Chapter 13

The syntax-prosody mapping of coordinated clauses, relative clauses, parentheticals and left-dislocations

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This chapter reviews findings and suggestions about the syntax-prosody mapping of particularly non-integrated syntactic collocations, i.e., coordinated clauses, relative clauses, parentheticals and left-disclocations. Downing (1970) usefully structured this terrain. His suggestion in terms of root sentences can be seen as a precursor to the more recent proposal of Kan (2009) and Selkirk (2011) that clauses representing separate illocutionary acts must be separate intonation phrases. The discussion also reveals some amount of disconnection between searches for generalizations in experimental work and what generative analyses there may be to account for them. The chapter attempts to cover some of both and points out some possibilities for further theorizing.

1 Overview

This chapter addresses the prosodic detachment of elements that can also be said to be syntactically and/or semantically detached from each other or from their host constituent to some larger extent: coordinated clauses, non-restrictive

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relative clauses, parentheticals and dislocated constituents. This is discussed by comparison with elements that show less syntactic or semantic detachment, such as restrictive relative clauses.

One of the anchor points of the discussion is a classical suggestion of Bruce Downing (1970), according to which the relevant syntactic detachment leads to prosodic detachment in the form of "obligatory pause", today often analyzed as obligatory IP boundaries (Nespor & Vogel 1986). In its modern form due to Kan (2009) and Selkirk (2011), this takes the form that illocutionary clauses are separated by obligatory IP boundaries.

We begin with this background in Section 2. In the following sections on coordinated clauses (Section 3) and relative clauses (Section 4), we review related studies from the syntax-phonology interface, phonetics, and parsing. These seem to largely call for an additional analysis of the initial picture without challenging it. The section on parentheticals (Section 5) broadens the theoretical basis we set up with our discussion of Downing (1970) and speech acts. We outline on the basis of Bing (1979, 1985) what a possible generative approach to integrating parentheticals that lack nuclear stress might look like and we present a review of experimental studies showing the variation that exists when it comes to parentheticals. In our discussion of left-dislocations (Section 6), we report on recent literature that argues for the alignment of topics with prosodic boundaries and discuss this in relation to the theoretical claims of the initial sections of this chapter. Section 7 sums up the paper.[1]

2 Theoretical background

2.1 Root sentences

The prosodic boundaries of primary interest in the current chapter are intonation phrase (IP) boundaries.[2] We structure our discussion with reference to an early piece of work on the IP boundaries, namely, the PhD thesis of Bruce Downing (1970). He referred to the relevant perceived phonological juncture as "pause" (not necessarily implying a phonetic pause, i.e. a stretch of silence). He investigated the distribution of pauses that are obligatory, and analyzed obligatory pauses in terms of the assignment of phonological phrase boundaries (using a

[1] A closely related chapter is that of Hamlaoui & Szendrői (2026). It focuses on argument and adverbial clauses.

[2] In this chapter, we use for the intonation phrase the abbreviation IP in the running text and iota ("ι") in the examples. For the syntactic inflectional phrase, we use the abbreviation *InflP* (so that it can be distinguished from the intonation phrase).

term from Chomsky & Halle 1968) relative to the syntactic structure. What Downing referred to as phonological phrase later came to be called intonation phrase (IP), see, e.g., Bing (1979, 1985), Nespor & Vogel (1986). The term *phonological phrase* is used by Nespor & Vogel (1986) and others for a lower level of prosodic constituency. The following pieces of motivation for the central role of Downing (1970) in our discussion are also a first introduction to Downing's work.

1. It is broad, addressing the prosodic separation of conjoined clauses, non-restrictive relative clauses, appositions, vocatives, left- and right-dislocated elements, topics at the clausal periphery, speech-commenting parentheticals and parenthetical adverbs.

2. At the length of more than 200 pages, Downing defends a single principled suggestion across all these collocations: phrase boundaries (today's IP boundaries) are inserted at the edges of syntactic root sentences, for which Downing gives a specific syntactic definition.

3. Downing's syntactic definition of root sentences foreshadows better-known later syntactic analyses such as the syntactic orphan analysis by Rotenberg (1974) and Safir (1986) and a hypothesis of syntactic attachment with crossing syntactic lines by McCawley (1982), recently adopted by Schlenker (2015).

4. Modern prosodic suggestions such as Kan (2009) and Selkirk (2011, 2009) build on Downing's suggestion in a fairly direct manner: the syntactic constituents giving rise to obligatory IP boundaries (Downing's root sentences) are here characterized as illocutionary clauses.

Downing's suggestion is rendered in (1), where (1a) (cf. Downing 1970: 30) is a syntactic definition and the principle of the syntax-phonology mapping in (1b) (cf. Downing 1970: 31) builds on it.

(1) a. *Root sentences*:
A clause is a root sentence if it is not the case that it is embedded in a higher clause with a predicate of its own.

b. *Obligatory boundary insertion convention* (OBI):
Phonological phrase boundaries "$" (today's IP boundaries) are inserted at the left and right edge of every root sentence.

For example, Downing makes the standard assumption that subject clauses and object clauses are parts of a higher matrix clause with a predicate of its own. They are therefore not root sentences and do not trigger obligatory pauses (p. 26).

On the other hand, consider an example with coordinated sentences from Downing (1970: 27), to which we have added some modern CP nodes for the purpose of discussion in Figure 1.

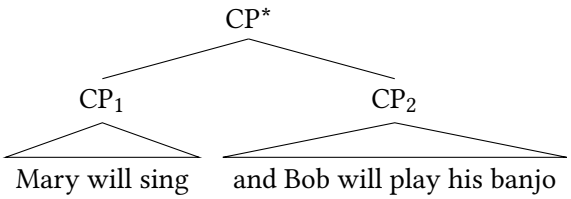

Figure 1: Coordinated root sentences. The example is from Downing (1970), the CP nodes are from us.

The way Downing looked at it is still relevant today: The two sentences (here notated CP_1 and CP_2) are dominated only by a higher sentence-node (here notated CP* for ease of reference) that does not have a predicate of its own. Both CP_1 and CP_2 are therefore root sentences as defined in (1a). Therefore (1b) inserts a phrase boundary between them (today: an IP boundary). The phrase boundary gives rise to the perceptual division that Downing calls "pause" and notates "/", so that (2) is obtained, the empirically correct result according to Downing.

(2) Mary will sing / and Bob will play his banjo.

Importantly, Downing envisaged a similar syntax for expressions where this is not as obvious, at a more abstract level of representation. For example, the non-restrictive relative clauses in (3) are separated by obligatory pauses (pp. 148, 152), while the restrictive relative clauses in (4) may show a pause at its right edge but need not (p. 14). Restrictive relative clauses (RRC), like "you met" in (4), restrict the nominal's denotation: Not all the boys are members of X, but only the boys the person referred to as "you" met. A RRC thus restricts the class of referents of the noun. Non-restrictive relative clauses (NRRC), in turn, provide additional information about the referent without such a restriction (see Stark 2016: 1030, Lehmann 1984: §V.2, Jackendoff 1977 and many others).

(3) a. Ralph, / *who has always been a good student*, / failed the exam.
b. The library, / *which is a large stone and glass building*, / is on the east side of the campus.

(4) The boys *you met* (/) are all members of the same fraternity.

Downing (1970: 145ff.) argued that non-restrictive relatives are represented as in Figure 2 at an abstract level of representation. For him, this was a post-cyclic representation, though one that undergoes further transformations to (5a) and then to (5b) before the surface. We continue to use the modern syntactic label CP for illustrating Downing's ideas.

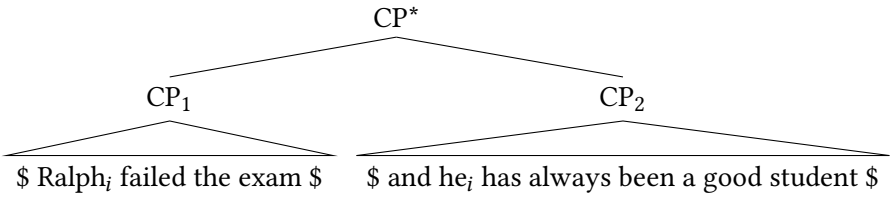

Figure 2: Illustration of the insertion of Downing's (phonological) phrase boundaries "$" at the edges of a root sentence that is later transformed into a non-restrictive relative clause (see (5)). The example is from Downing (1970), the CP nodes are from us.

(5) a. Ralph$_i$, $ and he$_i$ has always been a good student $, failed the exam.
b. Ralph$_i$, $ who$_i$ has always been a good student $, failed the exam.

Here again CP_1 and CP_2 are root sentences according to (1a), since CP* does not have a predicate of its own. Therefore, CP_1 and CP_2 come with markers for phrase boundaries at their edges by (1b). The phrase boundaries are retained when CP_2 is placed within CP_1 as in (5a) and when it is further transformed to (5b).

Downing (1970: 115) also discusses speech-commenting parentheticals as in (6d) and derives obligatory pause for it at both its edges as shown in (6). The derivation starts with a single root sentence (6a), which is then divided into two root sentences (6b). Based on this, phrase boundaries are established (6c). After that, a transformation to (6d) applies, placing one root sentence within another in parallel to (5).

(6) a. I believe John has sold his Mustang.
b. [I believe] [John has sold his Mustang] (two root sentences)
c. $[I believe]$ $[John has sold his Mustang]$
d. John, $ I believe $, has sold his Mustang.

Various later accounts have retained the syntactic detachment of the parentheticals from Downing's suggestion, which triggers prosodic detachment. McCawley (1982), for example, suggested untypical attachment at the sentence level, a suggestion also recently argued for by Schlenker (2015). We retain our notation, and we represent this suggestion in Figure 3. The hierarchical relations are parallel to Downing's structure as in Figure 2. With crossing lines assumed, the detached element (here CP_2) occurs in its surface position.

