apply. PF-deleted constituents are only recoverable if they appear in syntactically identical positions. With respect to (5a) one could argue that the unavailability of ellipsis is due to the different syntactic functions of the ellipsis target (i.e., prepositional object vs. subject). This argument, however, is invalidated by the ungrammaticality of (5b') and (5b'') in their intended reading. In both examples, the potential ellipsis target is the direct object. But nevertheless, neither forward deletion nor backward deletion is possible. (5b) is interesting in still another respect: the identical constituent *ihr Auto* appears at the right periphery of the conjuncts. As pointed out above, this is the structural position of a RNR target. However, RNR is impossible here, although the potential targets are phonetically and functionally identical and, moreover, satisfy the positional restrictions on RNR.

In the following sections, we elaborate the main claim of this article that ellipsis in RNR and Gapping is an epiphenomenon of the interactions of several grammatical properties of these coordinations, most prominently their syntactic and prosodic structures. We will not review the syntactic properties since these have been extensively discussed in the literature (e.g., Jackendoff 1971; Hankamer 1973; Munn 1993; Johnson 1994; Wilder 1997; Hartmann 2000), but instead we will concentrate on the prosodic properties. The occurrence of elision follows from two crucial conditions which must be met in order to make ellipsis in RNR and Gapping possible.

Conditions on ellipsis in RNR and Gapping

- (1) The conjuncts must exhibit a parallel syntactic and focus structure.
- (2) The focus constituents in the two conjuncts must allow for a contrastive interpretation.

In the following two sections we take a closer look at these conditions and illustrate them with numerous examples. We will then show in the final sections of this article that the prosodic and intonational structure of RNR and Gapping sentences also reflect them.

3. Focus structure

3.1. Focus and accent

A simple assumption on focus is that it marks a constituent in a sentence which cannot be contextually deduced. Most commonly, the context is the linguistic environment in which a sentence is uttered. Following a well-known strategy, we use question-answer sequences in which the question is the linguistic context for the following answer. A constituent of the answer which cannot be deduced from the question is the focus. In (6), the focus is the subject of the answer, which in the question corresponds to the *wh*-word. Focus on a constituent α is marked by a subscripted F: $[\alpha]_F$. For the reader's convenience, we underline the highest focus of a sentence. The phonological realization of a focus is a pitch accent on the metrically most prominent syllable of the focus. We indicate accent by capital letters.

- (6) Who left the party at midnight?
 [Graf DRacula]_F verließ die Party um Mitternacht.
 Count Dracula left the party at midnight
 'Count Dracula left the party at midnight.'

Our analysis is based on Selkirk's focus theory. As argued in Selkirk (1984; 1995), there is a relation between the position of pitch accents and the size of a focused constituent. This relation is expressed by two focus assignment rules. In a nutshell, Selkirk proposes that an accented word is marked by an F-feature (her Basic Focus Rule). The F-feature projects focus along the functor-argument structure up the tree. Starting from the accented word, it projects from a head to its maximal projection, and from a maximal projection to a selecting head (her Focus Projection).

- (7) F-Assignment Rules (Selkirk 1995: 555)
- a. Basic Focus Rule
An accented word is F-marked.
 - b. Focus Projection
 - (i) F-marking of the *head* of a phrase licenses the F-marking of the phrase.

The focus and prosodic structure of RNR and Gapping 75

- (ii) F-marking of an *internal argument* of a head licenses the F-marking of the head.

The focus of a sentence (“FOC” in Selkirk’s theory) is defined by a F-marked constituent which is not dominated by any other F-marked constituent. We assume without further ado that Selkirk’s rules are applicable to German, as well.⁸ F-assignment is illustrated in (8). The accented head noun of the object *Goldmedaille* is F-marked by the Basic Focus Rule. According to the rule of Focus Projection, the F-feature projects from the noun *Goldmedaille* to its maximal projection NP and across the indefinite article to the object-DP. From the object-DP, the F-feature projects to the selecting verb and from there to VP, which is the sentence focus of the answer in (8). Hence, the domain of focus projection is identical to the hierarchically highest maximal projection marked by an F-feature. The position from which focus projects is the syllable carrying a pitch accent. (We deviate from Selkirk’s representation by not marking the sentence focus as “FOC”, but by the highest F-feature not dominated by another one. The definition of a sentence focus is not influenced by our modified representation.)

- (8) What do you think Cathy Freeman will do?
Ich glaube, dass Cathy Freeman [VP [DP eine_F [NP
 I think that Cathy Freeman a
GOLDmedaille]_F] gewinnt_F].
 gold.medal wins
 ‘I think that Cathy Freeman will win a gold medal.’

As to the interpretation of F-features, F-marking indicates partial or complete novelty in the discourse, and the lack of F-marking indicates contextual givenness. As stated in the preceding paragraph, the highest F-feature marks the focus of the sentence. Thus, in (8), everything but the VP should be given in the discourse, which is correct in the context provided by the question. The VP (and every constituent contained in it) indicates novelty.⁹ Notice that, on the one hand, focus projection allows constituents to be F-marked – and interpreted as novel – which are not accented. On the other hand, focus projection may also force constituents to be accented if they are neither F-marked by focus projection nor given in the discourse. This happens, for example, with subjects in wide focus constructions, as triggered by appropriate questions. Consider (9).

8. Contributions to earlier discussions about focus in German are Féry (1993), Höhle (1982, 1992), Jacobs (1988, 1992, 1999), von Stechow (1991), and Uhmman (1991), among others.
 9. A refined theory of focus interpretation is presented in Schwarzschild (1999).

76 *Caroline Féry and Katharina Hartmann*

(9) Why was everybody so excited?

- a. #*weil* [IP *Cathy Freeman* [VP [DP *eine*_F [NP
because *Cathy Freeman* a
GOLDmedaille]_F] *gewonnen*]_F *hat*]_F
gold.medal won has
b. *weil* [IP [DP *Cathy FREEman*]_F [VP [DP *eine*_F [NP
because *Cathy Freeman* a
GOLDmedaille]_F] *gewonnen*]_F *hat*]_F
gold.medal won has
‘because Cathy Freeman won a gold medal’

As in Example (8), the accented head noun of the object is F-marked in (9a) and (9b) and the F-feature projects according to the F-Assignment Rules. In (9a) as well as in (9b), the F-features project from VP across the VP-selecting I⁰ to IP leaving out the subject in SpecI. Therefore, the subject is not F-marked by focus projection. Due to the fact that it is not given by the question, and assuming that it can not be inferred from the context otherwise, the only way for the subject to receive an F-feature and be interpreted as novel is by assigning it an additional accent. Hence, only (9b), with an additional accent on the subject, represents a well-formed stress-assignment in the given question context. (In (9a) and in later similar cases, the infelicity of the stress-assignment is indicated by “#”).

What all the examples discussed so far have in common is that the contexts which constitute the backgrounds for the determination of focus in the utterances *precede* these utterances. This, however, is not a condition *sine qua non*. Consider Example (10), taken from Rooth (1992), which is thought of as the beginning of a joke.

- (10) [DP *An* [AP *AMERican*]_F *farmer*] *was talking to a* [DP [AP *CaNAdian*]_F *farmer*].

Given our assumptions on question-answer-congruence, the accent placement in (10) is unexpected. The unspecific context does not provide the information necessary to license the focus structure of the example, which is as follows: the adjectives *American* and *Canadian* are F-marked by the Basic Focus Rule. Since they are modifiers, the F-features cannot project further up the tree.¹⁰

10. But even if the head nouns in (10) are given, the focus structure is not compatible with (10) being a licit beginning of a joke. This is because the highest focus is a narrow focus on the modifiers and not the sentence focus. Thus, the ban of focus projection from modifiers, which follows from Selkirk’s focus projection rules, cannot account for the well-formedness of (10) in the given context. There are two solutions to this problem. The first is to adopt an alternative syntactic structure for prenominal adjectives. As Abney (1987) proposes for instance, prenominal adjectives are heads which take the following NP as their complement.

The focus and prosodic structure of RNR and Gapping 77

As a consequence, the head nouns of the subject- and object-DPs (*farmer*) are not F-marked; they should be contextually given. The context, however, does not contain any reference to farmers. This problem becomes more evident in Example (11).

- (11) #_{[DP An} _{[AP AMERICAN]_F farmer] came.}

The grammatical accentuation pattern of the subject in (10) leads to an infelicitous accentuation pattern in (11). The reason is that the head noun *farmer* is neither F-marked, nor can it be contextually deduced. The interesting question is: What prevents Example (10) from the same type of ungrammaticality? We follow Rooth (1992) in suggesting that it is the presence of two DPs which exhibit a parallel syntactic structure and contain identical head nouns. The repetitive appearance of the head nouns provides the necessary context for interpreting the head nouns as given.

We conclude that not only contexts which precede an utterance influence the accentuation pattern, and consequently the focus structure of this utterance. Some part of an utterance, preceding or following, may also serve as a context for the determination of the accentuation pattern of another part of the same utterance. The phenomenon, by which constituents which are expected to be accented (as, e.g., *farmer* in (10)) ‘lose’ their accent to another constituent, is known as “deaccenting” (cf. Ladd 1978; Selkirk 1984). We will see in the next subsections that deaccenting plays an essential role in the focus structure of elliptical coordinations (for a different account of the role of prosody in parallel structures and nested foci, see Féry and Samek-Lodovici 2004).

3.2. *Right Node Raising*

Prior to deletion at PF, each conjunct of a RNR construction represents a partial discourse continuation, as, e.g., a partial answer to a *wh*-question. The answer is informationally complete only if the informational content of all conjuncts are taken together. A condition on the format of RNR constructions is that the conjuncts display parallel focus structures. As a consequence, the conjuncts exhibit syntactically and prosodically parallel structures. Apart from this, the foci must be contained in the same set of focus alternatives (in the sense of Rooth 1985; 1992). Selection from this set is pragmatically constrained in two respects: (i) each alternative selected must be semantically plausible in the given

Selkirk’s percolation mechanism would then extend to this case. The second solution is to deviate from Selkirk in allowing a NP to be focused if a prenominal adjective is (and N is given). That projection from AP to NP is indeed possible has been proposed in the literature, cf. Rooth (1992), Schwarzschild (1999), Büring (to appear) and references therein.

78 *Caroline Féry and Katharina Hartmann*

context; (ii) the selected alternatives must be semantically sufficiently disparate across the conjuncts, in order to make partial answers reasonable. For an illustration of these conditions, consider (12).

- (12) What are Peter and Klaus doing with their old cars?
Peter verSCHENKT_F sein altes Auto und Klaus verKAUFT_F
 Peter gives.away his old car and Klaus sells
sein altes Auto.
 his old car
 ‘Peter is giving away, and Klaus is selling his old car.’

In (12), both conjuncts represent partial answers to the preceding *wh*-question. Apart from the verbs, which express the inquired actions, everything can be contextually derived: the subjects as well as the objects are given in the discourse, because they are part of the question. Hence, only the verbs, which precede the target of RNR, represent new information. They are associated with a pitch accent and F-marked by the Basic Focus Rule. The foci are also semantically sufficiently disparate. (For further restrictions on the selection of alternatives as foci in elliptical coordination, cf. Section 4.)

