

Gerrit Kentner and Joost Kremers

# Prosody in syntactic encoding

## 1 Introduction

Prosody and syntax are fundamental components of linguistic form. The term prosody refers to those properties of the speech signal that are not reducible to the individual phones but to their grouping into phonological units of higher order, such as syllables, metrical feet, phonological words or prosodic phrases (Nespor & Vogel 2007; Selkirk 1984). The smaller prosodic units are necessary and inherent parts of the larger ones, i.e. every prosodic phrase consists of at least one phonological word which in turn consists of at least one metrical foot which in turn consists of at least one syllable. Therefore, with prosody, the sound string is not merely a linear sequence but it is endowed with hierarchical structure, i.e. another dimension of phonological organization. The audible reflex of this multi-layered organization is the rhythm, the phrasing, and the intonation of an utterance.

Like the sound units, the meaningful building blocks of language (the morphemes) are organized in hierarchical fashion: words consist of morphemes and are grouped into phrases, according to the rules of (morpho)syntax.

Whether the kind of hierarchical organization in phonology is comparable to the one in syntax is a contentious issue. To be sure, whatever the respective organizing principles, the structures are necessarily compatible. This is because phonology and syntax together are tasked with the form of language, albeit on different layers: Phonology is primarily responsible for the subsymbolic layer on which the sound units (which may bring about a difference in meaning but are themselves devoid of meaning) are put together, and syntax is responsible for the symbolic layer on which morphemes are arranged.

In spite of these similarities, however, the phonological and syntactic modes of hierarchical organization employ ontologically different vocabularies. For example, while the notion of *size* matters for the organization of prosody (smaller units, e.g. syllables, are grouped into larger ones, e.g. metrical feet), embedding in syntax does not make reference to size. Conversely, morphosyntactic concepts like the distinction between arguments and adjuncts are alien to the phonology.

The syntax-phonology interface is responsible for fusing these different structures to evolve into a coherent *Gestalt* of linguistic form. It is commonly assumed that prosody takes its cue from, and therefore reflects, syntactic structure (for a recent review, see Bennett & Elfner (2019)). The prosodic rendering of syntactic

structure, however, is imperfect and limited, as prosody is affected by other conditions as well, e.g. discourse-related and paralinguistic ones. What is more, prosody leads a life of its own, i.e. it is subject to inherently *prosodic* well-formedness conditions; chief among those are the constraints formulated in the Strict Layer Hypothesis (Selkirk 1984), or the preference for rhythmic alternation of stressed and unstressed syllables, or for balanced phrasing. It has been suggested that, under certain circumstances, syntax is malleable at the will of such prosodic well-formedness conditions. This is most obvious in metered poetry; poets may violate syntactic rules in order to make the word sequence fit the predetermined arrangement of metrical feet (Fitzgerald 2007; Kiparsky 1975; Youmans 1983). To a lesser degree, this is true for rhetoric registers as well (Bolinger 1957 and Anttila, this volume); crucially, even in normal language use, prosodic influences on syntax have been shown (see Sect. 3 and Anttila (2016) for a review), though they appear to be rather limited in scope (Kentner & Franz 2019).

At first sight, these reciprocal influences defy the traditional prerequisite that syntax be “phonology-free”: syntax operates on morphosyntactic structures without any awareness of the phonological structures onto which they are mapped. This assumption is in fact one of the main arguments in favor of so-called sequential grammar models, such as the derivational models developed within generative grammar.

Similarly, phonologists generally assume that phonology is syntax-free. For example, Scheer (2008, p. 146) refers to the principle of *Indirect Reference*: “according to which phonology cannot directly access morpho-syntactic structure and hence may not mention morpho-syntactic categories in the structural description of rules (or in constraints)”, see Bermúdez-Otero (2012) for a similar point.

However, it is becoming increasingly clear that there are phenomena that violate these principles. Faced with apparently reciprocal influences of syntax and prosody, some phonologists suggest certain aspects of prosody to be beyond the realm of phonology proper. For example, Scheer (2012) considers intonation to be syntactic in nature as it shows signs of recursion, a property that is considered to be at the heart of syntax. Some syntacticians happily co-opt prosodic phenomena into their representations: With the rising interest in, and development of, discourse-related left-peripheral projections in syntax (Rizzi 1997), researchers have incorporated *intonational morphemes* into the syntactic spine to signify notions such as focus.

On the other hand, recent years have seen widespread acknowledgement of the assumption that word order, a core aspect of sentence structure, is not solely the business of syntax but subject to phonological constraints as well (Bennett et al. 2016; Agbayani & Golston 2016; Kentner & Franz 2019).