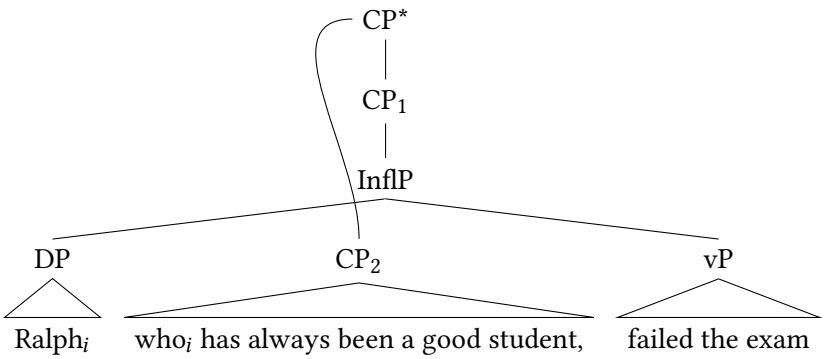

Figure 3: Untypical attachment of CP_2 at the sentence level following McCawley (1982) and Schlenker (2015)

Yet another suggestion is the syntactic orphan analysis of Rotenberg (1974), which was also argued for with appositive relatives by Safir (1986). In this analysis, the elements under discussion do not have a syntactic mother-node at all and are orphans in that sense. In the example used here, CP_2 then does not have a syntactic mother, as in Figure 4.

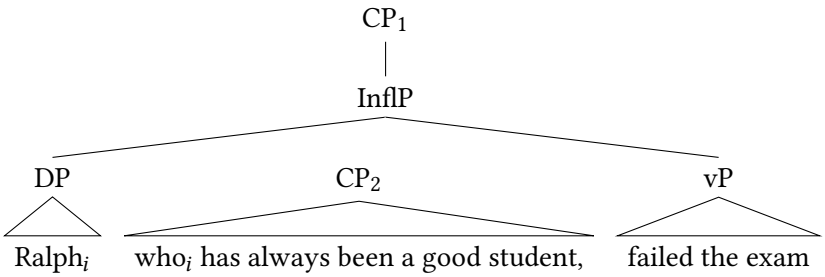

Figure 4: Orphan analysis of CP_2 following Rotenberg (1974) and Safir (1986)

We mention two further implementations of these special elements in different terms. Potts (2005) suggested that certain constituents in this class, his *supplements*[3], have standard syntactic attachment (without orphanage or crossing lines) and are marked by special features; these features trigger separate semantic interpretation at LF and separate prosodic interpretation at PF. Another suggestion was developed by de Vries (2006, 2012). According to him, there is a special separate merge-operation that merges these special elements in standard configurations but with special detachment consequences.

The analysis of Downing (1970) also has interesting consequences for further phenomena that do not necessarily include sentential material such as dislocations. While he doubts the grammaticality of right-dislocations in English and rather re-interprets them as "amplificatory parentheses" (*afterthoughts* in modern terms), which are added only in the performance of a sentence (Downing 1970: 141), he provides a detailed analysis of English left-dislocations (which he also labels *theme topicalization*) as in his examples in (7), cf. Downing (1970: 41ff.).

(7) a. John, / he never does anything right.
b. Me and Albert, / what would you do without us?

As shown in these examples, Downing (1970) diagnosed an obligatory prosodic boundary (obligatory pause) between the left-dislocated constituent and the main clause. He derived this from a syntactic analysis in which the left-dislocated constituent adjoins to the root sentence, and is outside of the root sentence in the relevant respect. The root sentence is delimited by prosodic phrase boundaries due to the OBI, so that the left-dislocated constituent is separated from the root sentence by an obligatory phrase boundary.

By contrast, a fronted focused constituent as in (8a) is phrased with the following clausal material, according to Downing. Downing (1970: 47f.) accounted for this by taking sentences such as (8a) to be derived from a corresponding cleft sentence (as in (8b)).

(8) (What do you like to eat?)
a. Fried zucchinis I like to eat.
b. It is fried zucchinis that I like to eat.

[3]Potts (2005) subsumes under the notion of supplements what we have called parentheses in the narrow sense (= speech-commenting parentheticals) and also appositive relative clauses (=NRRC).

In the cleft sentence, the clause "that I like to eat" is not a root sentence, and thus not delimited by obligatory prosodic boundaries.

In this analysis, other fronted theme elements (elements not part of the focus) cannot be derived from a cleft sentence and so must be left-adjoined to the root sentence. The OBI predicts that they are also separated by an obligatory prosodic boundary. Downing accepts and endorses that consequence. An example from him with a fronted theme argument (without pronominal resumption) is shown in (9a), an example with a fronted adverbial in (9b), cf. Downing (1970: 44, 50).

(9) a. That book, / I never managed to finish.
b. In the afternoon, / everyone went swimming.

In later studies, dislocations (and other elements) are labeled "extra-sentential elements" (e.g. Huddleston & Pullum 2002, Astruc-Aguilera 2005, Astruc-Aguilera & Nolan 2007) and this notion nicely reflects the idea by Downing: Because the elements are realized sentence-externally, i.e. outside the root sentence, an obligatory prosodic boundary exists between them and the root sentence (triggered by the root sentence).

2.2 Illocutionary acts

Potts (2005) initially attributed a speaker-oriented interpretation to his supplements, which was later refined in Harris & Potts (2009). Selkirk (2011, 2009) and Kan (2009) then developed the idea that what is special about root sentences is that they carry a relation to illocutionary force. Kan (2009), in a study on Turkish intonation, analyzes them as a special illocutionary ForceP and suggests that this ForceP is identified with an IP by (10) (Kan 2009: 145).

(10) During Spell-out, a $\text{Force}_{\text{Illoc}}\text{P}$ is mapped to an IP.

For Kan, the syntactic category $\text{Force}_{\text{Illoc}}\text{P}$ is a syntactic reflex of speaker-intended illocutionary force.

Selkirk (2011, 2009) suggested that the syntactic complement of a Force head is an illocutionary clause and is matched to IP boundaries. She casts this in the format of her more general match constraint format for the syntax-prosody mapping (11) (Selkirk 2009, 2011).

(11) Match(illocutionary clause, IP):
The left and right edges of an illocutionary clause must correspond to the left and right edges of an IP.

We will refer to this constraint as Match-iCP. These suggestions have found some support since then.

Güneş (2015) built on Kan (2009) and Selkirk (2011) and looked at a variety of non-integrated expressions in Turkish, assessing their edges in terms of measurements of final lengthening, pause length and fundamental frequency. Finite clauses infixed into the main assertion (e.g. "please turn to the side", when unrelated to the main clause) and appositive relative clauses introduced by the clause-initial particle "ki" are similar to sequences of unembedded clauses in being separated by IP boundaries. Güneş argued that it is the illocutionary act status that is decisive for IP formation, not their status as finite clauses. For example, vocatives show values comparable to these latter categories with IP boundaries. Building on Hill (2013) and others, vocatives were argued to be separate illocutionary acts. This can form the basis of an understanding of their boundary strength. Conversely, the category of comment clauses (infixed "I swear", "it is unbelievable") include finite verbs but pattern more closely with phonological phrases (= the prosodic level below the IP) at their edges. They may be classified as not constituting separate speech acts. Güneş interpreted her results more generally in the light of the possible correlation between illocutionary acts with IPs (where they are not finite clauses, they are augmented to Force$_{Illoc}$P, in her account), and showed how the results support that correlation.

Truckenbrodt (2015) also supported the correlation between illocutionary acts, or, for him, speech acts, and IPs. He mostly discussed cases at the fringes of Downing's separate root sentences and argued that some of them are neither separate IPs nor separate speech acts. On the other side of this divide, when they are separate speech acts, they also seem to be separate IPs.

Ishihara (2022) concentrated on the role of CPs that are not illocutionary acts. He argued that they do not play a special role in the syntax-phonology mapping. His more general argument that the status of CP or ForceP is not accessible to the syntax-phonology mapping then led him to a revision of Match-iCP (and the OBI, if you will) in terms of speech acts alone, with no reference to CP or ForceP (12) (Ishihara 2022).

(12) Match(speech act, IP) or MatchSA:
A speech act is realized as an IP in the prosodic representation.

Next to the obligatory boundaries inserted by the OBI and its modern versions such as Match-iCP, there are also optional but also somewhat systematic IP boundaries at other syntactic edges. We return to them and to Ishihara's point about regular CPs in connection with restrictive relative clauses below (see Section 4.2).

3 Coordinated clauses

As was seen in Section 2, coordinated unembedded clauses are separate root sentences and are separated by obligatory pauses in Downing's account. The example (2) is repeated here as (13).

(13) Mary will sing / and Bob will play his banjo.

On the other hand, embedded coordinated clauses in complement position are not root sentences by Downing's definition (1b) and are not separated by obligatory pauses introduced by (1a). That can be seen in the following example from Downing (1970: 27).

(14) I hope that Mary will sing (/) and Bob will play his banjo.

The following sections address coordinated root sentences (Section 3.1), coordinated root sentences with multiple layers (Section 3.2) and embedded coordinated clauses (Section 3.3).

3.1 Coordination of root sentences

Kawahara & Shinya (2008) experimentally investigated coordinated clauses in unembedded position in Japanese. They showed F0-raising initially in the clauses and F0-lowering in final position of the clauses, which they plausibly analyzed as correlates of separate IPs for the separate clauses. This analysis is endorsed in Selkirk (2009). The results by Kawahara & Shinya (2008) can be seen as experimental confirmation that separate coordinated clauses constitute separate IPs.

An aspect of the results of Truckenbrodt (2002, 2004, 2007) can be seen in the same way. A phenomenon of intonational upstep occurred with considerable regularity at the right edge of a clause when a coordinated clause follows, but not internal to the clauses. This upstep is analyzed as correlated with an utterance-medial IP boundary.

In the analysis of Selkirk (2011, 2009) and Kan (2009), coordinated declaratives can be analyzed as separate illocutionary clauses with separate IP boundaries, due to Match-iCP.

For German, Truckenbrodt (2015) showed apparent exceptions to the notion that coordinated declaratives are necessarily separate illocutionary clauses and separate IPs. In German, the standard form of a declarative is a V2-clause with the finite verb in second position. It is possible, however, for a sentence adverb

in the initial position of a V2-clause to scope over a coordinated following V2-clause, as in (15). The finite verbs in clause-second positions are italicized to help the reader with the syntactic analysis of this example.

(15) Angeblich *hat* der Mond geschienen und es *ist* kalt gewesen.
allegedly has the moon shone and it is cold been
'It was claimed that the following both hold: the moon shone and it was cold.'

These structures can also be coerced, using focus, into a single IP (marked by ι), as in B's utterance in (16). The evidence that there is only a single IP here is that there is only a single nuclear stress, namely the one on the conjunction, shown by underlining. (In response to an anonymous reviewer's question, we note that there is no causal or temporal relationship between the two propositions in connection with this semantic and prosodic integration.)