The correspondence between the *wh*-question and the (partial) answer(s) in (12) follows the well-established assumptions on question-answer-congruence: the *wh*-phrase corresponds to the foci in the answer which contain a pitch accent. Since the foci consist of just the verbs, association with the accent is trivial. The next example, however, is not as straightforward in that it involves an unexpected placement of accents relative to the placement of accents in non-coordinated clauses (cf. examples in (14) below).

- (13) Where are Halma and Mikado?
Halma ist [PP AUF_F dem Sofa]_F und Mikado ist [PP
 Halma is on the sofa and Mikado is
UNter_F dem Sofa]_F.
 under the sofa
 ‘Halma is on and Mikado is under the sofa.’

Due to the pitch accent on the prepositions, the PPs receive an F-feature by focus projection. These being the highest F-features in the respective conjuncts, the two PPs *auf dem Sofa* and *unter dem Sofa*, which correspond to the *wh*-phrase of the question, are the focus of the sentence. However, if a PP is the focus in a simple non-coordinated clause, the element, which must be associated with the focus accent in order to get an interpretation where the *entire* PP is novel, is the nominal head of the prepositional complement (see von Stechow and Uhmman 1986; Cinque 1993). This is illustrated in (14a), which is

The focus and prosodic structure of RNR and Gapping 79

an equally well-formed answer to the question in (13). Notice that (14b) is not a possible accentuation pattern within the same context because the DP-complement of the preposition is neither F-marked nor given in the discourse.

- (14) a. *Halma und Mikado sind* [PP *auf*_F [DP *dem*_F [NP *Sofa*]_F]_F].
 b. #*Halma und Mikado sind* [PP *AUF*_F [DP *dem Sofa*]_F]_F.

It seems that there is a conflict between the pragmatic condition on focus interpretation positing that a constituent which cannot be contextually deduced must indicate novelty, and the independent conditions on accent placement within the focus constituent. This conflict is manifest in the *farmer* example in (10) in Section 3.1 as well as in the RNR example in (13). What the two examples have in common is that the constituents containing the accents, i.e., the subject and object-DP in (10) as well as the PPs in (13) before deletion, contain some identical elements. In the *farmer* example, the subject DP differs from the object DP only with respect to the modifiers, and in the RNR example the PPs are almost identical, the only difference being the prepositional head. Following Rooth (1992), Hartmann (2000) proposes that parts of a sentence may serve as a linguistic discourse for other parts of the same sentence for the determination of focus. Thus, in (10), the presence of the NP *farmer* in the subject-DP has the consequence that the NP *farmer* in the object DP can be contextually deduced. Therefore, it is not novel and not a focus constituent. The reverse also holds: the object counts as a context for the subject, and therefore, the NP *farmer* of the subject is not a focus either. Only the accented pronominal modifiers are not present in any context. The F-features on these modifiers do not project; they are the highest F-features in the sentence and mark the sentence focus (but see Footnote 10).

Turning to RNR again, the same argumentation accounts for the accent pattern found in (13). In a coordination, one conjunct represents a linguistic context for other conjuncts. In this respect, conjuncts behave as independent clauses. Hence, the elements of the first conjunct are added to the discourse when the first conjunct is processed and they therefore count as contextually present when the second conjunct is processed. If constituents of the first conjunct are repeated in the second conjunct, they are consequently not F-marked there. It is interesting to note that a second conjunct also functions as a linguistic context for a first conjunct, which shows again that the linguistic context of an utterance does not necessarily have to precede this utterance. That is, a constituent can be deaccented in one conjunct although the information which licenses deaccenting in this conjunct has not been processed yet. We call such cases ‘cataphorically licensed deaccenting.’¹¹ Thus, in (15), the accented preposi-

11. Cataphorically licensed deaccenting can be observed in quite a variety of cases. Ray Jackend-

tions are F-marked by the Basic Focus Rule. The F-feature projects to the PPs by Focus Projection, leaving out the DP-complements of the prepositions (*dem Sofa*), which can be deduced in each conjunct from their presence in the other conjunct.

An alternative approach to account for deaccenting in (10) and (13) is to assume that the deaccented constituents are not contained in the linguistic context but are nevertheless pragmatically inferrable. Thus, in (10), which is thought of as the beginning of a joke, it is presupposed that farmers talked to each other. And in (13), it could be argued that the cats are usually somewhere around the sofa, thus deaccenting of *dem Sofa* would be licensed because it is pragmatically present in the discourse, although not directly uttered.

The contention that deaccenting is licensed by implication from a situational context in addition to licensing by the extra-sentential linguistic context possibly renders our claim superfluous that parts of a sentence may also influence the accentuation pattern of other parts of this sentence. However, minimal pairs such as (13) vs. (14b) provide strong support for our view. Given an identical extra-sentential context in both examples, there is a very clear contrast in grammaticality. While the RNR construction in (13) is flawless, the non-coordinated (14b), which has the same accentuation pattern as each of the conjuncts in (13), is ill-formed. We conclude from such minimal pairs that the focus and accentuation structure of one conjunct may influence the focus and accentuation structure of the other, irrespective of the preceding linguistic and non-linguistic context. Our conclusion will be corroborated by the discussion of the experiments in Section 6.

The focus structures of RNR which we have been considering so far have the property that the targets do not contain any accents. But this is not the only pos-

off (p.c.) considers score keeping in a baseball game, for instance. He notices that the natural way to announce the score is by accenting the number of scored points, as shown in (i).

- (i) *The Red Sox FOUR, the Yankees THREE.*

However, if the game is tied, the score numbers are deaccented, and the teams get an accent. Notice that only after the score of the second team (the Yankees) is expressed does one know that the score is even. This, however, is an obligatory piece of information when deaccenting the score of the first team (the Red Sox).

- (ii) *The RED Sox four, the YANkees four.*

Another example in which the information which licenses deaccenting of an element follows this element is enumerations.

- (iii) *I talked to the following linguists at yesterday's dinner party: Jaklin KORNFilt, Roland PFAU, Ray JACKendoff, Daniel BÜring, Ede ZIMMermann, Utpal Lahiri and ADIti Lahiri.*

The focus and prosodic structure of RNR and Gapping 81

sibility for RNR targets. Targets do not necessarily have to be deaccented, but can also contain pitch accents, cf. (15). (The T-indices on the indirect objects indicate their status as (partial) topics. Additionally, we make topics stand out by underlining them with dotted lines.) As we argue in Section 6, the presence of pitch accents in the target follows from the target's prosodic structure.

- (15) What do they promise Uta and Hans?
Paula verspricht UTA_T, *morgen mit dem Zug in Berlin*
 Paula promises Uta tomorrow with the train in Berlin
~~*anzukommen*~~, *und Martin verspricht* HANS_T, [CP MORgen_F
 to.arrive and Martin promises Hans tomorrow
 [mit_F dem_F ZUG_F] [in_F BerLIN_F] ANzukommen_F].
 with the train in Berlin to.arrive
 'Paula promises Uta, and Martin promises Hans to arrive by train in Berlin tomorrow.'

The objects *Uta* and *Hans* immediately preceding the target *morgen mit dem Zug in Berlin anzukommen* are pitch accented although they are given in the question. The reason is that although the direct object in the question is a coordinated DP and therefore pluralic, the single DPs of the coordinated object are distributed over the conjuncts in the RNR construction allowing a contrastive interpretation. The target of the RNR construction corresponds to the *wh*-phrase of the question, i.e., it is the focus. It is deleted in the first conjunct and contains pitch accents in the second conjunct. Interestingly, the presence of the target in the first conjunct prior to PF-deletion does not license deaccenting of the target in the second conjunct in the way assumed above. It seems that a focus is regularly accented as long as no conflict between pragmatics and stress assignment occurs.

To summarize our findings so far, we showed that Selkirk's focus theory makes correct predictions concerning the wellformedness of the conjuncts which serve as an input for RNR. Due to the parallel focus structure, each conjunct of this construction represents a partial answer to a *wh*-question (or a partial update of the discourse). The two conjuncts can take each other for the evaluation of givenness thereby overriding the context requirements imposed by the linguistic discourse preceding the RNR construction.

Selkirk's focus theory also predicts why ellipsis takes place in coordination.¹² However, it does not follow from her theory where ellipsis actually oc-

12. Note that ellipsis is not obligatory. If not deleted, the RNR target is deaccented in both conjuncts, thus (i) is a fine sentence.

(i) *Halma ist* [pp [AUF]_F *dem Sofa*]_F *und Mikado ist* [pp [UNter]_F *dem Sofa*]_F.

curs. We hypothesize in Sections 5 to 7 that it is the specific prosodic structure of RNR (and Gapping) which indicates the locus of ellipsis.

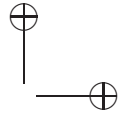
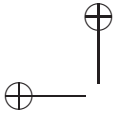
3.3. Gapping

We now turn to the focus structure of Gapping. Gapping is similar to RNR in that the remnants, i.e., the elements left behind after ellipsis, must be contrastively interpreted, except if they are mentioned in the question, as exemplified by (16). Gapping differs from RNR in that (i) the last conjunct contains the ellipsis, and (ii) the targets of Gapping need not be peripheral (cf. Section 1). The remnants, which succumb to the Major Constituent Condition (“A major constituent of a given sentence S_0 is a constituent either immediately dominated by S_0 or immediately dominated by VP, which is immediately dominated by S_0 ”, cf. Hankamer 1973: Footnote 4), each carry pitch accents, and the target is generally deaccented in the first conjunct. These properties of Gapping are illustrated in (16).

- (16) a. What kind of toys are Hanna and Maria making for their sons?
 [CP₁ HANna_T [C₁ *bastelt ihrem Sohn* [DP₁ ein_F
 Hanna makes her son a
SEgelboot_F]_F], und [CP₂ MaRIa_T [C₂ *bastelt ihrem*
 sailing.boat and Maria makes her
~~Sohn~~ [DP₂ ein_F MÜLLauto_F]_F].
 son a garbage.truck
 ‘Hanna is making a sailing boat for her son, and Maria a garbage
 truck.’
- b. Are both Hanna and Maria making a garbage truck for their
 sons? No,
 [CP₁ HANna_T [C₁ *bastelt ihrem Sohn* [DP₁ ein_F SEgelboot_F]_F],
 und [CP₂ MaRIa_T [C₂ *bastelt ihrem Sohn* [DP₂ *ein Müllauto*]]].

The focus structure of example (16a) follows straightforwardly from the assumptions on focus made in Section 3.1. The nominal heads of the direct objects receive a pitch accent by the Basis Focus Rule, and are therefore F-marked. The F-features project to the direct object DPs, which are correctly interpreted as indicating novelty in the given discourse.¹³ The subjects of the two conjuncts are also accented; they carry a topic accent.

13. One could ask the legitimate question why the focus features do not project further, as, e.g., to VP or CP. This is excluded by the constraint AVOID-F proposed in Schwarzschild (1999: 156). This constraint says that there should be as little F-marks as possible without violating the focus interpretation rules.