In sum, in the current discourse on the syntax-phonology interface, we observe a shifting definition of whether certain properties of linguistic form are phonological in nature or whether they are considered to be of syntactic essence (cf. Bermúdez-Otero & Honeybone 2006). The contributions in this volume take different stances regarding this question, and they bring to bear a variety of phenomena in evaluating this issue.

Before summarizing the contributions in this volume, we briefly review the two sides of the coin, as it were; namely, on the one hand, syntactic influences on prosody, and conversely, prosodic effects on sentence structure.

## 2 Syntax affecting prosody

The syntactic constituent structure is, to some extent, reflected in prosodic phrasing. In languages such as English or German, if a syntactic phrase boundary corresponds with a prosodic boundary, it is usually the right edge of the phrase that is prosodically marked: Intonational boundaries are signalled by final lengthening (a slowdown in speech rate towards the end of prosodic phrases), boundary tones (rising or falling pitch towards the end of a prosodic phrase) or pauses; usually, such intonational phrase boundaries correspond with the edges of major syntactic constituents. This is certainly true for boundaries of sentences (1b), but also for parentheticals such as in (2), which are prosodically detached from the clause they appear in.

- (1) a. Martin heiratet Maria nicht. Féry (1993)  
 Martin marries Maria not  
 ‘Martin does not marry Maria.’
- b. Martin heiratet. Maria nicht.  
 Martin marries Maria not  
 ‘Martin is getting married. Maria [is] not.’
- (2) In Pakistan, Tuesday, which is a weekday, is, Jane said, a holiday.  
Selkirk (1984)

However, while the distribution of intonational boundaries is not arbitrary (cf. the impermissible phrasing in (3c)), it is variable: both the phrasings in (3a) and (3b) are licit. As the prosodic integration of the PP *from London* into its host NP in (3a) shows, not all major syntactic phrases necessarily correspond to prosodic phrases.

- (3) a. Jill Smith from London # took part in the march.  
 b. Jill Smith # from London # took part in the march.  
 c. \*Jill Smith from # London took part in the march.

Whether or not a syntactic phrase has a prosodic analogue is determined by various factors. According to Watson & Gibson (2004), the production of prosodic boundaries depends both on syntactic structure and on the constituents' size. Specifically, Watson & Gibson (2004) observe that prosodic boundaries are often set after long constituents, providing the speaker with time for recovery, and – to a far lesser extent (Kentner 2007) – before long constituents to give the speaker planning time. Therefore, a prosodic break is very likely to occur before the conjunction *and* in (4a) but far less likely at the same syntactic position in (4b).

- (4) a. The guest list includes Benedict Timothy Cumberbatch and Daniel John Higginbotham.  
 b. The guest list includes Ben and Daniel.

Notably, if the conjuncts in (4b) are not separated by a clear prosodic phrase break before *and*, the conjunction is preferably cliticized to the preceding monosyllabic name *Ben*, effectively forming a trochaic foot that straddles a syntactic phrase boundary (Lahiri & Plank 2010).

The likelihood of observing a prosodic boundary at the edge of a syntactic boundary is also dependent on the depth of the constituent's embedding. Consider the potential phrase boundary before the *because*-clause in (5). A prosodic phrase boundary is likely to be stronger (or, put differently: more likely to be present) in (5a) compared to (5b). This is because in (5b) the *because*-clause is embedded under the sentence-initial concessive clause which in turn is embedded under the following main clause. Evidently, in (5b) the syntactically higher boundary between the concessive and the main clause needs to be marked more clearly by a prosodic phrase break than the lower boundary before *because*, while at the same time producing a coherent intonation for the whole sentence.

- (5) a. Jane was late because she had run into a friend; she still managed to catch the bus.  
 b. Although Jane was late because she had run into a friend, she still managed to catch the bus.

In line with this observation, studies by Wagner (2005) and Kentner & Féry (2013) on various string-identical structures involving coordinated names reveal

a prosodic reflex of syntactic depth of embedding. The prosodic boundary after the name *Willi* in (6a) is more pronounced compared to (6b), in which *Willi* is embedded within a larger constituent which in turn is closed off by a stronger intonational break after the name *Mila*. Because of the strong prosodic break after *Mila* in (6b), the two structures in (6) are clearly disambiguated by prosodic means.