(16) A: Did the moon shine? Was it cold?
B: (Angeblich *hat* der Mond geschienen <u>und</u> es *ist* kalt gewesen)ι
'Allegedly, the moon shone and it was cold'

Since this class of cases involves neither a separate illocutionary act nor separation by obligatory IP boundaries, it does not challenge the interface claims that separate illocutionary clauses correlate with obligatory separate IPs. Truckenbrodt (2015) analyzes it in terms of untypical coordination of the second clause with a part of the first clause, as in (17). The two clauses constitute one illocutionary act together, which thus does not strictly require an internal IP boundary. Notice also that there is no right edge of a full CP preceding the conjunction.

(17) [$_{CP}$ Angeblich [[$_{C'}$ *hat* der Mond geschienen] und [$_{CP}$ es *ist* kalt
allegedly has the moon shone and it is cold
gewesen]]].
been
'Allegedly, the moon shone and it was cold.'

German has a set of other phenomena of "asymmetric coordination" in which a second conjunct in the form of a declarative V2-clause shows behavior that is unexpected for a coordinated declarative (Höhle 1990, Reich 2009).

Güneş (2015: 279ff.) addresses related issues in Turkish with a related suggestion in terms of the syntactic label Force$_{SENT}$P.

3.2 Multiple layers of coordinated root sentences

Ladd (1988) compared the intonation of sentences like (18a) with sentences like (18b) in English.

(18) a. Allen is a stronger campaigner, and Ryan has more popular policies, but Warren has a lot more money.
b. Ryan has a lot more money, but Warren is a stronger campaigner, and Allen has more popular policies.

The structures are [AB]C on the one hand, and A[BC] on the other, where A, B, and C are clauses. The respective sisters in [AB]C and in A[BC] are syntactically coordinated at two levels: At a higher level, the bracketed constituent is coordinated with its sister. At a lower level, the two elements inside of the brackets are sisters. Ladd found systematic distinctions in tonal height between the two conditions. He accounted for them using phonological structures for the two conditions that mirror the syntactic structures, i.e. the phonological structures are likewise [AB]C vs. A[BC]. The tonal height phenomena are captured with these structures if a sister configuration of X and Y leads to lowering of the tonal register of Y relative to that of X. In A[BC], this amounts to lowering from A to B (sisters A and [BC]) and lowering from B to C (sisters B and C). In [AB]C, it amounts to lowering from A to B (sisters A and B) but not from B to C. Instead, C is lowered relative to its sister [AB], which amounts to lowering relative to the initial reference height of A.

Ladd's main results were reproduced for German in Truckenbrodt & Féry (2015). The tonal height distinctions were also shown to interact with German upstep in an expected fashion. Match-iCP can provide the isomorphic mapping from CPs to IPs.

The updated discussion of Ladd's account there also shows how Ladd's account bears on recursion in prosody, an issue that has also received attention in other recent work. For details, we refer the interested reader to Wagner (2005), Selkirk (2011), Ito & Mester (2013), Féry (2017), Bennett & Elfner (2019), Feldhausen et al. (2021) and references cited therein.

3.3 Genuinely embedded coordinated clauses

Downing (1970) strengthened the prosodic distinction between unembedded and embedded coordinated clauses with the following example.

(19) Bill believed his father was older than his mother / and his mother was older than his father.

Downing's point is as follows. With a pause in the position of "/", it has a reading in which Bill has a wrong belief, but not a contradictory one. In this reading, the clausal structure is as in (20a). Here the final clause Y is a root sentence and requires the pause to its left. Importantly, when the sentence is read with the pause omitted, the only reading left is one in which Bill has contradictory beliefs. Here the structure is as in (20b). The final clause is part of an embedded coordination. It is not a root sentence and therefore does not require an obligatory pause to its left.

(20) a. [Bill believed X] & Y
b. Bill believed [X & Y]

Downing's account correctly predicts that the omission of the pause leaves only the reading involving contradictory beliefs, since only this reading has a possible phrasing without the internal pause. The structure and reading in (20a) require an obligatory pause to the left of Y.

4 Relative clauses

This section is dedicated to relative clauses (RCs). As was seen, Downing (1970) predicts that non-restrictive relative clauses (NRRC) are root sentences and are thus separated by an obligatory pause. He does not exclude that pauses may exist where his account does not insert them, such as at the edges of restrictive relative clauses (RRCs). However, it is expected that they are not obligatory in the same way. In this area of pauses that are less strict, we already saw the tendency for pauses at the boundaries of embedded clauses. In this section, we turn to studies that further bear on the stricter boundaries of NRRCs and on factors that encourage boundaries at the edges of RRCs. In Section 4.1, we address studies dealing with the prosodic realization of the edges of these two types of RCs, and in Section 4.2, we take a closer look at prosodic boundaries at the edges of RRCs. In Section 4.3, we turn to some relevant factors from studies on the interplay between prosodic edges and parsing preferences. Finally, in Section 4.4, we briefly address another prosodic effect in RCs: syntactic movement for relative-clause formation interacts with stress-assignment.

4.1 The prosodic edges of relative clauses: informal and experimental findings

Traditional descriptions converge with the expectations of the account of Downing (1970) in the following respects: non-restrictive relative clauses create a

prosodic unit of their own and their edges are crucially marked by pauses, while restrictive relative clauses create a prosodic unit together with the preceding material and are not accompanied by pauses (see, e.g., Smith 1964: 38, Carlson 1977 for English; Lehmann 1984: 263 for German; Bello & Cuervo 1970: 128, Hadlich 1971: 136, Franch & Blecua 1975: 1024, D'Introno 1979: 214 for Spanish). In the prosodic literature, these distinctions are analyzed at the level of the IP (e.g. Nespor & Vogel 1982, 1986/2007: 88, Selkirk 1984, Vigário 2003, Kan 2009, Hualde et al. 2020: 265, Güneş 2015).[4]

Garro & Parker (1982) phonetically investigated restrictive and non-restrictive relative clauses in English, and Garro & Parker (1983) reported results of a related experimental study in Spanish (from the *Río de la Plata* region). They compared RRCs and NRRCs for the length of pauses at the left and right edge of the RCs, as well as the length of the vowel preceding these edges, i.e. in a position where final lengthening can be expected if the edge of a RC coincides with a prosodic boundary. In both languages, and at both edges, NRRCs showed greater pause length and greater length of the preceding vowel than in RRCs. Their results support the original description of Downing (1970) or the analysis in terms of illocutionary-act related clauses by Selkirk (2005, 2009) and Kan (2009): NRRCs show stronger boundaries at both their left and right edges than restrictive relative clauses. To the extent that CPs that are not illocutionary acts also trigger prosodic boundaries in RRCs, they do so in this data in a way that does not neutralize this effect.

We would like to mention that the study on Spanish is based on productions of two speakers, and that in our reading of their paper, one of the cues for triggering the distinction between RRCs vs. NRRCs was the presence of orthographic commas on both sides of NRRCs vs. the absence of commas with RRCs. It is conceivable that the orthographic representation, in addition to the mental syntactic representation, played a role in triggering these prosodic effects (see Potts 2005 and Selkirk 2009: fn.13 for "comma intonation"; see Feldhausen 2016a: 300 for further comments on test items and punctuation marks).

Closely related to the last point, Poschmann & Wagner (2016) investigated differences in phonetic realization and acceptability between RRCs and NRRCs in German. They considered subject relative clauses in unextraposed position and in extraposed sentence-final position, and their stimuli were assessed under subject focus, object focus and sentence focus. Of particular interest here is that non-extraposed NRRCs were preceded by stronger prosodic boundary cues than

[4]For general references and discussion of the syntax of RCs, we refer the reader to Alexiadou & Meinunger (2026).

non-extraposed RRCs. Effects of both length and pauses preceding the RCs were significant – however, with a maximum occurrence of 25% in NRRCs pauses were not obligatory (Poschmann & Wagner 2016: 1048f.). These results cannot be attributed to the orthographic effects of comma placement. For one thing, the German comma rules require commas surrounding both RRCs and NRRCs. For another, Poschmann and Wagner forced the respective readings by choices of lexical items in the stimuli that are syntactically only compatible with either a RRC reading or a NRRC reading.

In her detailed study on prosody and sentence disambiguation in European Portuguese, Vigário (2003) concentrated on different types of structural ambiguity and investigated in which way prosody helps to disambiguate the possible structures. She conducted a production study with three speakers. Among other things her materials included (a) relative clauses, which are ambiguous with respect to their restrictive / non-restrictive meaning, and (b) non-restrictive relative clauses, whose possible antecedent can be local or non-local.

As for (a), Vigário (2003) shows that NRRCs are always produced as independent IPs. Thus, a sentence like (21) (adapted from Vigário 2003: 267) consists of three IPs (marked by ι) that are separated by "(acoustic or at least perceived) pauses" and by high boundary tones (H%), as long as they are in a sentence-internal position (Vigário 2003: 266). Her formulation "perceived pause" indicates that an acoustic and thus measurable pause is not obligatory[5].

(21) Prosodic Phrasing of NRRC in European Portuguese (EP)

		H			L*H	H%				HL*	H%		H	
		|			|	|				|	|	|	
(A	amiga	da		Joana)ι		(que	vive	em	Coimbra)ι		(ofereceu		rosas	
the	friend	of.the		Joana		who	lives	in	Coimbra		gave		roses	
			HL*	L%										
			|	|									
ao	namorado)ι													
to.the	boyfriend													

'Joana's friend that lives in Coimbra has given roses to her boyfriend.'

(22) Prosodic phrasing of RRC in EP
((A amiga da Joana)ι (que vive em Coimbra)ι)ι^{max} (ofereceu rosas ao namorado)ι

[5]The tonal annotations are couched in the AM theory (Pierrehumbert 1980, Ladd 2008, Arvaniti 2022). For a recent overview of the transcription of Portugese prosody, see Frota et al. (2015).