The focus and prosodic structure of RNR and Gapping 83

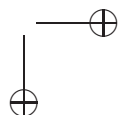
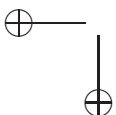
Example (16b) differs from (16a) in that the direct object of the second conjunct *Müllauto* has already been mentioned in the question. Therefore, it need not be accented, though we will see in Sections 6 and 7, when we discuss our experimental results, that some speakers choose to accent such a contrasting element all the same. If *Müllauto* is deaccented, *Maria* bears the only pitch accent of the second conjunct. Interestingly, it must be a falling accent, even though it is a topic, which is usually associated with a rising accent (cf. Büring 1997; Féry 1993).

To summarize, in this section we presented a model of focus interpretation which we applied to coordinate structures that involve ellipsis. We made the following predictions: Ellipsis in RNR and Gapping is heavily dependent on the focus structure of these constructions, which share the following properties: Both exhibit a parallel focus structure of their conjuncts. Both contain elements in the first and second conjuncts which are contrastively interpreted, in a sense to be made precise in Section 4. Both contain a number of identical elements in the two conjuncts. The interplay of these properties makes ellipsis possible. The differences between the two constructions consist firstly in the directionality of deletion (RNR involves backward deletion, and Gapping forward deletion), and secondly in the way in which ellipsis makes use of the pitch accents: in RNR, ellipsis only targets elements *following* the nuclear pitch in non-last conjuncts. In Gapping, on the other hand, it is also possible to delete parts which *precede* the pitch accents. The next section examines the second condition formulated at the end of Section 2, that the focus constituents in the two conjuncts must be semantically sufficiently distinctive.

4. Semantic contrast

We continue with the second condition on the prosodic structure of RNR and Gapping: the two conjuncts must be semantically sufficiently distinctive. If the remnants of one conjunct do not semantically contrast with their counterparts in the other conjunct, the input to RNR and Gapping is not well-formed. The required contrast between the conjuncts does not show up if the relevant pairs are either identical, or too similar, or of a different semantic kind. Such examples are given in (17) for Gapping and in (18) for RNR.¹⁴

14. In order to keep the focus structure of the following examples simple, the *wh*-questions providing the context are constructed such that the ellipsis is part of the background. As we have shown in Section 3, this is not obligatory, i.e., the ellipsis can also be a part of the focus.



84 *Caroline Féry and Katharina Hartmann*

- (17) a. Who read what?
 *[ICH]_F las [die]_F [ZEitung]_F und [ICH]_F las [das]_F
 I read the newspaper and I read the
[BUCH]_F.¹⁵
 book
- b. Who kissed whom?
 *[ICH]_F küsste [Eva]_F und [HANS]_F küsste [Eva]_F.
 I kissed Eva and Hans kissed Eva
- (18) a. Whose car did Peter and his brother sell?
 *Peter kaufte [MaRIas]_F ~~Auto~~ und sein Bruder kaufte
 Peter bought Maria's car and his brother bought
[MaRIas]_F Auto.
 Maria's car
- b. What did Jonas and Claus do with the letters?
 *Jonas [SCHICKte]_F ~~einen Brief~~ und Claus
 Jonas sent a letter and Claus
[verSCHICKte]_F einen Brief.
 PREFIX-sent a letter

In the Gapping examples (17) as well as in the RNR example (18a), the focused constituents do not contrast at all; in (18b) the contrast between *schicken* and *verschicken* is semantically not strong enough. Thus, despite the fact that stress is placed appropriately in the context, the examples are ungrammatical nevertheless.¹⁶ Since the contrast between the foci in the two conjuncts is not strong

15. Ewald Lang (p.c.) points out that identical subjects are possible in (17a) if the speaker changes via turn taking with the effect that the first person singular pronoun changes its indexical referent. Furthermore, one reviewer notes that (17a) is an appropriate answer to the question *Las Hans die Zeitung und das Buch?* ('Did Hans read the newspaper and the book?'). We do not share this judgement.

16. Note that each conjunct in isolation provides a possible answer to the *wh*-question prior to deletion, if the subject is provided with a topic accent. Thus, the question in (18a)(i) is felicitously answered by either (ii) or (iii). In the cases at hand, the subjects are *partial* topics (cf. Büring 1997). Thus, (ii) and (iii) each provide partial answers to the *wh*-question.

- (i) Whose car did Peter and his brother sell?
- (ii) [Peter]_T kaufte [MaRIas]_F Auto.
 Peter bought Maria's car
- (iii) [Sein Bruder]_T kaufte [MaRIas]_F Auto.
 his brother bought Maria's car

The fact that (18b) is ungrammatical shows that it is not enough for the foci in elliptical coordinations to belong to the same set of alternatives in the sense of Rooth (1985) and (1992). Being verbs, both *schickte* ('sent') and *verschickte* ('sent away') belong to the same set of

enough, the conjuncts cannot provide partial answers to the *wh*-question.

If the examples are changed such that the constituents exhibit a stronger semantic contrast, they become grammatical.

- (19) a. [ICH]_F las [die]_F [ZEitung]_F und [ER]_F ~~las~~ [das]_F
 I read the newspaper and he read the
 [Buch]_F.
 book
 'I read the newspaper and he the book.'
- b. [ICH]_F küsste [EVA]_F und [HANS]_F küsste [SUSI]_F.
 I kissed Eva and Hans kissed Susi
 'I kissed Eva and Hans Susi.'
- (20) a. Peter kaufte [MaRIAs]_F ~~Auto~~ und sein Bruder kaufte
 Peter bought Maria's car and his brother bought
 [CLAudias]_F Auto.
 Claudia's car
 'Peter bought Maria's, and his brother bought Claudia's car.'
- b. Jonas [SCHICKte]_F ~~einen Brief~~ und Claus [erHIELT]_F
 Jonas sent a letter and Claus received
 einen Brief.
 a letter
 'Jonas sent and Claus received a letter.'

In the following examples, the focused constituents are not identical, but still, they cannot be contrastively interpreted. The reason for the ungrammaticality of these examples is that the foci in the two conjuncts are semantically and syntactically too different from each other. Thus, in the Gapping examples (which are almost direct translations from Sag 1976: 192), edibles cannot contrast with temporal information (21a), and animals cannot contrast with predicates (21b). If the focused parts in the respective conjuncts are of the same semantic kind, semantic contrast is possible again; cf. (22).

- (21) a. *Eva aß [JOghurt]_F und Nora ~~aß~~ [um MItternacht]_F.¹⁷
 Eva ate yoghurt and Nora ate at midnight

focus alternatives. But they are not sufficiently different in order to express the required contrast.

17. Example (21a) is marginally possible as an answer to the very specific multiple *wh*-question *What and when did Eva and Nora eat?* Each conjunct of (21a) gives an answer to one of the *wh*-words *what* and *when*. This is untypical for Gapping since the conjuncts of Gapping sentences normally represent partial answers of the whole *wh*-question. Since there is not natural *wh*-question which would have (21) as an answer, we do not give a context for this example.

86 Caroline Féry and Katharina Hartmann

- b. What do Frank and Susanne like?

**Frank mag [RepTilien]_F und Susanne mag* [[PP *mit dir*]_F *SPREchen*]_F.
 Frank likes reptiles and Susanne likes with you to.talk

- (22) What did they eat?

a. *Eva aß [JOghurt]_F und Nora aß [SchokoLAdE]_F.*
 Eva ate yoghurt and Nora ate chocolate
 ‘Eva ate yoghurt, and Nora chocolate.’

b. *Frank mag [RepTilien]_F und Susanne mag*
 Frank likes reptiles and Susanne likes
[InSEKten]_F.
 insects
 ‘Frank likes reptiles, and Susanne insects.’

Apart from being of the same semantic kind, the conjuncts of the sentences in (22) also exhibit stronger syntactic parallelism. In (22a), the foci in the conjuncts are the direct objects of the verbs, while the ungrammatical (21a) shows an argument/adjunct asymmetry with respect to the foci. And while *Reptilien* and *Insekten* are both objects of the main verb *mögen* (‘like’) in (22b), there is again an asymmetry in the ungrammatical (21b): in the first conjunct, the (nominal) object is selected by the main verb, but in the second conjunct, the (non-nominal) object is selected by an epistemic modal verb. That syntactic parallelism plays a role, in addition to the requirement that the conjuncts must allow for a sufficient contrastive interpretation, is shown by the following example (23). *Glauben* (‘believe’) is a verb which subcategorizes for either a DP or a PP (or a CP) without change of meaning. Gapping the verb yields a marked sentence if *glauben* subcategorizes different syntactic categories in the two conjuncts. Since both objects denote individuals, the awkwardness of (23) must be due to the different syntactic realizations of them.

- (23) Whom do Eva and Ute believe?

?*Eva glaubt* [PP *an*]_F *WUNderheiler*]_F, *aber Ute glaubt*
 Eva believes in faith.healers but Ute believes
nur [DP *traditioNELlen*]_F *Ärzten*].¹⁸
 only traditional doctors
 ‘Eva believes in faith healers, but Ute only in traditional doctors.’

18. Irrespective of the markedness of the sentence, which is due to the syntactic asymmetry of the conjuncts, we observe that *Ärzte* (‘doctors’) in the second conjunct is deaccented due to an implication from *Wunderheiler* (‘faith healer’) in the first conjunct. Deaccenting is not obligatory here but depends on the speaker’s belief that faith healers are doctors.

The focus and prosodic structure of RNR and Gapping 87

Example (24) shows that the restriction which accounts for the ungrammaticality of (21) also holds for RNR. Again, the focused elements do not contrast because they are not of the same semantic kind: an indefinite article cannot contrast with a proper name. (The example in (24) is a slightly modified translation of an English example from Swingle 1993).

- (24) Which egg boiler did Olaf always want?
 **Olaf wollte immer schon [EInen]_F Eierkoe~~cher~~, aber*
 Olaf wanted always already a egg.boiler but
schließlich gab ich ihm [MARthas]_F Eierkoe~~cher~~.
 finally gave I him Martha's egg.boiler

As (25a) illustrates, an indefinite article may contrast with a definite article. The numeral *einen* ('one') semantically contrasts with other numerals (25b). Finally, two possessives are potentially contrastive and can therefore be the focus in RNR (25c).¹⁹ In the examples in (25), stress on the determiners licenses an F-feature on the D-heads. These F-features do not project to their maximal projections since projection would violate the principle AVOID-F (cf. Footnote 13).

- (25) a. Did Olaf want just any egg boiler?
Olaf wollte nicht [EINen]_F Eierkoe~~cher~~ sondern
 Olaf wanted not any egg.boiler but
[DEN]_F Eierkoe~~cher~~ schlechthin.
 the egg.boiler quintessential
 'Olaf didn't want just any egg boiler, but the quintessential egg boiler.'

19. Example (25a) is from Ewald Lang (p.c.), to whom we also owe the following observation: If the indefinite article *einen* in (24) is replaced by *irgendeinen* ('some', 'any'), RNR becomes possible, cf. (i) and (ii):

- (i) *Olaf wollte nur IRgendeinen, aber ich gab ihm MARthas*
 Olaf wanted only any but I gave him Martha's
Eierkoe~~cher~~.
 egg.boiler
 'Olaf just wanted any egg boiler, but I gave him Martha's egg boiler.'
- (ii) *Olaf wollte nicht IRgendeinen, sondern MARthas Eierkoe~~cher~~.*
 Olaf wanted not any but Martha's egg.boiler
 'Olaf didn't want any, but Martha's egg boiler.'