- (6) a. (Nino and Willi) or Mila or Suse  
 b. ((Nino and Willi) or Mila) or Suse

Interestingly however, as shown by Kentner & Féry (2013), while the left branching structures in (6) are marked by significantly distinct prosodic phrasings, the prosodic difference between the right-branching counterparts (7) is minuscule and the prosodic renderings of (7a) and (7b) hardly discernible. That is, whether or not syntactic depth of embedding is reflected in prosodic phrasing crucially hinges on the branching direction.<sup>1</sup>

- (7) a. Nino or Willi or (Mila and Suse)  
 b. Nino or (Willi or (Mila and Suse))

Like prosodic phrasing, prosodic prominence can be affected by syntax. For example, while lexical arguments usually bear sentence stress, their heads do not, or at least not necessarily (Gussenhoven 1983; Truckenbrodt 2006). As a case in point, consider the phrase *in Berlin* in (8): When serving as a prepositional object (8a) it receives nuclear accent and the verb may remain unaccented; as a locative adjunct (8b), *Berlin* bears prenuclear or secondary accent, with the main accent falling on the verb. Truckenbrodt (2006) attributes this difference in accentuation to the workings of the syntax-phonology interface constraint STRESSXP that requires every lexical XP to bear stress. This constraint is sensitive to the different syntactic associations of the phrase *in Berlin* in (8a) and (8b): the object *in Berlin* (8a) is considered an inherent part of the VP; therefore, stress on *Berlin* satisfies STRESSXP for the VP and the prepositional object at the same time. In (8b), *in Berlin* is adjoined to the VP. Stress on the adjunct alone however, would not satisfy

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<sup>1</sup> There is reason to doubt that the correspondence between syntactic constituent structure and prosodic phrasing is universal. A comparable study on coordinated names in Hindi failed to show effects of syntactic embedding on prosodic phrasing (Féry & Kentner 2010); another study by Féry & Schubö (2010) shows syntactic effects on prosodic phrasing in center embedded relative clauses in German, but fails to find them in equivalent structures in Hindi. Apparently, languages differ with respect to the plasticity of their prosodic structures, with Hindi displaying rather rigid prosodic phrasing that is less responsive to syntactic or pragmatic givens when compared to intonation languages like German or English (Féry 2016).

STRESSXP for the core projection of the intransitive verb. Therefore, main stress on the verb is called for in (8b).

- (8) a. Peter hat sich in BERLIN verliebt.  
Peter has himself in Berlin fallen-in-love  
'Peter has fallen in love with Berlin.'
- b. Peter hat sich in Berlin VERLIEBT.  
Peter has himself in Berlin fallen-in-love  
'Peter has fallen in love in Berlin.'

The minimal pair (9) by Bresnan (1971) works in a similar way. In (9a), *plans* is the direct object to the verb *leave*; hence, with stress on *plans*, STRESSXP is satisfied for the entire VP and the verb remains unstressed, as in (8a) above. In (9b), on the other hand, *to leave* is the argument to the noun *plans* and hence needs to receive prominence.

- (9) a. George has PLANS to leave.  
b. George has plans to LEAVE.

Another case of prosodic prominence reflecting syntactic structure is represented by expressions with focus-sensitive particles like *only* (10).

- (10) a. Brian only touched the CHALICE [... but not the altar].  
b. Brian only TOUCHED the chalice [... but did not drink from it].

The accentual difference is due to the different foci in (10a) (focus on *chalice*) and (10b) (focus on *touched*), with *only* associated with the respective domain of focus (skipping the verb in the case of (10a)).

Similarly, as shown by Selkirk (2002); Féry & Hartmann (2005), and Kentner et al. (2008), elliptical sentences like (11b) are prosodically distinct from string-identical non-elliptical counterparts (11a). Again, this difference is related to focus, as the verb *fixing* in the second conjunct in (11b) is contrasted to the verb *riding* in the first conjunct, hence the contrastive focus on *fixing* that is marked by accentuation.

- (11) a. Nina is RIDING and Ian is fixing a BIKE.  
b. Nina is RIDING a ~~bike~~ and Ian is FIXING a bike.

Whether information structural notions such as topic or focus are to be directly represented as dedicated heads in the syntactic representation (Rizzi 1997;

Frey 2004), or whether they only indirectly interact with syntax and hence need to be modelled independently (Fanselow 2007), is debatable (see, e.g. the contributions by Struckmeyer and Wierzba, this volume). Nevertheless, the examples clearly show that different syntactic associations (focus-related or otherwise) may have consequences for the pattern of prosodic prominences.

### 3 Prosody affecting syntax

Syntactic phenomena in which phonology appears to play a role are also well-known. For example, Zec & Inkelas (1990) discuss three phenomena, among which the well-known Heavy-NP Shift phenomenon in English, where a “heavy” NP undergoes movement to the right:

- (12) a. \*Mark showed to John {some pictures}<sub>p-phr</sub>.  
 b. Mark showed to John {some pictures}<sub>p-phr</sub> {from his beloved city}<sub>p-phr</sub>.