RRCs show a mixed picture: While the right edge of an RRC is always separated by an IP boundary accompanied by "a pause (often acoustic silence)", the left edge of the RRC is never realized with a pause and the boundary tone seems to be optional (Vigário 2003: 267). Due to this mixed picture, Vigário concludes that RRCs are part of a compound IP, illustrated by ι^{max} in (22) (Vigário 2003: 276f.), where the RC and its preceding material are grouped together in a higher IP – indicating that they have a stronger connection than the same constituents in NRRCs – and that each constituent is also an IP of its own, allowing for the attested phenomena at the left edge of the RRC (see Ladd 1992, 2008: 297 for compound prosodic domains). According to Vigário (2003), the advantage of this assumption lies in the following facts: (i) the last word before the RC is obligatorily accented – which is typical for heads of IPs in EP (inversely, units that are not heads are often not accented in EP); (ii) the uncertainty of the boundary tone before the RC can be explained.

As mentioned in Section 2.2, Güneş (2015) includes Turkish appositive relative *ki*-clauses in her study of prosodic boundaries. They showed values for final lengthening preceding the left and right edge of the relative clause as well as pause frequency at both edges and pause length at the right edge that was clearly more similar to the comparison case of IPs than to the comparison cases of the smaller phonological phrase.

Van Heuven & Kaland (2017) conduct a perception study on the prosody of RCs in Dutch and German to investigate "which prosodic patterns are (i) preferred, (ii) allowed and (iii) illegal as markers of" NRRCs and RRCs (p. 159). For each language they had 20 native hearers who listened to a prosodically modified set of RCs. The results show some differences between the two languages. For Dutch listeners NRRCs are more acceptable with prosodic breaks at both edges, while RRCs are more acceptable when the left boundary is not marked by a pre-boundary lengthening and a pause – independent of the occurrence of a high boundary tone (p. 167). The authors conclude that temporal marking of a boundary is the primary cue for prosodic cohesiveness. In German, the results did not show a clear picture and thus indicate – according to the authors – that there is no systematic difference between NRRCs and RRCs (p. 167). In another perception study on German RCs, however, Schubö et al. (2015) found evidence that the two types of RCs can be distinguished by native listeners. Also, Poschmann & Wagner (2016) found clear differences between the two types of RCs in German (see above). Despite the mixed findings on German, the perception experiments seem to also indicate that NRRCs need to mark both edges, while RRCs need only a marked right edge.

In summary, recurring patterns in the more detailed studies on relative clauses are: (a) confirmation for the asymmetry between stricter boundaries at the edges of NRRCs than at the edges of RRCs; (b) in RRCs, a greater affinity to such a boundary at the right than the left edge; and (c) variation and open issues regarding the prosody of the left edge of RRCs. The results also support the decision of the literature after Downing (1970) to transpose his "obligatory pause" to "obligatory IP boundary" rather than to "obligatory acoustic pause". There are regularly cues for IP boundaries at the edges of NRRCs, but an actual acoustic pause is only an optional accompaniment of such boundaries. These boundaries can be derived by the OBI, construed in terms of IP boundaries, or in terms of Match-iCP. In our overview, a variety of language-specific observations were made, which we hope will be pursued and refined in the future.

4.2 The boundaries at the edges of restrictive relative clauses

While Match-iCP inserts the boundaries at the edges of non-restrictive relative clauses, it does not insert any IP boundaries at the edges of restrictive relative clauses. We report two suggestions about what might motivate these additional boundaries.

Truckenbrodt (2005) had included subject clauses, object clauses and restrictive relative clauses in a small study of IP boundaries in German. The study was based on recordings of designed sentences by a single speaker. He found regular IP boundaries at the right edges of all these embedded clauses, even where their right edges do not coincide with the edges of root sentences. His tentative suggestion was that the grammar also contains a constraint that aligns all clauses, not just root sentences, with IP boundaries. Selkirk (2009) similarly argued for such a constraint with an analysis of wh-questions in Fukuoka Japanese. Feldhausen (2011) also argued for a constraint aligning all clauses with prosodic constituents. He conducted a study on Catalan SVO structures with both DP objects and sentential objects (the latter being either short (1 prosodic word) or long (3 prosodic words)). His results showed that short and long object clauses are typically separated by an IP boundary from the preceding SV part in contrast to DP objects. A constraint in that spirit, then, would also be able to insert IP boundaries at the edges of restrictive relative clauses in other languages. Selkirk (2011) suggested that the grammar includes two constraints building IP boundaries relative to syntactic constituents. Match-CP for the regular clauses and Match-iCP for the illocutionary clauses.

On the other hand, Ishihara (2022) argues that the grammar does not make reference specifically to CP. Instead of a constraint matching illocutionary clauses,

he suggests the constraint in (12), Match (speech act, ι), or MatchSA for short, which matches speech acts to IPs. He also argues against the grammar containing a constraint like Match-CP. In this context, he offers alternative analyses for some of the cases mentioned above. For Fukuoka Japanese, he argues that the relevant phenomenon is not bounded by clauses but by the scope of the wh-phrases. For German, he points out that the data could also be captured in terms of a constraint that aligns long syntactic constituents with IP boundaries. This could then also be the source of the IP boundaries at the right edge of restrictive relative clauses in other languages. In the examples used there, as in Truckenbrodt's (2005) data, the right edge of such an embedded clause is normally the only internal right edge of a longer embedded constituent. However, the alternative analysis in terms of length does not carry over to the Catalan data of Feldhausen (2011), who shows that clausal status affects the prosody regardless of length. While the Catalan data is thus a considerable problem for a length-based approach, Ishihara (2022) discusses a further possibility to account for IP boundaries without referring to Match-CP: *stylistic promotion* (in the sense of Selkirk 2005), which refers to a prosodic promotion of phonological phrases to IPs. However, the weak point of stylistic promotion is the fact that this approach is arbitrary. It does not offer a principled explanation, instead, it rather collects cases that cannot be explained otherwise – but the Catalan pattern is not arbitrary.

4.3 Prosodic edges and parsing preferences with relative clauses

While research on boundary differences between RRC and NRRCs seems to be relatively rare, there are many studies dealing with attachment ambiguities in relative clauses (see Alexiadou & Meinunger 2026, for detailed information). These also relate to the prosody of the left edge of RRCs. The relevant structure of attachment ambiguities is given in (23). The question, informally put, is whether the relative clause modifies the first or the second noun, as shown by coindexing.

(23) a. $[_{DP_1}$ the servant$_1$ of $[_{DP_2}$ the actress$_2$ who$_2$ was on the balcony]]
b. $[_{DP_1}$ the servant$_1$ of $[_{DP_2}$ the actress$_2$] who$_1$ was on the balcony]

Languages differ in their attachment preferences. Non-local or high attachment preferences as in (23b) are attested for Spanish (Cuetos & Mitchell 1988, Carreiras & Clifton 1993, 1999, Carreiras et al. 2004, Bergmann et al. 2008, Acuña-Fariña et al. 2009, de la Cruz-Pavía & Elordieta 2015), European Portuguese (Vigário 2003 [NRRC], Soares et al. 2010), Galician (Fraga et al. 2005), French

(Zagar et al. 1997, Fodor 2002), and German (Konieczny 2000, Hemforth et al. 2015). Local or low attachment preferences as in (23a) are attested for Italian (de Vincenzi & Job 1993), Basque (Gutierrez et al. 2004), English (Cuetos & Mitchell 1988, Fodor 2002), Swedish and Norwegian (Ehrlich et al. 1999, Fodor 2002), and Brazilian Portuguese (Miyamoto 1998, 1999; but see Miyamoto & Finger 2003, who argue that BP shows high attachment). The relevant point of this research for the present discussion is the fact that prosody is used for disambiguating the structure (Fodor 2002, Vigário 2003): The default phrasing pattern of languages with high attachment preferences is the one given in (24), in which a prosodic break (indicated by //) occurs immediately before the RC (Maynell 1999, Lovrić et al. 2000, 2001, Fodor 2002, de la Cruz-Pavía & Elordieta 2015).

(24) N_1 N_2 // RC

For example, de la Cruz-Pavía & Elordieta (2015) argue for (24) based on a production study with native speakers of Spanish spoken in the Basque country. Their results show four possible phrasing patterns (1: a single boundary after N_2 (= (24)); 2: a single boundary after N_1; 3: two boundaries (one after each noun); and 4: no sentence-internal boundaries), but (24) is the most common one.

They have furthermore shown that the length of the RRC also plays a role for phrasing. The longer the RC, the more probable a boundary between NP_2 and RC (p. 196). Fodor (2002), in the same vein, discusses the finding that short RRCs show a greater tendency to local attachment, concluding that the prosodic breaks are interpreted as a mark of non-local attachment (Fodor 2002: 3).

Thus, the research on attachment ambiguities also adds information about prosodic boundaries in places where they are not generally obligatory by Downing's initial classification, such as at the edges of restrictive relative clauses.

While most studies on ambiguities deal with RRCs, Vigário (2003) considers NRRCs (in EP). She concludes that "although the prosodic break is independently triggered by the syntax-prosody algorithms it seems to be reused for resolving the attachment ambiguity" (p. 271) – which is in line with Fodor (2002). That reuse of the IP-boundary (marked by ι) does not occur, though, when the lower constituent is semantically the only possible antecedent as in (25), taken from Vigário (2003: 272). Here, the non-local preference is blocked, because *carro* 'car' is not a possible antecedent.

(25) (O carro da Joana)ι (que vive em Coimbra)ι (foi essencial para ela poder trabalhar em Portimão)ι

'The car of Joana, who lives in Coimbra, was crucial for her to be able to work in Portimão'

In summary, the prosodic marking of the left edge of a relative clause interacts with parsing preferences. A boundary preceding a RRC seems to have an affinity to high attachment in case of attachment ambiguities and in case the relative clause is long.

4.4 Interaction of stress-assignment and movement in relative clauses

In this section, we review an interaction of syntactic wh-movement with the prosodic structure that also occurs in relative clauses. While it is unrelated to the OBI and Match-iCP, it is an interesting quirk in connection with the prosody of relative clauses. Further, a more general suggestion we offer in Section 5.2 will be based on these interactions.

Like wh-questions, relative clauses show interaction of stress-assignment with syntactic movement as described by Bresnan (1971). This is illustrated in (26) with examples from Bresnan (1971). (26a) illustrates the stress-pattern of English clauses when narrow focus does not retract the stress: Stress is assigned rightmost in the sentence, i.e. rightmost in the IP. (26b) is one of a class of systematic exceptions: Where movement has taken place from rightmost position, the sentence stress is in certain cases instead on an earlier element – broadly speaking, an earlier element that is syntactically connected to the sentence-final position. In (26b) this is the head noun of the relative clause, with the trace of relativization in final position.