We do not have an explanation for this interesting difference between *einen* and *irgendeinen*.

88 *Caroline Féry and Katharina Hartmann*

- b. Did Olaf want just one egg boiler?
Olaf wollte nicht [EInen]_F ~~Eierkoeher~~, sondern
Olaf wanted not one egg.boiler, but
[ZWEI]_F Eierkocher.
two egg.boilers
'Olaf didn't want one, but two egg boilers.'
- c. Whose egg boiler did Olaf always want?
Olaf wollte immer schon [MEInen]_F ~~Eierkoeher~~,
Olaf wanted always already my egg.boiler
aber schließlich gab ich ihm [DEInen]_F Eierkocher.
but finally gave I him your egg.boiler
'Olaf always wanted to have my egg boiler, but finally I gave him
your egg boiler.'

We sum up: The conjuncts of a RNR or a Gapping construction must stand in a relation of semantic contrast. If semantic contrast is not possible between the respective pairs of the conjuncts, either because the pairs are too similar or because they are not of the same semantic kind, RNR and Gapping are ungrammatical. In the next sections, we will correlate the findings of Sections 3 and 4 with an analysis of the prosodic structures of the coordinate structures and show that both constructions make extensive use of prosodic means in order to indicate ellipsis in one of their conjuncts.

5. Prosodic background

In this section, we introduce the prosodic background for the evaluation of our experimental data.

5.1. Intonational model

The analysis of the intonation pattern is couched in a modified version of Pierrehumbert's (1980) tone sequence model, using two kinds of tones: pitch accents, which can be bitonal (H*L and L*H) or monotonal (H* and L*), and boundary tones. An asterisk to the right of H or L marks the tone associated with the stressed syllable. According to Uhmman (1991) and Féry (1993), German does not need a phrase accent (but see Benz Müller and Grice 1998; and Grice et al. 2000 for a different view). As first proposed by Hayes and Lahiri (1991) for Bengali, we opt for a solution with two different kinds of boundary tones, the weaker of which are equivalent to phrase accents (see Beckman and Pierrehumbert 1986 for this view). The tones listed in (26) are sufficient for

The focus and prosodic structure of RNR and Gapping 89

an account of our elicited elliptical data, but a complete inventory of German tones would need amendments. ‘H’ stands for ‘high’, and ‘L’ for ‘low’.

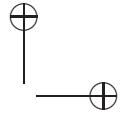
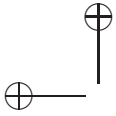
- (26) Inventory of tones
- a. Pitch accents: H*, L*, H*L and L*H
 - b. Boundary tones: H_I and L_I: delimit Intonation Phrases (IP)
H_p and L_p: delimit Phonological Phrases (PhP)

Pitch accents and phrasing are the most prominent indicators of the kind of intonational phenomena we are interested in, namely accents and phrasing. Pitch accents realize stress. Nuclear accents, or more generally, accents located at the right edge of prosodic phrases, are associated with bitonal contour tones, phonetically implemented as excursions of the fundamental frequency contour on – or in the neighborhood of – the stressed syllables. L*H is a rising bitonal tone and H*L is falling. According to Grice et al. (2000), a final falling bitonal tone in German is best transcribed as HL*, though the distinction between the two possibilities could turn out to be noncrucial (see Grabe 1998, who suggests that the two tones are not categorically distinct). Stress is triggered by independent grammatical components like metrical structure and of course the kind of pragmatic conditions which were introduced in Sections 3 and 4.

Phrasing is rendered by at least the following three factors: timing (breaks or longer segmental duration), boundary tones and register relationships between phrases (downstep, upstep and reset). The boundary tones can be high or low and they come in two strengths: the stronger H_I/L_I, delimiting Intonation Phrases (IP), and the weaker H_p/L_p, delimiting Phonological Phrases (PhP). Boundary tones, most of all those of the weaker kind, are often indistinguishable from trail tones – the starless second part of bitonal pitch accents. We assume that the association of tones to syllables happens according to tune-text association rules that we will not consider here. Very briefly, pitch accents associate with metrically prominent syllables and boundary tones with final syllables. Register scaling modulates the relationship between individual tones inside of a single IP, as well as across phrases. Since our sentences consist of two IPs, the register of the whole phrases is scaled relatively to each other, beside the scaling of the tones corresponding to the PhPs in a single IP. Downstep, upstep and reset appeared to be prominent tonal aspects of the elliptical sentences. Sections 6 and 7 will provide an overview of these phenomena for RNR and Gapping constructions, respectively.

5.2. *The prosodic structure of elliptical constructions*

Sentences (27) and (28) show the accentual and prosodic structure for RNR and Gapping as predicted by our theoretical findings. Each accented constituent



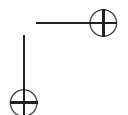
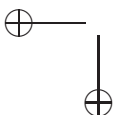
90 *Caroline Féry and Katharina Hartmann*

forms a PhP, each conjunct an IP and the whole sentence an IP, as well. We thus agree with Ladd (1986) in assuming that prosodic constituents can be recursive.²⁰ Except for the recursiveness, this hierarchically organized prosodic phrasing follows proposals made by Hayes and Lahiri (1991); Nespor and Vogel (1986); Pierrehumbert (1980); and Selkirk (1984), among others, according to which prosodic constituents are organized in a hierarchy of phonological elements of increasing length which often correspond to syntactic constituents. Following a suggestion by Pierrehumbert and Beckmann (1988), the tonal structure is implemented on the hierarchical prosodic structure, and the boundary tones are associated with the node corresponding to the phrase they delimit. This allows us to predict that tones have scope on entities larger than the syllable or the words they associate with, and accounts for register scaling effects on whole phrases rather than on isolated tones.

In the RNR example in (27), each element of a contrasting pair is expected to carry a pitch accent, noted T*, a notation used indifferently for both a monotonal and a bitonal pitch accent. In our example, these pairs are *Hanna/Erika* and *summte/sang* ('hummed/sang'). The target *eine Melodie* is unaccented. In (28), an example of Gapping, all contrasting material is again predicted to be accented (*die Kinder/die Eltern, einen Roman/eine Ballade*, 'the children/the parents, a novel/a ballade'). The target *lesen* ('to read') is deaccented in the first conjunct. Each Phonological Phrase contains at least one bitonal tone, generally rising when nonfinal and always falling when final. Each conjunct forms an Intonation Phrase which is delimited by a boundary tone T_I, and the whole sentence is closed up by another boundary tone T_I. However, the two low IP-boundary tones at the end of the sentence mostly fell together in our data. Consequently, we will often indicate only one in the figures of Sections 6 and 7 (but see Figures 1 and 2 for separate boundary tones). (27) and (28) give the prosodic and focus structures.²¹

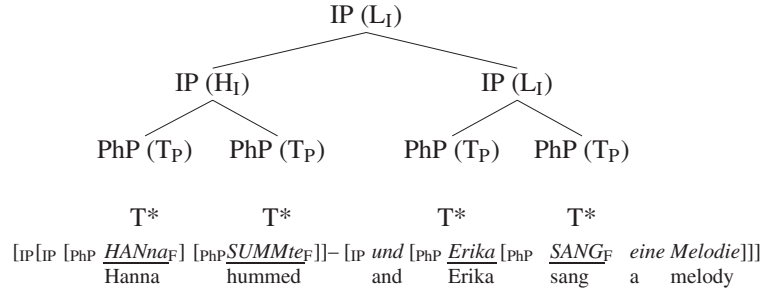
20. The recursivity of prosodic constituents is not crucial for the following discussion. The whole sentence could be a constituent of another kind, like an Utterance. We chose a recursive structure because we find Ladd's arguments convincing, and tend to reserve the term Utterance for even larger constituents.

21. See Winkler (1997) for a similar study for English.

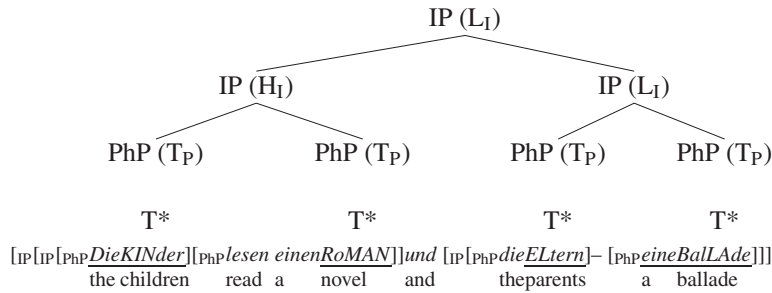


The focus and prosodic structure of RNR and Gapping 91

(27) Prosodic and tonal structure of an RNR construction



(28) Prosodic and tonal structure of a Gapping construction



Important for the remainder of this article is the prediction that the background against which the sentences are realized, meaning the question preceding the sentences or the context in which the sentences are uttered, is not the only factor which determines the accent structure, since the accent structure can be overridden by considerations of contrast, as was shown in Section 4. In (28) for example, *the children* and *the parents* (or *a novel* and *a ballade*) may or may not have been mentioned in the question. Since they contrast in the answer, they may be accented.

5.3. *Data elicitation*

In our experiment, 23 native speakers of German, aged between 22 and 37, read 12 experimental sentences as answers to different questions. All were native speakers of Standard German; most of them originated from the Berlin-Brandenburg region in northern Germany. The material was recorded in a quiet environment on a DAT-recorder (Sony TCD-D100) and analyzed with Praat[©], a computerized speech analysis program, which was also used for the pitch tracks shown in this article. The sentences were written on file cards, pseudo-randomized and separated by distractors in order to avoid a listing effect. The

92 *Caroline Féry and Katharina Hartmann*

data of seven of the speakers were excluded from the analysis since they lacked naturalness. We realize that this is a high rate of dismissal, but we felt that the seven speakers could not be taken as serious informants because the kind of sentences they produced were highly stylized, a problem that was present in some of the sixteen remaining speakers, as well, but only to a lesser extent. We assume that the artificial intonation that so many speakers produced is due to the kind of data tested, and this in spite of the numerous distractors inserted. RNR and Gapping sentences involve the formation of many phrasing units, a slightly unnatural situation for material read aloud.

The speakers were divided into three groups, each of which had to read the same sentences, but as answers to different questions. After the elimination of a number of speakers as discussed, group 1 consists of four speakers and groups 2 and 3 of six speakers each. The sentences are listed in the appendix. The results are based on 192 sentences altogether. The data elicited consist of six sentences with RNR and six with Gapping, realized as answers to questions which triggered different focus-background structures. Each of the sentences was uttered as an answer to three questions, one of which induced a whole focus reading and the other two a narrow focus (except for one sentence, for which all questions induced a narrow focus), and the informants were confronted with just one of the questions per sentence.