One of the factors that appears to play a role in allowing the NP to shift is its phonological structure. If the NP consists of at least two phonological phrases, shifting is possible, provided the NP also constitutes new information (cf. Arnold et al. 2000). An NP that consists of a single phonological phrase cannot shift, even if it is new information.

Similarly, Samek-Lodovici (2005) discusses Italian examples in which the syntactic structure appears to adapt itself in order to meet a prosodic requirement:

- |  |   |
|--|---|
| <p>(13) context: <i>What happened?</i><br/>         [Gianni ha RISO]<sub>F</sub><br/>         Gianni has laughed</p> | <p>(14) context: <i>Who laughed?</i><br/>         a. *GIANNI<sub>F</sub> ha riso<br/>            Gianni has laughed<br/>         b. Ha riso GIANNI<sub>F</sub><br/>            has laughed Gianni</p> |
|--|---|

In (13), the entire clause is new information (focus), answering the question *What happened?* In (14), the verb *laughed* is mentioned in the question, so when it appears in the answer, it is not in focus. Instead, only the subject *Gianni* is in focus. In English, it is possible to indicate this by emphasising the subject (cf. *JOHN*

*laughed*). In Italian, this option is not available. In order to mark subject focus, the syntactic structure must be changed. The trigger for this change, however, is not syntactic but prosodic, as Féry (2013) argues: the focused element *Gianni* must be right-aligned with an intonational phrase (IntP).<sup>2</sup>

If the proposed phonological (or prosodic) analysis for such phenomena is on the right track, several important questions are raised. Foremost, interactions between syntax and phonology of this type are difficult, if not impossible, to account for in standard models of grammar. A common assumption in many generative approaches is that the grammar is sequential. Syntax operates on morpho-syntactic heads void of phonological content and without prosodic constituency. Only when syntax completes a structure is it handed over to the phonological component. At this point, the syntactic structure is fixed and cannot be altered anymore.

One analysis that has been proposed is to have syntax generate multiple structures simultaneously and have phonology filter out those structures that violate some phonological or prosodic constraint. One such proposal is made by Büring (2013), who calls this a *Try-and-Filter* approach. A similar proposal is the so-called *distributed deletion* account (e.g., Fanselow & Çavar 2002), which exploits Chomsky's (1993) *copy theory of movement*. Chomsky argues that a moved element does not leave behind a trace in the traditional sense, but a copy of itself, so that the syntactic structure contains multiple copies of any moved element. Chomsky simply assumes that it is always the highest copy that is pronounced, while all other copies are by definition silent. Fanselow & Çavar argue that under certain circumstances, the phonological component has the option to spell out a lower copy.

However, such proposals cannot escape the fact that they need some point in the derivation in which syntactic and phonological information is available simultaneously. For example, in Samek-Lodovici's focus example above in (13) / (14), it is the element that carries the focus feature that must be right-aligned with the IntP boundary. This focus feature is not a phonological feature, however, and the element that carries it is a syntactic constituent.

Note that we cannot argue that what is actually being aligned is a prosodic constituent that has some phonologically visible property (e.g., sentence stress) that corresponds to the focus feature. As Féry (2010) points out, languages generally do not have a single phonological correlate of focus (apart from alignment).

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<sup>2</sup> Other phenomena not discussed here include subject drop in English (Weir 2012), *wh*-movement or lack thereof (Richards 2010). See also Erteschik-Shir & Rochman (2010) for further discussion.



For example, in languages like German, the focused constituent often carries sentence stress, but it does not always do so. Alignment applies nonetheless.<sup>3</sup>

The sequential approach therefore runs into a fundamental problem: in order to account for phonology-to-syntax interaction effects, the grammar needs access to syntactic and phonological information *at the same time*. In a sequential model, this inevitably requires making detailed information from one module available in another, or, alternatively, setting up an additional module that has access to both kinds of information. In some approaches, this is the role ascribed to the PF component of grammar (e.g., Kandybowicz 2007).

One possible solution may be to adopt Chomsky's (2001) proposal that the derivation proceeds *cyclically*: at certain steps in the derivation, the structure built up so far is evaluated by phonology and the result passed back to syntax. If the cycles are small enough, the grammar may be able to deal with the phenomena under discussion, although it is an open question how exactly this would work. Another solution could be to adopt a parallel model (Culicover & Jackendoff 2005; Sadock 2012, 1992), since such a model makes the fundamental assumption that the relevant syntactic and phonological information is available simultaneously, albeit to different modules. Here, too, the question is how exactly such a system would work, however, since it is not clear how violations of phonological constraints can be fed back to syntax in a parallel model.