(26) a. Mary liked the proposal that George leave.
b. Mary liked the proposal$_i$ that George left t_i.

Bresnan saw these effects as evidence for stress-assignment on a syntactic cycle, where rightmost stress is correctly assigned by the Nuclear Stress Rule (Chomsky & Halle 1968) on the lowest cycle (”that George left the proposal”). Truckenbrodt (2019) argues that they are instead evidence for multi-dominance structures, which can naturally be derived by Chomsky’s internal merge (Chomsky 2000, 2001, 2008. In (27), a multiply linked representation of ”(the) proposal” is indicated by means of stricken-through copies. The structure satisfies the stress-requirements because of the link to the object position in the embedded clause, and the stress surfaces in the position in which the NP ”proposal” is spelled out.

(27) Mary liked the proposal$_i$ [~~the proposal~~$_i$ that George left ~~the proposal~~$_i$].

See Truckenbrodt (2019) and Büring & Truckenbrodt (2021) for arguments for this analysis. The effect is generally found for movement to Spec,CP and

movement to C in German, though not for English *tough*-movement (Richards 2017) and not for German scrambling (Truckenbrodt 2019). The cases of stress-movement interaction studied by Zubizarreta (1998), where stress is not "taken along", are in a natural class with the latter phenomena.

In summary, relative clauses may show prosodic effects of relativization over and above the boundary-effects addressed by Downing (1970). These relate to the interaction of stress-assignment with syntactic movement.

5 Parentheticals

In this section, we take a closer look at parentheticals and go beyond our theoretical questions based on Downing (1970) and speech acts. In Section 2.1, we have already shown how Downing deals with speech-commenting parenthesis (6) and non-restrictive relative clauses (5) (which are often considered to be parentheticals). Thus, from a general point of view, Downing's (1970) approach is able to account for parentheticals. As we will see here, there is much more to say on that issue. We therefore broaden our considerations and integrate generative issues as well as findings from various empirical studies that go beyond our previous theoretical base.

In Section 5.1, we first clarify the notion of parentheticals (in both the wide an narrow senses). In Section 5.2, we discuss the class 0 elements of Bing (1979, 1985) and the need for further theory in a generative analysis of parentheticals. In Section 5.3, we review a rich literature with empirical approaches to parentheticals. Section 5.4 concludes the section on parentheticals.

5.1 Introduction: the notion of parentheticals

As we already mentioned, the class of elements triggering obligatory pauses at their edges according to Downing (1970) overlaps with the class of parentheticals, such as the parenthetical "I believe" in the example "John, I believe, has sold his Mustang".

According to Burton-Roberts (2006), a "parenthetical (P) is an expression of which it can be argued that, while in some sense 'hosted' by another expression (H), P makes no contribution to the structure of H." (p. 179). In this wide sense, parentheticals also include non-restrictive relatives, and a parenthetical might be as syntactically disjoint from its host clause as one of two coordinated declaratives is from the other. Burton-Roberts (2006: 180) also states that these parentheticals (in the wider sense) "are marked off from their hosts by some form of punctuation in writing and special intonational contour in speech". He gives an example

for a P (p. 180) that is neither syntactically nor discursively integrated in H, see (28). Despite this non-contribution to H, P's position within the host clause is "quite severely constrained" (Burton-Roberts 2006: 180).

(28) The main point – *why not have a seat?* – is outlined in the middle paragraph.

In line with this definition, parentheticals have also been labelled extra-sentential elements (e.g. Huddleston & Pullum 2002, Astruc-Aguilera 2005, Astruc-Aguilera & Nolan 2007) and their extra-sentential nature is typically taken to correspond to some amount of prosodic separation (see also Pierrehumbert 1980, Nespor & Vogel 1986/2007: 188, Nespor 1993).

In many cases, the extra-sentential elements are not quite as dramatically unrelated as in (28). Dehé (2014) investigates six selected types of parentheticals in British English. They are presented in (29) in italics in sentences excerpted from the International Corpus of English.[6]

(29) a. Full parenthetical clauses, e.g.
So what we can do in fact *I'll just turn it off* is to use that signal to train people's ability to perceive voicing distinctions in speech and their ability to actually produce them

b. Non-restrictive relative clauses
But what has amazed me about a lot of Elgar's music is that since then I don't think uh a great deal of his music's played in Germany uh *which I think is a great pity*

c. Nominal appositions
Captain Richard Sharp *editor of Jane's Fighting Ships* is on the line

d. Comment clauses
Well they dropped cards in *I suppose* the doors

e. Reporting verbs
My learned friend relied on a number of facts of establishing *he says* beyond doubt that this vessel had been used to import prohibited drugs

f. Question tags
We had a big chat about this before *didn't we*

[6](29a) ICE-GB: s2a-056 #87 (Dehé 2014: 45); (29b) ICE-GB: s1b-032 #50 (Dehé 2014: 48); (29c) ICE-GB: s2b-012 #36 (Dehé 2014: 56); (29d) ICE-GB: s1a-020 #177 (Dehé 2014: 65); (29e) ICE-GB: s2a-068 #072 (Dehé 2014: 74); (29f) ICE-GB: s1a-006 #172 (Dehé 2014: 80).

We already discussed the non-restrictive relative clauses (point (b) of Dehé's list) earlier. Before turning to other parentheticals and their phrasing properties, we highlight the special subclass consisting of comment clauses (d) and reporting verbs (e). This subclass has also been called *parentheticals* in a narrow sense. They are short clauses that provide evidence about the source of the speaker's assertion or that attribute the content of their host clause to the speech or to the thoughts of an individual or a group of individuals (see, e.g. Reinhart 1983). Downing (1970) treated them as syntactic root sentences of their own, separated prosodically by obligatory pauses. An example is given in (30). See (6) for the treatment of this case in the account of Downing (1970).

(30) John, *I believe*, has sold his Mustang

5.2 The class 0 elements of Bing (1979, 1985)

The generative analysis in terms of the OBI of Downing (1970) and its modern versions from Kan (2009) and Selkirk (2011) in the form of Match-iCP have given our discussion up to here principled theories to connect to. In a generative account, additional analysis is needed when it comes to the prosody of parentheticals in the narrow sense and various parentheticals in the wider sense. We think that sensible starting points for such additional analysis can be found in Bing (1979, 1985) and we review some relevant elements in this section. We also outline a direction for such analysis to encourage further theorizing in this domain.

In our discussion, we tentatively relate parentheticals in the wide sense to illocutionary clauses as follows: If an element E has a host clause that is an illocutionary clause and if that illocutionary clause does not genuinely syntactically contain E, then E is a parenthetical. That allows that a parenthetical can itself be an illocutionary clause or not.

In standard cases, an English or German IP comes with a nuclear stress or nuclear prominence (the strongest stress or prominence in the IP) and with a nuclear pitch accent (a pitch accent on that nuclear stress) (see Pierrehumbert 1980, Beckman & Pierrehumbert 1986 and later literature). A range of parentheticals, however, seem to lack the nuclear stress and the nuclear pitch accent, as discussed in the following.

Bing (1979, 1985) argued for a distinction of parenthetical elements into class 0 and class 1 expressions. Non-restrictive relative clauses belong to class 1. This is the well-behaved class in which the IP delimiting a parenthetical normally includes the intuitive presence of a nuclear stress and a pitch-accent on it that can be documented in the F0 contour. An example of our own is shown here:

(31) John visited Mary, who lives in Austria.

On the other hand, class 0 elements, when occurring in medial or final position, are allowed to lack pitch accents in nuclear (and other) positions, and intuitively also seem not to have a nuclear stress when they do. Bing takes the allowed lack of pitch-accents to be the defining factor of class 0 elements. Many different kinds of parentheticals belong to class 0, as shown with examples from Bing (1979, 1985) in (32). We added simple underlining for the nuclear stress in the main clause. There is not a second instance of such intuitive nuclear stress on the class 0 parentheticals later in the utterances. (Examples that show that these class 0 expressions are not inherently stressless will be seen below in (38).)

(32) Class 0 elements

a.	Pray be seated, *Miss Faulkner*.	Vocatives
b.	I'd like a box of chocolates, *please*.	Polite expressions
c.	John wouldn't give me his car, *the stupid bastard*	Expletives
d.	She already knows, *apparently*.	Sentence adverbials
e.	You're coming, *aren't you*?	Tag questions
f.	It's not possible, *I suppose*.	Parentheticals in the narrow sense

Bing argues that these parentheticals are nevertheless separate IPs, though in a special way since they are allowed to lack pitch accents.[7] To us, they also seem special in that they seem to lack nuclear stress.

The lack of a nuclear stress was independently observed for German by Reis (1995) for parentheticals in the narrow sense. She cast this issue in terms of the number of focus-background structures in a configuration with two clauses. Dehé (2007) made a related point that will be reviewed in the next section. In her analysis, there is no separate IP for her category of integrated parentheticals, which could be viewed as close to Bing's class 0 elements.

One would like to know what derives the distinction between class 0 and class 1 elements. We are not aware of principled suggestions on this matter. We briefly outline one of our own. We begin by illustrating the analysis with parentheticals in the narrow sense.

A sketch of the classical *slifting* analysis for a relevant class of parentheticals by Ross (1973) is shown in (33a). An implementation of this in the copy-theory of movement (Chomsky 1993) is shown in (33b). A variant of this analysis from

[7] Bing uses the term *prominence tones* instead of *pitch accents*. The latter is mostly used since Pierrehumbert (1980).

Truckenbrodt & Sode (2020) is sketched in (33c–33d). Here (33c) gives the idea of the analysis in terms of a classical operator and (33d) gives the fuller version using copies. The operator is a copy of its antecedent host clause and the trace of the operator is a copy of the operator.

(33) a. I suppose [that it's not possible]. => [it's not possible]$_i$ I suppose e$_i$
b. [it's not possible]$_i$ I suppose [~~that it's not possible~~]$_i$
c. [it's not possible] Op$_i$ I suppose e$_i$
d. [it's not possible] [~~it's not possible~~]$_{Op,i}$ I suppose [~~it's not possible~~]$_i$

Syntactic arguments for these structures are the original island arguments for a movement analysis in Ross (1973) as well as the Condition C effects, which can be argued to support the presence of the rightmost copy at LF (see the discussion of subject-oriented parentheticals in Reinhart (1983) and see Pittner (1995) on German, for the descriptive binding facts that we have in mind).