The syntactic structure of our elliptical constructions was variously complex. Two RNR and two Gapping constructions consisted of just a subject, a verb and a complement, as the examples in (27) and (28). Four Gapping constructions consisted of a subject, a verb and two complements, and the remaining four sentences, all RNR constructions, consisted of a verb, a complement and a subordinate clause.

Most consonants of the words used in our sentences are voiced, though we did not try to use sonorants throughout.

6. Results of the RNR experimental data

This section and the next one present the results of the experiment, as well as the prosodic and tonal analysis of the elicited sentences. We concentrate on the two aspects mentioned above: pitch accents and phrasing, which we discuss in turn in two subsections. Section 6 sums up the results obtained for the RNR sentences, and Section 7, the results of the Gapping sentences. As an introductory remark, it must be observed that our results were surprisingly consistent. In the majority of the cases, the phrasing, location and direction of the pitch accents, as well as register phenomena, were realized alike, or very similarly, by all speakers. The variation that we found involves the number of phrases on syntactically complex sentences as well as the number of pitch

The focus and prosodic structure of RNR and Gapping 93

accents in some sentences, the tonal height of pitch accents and boundary tones, and, more importantly, the realization of the first IP boundary tone as high or low.

6.1. *Pitch accents in RNR sentences*

6.1.1. *Whole-focused sentences.* The corpus comprises six whole-focused RNR sentences, all-new or multiply focused, elicited with either very general questions like *Was höre ich da?* ('What do I hear?'), *Was ist da los?* ('What is happening there?'), or with more specific questions requiring a focus on all parts of the sentence like *Sag mal was über den Winterschlaf!* ('Tell me something about hibernation!') in (29) or *Wer hat was versprochen und wem?* ('Who promised what and to whom?'). We will first examine the pitch accents on the contrasting words in some details, and then turn to the target below. We predict that the rules assigning a default accent and the pragmatic conditions on contrast should converge to deliver the same accent structure on the new contrasting elements, and this prediction has been fully confirmed in our data. In all cases, the speakers realized a pitch accent on the contrasting words, as shown in (29) and (30). The verb *schläft* ('sleeps') as well as the object of the prepositional phrase *dem Baum* ('the tree') in (29) are not accented. The explanation given in Section 3 is that the anaphoric and cataphoric relation between the two conjuncts leads to deaccenting. In the first conjunct, the prepositional object, which appears in the RNR target position, is deleted at PF.²² In (29), as well as in all following examples, F-marking is indicated on the accented word, and on the maximal phrase to which it projects, according to the rules introduced in (7).

- (29) a. Tell me something about hibernation!
- | | | | | | | | |
|--------------|------------|--|------------|--|------------------------------|----------------|-------------------------|
| [IP [IP [PhP | <u>Das</u> | <u>MUR</u> meltier _F] _F | [PhP | <i>schläft</i> | <u>NEben</u> _F]] | | |
| | the | marmot | | sleeps | beside | | |
| [IP | <i>und</i> | [PhP | <u>der</u> | <u>BRAUN</u> bär _F] _F | [PhP | <i>schläft</i> | <u>AUF</u> _F |
| | and | | the | brown.bear | | sleeps | on.top.of |
| | | | | | | | <u>dem Baum</u>]]] |
| | | | | | | | the tree |

22. Note that neither the verb, nor the object of the preposition carry an F-feature. Since these constituents are not accented, no F-feature is assigned by the Basic Focus Rule. They cannot be F-marked by focus projection either for the following reason. The PP *auf dem Baum* is F-marked by focus projection from the prepositional head *auf*, skipping the object of the preposition (*dem Baum*). Since PP is a modifier of VP, the F-feature cannot project to the verb *schläft*. Thus, although the *wh*-question asks for an all-new focus, the answer does not provide an out-of-the-blue utterance. The sentence is only well-formed due to the parallel structure of the coordination.

94 *Caroline Féry and Katharina Hartmann*

‘The marmot sleeps beside the tree, and the brown bear sleeps on top of it.’

b. What is going on here?

[IP [IP [PhP ROman]_F] [PhP *hat* BEa]_F] [IP *und* [PhP MARtin]_F] [PhP *hat* LEna *gefragt*]_F, [PhP wann *der* Nikolaus *kommt*]_F].

Santa.Claus comes

‘Roman asked Bea and Martin asked Lena when Santa Claus will come.’

Pitch accents are associated with the stressed syllables of the relevant PhPs or IPs, according to the rules and pragmatic conditions introduced in the earlier sections of this article. In our examples, and as shown in (27) and (28), the sentences are organized into two IPs, each consisting of at least two PhPs. Each IP has a prenuclear accent on the first contrasting element, and a nuclear accent on the second one. In the sentence (27), repeated here as (30), T1 and T3 form a contrast with each other, and T2 and T4 contrast, too. T1 and T3 are prenuclear tones and T2 and T4 are the nuclear accents of their respective IP.

(30) [IP[IP[PhP HANna]_F] [PhP SUMMte]_F] – [IP *und* [PhP Erika]_F] [PhP SANGe eine Melodie]]

As far as the theory is concerned, the nuclear tone of each IP is always bitonal. Prenuclear tones can be bitonal or monotonal, depending on the strength of the contrast, or on the prosodic weight of the segmental material. In our data, it was nearly always bitonal. An illustration of a multiply-focused sentence is given in Figure 1, a prototypical example of a RNR sentence with all focused constituents.²³ The question in Figure 1 is a multiple *wh*-question which calls for two pairs of contrasting elements in the answer. The three lower tiers show the tonal structure, the question serving as the background and the spoken text, respectively. The upper tier contains the sound wave and the pitch track.

As illustrated in Figure 1, the last tone of the sentence is always a low tone, which has a nuclear rise on the word *sang* (L*H), but a low boundary tone (L_PL_I). There is nothing special about this fact, since the realization of a falling contour in a declarative sentence is the unmarked expression of finality. More interesting is what happened with nonfinal pitch accents. Since nonfinality is preferably expressed by rising intonation, we expected to find a clear prefer-

23. All sentences illustrated in the article are downloadable under the URL <http://www.ling.uni-potsdam.de/~fery/rnr-gap-data>.

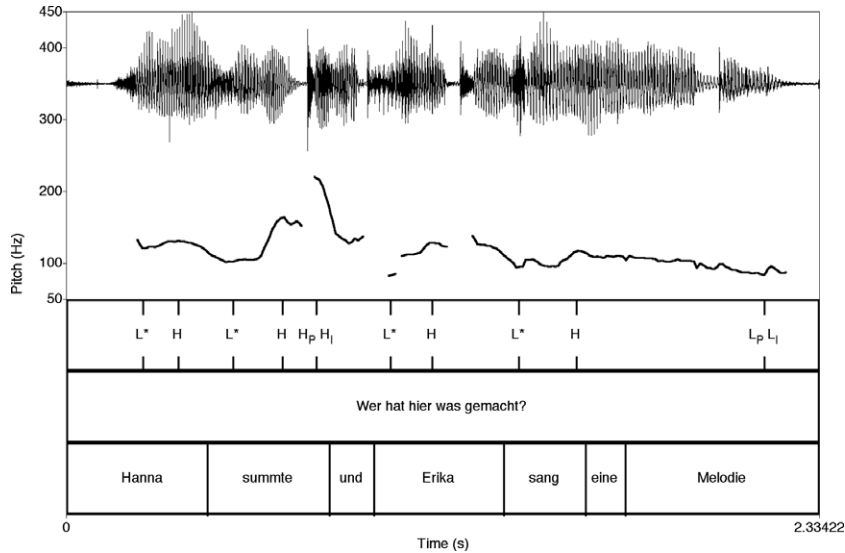


Figure 1. A multiply focused RNR sentence: (*Wer hat hier was gemacht?*) *Hanna sumnte und Erika sang eine Melodie.*

ence for rising nonfinal accents (L*H). And indeed, this is what we found (see Section 6.2 on phrasing for discussion).

The first accent of the first conjunct (on *Hanna*) is relatively weak, and only slightly rising, even if *Hanna* contrasts with *Erika* and even if the names are not mentioned in the question. The accent on *sumnte* ('hummed'), in contrast, is rising and has an extremely prominent rise due to the high boundary tone. When we turn to phrasing in Section 6.2, more will be said about the height of the high tone in L*H on the word *sumnte*, which will be analyzed as an upstep. In the second conjunct, the first word *Erika* has a rising tone on the stressed syllable, which is the initial one in this word.

As for the accenting of the target, the conflict identified in Section 3.1 between the pragmatic conditions on focus interpretation positing that a constituent which cannot be contextually deduced must indicate novelty, and the independent conditions on accent placement within the focus constituent, can be felt here, too. In a VP consisting of a verb and an object like *sang die Melodie*, as in Figure 1, the regular accent placement rules assign stress on the object (Cinque 1993; von Stechow and Uhmman 1986), and accordingly, we would expect *Melodie* to have a pitch accent. But, as we saw above, the pragmatic conditions on contrast are stronger and impose an accent on *sang* because of the contrasting pair it forms with *sumnte* and the corresponding

deaccenting of the object. As a result, the word *Melodie* was not accented in most cases, even if entirely new, and even if it is the unmarked location for accent.

A pitch accent on a focused target is in fact predictable and correlates with PhP. If the target is part of the same PhP as the last accented word, no pitch accent is present. But if it forms its own PhP, then a pitch accent (or more than one) is realized. This is also illustrated with the Gapping sentence in (29a): *dem Baum* ('the tree.dat') was never accented, neither when it was given nor when it was new. Note that it is in the same PhP as the contrasting preposition. But in (29b), the expression *wann der Nikolaus kommt* ('when Santa Claus comes'), was given a pitch accent on *Nikolaus* in eight instances: two of ten realizations when the embedded sentence had been mentioned in the question, and every time the sentence was uttered in a context inducing a wide focus (six realizations). In this sentence, the target forms at least its own PhP, if not even its own IP.

In Figure 1, *Melodie* is not completely flat, but has a small pitch excursion on its final syllable. Auditively, this word does not sound as if accented. The small fall can be analyzed in terms of Grice et al.'s (2000) proposal, according to which phrase accents (in our terminology T_P) target stressed syllables of unaccented words. In such an approach, it is to be expected that the stressed syllable of *Melodie* bears the phrase accent. Quite a few instances of this sentence can be analyzed in this way, but not all. As a result, the realization of an L_P on a postfocal unaccented word is optional.

To sum up the results of this subsection, the contrasting elements were always assigned pitch accents in our all-focused RNR sentences. The target was accented in case it formed its own PhP, and unaccented otherwise, as predicted by the pragmatic conditions.

6.1.2. *Narrow focus.* Turning now to sentences induced by a question eliciting a narrow focus, two cases must be distinguished. First, the sentences realized as answers to questions asking just for the contrasting elements (and not the target) and second those answering questions asking for the target (and not the contrasting words). We discuss the first case in some details and turn to the second case below. The questions asking for the contrasting elements explicitly focus just one contrasting pair, like in (31a), or all of them, like in (31b). In (31b), the infinitive sentence is given no more detailed prosodic structure than the IP since, as a consequence of its pre-mentioning in the question, it was often deaccented by the speakers.