Another question that is raised by the idea that phonology can affect syntax concerns the types of phonological information that has the ability to trigger syntactic effects. Zec & Inkelas (1990) argue that this should be limited to prosodic structure, i.e., requirements on prosodic structure can trigger syntactic reordering, but other phonological information cannot.

While it is true that there do not seem to be languages with syntactic rules of the type "Front a word if it starts with [b]", it is not entirely certain that segmental structure is completely irrelevant for syntax. For example, Golston (1995) points to effects such as the one illustrated in (15):

- (15) a. The video of "Macbeth" / The "Macbeth" video  
 b. The video of "The Dead" / \*The "The Dead" video

Golston does note that *The "The Dead" video* is only ruled out because there is an alternative structure that has the same semantics and does not have a se-

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<sup>3</sup> Note, however, that Kügler & Féry (2017) show that even deaccented foci have some residual accent. It is an open question whether this residual accent would suffice for alignment to be prosodic in nature.

quence of *the the*. Similar structures in German are not ruled out because there is no syntactic alternative:

- (16) a. die, die die Blumen gekauft haben  
 those who the flowers bought have  
 ‘those who have bought the flowers’
- b. dass das das Problem ist  
 that this the problem is  
 ‘that this is the problem’

These facts suggests that syntax overrules phonology, at least when it comes to phonological constraints involving segments, but the question is still very much open, especially considering the fact that in the English example, the two *the*’s are morphosyntactically identical, while the three *die*’s and the three *das(s)*’s in the German examples are not, suggesting that a purely morphosyntactic analysis may not be infeasible.

## 4 Outline of this book

The contributions in this volume bring to bear various kinds of evidence in evaluating the role of prosody in syntactic encoding; the theoretical models that guide both the research questions and the interpretation of the data are equally diverse. Therefore, the reader will not find a unique and coherent answer to the question what role prosody has to play in sentence formation. Rather, the variety of answers presented here reflect the different stances the authors take regarding what the terms prosody and syntax entail. At the same time, they hint at how far-reaching the question of prosody-syntax interactions is for the study of linguistic form.

**Arto Anttila, Timothy Dozat, Daniel Galbraith, and Naomi Shapiro** examine the prosody and syntax of presidential speeches. Even though this rhetoric genre consists – to a large extent – of scripted speech, the authors make a general point regarding the sources of prosodic prominence and its relation to syntax. Specifically, they argue that sentential prominences are, on the one hand, directly related to surface syntactic structure and, on the other hand, to the informativity of a given word within its context. The analysis of the speeches reveals that syntax and informativity independently contribute to perceived sentence stress. Moreover, the data suggest that speakers preferably place the more informative words in positions that receive prominence by virtue of their syntactic status.

**Tina Bögel** presents a formal model within the framework of Lexical Functional Grammar (LFG) that is concerned with the role of prosody in the resolution of syntactic ambiguities in sentence comprehension. This model assumes a close relationship between syntactic and prosodic constituent structure, such that, e.g. syntactic XPs are mapped onto prosodic phrases in sentence production. By way of a comprehension experiment, Bögel shows how such a close association may be exploited by listeners when parsing ambiguous word strings in German. The special feature of Bögel's LFG architecture is its ability to model both the syntax-prosody mapping in production as well as the prosody-syntax mapping in comprehension while otherwise maintaining strict modularity in linguistic representation.

Bögel's ideas on the syntax-phonology interface also feature prominently in the chapter by **Miriam Butt, Farhat Jabeen, and Tina Bögel**. This time, the LFG architecture is used to model the prosodic rendering of the ambiguous word *kya* in Hindi/Urdu which differs depending on its syntactic status. In a production experiment, the authors establish that this ambiguous word remains accentless when serving as a polar question particle; as wh-word in (potentially string-identical) constituent questions, *kya* bears prosodic prominence. Listeners are shown to be sensitive to this prosodic difference. According to the model presented, the prosodic difference between the polar and wh-reading of *kya* is not due to lexical differences but to syntactic constituent structure. Within the LFG interface architecture, this structure is annotated with prosodic information requiring accentuation of *kya* in the case of the wh-questions and prohibiting accentuation in polar questions.

The experiments and corpus studies reported in the contribution by **Katy Carlson** are concerned with the interpretation of elliptic sentences and the role of accentuation for the syntactic association of a remnant like *Wally* in sentences like (17), which may be interpreted as subject (... *than Wally respected Kenny*) or object (... *than Theo respected Wally*).