Our tentative analysis of class 0 elements postulates a parallel of class 0 elements to stress-movement interaction discussed in connection with (27). Since an intervening relative clause operator did not play a blocking role there, we assume that the presence of an operator, as in (33c–33d), would also not play a blocking role in class 0 elements. We ignore the possible operator in the following to keep things simple. In a repesentation like (34), then, the two instances of "it is possible" are related by movement, and thus, by hypothesis, represented by a single underlying instance of this clause that is linked to multiple positions.[8] In the case at hand, the multiply linked element is stressed, which we indicate by underlining in all copies. In a representation like this, the parenthetical clause "I suppose it's not possible" does actually contain a nuclear stress – the one on "possible" – though this stress is spelled out outside of the parenthetical in the overt host clause, due to syntactic movement. The parenthetical clause "I suppose it's not possible" could thus be an IP, as shown, and would, in the abstract, satisfy a requirement that if it constitutes is an IP, it also contains nuclear stress.

(34) [It's not <u>possible</u>] I suppose [~~it's not <u>possible</u>~~]
(ι) (ι)

Looking only at the overt elements, as in (35), of course, this nuclear stress is not inside the parenthetical but in the host clause.

[8] See Kluck (2011) for an analysis of a different case, amalgams, in terms of multidominance. See Griffiths (2015) for an analysis of constituent answers with parentheticals in terms of ellipsis.

(35) It's not possible , I suppose .
(ι) (ι)

Without further ado, we derive a parenthetical that is an IP but lacks nuclear stress. We think this is a very reasonable approach to class 0 elements since its parts are independently motivated. We could then leave open, for the moment, whether the IP of the parenthetical is retained (closer to Bing's analysis) or whether phonological readjustment leads to its reduction (with a result closer to Dehé's analysis).[9]

Bing (1979, 1985) characterizes class 0 elements semantically as relating to the interaction of the speaker and the hearer. Following up on this, we might tentatively say that this class more generally embeds a silent copy of the main clause, embedded in a speech-act related meaning component that includes or integrates the class 0 element. For example, in (36a), the class 0 vocative expression is the hearer of this speech-act related meaning component, and in (36b), the class 0 element "please" can be construed as a short form of such a meaning component that embeds a silent copy of the main clause.

(36) a. ~~S asks Mrs. Faulkner:~~ Pray be seated, ~~S asks~~ Mrs. Faulkner ~~to (pray) be seated~~
b. ~~S asks H politely:~~ I'd like a box of chocolates S asks H politely: ~~I'd like a box of chocolates~~
"please"

According to Bing, class 1 elements do not relate to the speaker or the hearer of the main clause but to its content. We might say that class 1 elements constitute a separate speech-act that does not include a copy of the host clause, see (37).

(37) ~~S tells H:~~ [John visited Mary] [~~S tells H:~~ who lives in Austria]
(ι) (ι)

Since this parenthetical does not include a silent copy of its host clause with silent nuclear stress, it requires overt nuclear stress in the IP of the parenthetical.

Bing (1979, 1985) also observes that while class 0 elements are allowed to lack pitch accents in medial and final position, they will carry pitch accents in initial position. In (38), we indicate this by single underlining, so that there are two nuclear pitch accents.

[9] We think that this approach is promising even though it takes a different stand on the interaction of deletion and deaccenting than does Tancredi (1992), whose perspective would not allow him to integrate the account outlined here. See Truckenbrodt (2013: 139ff.) for discussion of deletion and deaccenting that supports the perspective taken here.

(38) a. Mrs. Faulkner, pray be seated.
b. Apparently, she already knows.

If, in (32a), the two speech-acts are constrained to be identical in meaning, then the overt occurrence of "Mrs. Faulkner" may count as *contextually given* relative to the preceding, covert one. This would be a reason for it to reject stress and a pitch accent (Ladd 1983, Féry & Samek-Lodovici 2006, Büring 2016). This reason would not be present in (38a), assuming that the first occurrence of "Mrs. Faulkner" is spelled out here. In an analysis along these lines, the deletion analysis could account for the lack of a *need* of a pitch-accent on the overt parenthetical elements, but the actual deaccentuation would also be due to a hidden givenness factor that emerges under these circumstances.

We sum up this section. If a generative analysis explores a constant base-line for mapping syntactically unintegrated elements to separate IPs, additional analysis is needed for the class 0 elements of Bing (1979, 1985). They seem not to require a nuclear stress or pitch accents. We outlined a possible direction for such an analysis.

5.3 Acoustic findings on parentheticals

There are a range of experimental studies (not necessarily with a generative orientation) that have detailed acoustic results in the domain of parentheticals. In the following, we review such studies that bear on the amount of separation of the parentheticals. Two questions accompany our investigation:

(39) a. Are parentheticals prosodically separated from the matrix sentence?
b. How are parentheticals realized phonetically?

In her acoustic analysis of spontaneous British English data taken from the British component of the International Corpus of English (ICE_GB, Nelson et al. 2012), Dehé (2007) argues that the edges of syntactic parenthetical constructions do not always coincide with prosodic boundaries. Dehé (2007) makes a distinction between syntactic and prosodic parentheticals. While the former "are linearly represented in the syntactic string of utterance but are not part of its hierarchical structure" (Dehé 2007: 264), the latter have to be "prosodically different from its immediate environment in at least one prosodic parameter" (Dehé 2007: 266). Following these criteria, Dehé proposes a classification of parentheticals into (i) prototypical parentheticals, (ii) integrated parentheticals and (iii) other types.

In the prototypical case, where the parenthetical matches the syntactic and prosodic criteria, its intonation shows standard characteristics of larger intonation domains including the relevant pitch movements and possible separation by pauses, but also faster speech rate. For example, in the analysis of the recording of "C is therefore important *and this is how the argument runs* to do things or to prevent other things (...)" (Dehé 2007: 267), the middle part "and this is how the arguments runs" is a prototypical parenthetical. It forms an intonation domain with standard properties of intonation domains.

On the other hand, an integrated parenthetical is prosodically part of another intonation domain. For instance, in the sentence "The voters *I think* just have an opportunity (...)", the part "I think" is an integrated parenthetical. Dehé shows that the recording provides evidence for two prosodic domains, "The voters, I think" and "just have an opportunity", with separate nuclei on "voters" and on "just", a rise-fall pattern in each domain and a pause separating the domains. The parenthetical "I think" is here prosodically fully integrated with the first part of the host clause. Integrated parentheticals also include pause fillers. It is apparent that prototypical parentheticals resemble the class 1 elements and integrated parentheticals resemble the class 0 elements proposed by Bing (1979, 1985) (see Section 5.2).

Finally, there are cases which cannot be classified as either of the categories described above. In such cases it is difficult to find at least one prosodic parameter separating the parenthetical from its environment (Bolinger 1989); at the same time such syntactic parenthetical constructions are not prosodically fully integrated in the sense described above. For example, Dehé analyzed a recording of "(…) to put the philosophy into practice because *I suppose* uh in in a way what Marx was uh uh having a go at (…)" (Dehé 2007: 278). The parenthetical is "I suppose" but the relevant intonation domain in Dehé's recording seems to be "because I suppose". This intonation domain shows a nuclear fall on the stressed second syllable of "suppose". Having its own nuclear fall sets the parenthetical apart from the class of integrated parentheticals. At the same time, there is no prosodic separation from the preceding word "because" of the host clause, and the intonation domain of the parenthetical seems to include the word "because" in its intonational prehead. The parenthetical thus seems to be at least partly integrated with the host clause in its prosody.

In a more recent study, Dehé (2014) investigated six selected types of parentheticals in British English (see (29) above). Her prosodic analysis is based on 1160 excerpted items and reveals that full parenthetical clauses, non-restrictive relative clauses and to a lesser degree clause nominal appositions are prosodically separated while comment clauses and reporting verbs are prosodically integrated

by default. Variation seems to be, however, an inherent characteristic of parenthetical constructions. But as Dehé (2014) observed, more variation is observed in the comment clauses and reporting verbs than in full parenthetical clauses and nominal appositions. Finally, question tags are more prosodically separate than integrated.

The study by Peters (2006: 1) investigates whether parentheticals obligatorily form an IP and break up the IP of the matrix sentence, as claimed by Selkirk (1980) and Nespor & Vogel (1986). By examining a spontaneous speech corpus of Hamburg German (17 speakers), Peters proposed four types of prosodic integration of parenthesis, as shown in (40). The first type (40a) represents parentheticals which break up the host clause into two IPs creating the IP on its own. Thus, such a sentence is realized with three IPs. The second type (40b) shows a full prosodic integration of the parenthesis with the matrix sentence. The third type (40c) illustrates the insertion of one IP into another. Finally, the fourth type (40d) presents the parenthesis and the following part of the matrix sentence as separate IPs. It is a combination of prosodic parataxis and prosodic parenthesis.

(40) a. Prosodic parataxis {...} {...} {...}
{Paul} {glaub ich} {ist es gewesen}
Paul think I is it been
It was Paul, I think.

b. Prosodic incorporation {... ... ...}
{Paul glaub ich ist es gewesen}

c. Prosodic parenthesis {... {...} ...}
{Paul {glaub ich} ist es gewesen}

d. Mixed type {... {...}{...}
{Paul {it is true} {he is dead}

To identify prosodic integration, Peters (2006) defines the IP as the domain of a single intonational contour considering pauses, discontinuities in speech scaling and varying speech rate as optional cues in defining IP (see also Wichmann 2000; Fagyal 2002a). In order to determine the number of contours in a given sentence the inventory of nuclear contours established for Hamburg German was used (Peters 2004). The study reveals that out of 96 syntactic parentheticals found in the corpus, prosodic parenthesis (40c) was the most frequent type (more than 40% cases) followed by prosodic parataxis (40a) and mixed type (40d) (ca. 25 % each). The prosodic incorporation type (40b) was attested in less than 10 % of the data. Another finding was that shorter parentheticals are more likely to be prosodically incorporated than longer ones. Finally, the study also shows that

the prosodic integration of parentheticals is related to their syntactic integration. First, prosodic parataxis is most frequently found in parentheticals inserted between clauses. Second, prosodic parenthesis and prosodic incorporation are attested in parentheticals inserted within a clause. Finally, the mixed type is most frequently found in parentheticals which are followed by syntactic resumption. To sum up, the phonetic evidence does not support the claim that parentheticals always form IPs on their own, as suggested by Downing (1970), Fortmann (2007), Burton-Roberts (2006), Selkirk (1980) and Nespor & Vogel (1986).