- (31) a. What did Hanna and Erika do with the melody?
 [IP [IP [PhP HANna_T]_T [PhP SUMMte_F]_F] [IP und [PhP Erika_T]_T [PhP SANG_F eine Melodie]_F]]

The focus and prosodic structure of RNR and Gapping 97

- ‘Hanna hummed and Erika sang a melody.’
- b. *Who promised whom to arrive at 7 by car in Berlin?*
 [IP[IP[PhP PAUla]_F] [PhP *versprach* LIsa]_F] [IP[IP[PhP
 Paula promised Lisa
und ERIka]_F] [PhP *versprach* ANna]_F] [IP *um sieben*
 and Erika promised Anna at seven
mit dem Auto in Berlin anzukommen]
 with the car in Berlin to arrive
 ‘Paula promised Lisa and Erika promised Anna to arrive in Berlin
 by car at seven.’

Not surprisingly, the focused contrasting words were always realized with pitch accents. In (31a) the names *Hanna* and *Erika* are assigned a subscripted F because they contrast with each other. This result confirms once more the dominance of the pragmatic conditions over the regular stress assignment rules.

Figure 2 shows a pitch track of the same sentence as in Figure 1 but this time as an answer to a single *wh*-question which requires just one pair of contrasting elements (31a). The subjects *Hanna* and *Erika* were part of the backgrounded material. As the readers can confirm by themselves, the pitch tracks in Figure 1 and Figure 2 are similar, even if realized by two different speakers. All contrasting elements are accented, exactly as was the case in the sentences with a wide focus, and the word *Melodie*, mentioned in the preceding question, has again a small pitch fall on its last syllable.

In RNR constructions, thus, the contrasting elements are always provided with a pitch accent, regardless of their status as new or given. We did not find any significant difference between a pitch accent realized as a consequence of a question and one realized just as a contrast, given or not.

Consider next what happens when the target is asked for. In the preceding subsection, we suggested that a ‘new’ target has a pitch accent if it forms a PhP on its own, but not if it is part of the same PhP as the last contrasting word. This result has been corroborated in the narrow focused sentences. Our corpus contained only one sentence which asked only for the target. This sentence is reproduced in (32). The target is *Mutter, in den Wald zu gehen*. The first word *Mutter* was not accented, but the infinitive sentence was. We claim that the difference in stressing is a consequence of the inclusion into an independently existing PhP in the case of *Mutter*, and of a new PhP in the case of the infinitive clause.

- (32) What do Gabi and Manuel promise their mothers?
 [IP[IP[PhP GAbi]_T] [PhP *verspricht* IHrer]_F] [IP[PhP *und*
 Gabi promises her and

98 *Caroline Féry and Katharina Hartmann*

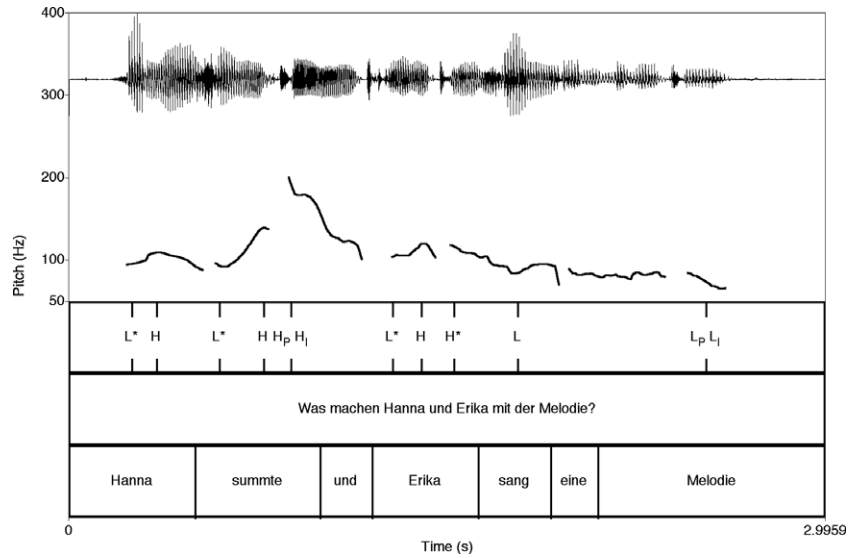


Figure 2. A narrow focused RNR sentence: (*Was machten Hanna und Erika mit der Melodie?*) *Hanna sumtete und Erika sang eine Melodie.*

*MANuel*_T [IP[PhP *verspricht* *SEIner*_F *Mutter*] [PhP *in* *den*
 Manuel promises his mother into the
*WALD*_F *zu gehen*]_F]
 forest to go
 ‘Gabi promises her mother and Manuel promises his mother to go into
 the forest.’

In several sentences, the target was part of a narrow focus, as illustrated in (33). In this case, as in all similar cases, we found a pitch accent on a target forming its own PhP and no pitch accent when the target was part of an independently existing PhP with a contrastive stress, as is the case in (33). Compare the sentences in (29a) and (31a) for further examples.

- (33) What kind of things do the men wear who Claudia and Maria know?
 [IP[IP[PhP *MaRIa*_T] [PhP *kennt* *einen Mann*] [PhP *der*
 Maria knows a man who
*GELbe*_F]] [IP[PhP *und* *CLAUdia*_T] [PhP *kennt* *einen Mann*]
 yellow and Claudia knows a man
 [PhP *der* *ROsa*_F *Hemden trägt*]].
 who pink shirts wears

The focus and prosodic structure of RNR and Gapping 99

'Maria knows a man who wears yellow shirts, and Claudia knows a man who wears pink shirts.'

The assumption that the target is accented when it has not been mentioned in the question and unaccented otherwise is thus untenable. In the cases in which the target was predicted to be accented, because explicitly asked for, it was accented in only half of the cases (26 of 56 utterances), and it was unaccented in the remaining sentences. When the target was predicted to be unaccented as a consequence of having been previously mentioned in the preceding question, it was actually unaccented in 30 sentences out of 40 (75 %). In the remaining 10 cases, it was accented. If the PhP explanation offered above is taken into consideration, however, then things become much clearer. A new target is assigned a pitch accent only when it forms its own PhP. It is never accented when it is part of a preceding PhP which already contains a contrastive pitch accent. This remark closes the discussion of pitch accents in RNR sentences. We turn next to phrasing and upstep in these sentences.

6.2. *Phrasing and upstep in RNR sentences*

In our experimental data, phrasing is expressed by boundary tones and register scaling. The boundary tones associated with the final Intonation Phrase are low in all our examples, but the boundary tones of the first phrase are generally high, though they were low in several instances. We will discuss the realization of medial boundary tones as low tones in Section 7, since they mostly arose in Gapping sentences. In this section, we concentrate on the high boundary tones.

In most of our experimental data, the high tone at the end of the first conjunct was extremely high. This phenomenon has been discussed at length by Truckenbrodt (2002). Truckenbrodt discusses the intonational pattern of conjoined sentences without ellipsis realized by South German speakers. According to Truckenbrodt, the high tone appearing at the end of the first intonation phrase is a consequence of the rescaling of the register to the value it had at the beginning of the intonation phrase.

While in Truckenbrodt's data the upstep is unmistakably located on the IP-final high part of the pitch accent, in our data, it is not clear whether the pitch accent or the boundary tone is upstepped. On both accounts, it is a side-effect of the intonational phrasing. According to Truckenbrodt, as well as to Féry and Truckenbrodt (2004), who find support for their analysis in results by Clements (1979); Ladd (1988); and van den Berg et al. (1992), the upstep is triggered by the possibility for the pitch accent to be scaled on the upper line of the IP's overall register. In this view, the phenomenon of downstep is best understood as rescaling of several layers of registers, according to phonological domains.

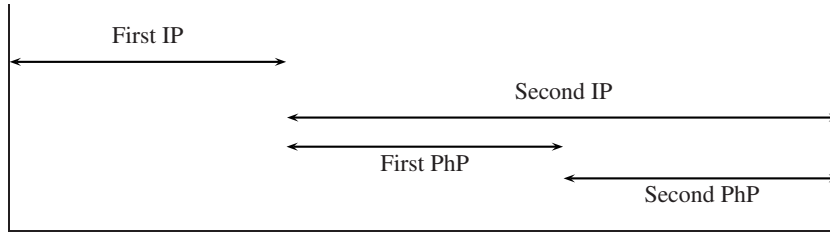


Figure 3. Downstep in phonological domains

Intonation phrases are downstepped relative to each other and inside of them, Phonological Phrases also enter a downstepping pattern. This is illustrated in Figure 3 (but see Figure 5 for a real contour). The whole contour represents two IPs in a downstep relationship to each other and the second IP contains two PhPs, also in a downstep relationship to each other.

Inside of the first conjunct, the upstepped IP-final high accent is rescaled to the level of the initial pitch accent (or even higher in our data), which shows that the reference line for the upstep is the IP's top register. Upstepping is interpreted as an evidence for the reality of this register line, which remains constant throughout the whole IP and which can be reached again by the end of the domain, as is visible in Figure 5. The fact that upstepping rescales the final high tone even higher than the first pitch accent of the IP, as was the case in our data, can be an indication that the speakers did not start the intonation phrase at the highest point of the register. Only when they get to the end of the phrase do they use their highest voice level at this point of the utterance.

Because of their remarkable stability, our data can help to formulate some hypotheses about why speakers would choose to upstep their medial boundary tones. Clearly, just observing that a final rise provides a meaning of continuation is not enough, since it appears that the height of the rise also varies significantly across types of sentences. It could be the case that, in our sentences at least, returning to the initial height in a medial IP signals not only the incompleteness of the utterance at this stage, as well as the concomittant intention of the speaker to continue the sentence, but also the fact that some material is missing. In other words, part of the upstep could be motivated by the incompleteness of the utterance and part of it by the ellipsis.²⁴ Since upstepping a final high tone is a choice that speakers can make, it is not possible to make categorial judgments about the meaning and significance of upstep, but rather

24. See also Muckel (2001) who defends the thesis that prosodic information helps the listener to reconstruct phonetically missing material, in her study the presence of traces.

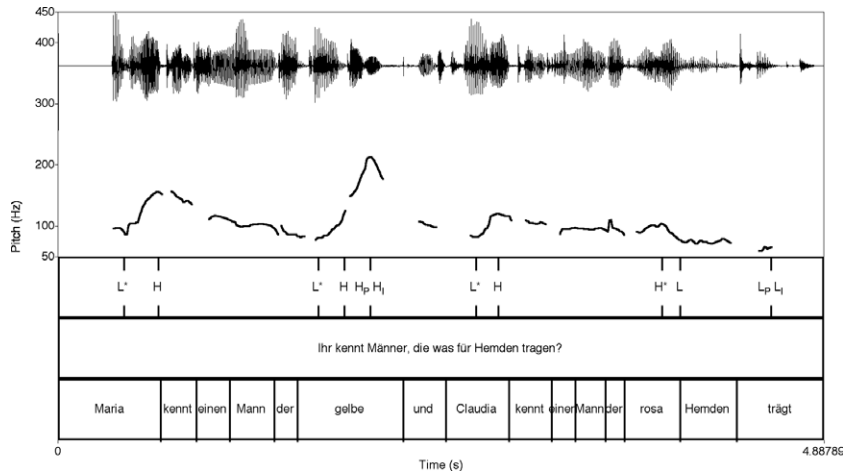


Figure 4. Upstep in a RNR sentence (*Ihr kennt Männer, die was für Hemden tragen?*)
Maria kennt einen Mann, der gelbe, und Claudia kennt einen Mann, der rosa Hemden trägt.

some tendencies can be expressed. We suspect that upstep is a more probable choice in the case of ellipsis than in simple conjoined sentences, but since it is a matter of gradiency, careful experiments should be undertaken which go beyond the limit of this article.