(17) Theo respected Kenny more than Wally.

The results of a comprehension experiment reveal a general preference for object interpretations (i.e. with *Kenny* and *Wally* being the contrasted grammatical objects) but this preference is modulated by accentuation: When the subject (*Theo*) and the remnant (*Wally*) are prosodically contrasted with both bearing accent, the likelihood of the subject reading is significantly increased. Interestingly, a corpus study reveals that bare NP ellipses as in (17) serve as contrasted subjects in 80% of the cases, which is at odds with the strong preference for object rem-

nants found in the comprehension experiment. Carlson ascribes these conflicting results to different strategies in comprehension versus production.

**Marta Wierzba** discusses the syntactic and prosodic makeup of noncanonical, object initial orders in German under different information structural conditions. Based on the observation that “object-initial sentences can have a broad focus interpretation under the condition that sentence stress falls on the object and the subject is either a definite pronoun or a given DP” Wierzba proposes a serial architecture of the syntax-phonology interface and the role of information structure in it. This model predicts that focus may impinge on the syntactic makeup of sentences and also determines sentence stress; givenness, on the other hand, does not affect the syntactic structure, and its effect on prosody is limited to conditioning accent types and pitch excursion and does not touch upon the prosodic phrasing and the presence of accents.

**Johannes Heim and Martina Wiltschko** analyse the sentence-peripheral particle *eh* in Canadian English (as in *You have a new dog, eh?*) and argue that it is used to manage the Common Ground. In addition, they discuss specific sentence-final intonation patterns and argue that these have the same function as the various instances of *eh* in managing the Common Ground. Based on this shared function, Heim and Wiltschko argue that sentence-final intonation should be represented in the syntactic structure, adding a third functional layer to the clause above the CP and TP layers.

The proposal made by Heim and Wiltschko is taken up in **E. Jamieson**’s analysis of the sentence-final questions tag *-int* in Glasgow Scots. Due to the posited meaning for intonation and the nature of *-int*, this particle is predicted not to be compatible with rising intonation. Jamieson presents an experiment to test this hypothesis, the results of which suggest that the hypothesis is wrong. This, in turn, leads Jamieson to argue that intonation should not be represented in syntax, because its (un)acceptability is not as sharply delineated as one would expect for a syntactically represented property.

**Hisao Tokizaki and Jiro Inaba** look at complex prenominal modifiers across languages, e.g., English *\*a [sleeping on the sofa] baby* vs. German *ein [in München wohnhafter] Künstler* (‘an in Munich living artist’). Tokizaki and Inaba argue that the grammaticality facts can be accounted for by a prosodic constraint, without needing to assume something like an adjacency requirement or a head-finality constraint. Essentially, a prosodic break between the prenominal modifier and the head is not allowed. The approach can be extended to languages such as Russian, which do allow structures such as *[gotovyi na vse] student* ‘ready for all student’, and to phrasal compounds such as *connect-the-dots puzzle*. These are correctly predicted to be grammatical due to the differences in prosodic phrasing compared with the ungrammatical English structure *\*a sleeping on the sofa baby*.

In his paper on scrambling in German, **Volker Struckmeier** argues against a cartographic approach, in which scrambling targets specific functional heads in the clause and focused constituents cannot scramble. On the basis of two experiments, Struckmeier shows that focused constituents do have the ability to scramble in German, provided the resulting structure transparently represents focus or if the resulting outcome is prosodically inconspicuous. Based on his data, Struckmeier argues that restrictions on scrambling should be formulated in terms of relations between constituents.

**Joost Kremers** discusses the topic of head movement in minimalist theories, which, as has been pointed out before, actually comprises two very different operations: head substitution and head adjunction. Head adjunction is thought to be the operation that builds complex word forms in syntax, but it is problematic from a theoretical perspective for various reasons. Kremers argues that these problems can be resolved if head adjunction is treated as an operation that is essentially phonological: the phonological form onto which a syntactic head is mapped essentially determines its position. Unlike previous attempts to treat head adjunction as a phonological operation, Kremers argues that there is no need to add a phonological diacritic to syntactic heads or syntactic information to the phonological representation.

## 5 Concluding remarks

The present volume is a collection of works from different linguistic camps that have been presented at the eponymous workshop on “Prosody in Syntactic Encoding” on the occasion of the 2017 annual meeting of the German Linguistic Society (Deutsche Gesellschaft für Sprachwissenschaft, DGfS) in Saarbrücken. We thank the group of reviewers for their assessment and their valuable suggestions for improvement of the contributions.