In a similar vein, Gachet & Avanzi (2008) and Avanzi (2012) show that the prosody of parenthetical constructions in French is less prototypical than expected: Even though parentheticals can be separated from the preceding and following material, they can also build a prosodic unit with adjacent material. More concretely, in their corpus study on spoken French, Gachet & Avanzi (2008: 63ff.) identify four possible phrasing options for center-embedded parenthetical clauses, see (41).[10] An example for a parenthetical clause (PC) is given in (42). Here, the PC "je me trompe peut-être", 'I might be wrong', is located inside the clause "Est-ce que ça correspond à D.J. ou D.J.", 'Does it correspond to D.J. or D.J.' extracted from an interview (Gachet & Avanzi 2008: 59). "D.J." stands for "disc jockey" and the speaker wonders whether it has to be pronounced as [didʒe] or [didʒi].

(41) a. [matrix clause] [PC] [matrix clause]
b. [matrix clause PC] [matrix clause]
c. [matrix clause] [PC matrix clause]
d. [matrix clause PC matrix clause]

(42) Est-ce que ça correspond je me trompe peut-être à D.J. ou D.J.
'Does it correspond – I might be wrong – to [didʒe] or [didʒi]'

(43) J'ai eu la chance d'avoir à Besançon parce que j'étais + à Besançon dans l'enseignement + j'ai eu la chance d'avoir des normaliennes (p. 65)
'and I was lucky to be in Besançon - because I was teaching in Besançon - and I was lucky to have students from the École Normale Supérieure'

In the first type (41a), the parenthetical clause is realized as an IP of its own. The PC is characterized by a lower fundamental frequency than the surrounding

[10] Most of the data in Gachet & Avanzi (2008) are based on the corpora *Choix de Textes de Français Parlé* (cote CTFP) (Blanche-Benveniste et al. 2002) and *Corpus de Référence du Français Parlé* (cote CRFP) (Delic et al. 2004).

material and the left and the right edges can optionally be marked by pauses. In the second type (41b), the PC is prosodically not separated from the preceding material by an IP boundary (there might be a boundary of a lower prosodic level though). Gachet & Avanzi attest a further realization option for the second type: The IP boundary (indicated by +) might occur within the PC (indicated by an underscore), as shown in (43). This realization typically occurs in case the PC is very long. In both realization options of the second type, the PC displays an IP boundary at its right edge. Both the first and the second type are typical prosodic realizations of parenthetical clauses in the corpus of French investigated by Gachet & Avanzi (2008). The third and the fourth type ((41c) and (41d), respectively) occur infrequently (if at all) and can thus not be considered as typical realization patterns. The third type is characterized by the absence of an IP boundary at the right edge of the PC. As a consequence, the PC creates one prosodic unit with the following material. In the fourth type neither a left nor a right IP boundary occurs at the edges of the PC.

Schneider (2007) investigated parenthetical constructions focusing on the so-called reduced parenthetical clauses in spontaneous speech of French, Italian and Spanish; see examples in (44) where the parentheticals are underlined (examples and translations from Schneider 2007: 1).

(44) a. Ah ben c'est plus libre maintenant, je crois
'It's freer now I believe'

b. c'était euh je me rappelle/dans les années après-guerre/ [...]
'that was, I remember, in the years after the war'

According to Schneider (2007: 215) syntactically defined parentheses may or may not interrupt the utterance's intonational contour. If they do, they are marked by the sudden change of the utterance's initial contour and a following low and almost flat F0 slightly rising at the end. Their speech rate is higher and they can be separated by pauses. Such characteristics allude to a separate intonation units. If the parentheses do not interrupt the intonational contour of the utterance, which is often, but not always, the case in reduced parenthetical clauses, their prosodic characteristics are different: they neither induce a sudden change of the intonational contour nor pauses. In other words, they do not create separate intonation units.

However, it should be also stated that there are studies which speak in favour of Downing's (1970) claims. For instance, Barros & Frota (2015) demonstrate that in Porto and Évora, varieties of European Portuguese, parentheticals form independent IPs and their intonational contour is similar to the one described for the

Standard European Portuguese (Frota 2000). In particular, it was reported that utterances with inner parentheticals (i.e. appearing host-medially) tend to form 3 IPs and show the following contours: L*(+H) H%, L*(+H) H%, or (H+)L* L%. In total, 16 sentence-internal parentheticals taken from a corpus of spoken speech (SEP, Frota 2000) underwent the analysis. The authors conclude that on the one hand there is no variation in prosodic phrasing, in the sense that parentheticals form the IPs in both varieties, but on the other hand there is variation concerning the effect of constituent length on phrasing and boundary marking strategies.

What the study of Stoltenburg (2003: 20) adds about the location of parentheticals is that most parentheticals, at least in German, are found in the middle field (46% out of 531 parentheses found in corpora of German spontaneous speech), followed by locations at sentence boundaries (12%), and after conjunctions (8%). Furthermore, 4% of the parentheses were found after the right sentence boundary and before the postfield and 4% between pre-prefield and prefield; 12% between the pre-field and the left sentence boundary and 11% after the left sentence boundary or the following pronoun.

In summary, regarding question (39a) we conclude based on empirical cross-linguistic evidence that not all parenthetical constructions are prosodically separated from the matrix sentences. The phonetic evidence does not entirely support the claim that parentheticals form IPs on their own, as suggested by Downing (1970), Fortmann (2007), Burton-Roberts (2006), Selkirk (1980) and Nespor & Vogel (1986), because other types of prosodic integrations were found as well. If viewed from a more narrowly generative standpoint, it remains to be seen how well refinements such as the one sketched in connection with Bing (1979, 1985) above are adequate for capturing the observations reviewed here.

There are also other possibilities including, e.g. prosodic integration, which speakers seem to frequently employ.

Regarding question (39b), parenthetical constructions are found to be usually faster and quieter than the remaining part of the sentence. They are also produced with a lowered F0 and pauses. This is related to the assumption that parentheticals are constructions with inherent conflict: on the one hand they are interpolated into a sentence (often interrupting the linear order of that sentence), but on the other hand they are somehow detached from that sentence. This syntactic independence is often reflected in prosody.

Döring (2010: 44) gives an overview of different cues theoretically assumed or experimentally found in the phonetic realization of parenthetical constructions; see Table 1.

The acoustic cues provided in Table 1 are by no means exhaustive. According to Bolinger (1989: 186), a parenthetical construction is typically characterized

Table 1: Prosodic characteristics of parenthetical constructions (Döring 2010: 44).

Faster tempo	Brandt (1994), Bolinger (1989), Crystal (1969), Jung (1980), Payà (2003), Pittner (1993), Schwyzer (1939)
Varying tempo	Erben (1980), Öhlschläger (1996)
Lowered F0	Bolinger (1989), Crystal (1969), Jung (1980), Payà (2003), Pittner (1993), Reinhart (1983)
Mostly lowered F0	Schwyzer (1939), Wichmann (2001)
Quieter	Bolinger (1989), Crystal (1969), Jung (1980), Payà (2003)
Pauses	Altmann (1981), Bolinger (1989), Dehé & Kavalova (2006), Erben (1980), Grewendorf (1988), Helbig & Buscha (1996), Hoffmann (1998), Lampert (1992), Payà (2003), Pittner (1995), Reinhart (1983), Schindler (1990), Taglicht (1998), Toepel (2001)

by "lower pitch than the matrix sentence, it is set off by pause(s) and it has a rising terminal" (Bolinger 1989: 188). Wichmann (2001: 188) also notices that a parenthesis can be marked by higher pitch. However, it is also possible that the presence of these cues is contingent upon the function, length and position of the parenthetical construction (Wichmann 2001; see also reports of other studies given below).

Several experimental studies also report variation among speakers in the production of parentheticals. For instance, in her study on parenthetical constructions in German, Döring (2010) analysed a corpus of political speeches given in the Bundestag. Her analysis based on 67 participants clearly shows that parentheticals are not only produced faster, quieter, with a lowered F0 and pauses (cf. Table 1). On the contrary, her data point to a substantial interspeaker variation: 1/3 of the data is not produced at a higher rate of speech, but rather at a lower or unchanging rate of speech. Furthermore 1/4 of the data are produced either with higher F0 or do not show any F0 differences. Moreover, 40% of the data (or even 60% depending on the assumptions) are not produced with a lower intensity. Finally, 80% of the parentheticals are produced without pauses. Thus, Döring (2010) shows that the interspeaker variation is an inherent part of the production of the parentheticals as far as speech rate, F0, intensity or pauses are concerned.

Furthermore, in her investigation of sentence medial French parenthetical constructions, Fagyal (2001) studied pitch range defined as the speaker's maximal range of F0 variations (calculated as the highest minus the lowest pitch values). Based on four speakers' production, Fagyal reports that all non-final IP pitch targets are lowered but the degree of lowering is "entirely speaker-dependent" (Fagyal 2001: 159). The interspeaker variation found in the study led Fagyal to conclude that there is no unified strategy in compressing pitch range and lowering H and L pitch targets in the parenthetical IP. In addition, the resetting of the pitch range also varied among speakers. Finally, she also suggests that the issue of modelling pitch range as gradient or categorical phonetic/phonological features might be not of phonological nature but is rather triggered by the pragmatic-phonetic interface, see also Fagyal (2002b) for similar conclusions.

5.4 Conclusions on the prosodic phrasing of parentheticals

We discussed parentheticals from two different angles. Bing (1979, 1985) analyzed class 0 elements as IPs that do not need to have a pitch accent (or, we think, nuclear stress) and there seems to be a not unreasonable way of deriving such structures in a principled fashion. There is, on the other hand, a rich experimental literature in which parentheticals have often been analyzed as smaller prosodic categories than IPs. The prosodic reduction of parentheticals has been found in almost all languages examined so far, including English, German, French, Turkish and Portuguese. The phonetic studies also convincingly show that there is no single cue (e.g. pauses) which would define the prosody of a parenthetical. Instead, a repertoire of various cues is employed by speakers and their choice is subject to considerable variation.