The upstep was always followed by a downstep in the first tone of the next IP, which is analyzed as an indication that the whole following IP is downstepped relative to the first one. The register relationship between the first and the second IP is a very stable one: the second IP's register is always downstepped relative to the first one. More about the relationship between the registers of the conjuncts will be said in Section 7.2, since the remarks made there hold for both Gapping and RNR sentences.

The high boundary tone of the first conjunct is clearly visible in Figure 4 and Figure 5, as it was in Figures 1 and 2. The sentences are answers to different questions: Figure 4 is an answer to a question which requires topic accents on the subjects and narrow focus on the adjectives *gelbe* ('yellow') and *rosa* ('pink') (*Ihr kennt Männer, die was für Hemden tragen?* 'You know men who wear what kind of shirts?'). The second question asks for a narrow focus on the elements specifying the clothes, thus *gelbe und rosa Hemden* ('*Was für Sachen tragen die Männer die Claudia und Maria kennen?*' 'What kind of things do the men wear who Claudia and Maria know?'). Apart from the topic accents on the subjects, only the adjectives are assigned pitch accents in both realizations.

These illustrations close the overview of the accenting and phrasing proper-

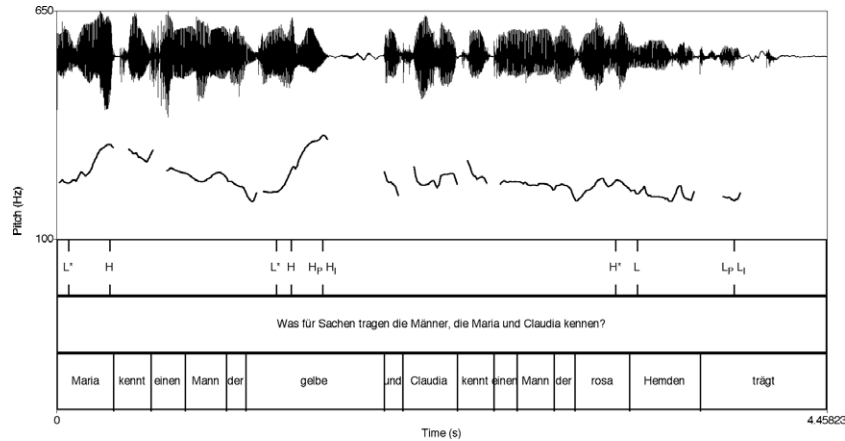


Figure 5. Upstep in a RNR sentence (*Was für Sachen tragen die Männer die Claudia und Maria kennen?*) *Maria kennt einen Mann, der gelbe, und Claudia kennt einen Mann, der rosa Hemden trägt.*

ties of the RNR sentences. These properties relate primarily to their intrinsic contrastive and prosodic characteristics. Accenting or not depends on contrast, as far as the contrasting elements are concerned, and on the formation of PhP, as far as the targets are concerned.

7. Gapping

7.1. Pitch accents

The prosodic structure of Gapping constructions shares several properties with the RNR constructions, such as the phrasing in two IPs and in PhPs, the contrasting pairs of accents, and the frequent deaccenting of the target. As before, pitch accents were often realized on the contrasting elements, whether they were explicitly asked for or given in the context. But in the Gapping sentences, some contrasts were not realized with two pitch accents, but with just one on the first element of the contrasting pair. There were ten instances of such a deaccenting for which two sources can be identified. The first is that one element of the contrast has already been mentioned in the question. However, as we saw, pre-mentioning in the discourse is not a necessary condition for deaccenting, since in the majority of cases, an accent was indeed realized by our informants on elements which had been previously mentioned. As an illustration, consider the sentence (34a). A pitch accent on *Ballade* was realized in four

The focus and prosodic structure of RNR and Gapping 103

cases, even if this word was previously mentioned in the question, and only two speakers deaccented this word. In (34b), however, three speakers deaccented the PP *hinter der Tür* ('behind the door') entirely, and one speaker accented the preposition *hinter* because of the contrast with *vor* ('in front of'). The conflict between the pragmatic conditions inducing a contrast and the deaccenting conditions are in action again.

- (34) a. Are they all reading a ballade?
Nein, [IP[IP[PhP die KINderT]T [PhP lesen einen
no the children read a
RoMANF]F] [IP[PhP und die ELternT]T [PhP eine
novel and the parents a
Ballade]]
ballade
'No, the children read a novel and the parents a ballade.'
- b. Are the bananas and oranges still behind the door?
Nein, [IP[IP[PhP die BaNanenT]T [PhP liegen VORF
no the bananas lie in.front.of
der TürF]F] [IP[PhP und die ORANgenT]T [PhP hinter
the door and the oranges behind
der Tür]]
the door
'No, the bananas are lying in front of the door, and the oranges behind the door.'

The second reason why one element of a contrast lacks a pitch accent is also of pragmatic nature, but of a different kind. In (35), although *Mann* ('husband') was not introduced in the question, five speakers out of six did not put an accent on this word if the question asked for the goal of the journey. In this case, speakers accented *Indien* and *England*, and the other arguments, *Mann* and *Kollege* ('colleague'), were not considered prominent, since they were not asked for in the question. However, when the question induced a wide focus (*Haben deine Freunde Urlaubspläne?* 'Do your friends have vacation plans?'), *Mann* always contrasted tonally with *Kollegen* (all six speakers put an accent both on *Mann* and on *Kollegen*).

- (35) Where are Anna and Manu traveling to?
[IP[IP[PhP AnnaT]T [PhP reist mit ihrem MannF]F] [PhP
Anna travels with her husband
nach INdienF]F] [IP[PhP und ManuT]T [PhP mit ihrem
to India and Manu with her

104 *Caroline Féry and Katharina Hartmann*

*KoLLEgen*_F]_F] [_{PhP} *nach* *ENgland*_F]_F
 colleagues to England

‘Anna travels with her husband to India and Manu with her colleagues to England.’

In all our Gapping examples, the target comprised the inflected verb only. It must be noticed that the location of the gap in the middle of the second conjunct leads to different expectations as to the overall prosodic structure. If the ellipsis is signaled prosodically, as hypothesized in Section 6.2, the prosodic cue is now expected after the first PhP of the second conjunct. The phrasing in the second conjunct should be realized as to render this boundary very clear. And indeed this is what we found. The first pitch accent of the second conjunct is both higher and more clearly separated from the rest of the sentence than in the RNR sentences. The difference is apparent in the figures illustrating RNR and Gapping constructions, respectively. In sentences consisting of more than two PhPs, like (34) and (35), it is also conspicuous that each PhP is clearly separated from its neighboring phrases.

7.2. *Phrasing: Medial low boundary tones and downstep*

This last subsection discusses first the realization of the nonfinal IP’s boundary as a low tone, and second, the downstep relation between the two conjuncts, both correlates of phrasing.

The first conjunct was not always terminated by a high boundary tone. Indeed, a low tone was realized in a significant number of cases. This was also a property of the RNR sentences, but to a much smaller extent. Nineteen sentences, fourteen Gapping and five RNR sentences (out of the 192), were realized in this way. Since they were realized by just a few of our subjects, it can be hypothesized that the propensity to realize nonfinal falling tones is speaker-dependent. The fact that the nonfinal tones are falling in some cases is significant since it falsifies the claim that syntactic constructions are necessarily associated with a certain kind of tone. Our experimental results did not confirm this assumption, but rather confirm the view, generally shared by intonatologists, that pitch accents have just very general meanings, highly context-dependent, and that there is generally more than one way to convey a meaning by means of tones. In particular, it is not the case that the first element of a contrasting pair at the end of the first conjunct is obligatorily associated with a rising tone. We suspect that the rising contour on nonfinal contrasting elements is just strongly preferred in elliptical constructions, because of phrasing considerations. A phrase terminated by a high tone is generally perceived as nonfinal. More important for the rendering of syntactic structure by prosody is

The focus and prosodic structure of RNR and Gapping 105

the prosodic phrasing, which can be realized in different ways.

The fact that a falling boundary tone is more frequent in Gapping than in RNR constructions correlates with the location of the ellipsis. In the RNR cases, the ellipsis falls together with the boundary tone of an Intonation Phrase, but this is not true of the Gapping constructions. There, the ellipsis is located just after the boundary tone of a Phonological Phrase. The need to signal a clear boundary is thus greater in the RNR cases, and the more frequent realization of a high boundary tone in RNR sentences than in Gapping sentences finds a natural explanation in the context of Pierrehumbert and Hirschberg's (1990) interpretation of a high boundary tone: the sentence terminated by such a high tone is to be interpreted as part of a larger unit that includes following material. The crucial point is that the following material truly includes material which is part of the interpretation of the first clause, namely the target.

The following pitch track illustrates an example with a falling boundary tone at the end of the first IP. The clear phrasing of the first contrasting element before the gap (*Maria*) is visible (and audible). Recall that, in a RNR sentence, a similar phrase was just weakly phrased (see Figures 1 and 2 for comparison).

- (36) What kind of toys are Anna and Maria making for their sons?
 [IP[IP[PhP Anna]_T] [PhP *bastelt ihrer ENkelin*]_F] [PhP *ein*
 Anna makes her granddaughter a
SEgelboot]_F] [IP[PhP *und Maria*]_T] [PhP *ihrem SOHN*]_F] [PhP
 sailing.boat and Maria her son
ein MÜLLauto]_F]]
 a garbage.truck
 'Anna is making her granddaughter a sailing boat and Maria her son a
 garbage truck.'

Probably the most stable and reliable correlate of phrasing in our findings was the register downstepping which turned out to be crucial for the elliptical sentences. The IPs were always downstepped relative to each other in our data. In other words, the register of the second phrase is *always* a subinterval of that of the first one (see Figure 3). This is visible in Figure 7, as well as in the preceding pitch tracks. The phrasing and focus structure of Figure 7 appears in (37).