## References

- Agbayani, Brian and Chris Golston (2016). Phonological constituents and their movement In Latin. *Phonology*, 33(1):1–42. doi:10.1017/S0952675716000026.
- Alexiadou, Artemis, ed. (2002). *Theoretical approaches to universals*. Amsterdam / Philadelphia: John Benjamins.
- Anttila, Arto (2016). Phonological effects on syntactic variation. *Annual Review of Linguistics*, 2:115–137. doi:10.1146/annurev-linguistics-011415-040845.

- Arnold, Jennifer, Tom Wasow, Anthony Losongco, and Ryan Ginstrom (2000). Heaviness vs. newness: The effects of structural complexity and discourse status on constituent ordering. *Language*, 76(1):28–55.
- Bennett, Ryan and Emily Elfner (2019). The syntax-prosody interface. *Annual Review of Linguistics*, 5:151–171. doi:10.1146/annurev-linguistics-011718-012503.
- Bennett, Ryan, Emily Elfner, and James McCloskey (2016). Lightest to the right: An apparently anomalous displacement in Irish. *Linguistic Inquiry*, 47(2):169–234. doi:10.1162/LING\_a\_00209.
- Bermúdez-Otero, Ricardo (2012). The architecture of grammar and the division of labour in exponence. In Trommer, Jochen, ed., *The morphology and phonology of exponence*, pp. 8–83. Oxford University Press.
- Bermúdez-Otero, Ricardo and Patrick Honeybone (2006). Phonology and syntax: A shifting relationship. *Lingua*, 116(5):543–561.
- Bolinger, Dwight L. (1957). Maneuvering for stress and intonation. *College Composition And Communication*, 8(4):234–238. doi:10.2307/354910.
- Bresnan, Joan W (1971). Sentence stress and syntactic transformations. *Language*, 47(2):257–281.
- Büring, Daniel (2013). Syntax and prosody, syntax and meaning. In den Dikken (2013), pp. 860–896.
- Chomsky, Noam (1993). A minimalist program for linguistic theory. In Hale & Keyser (1993), pp. 1–52.
- Chomsky, Noam (2001). Derivation By Phase. In Kenstowicz (2001).
- Culicover, Peter and Ray Jackendoff (2005). *Simpler syntax*. Oxford: Oxford University Press.
- den Dikken, Marcel, ed. (2013). *The Cambridge handbook of generative syntax*. Cambridge: Cambridge University Press.
- Erteschik-Shir, Nomi and Lisa Rochman (2010). *The sound patterns of syntax*. Oxford: Oxford University Press.
- Fanselow, Gisbert (2007). The restricted access of information structure to syntax: A minority report. In Féry, Caroline, Gisbert Fanselow, and Manfred Krifka, eds, *The notions of information structure*, pp. 205–220. University of Potsdam.
- Fanselow, Gisbert and Damir Çavar (2002). Distributed deletion. In Alexiadou (2002), pp. 65–107.
- Féry, Caroline (1993). *German intonational patterns*. Tübingen: Niemeyer.
- Féry, Caroline (2010). Informationsstruktur: Begriffe und grammatische Korrelate. In Tanaka, Shin, ed., *Linguisten-Band 9 der Japanischen Gesellschaft für Germanisten*. Japanische Gesellschaft für Germanisten.
- Féry, Caroline (2013). Focus as prosodic alignment. *Natural Language and Linguistic Theory*, 31:683–734.
- Féry, Caroline (2016). *Intonation and prosodic structure*. Cambridge, UK: Cambridge University Press.
- Féry, Caroline and Katharina Hartmann (2005). The focus and prosodic structure of German right node raising and gapping. *The Linguistic Review*, 22(1):69–116.
- Féry, Caroline and Gerrit Kentner (2010). The prosody of embedded coordinations in German and Hindi. In *Proceedings of Speech Prosody*, Chicago.
- Féry, Caroline and Fabian Schubö (2010). Hierarchical prosodic structures in the intonation of center-embedded relative clauses. *The Linguistic Review*, 27(3):293–317.