- (37) What kind of things are the children and the parents reading?
 [IP[IP[PhP Die KINder]_T] [PhP *lesen einen dicken Roman*]_F]
 the children read a thick novel
 [IP[PhP *und die ELtern*]_T] [PhP *eine langweilige Ballade*]_F]
 and the parents a boring ballade
 'The children are reading a thick novel and the parents a boring bal-

106 *Caroline Féry and Katharina Hartmann*

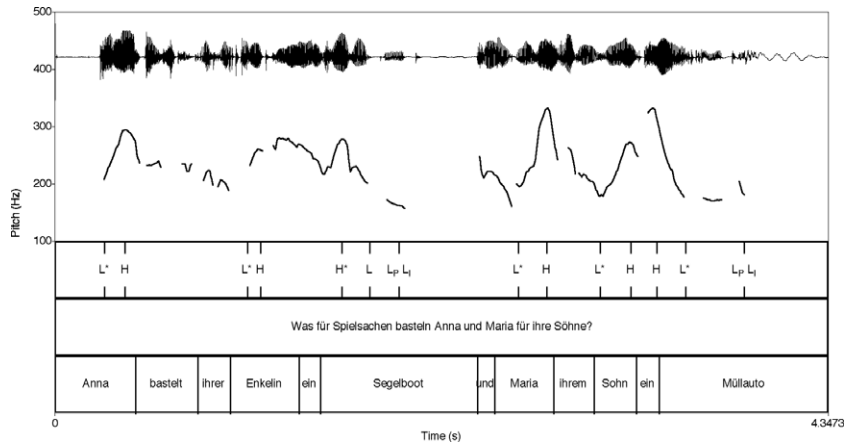


Figure 6. Gapping with a falling boundary tone at the end of the first IP: (*Was für Spielsachen basteln Anna und Maria für ihre Söhne?*) *Anna bastelt ihrer Enkelin ein Segelboot und Maria ihrem Sohn ein Müllauto.*

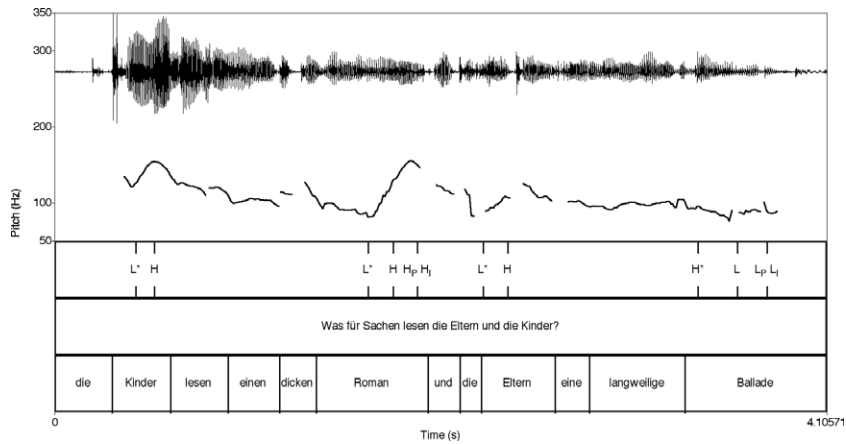


Figure 7. Register and phrasing in a Gapping sentence. (*Was für Sachen lesen die Kinder und die Eltern?*) *Die Kinder lesen einen dicken Roman und die Eltern eine langweilige Ballade.*

lade.?

8. Conclusion

Theories of focus make strong predictions with respect to the placement of accents in a clause. One type of construction in which the accent placement plays a crucial role is elliptical coordination. In this article we investigated two kinds of elliptical coordination, RNR and Gapping. We claimed that the emergence of ellipsis in these constructions greatly depends on the focus structure as well as on pragmatic and prosodic factors.

After introducing the syntactic properties of RNR and Gapping, we discussed the theoretical predictions which a theory of focus makes with respect to elliptical coordination. In particular we claimed that the focus structure of a coordinated clause is determined not only by the discourse which precedes the coordination, but also by the need to contrast pairs of elements contained in the conjuncts. This contrast was predicted to be strong enough to override the focus structure as determined by the extrasentential discourse. The intrasentential structure of a coordination was also shown to license deaccenting in cases where the preceding discourse did not provide enough information to trigger deaccenting.

These theoretical predictions were by and large confirmed by our elicited data. Both in RNR and in Gapping, the contrasting elements were generally realized with two pitch accents, regardless of the informational structure of the sentences elicited by the context. The systematic overriding of general accenting strategies because of pragmatic considerations was a stable effect, though we are well aware that in a non-experimental situation, forerunner questions inducing backgrounding of some of the contrasting material probably have a more drastic deaccenting effect. Second, the phrasing correlates were extremely clear and supported by several tonal cues: boundary tones were present at the end of the conjuncts (IPs). The first conjunct was, in most cases, delimited by a very high tone, analyzed as upstep. And downstep relationships were also very consistently realized: the register of the second conjunct was always a subset of that of the first one. Also inside of Intonation Phrases, we found a consistent downstep effect among Phonological Phrases.

A few differences between RNR and Gapping also came to light, most probably due to the place of the ellipsis in the sentence. In RNR, the missing element is located at the end of the first conjunct, which induces the regular upstep of the last high tone. In Gapping constructions, the ellipsis is located after the first PhP, also triggering a clear phrasing effect, but of a weaker kind. The first contrasting accent was always more clearly separated from the remaining of the sentence in the Gapping sentences than in the RNR constructions. Another difference between the constructions was the fact that deaccenting of one of the contrasting element was only made in the Gapping sentences. Finally, a falling tone to close the first intonation phrase was more often found in the Gapping

108 *Caroline Féry and Katharina Hartmann*

sentences than in the RNR ones. Even though natural data could reveal that deaccenting, phrasing and realization of boundary tones can have other options as those described here, we are confident that our findings give a clear indication of how German speakers signal contrast in this kind of sentences.

affiliation?

Appendix

This appendix lists the RNR and Gapping examples used in the experiments.

Right Node Raising

- (1) *Wer verspricht wem in den Wald zu gehen?*
Was versprechen Gabi und Manuel ihren Müttern?
Was ist da los?
Who promises whom to go into the forest?
What do Gabi and Manuel promise their mothers?
What is happening there?

Gabi verspricht ihrer und Manuel verspricht seiner Mutter in den Wald zu gehen.

Gabi promises her and Manuel promises his mother to go into the forest.

- (2) *Wer hat wen gefragt, wann der Nikolaus kommt?*
Wer hat Bea und Lena gefragt, wann der Nikolaus kommt?
Was höre ich da?
Who asked whom when Santa will come?
Who asked Bea and Lena when Santa will come?
What do I hear?

Roman hat Bea und Martin hat Lena gefragt, wann der Nikolaus kommt.

Roman asked Bea and Martin asked Lena when Santa will come.

- (3) *Wer hat wem versprochen um 7 mit dem Auto in Berlin anzukommen?*
Wer hat was versprochen und wem?
Was ist da draußen los?
Who promised whom to arrive at 7 by car in Berlin?
Who promised what and to whom?
What is happening outside?

The focus and prosodic structure of RNR and Gapping 109

Paula versprach Lisa und Erika versprach Anna um sieben mit dem Auto in Berlin anzukommen.

Paula promised Lisa and Erika promised Anna to arrive in Berlin by car at seven.

- (4) *Ihr kennt Männer, die was für Hemden tragen?
Was für Sachen tragen die Männer, die Claudia und Maria kennen?
Was höre ich da?
You know men who wear what kind of shirts? What kind of things do the men wear who Claudia and Maria know? What do I hear?*

Maria kennt einen Mann, der gelbe, und Claudia kennt einen Mann, der rosa Hemden trägt.

Maria knows a man who wears yellow, and Claudia knows a man who wears pink shirts.

- (5) *Wer hat hier was gemacht?
Was war hier los?
Was machten Hanna und Erika mit der Melodie?
Who did what?
What happened here?
What did Hanna and Erika do with the melody?*

Hanna sumnte und Erika sang eine Melodie.

Hanna hummed and Erika sang a melody.

- (6) *Schlafen die Tiere auf dem Baum?
Welches Tier schläft wo?
Sag mal was über den Winterschlaf!
Do the animals sleep in the tree? Which animal sleeps where? Tell me something about hibernation!*

Das Murmeltier schläft neben und der Braunbär schläft auf dem Baum.

The marmot sleeps beside and the brown bear sleeps on top of the tree.

Gapping

- (1) *Was ist im Kinderzimmer los?
Basteln Anna und Maria tatsächlich ein Flugzeug und einen Strohstern für ihre Enkelin und ihren Sohn?
Was für Spielsachen basteln Anna und Maria für ihre Söhne?
What's happening in the children's room?
Are Anna and Maria really making an airplane and a straw for*

110 *Caroline Féry and Katharina Hartmann*

their granddaughter and their son?
What kind of toys are Anna and Maria making for their sons?

(Nein,) Anna bastelt ihrem Sohn ein Segelboot und Maria ein Müllauto.
(No,) Anna is making a sailboat for her son and Maria a garbage truck.

- (2) *Sind die Bananen und die Orangen im Obstkorb?*
Wo liegt denn das Obst?
Liegen die Bananen und die Orangen immer noch hinter der Tür?
Are the bananas and the oranges in the fruit basket? Where is the fruit?
Are the bananas and the oranges still behind the door?

(Nein,) Die Bananen liegen vor der Tür und die Orangen hinter der Tür.
(No,) The bananas are in front of the door and the oranges behind the door.

- (3) *Was kaufen Karl und Maria?*
Wer kümmert sich um die Getränke?
What are Karl and Maria buying?
Who is taking care of the drinks?

Karl kauft sieben Flaschen Wein aus dem Burgund und Maria drei Fässer Bier.
Karl is buying seven bottles of wine from Burgundy and Maria three kegs of beer.

- (3') *Wer kauft was?*
Who is buying what?

Karl kauft sieben Flaschen Wein aus dem Burgund und Maria sieben Flaschen Bier.
Karl is buying seven bottles of wine from Burgundy and Maria seven bottles of beer.

- (4) *Was macht die Familie?*
Was für Sachen lesen die Kinder und die Eltern?
What is the family doing? What kind of things are the children and the parents reading?

Die Kinder lesen einen dicken Roman und die Eltern eine langweilige Ballade.
The children are reading a thick novel and the parents a boring ballade.

- (4') *Lesen sie alle eine Ballade?*
Are they all reading a ballade?

Nein, die Kinder lesen einen Roman und die Eltern eine Ballade. No, the children are reading a novel and the parents a ballade.

The focus and prosodic structure of RNR and Gapping 111

- (5) *Wohin reisen Anna und Manu?*
Haben deine Freunde Urlaubspläne?
Where are Anna and Manu traveling to?
Do your friends have vacation plans?

Anna reist mit ihrem Mann nach Indien und Manu mit ihrem Kollegen nach England.

Anna is traveling with her husband to India and Manu with her colleague to England.

- (5') *Mit wem reisen Anna und Manu nach England?*
With whom are Anna and Manu traveling to England?

Anna reist mit ihrem Mann nach England und Manu mit ihrem Kollegen.

Anna is traveling with her husband to England and Manu with her colleague.

- (6) *Wo jagen deine Freunde gerade?*
Sind Gabi und Sylvia beide auf Löwenjagt in Kenia?
Where are your friends hunting?
Are Gabi and Sylvia both hunting lions in Kenya?

(Nein,) Gabi jagt einen Braunbär in Sibirien und Sylvia einen Löwen in Burundi.

(No,) Gabi is hunting a brown bear in Siberia and Sylvia a lion in Burundi.

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114 *Caroline Féry and Katharina Hartmann*

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