- Fitzgerald, Colleen M. (2007). An optimality treatment of syntactic inversions in English verse. *Language Sciences*, 29(2):203–217. doi:10.1016/j.langsci.2006.12.020.
- Frey, Werner (2004). A medical topic position for German. *Linguistische Berichte*, 198:153–190.
- Golston, Chris (1995). Syntax outranks phonology: Evidence from Ancient Greek. *Phonology*, 12(03):343–368. doi:10.1017/S0952675700002554.
- Gussenhoven, Carlos (1983). Focus, mode and the nucleus. *Journal of Linguistics*, 19(2):377–417.
- Haegeman, Liliane, ed. (1997). *Elements of grammar*. Dordrecht: Kluwer.
- Hale, Kenneth and Samuel Jay Keyser, eds (1993). *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger*. vol. 24 of *Current Studies in Linguistics*. Cambridge, MA: The MIT Press.
- Hartmann, Jutta, Veronika Hegedűs, and Henk van Riemsdijk, eds (2008). *Sounds of silence: Empty elements in syntax and phonology*. Amsterdam: Elsevier.
- Inkelas, Sharon and Draga Zec, eds (1990). *The phonology-syntax connection*. Chicago: University of Chicago Press.
- Kandybowicz, Jason (2007). Fusion and PF architecture. *University of Pennsylvania Working Papers in Linguistics*, 13(1):85–98.
- Kenstowicz, Michael (2001). *Ken Hale: A life in language*. Cambridge, MA: The MIT Press.
- Kentner, Gerrit (2007). Length, ordering preference and intonational phrasing: Evidence from pauses. In *Proceedings of Interspeech 2007*, Antwerp.
- Kentner, Gerrit and Isabelle Franz (2019). No evidence for prosodic effects on the syntactic encoding of complement clauses in German. *Glossa: a journal of general linguistics*, 4(1):1–29.
- Kentner, Gerrit and Caroline Féry (2013). A new approach to prosodic grouping. *The Linguistic Review*, 30(2):277–311.
- Kentner, Gerrit, Caroline Féry, and Kai Alter (2008). Prosody in speech production and perception: The case of right node raising in English. In Steube, Anita, ed., *The discourse potential of underspecified structure*, pp. 207–223. Berlin: Mouton de Gruyter.
- Kiparsky, Paul (1975). Stress, syntax, and meter. *Language*, 51(3):576–616. doi:10.2307/412889.
- Kügler, Frank and Caroline Féry (2017). Postfocal downstep in German. *Language and Speech*, 60(2):260–288.
- Lahiri, Aditi and Frans Plank (2010). Phonological phrasing in Germanic: The judgement of history, confirmed through experiment. *Transactions of the Philological Society*, 108(3):370–398.
- Nespor, Marina and Irene Vogel (2007). *Prosodic phonology*. Berlin: De Gruyter.
- Richards, Norvin (2010). *Uttering trees*. Cambridge, MA: MIT Press.
- Rizzi, Luigi (1997). The fine structure of the left periphery. In Haegeman (1997), pp. 281–337.
- Sadock, Jerrold M. (1992). *Autolexical syntax*. Chicago: University of Chicago Press.
- Sadock, Jerrold M. (2012). *The modular architecture of grammar*. Cambridge: Cambridge University Press.
- Samek-Lodovici, Vieri (2005). Prosody-syntax interaction in the expression of focus. *Natural Language and Linguistic Theory*, 23:687–755.
- Scheer, Tobias (2008). Why the prosodic hierarchy is a diacritic and why the interface must be direct. In Hartmann et al. (2008), pp. 145–192.
- Scheer, Tobias (2012). How phonological is intonation? In *Jahrestagung der deutschen Gesellschaft für Sprachwissenschaft (DGfS)*, Frankfurt.

- Selkirk, Elisabeth (1984). *Phonology and syntax*. Cambridge, MA: MIT Press.
- Selkirk, Elisabeth (2002). Contrastive FOCUS vs. presentational focus: Prosodic evidence from right node raising in English. In *Proceedings of the First International Speech Prosody Conference*, pp. 643–646. Université de Provence.
- Truckenbrodt, Hubert (2006). Phrasal stress. In Brown, Keith, ed., *The encyclopedia of languages and linguistics*, vol. 9, pp. 572–579. Amsterdam: Elsevier: 2 edn.
- Wagner, Michael (2005). *Prosody and recursion*. Phd thesis, MIT, Cambridge, Massachusetts.
- Watson, Duane and Ted Gibson (2004). The relationship between intonational phrasing and syntactic structure in language production. *Language and Cognitive Processes*, 19(6):713–755.
- Weir, Andrew (2012). Left-edge deletion in English and subject omission in diaries. *English Language and Linguistics*, 16(1):105–129. doi:10.1017/S136067431100030X.
- Youmans, Gilbert (1983). Generative tests for generative meter. *Language*, 59(1):67–92. doi:10.2307/414061.
- Zec, Draga and Sharon Inkelas (1990). Prosodically constrained syntax. In Inkelas & Zec (1990), pp. 365–378.