6 Left-dislocated constituents

In this section we would like to take a closer look at left-dislocations, which belong to the class of the so-called extra-sentential elements (ESE, see Astruc-Aguilera & Nolan 2007, and Section 2.1). Left-dislocations, like other ESE, are not necessarily sentential – but they can be. This is one reason why it is worth looking at them in more detail in this chapter. Another reason has to do with the role of ESEs in phonological research: they have been used to define IPs (cf. Pierrehumbert 1980, Nespor & Vogel 1986: 188, Nespor 1993, Astruc-Aguilera & Nolan 2007: 85) – the level with which we are primarily concerned in this chapter. The third reason is based on their specific role in the sentence: they are not part of the root sentence, but they form the entire clause with it, and thus should

be taken into account when considering the intonational pattern of a (complex) sentence at the syntax-prosody interface. Recall that Downing (1970) accounts for the obligatory boundary between the (left-)dislocated element and the following sentence by means of the root status of the latter (see Section 2.1). Our discussion of class 0 and class 1 elements (in the sense of Bing 1979, 1985) or extra-sentential elements (in the sense of Astruc-Aguilera 2005, Astruc-Aguilera & Nolan 2007) has shown that the assumption that these elements constitute an independent intonational unit cannot be fully maintained. Modern approaches, in turn, differ from Downing (1970) in attributing the occurrence of the prosodic boundary to the dislocated element and not to the following root sentence (e.g. Feldhausen 2010, 2016a, Hamlaoui & Szendrői 2017). By doing so, they are able to deal with more complex data, which includes dislocations in embedded sentences and the varying prosodic nature of dislocations. In contrast to Downing (1970) and the modern approaches, Ishihara (2022) has brought a new proposal into play that looks neither at root sentences nor specifically at the dislocated element/topic (see Section 4.2): He proposes that speech acts in general trigger IP boundaries and thus possibly also speech acts consisting of only a topic constituent. Ishihara's (2022) proposal is addressed in more detail towards the end of the section.[11]

Another reason to consider left-dislocations in this chapter is to be found in relatively recent approaches that assume that sentences with dislocations are biclausal, i.e., they consist not of one sentence but of two sentences that are connected to some degree (cf. Ott 2014, 2015). The idea of a complex, biclausal structure for dislocations has received a new boost thanks to Ott's work. However, biclausal approaches for dislocations already existed before the current upswing and can be found, for example, in studies on right-dislocations (cf. Kuno 1978, cited in Whitmann 2000). Recently, Fernández-Sánchez (2017, 2020) proposed a biclausal analysis for right-dislocations in Romance languages.

Let us start with a definition of left-dislocations: According to Alexiadou (2006), left-dislocations are characterized by "the presence of a phrase in the first position of the clause which is connected with that clause through the intermediary of some anaphoric element referred as the resumptive element", as illustrated in (45) for English (resumptive element: "it") and Spanish (resumptive

[11] We do not elaborate on right-dislocation here for reasons of space (nevertheless, here are several references on the prosody of right-dislocations for the interested reader: for Germanic languages see Truckenbrodt 2015, Kalbertodt 2019; for Romance languages see: Fant 1984, Zubizarreta 1998, Astruc-Aguilera 2005, Samek-Lodovici 2006, 2015, Astruc-Aguilera & Nolan 2007, Avanzi 2009, 2012, Feldhausen 2010, Crocco 2013, Feldhausen & Lausecker 2018; for Bantu languages see: Zerbian 2007, Downing 2011, Aborobongui et al. 2014).

element: ”lo”; see, e.g., Casielles-Suárez 2003: 327 for syntactic differences between English left-dislocation and Spanish/Romance clitic left-dislocation). From an information structural point of view, dislocations are typically characterized as expressions of topicalization (see, e.g., Gundel 1988, Lambrecht 1994, 2001, see López 2009a,b for a different view), as shown in (45).

(45) a. I think that **the book**, I read (it) (English)
b. Pienso que **el libro**, lo he leído (Spanish)

As Astruc-Aguilera & Nolan (2007) point out, due to the traditional assumption that these elements are syntactically and prosodically independent, they “have been used as evidence of the effect of syntactic constraints upon phrasing” (p. 85). In general, these elements are typically considered as establishing independent units on the level of the IPs (Downing 1970, Nespor & Vogel 1986: 188, López 2016). The idea that dislocations are independent IPs is formalized by Frascarelli’s (2000) Topic Prosodic Domain or Féry’s (2011) Topic constraint, see (46) (Frascarelli 2000: 63) and (47) (Féry 2011: 1910), which proposed their formulations based on sentence-initial dislocations as shown in (48). The resulting prosodic structure is illustrated in (48) by parenthesis. In contrast to Downing (1970), these formulations concentrate on the information structural component of the dislocated material and not on the status of the following sentence.

(46) Topic Prosodic Domain

A Topic is minimally and exhaustively contained in an Intonational Phrase.

(47) Topic

A topic is entirely contained in a separate ι (=IP).

(48) a. (**The book**)ι (I read)ι (English)
b. (**El libro**)ι (lo he leído)ι (Spanish)

(48) shows that the constraints (46) and (47) work well in case of unembedded sentences. The crucial test case for constraints that require prosodic separation of a topic, however, are dislocations occurring in embedded clauses: Only when there is material both preceding and following the dislocation, as in (45) above, can the question about the correct generalization be answered. Recent experimental research, which was conducted mainly on Romance and Bantu languages, provides several interesting results with respect to the type of prosodic unit, the obligatoriness of the right boundary, and the obligatoriness of the left boundary.

First, the relevant prosodic unit of a *clitic left-dislocation* (CLLD) can be both an intermediate phrase (ip) or an intonation phrase (IP), and the prosodic cues for the prosodic boundary are hardly pauses (in contrast to the standard assumption in the syntactic literature). This is attested for French (Delais-Roussarie et al. 2004, Avanzi 2012, Delais-Roussarie & Feldhausen 2014), Catalan (Feldhausen 2010, Feldhausen & Villalba 2020), Italian (Bocci 2013: 147ff., Feldhausen 2014a), and Spanish (Feldhausen 2016a,b, Feldhausen & Lausecker 2018, Sequeros-Valle 2019). Despite the variable strength of the boundary at the right edge, it is obligatory in these languages. The boundary is typically marked by a rising intonation, only Italian allows for low boundary tones (for an overview see Feldhausen 2016a: 298).

The variability in the strength of the prosodic boundary leads to the question as to why this variation shows up. Delais-Roussarie & Feldhausen (2014) suggest that some sort of prosodic neutralization might occur when the correct interpretation of the sentence does not depend on a clear distinction between different layers of prosodic phrasing (such as ip and IP). The neutralization between ip and IP might show up as long as the boundary is the highest or most important one in the sentence. The question as to why the CLLD boundary is the most essential one in the sentence is captured by Feldhausen's (2016a) *IS-over-Alignment* hypothesis: It says that prosodic boundaries satisfying information structural (IS) demands (like Align-Topic,R in (52) below) play a more important role in the interpretation of the utterance than simple alignment constraints of the syntax–prosody interface such as Align-XP (Feldhausen 2016a: 325). As a consequence, the CLLD boundary is obligatory, while other sentence-internal boundaries might disappear or might be subject to inter-speaker variation. The hypothesis is empirically corroborated by Feldhausen's (2016a) study on the prosodic phrasing of embedded CLLD in Murcia Spanish.

Hamlaoui & Szendrői (2017) suggest another idea for dealing with the variation between ip and IP without elaborating on it: left-dislocations can be promoted to IP by constraints such as StrongStart (Selkirk 2011) or EqualSister (Myrberg 2013). Despite these two ideas, there is no detailed analysis to date that can account for the variation in boundary strengths.

Second, there are also instances where no boundary occurs at the right edge of the dislocated constituent at all. This non-occurrence of a right boundary can either be obligatory (as in the Bantu languages Haya and Northern Sotho, see Zerbian 2007, Patin et al. 2017, and as in Hungarian, see Genzel et al. 2015) or optional (as in *Porteño* Spanish, see Feldhausen 2014b: ch.4.2.2.1, Pešková 2015, and Durban Zulu, see Downing 2011). The optional boundary in *Porteño* Spanish is

attributed to possible restructuring effects in this variety: Short dislocated constituents can prosodically be restructured with following material. This is also known from Italian (Frascarelli 2000) and possibly from French (Avanzi 2012).

(49) Embedded CLLD in Murcia Spanish (Feldhausen 2016a)

a. ( )( )( )
b. [$_{CP1}$ [$_{CP2}$]]
Bárbara supone que **el águila** la vendió su hermano.
B. assume.3SG that the eagle CL sold her brother.
'Barbara assumes that the eagle, her brother sold (it).'

(50) Embedded CLLD in Catalan (Feldhausen 2010: ch.5)

a. ( )( )
b. [$_{CP1}$ [$_{CP2}$]]
La Maria diu que **l'ampolla de vi** la va comprar el Joel.
The M. says that the.bottle of wine CL PAST buy the J.
'Mary says that Joel bought the bottle of wine.'

(51) Embedded CLLD in Tumbuka (Downing 2011: 779)

a. ( )(
b. [$_{CP1}$ [$_{CP2}$
N-khu-kumbuka apo **βa-nyane βa-wémi áaβa**
I-TAM-remember when 2-friend 2-good 2.these
)
]]
n-kha-kumana na-βo pa-kw-áamba.
I-TAM-meet with-2 LOC-INF-begin.
'I remember when I first met these good friends.'

Third, the limited research on CLLDs in embedded clauses shows a mixed picture of phrasing possibilities, which is illustrated by (49), (50), and (51). While the left boundary is obligatory in Murcia Spanish (49) (Feldhausen 2016a), it is optional in Cusco Spanish (Feldhausen & Lausecker 2018), and not realized in most of the cases in Catalan (50) (Feldhausen 2010: 162). Downing (2011), expanding the research question of Feldhausen (2010) to Bantu languages, shows that the left boundary is optional in Chichewa and Tumbuka (51). The embedded left-dislocations are marked by bold letters; the relevant location is the one at the [$_{CP2}$] edge.

Based on Catalan, Feldhausen (2010) proposes the constraint Align-Topic,R (52), which demands the alignment of the right edge of a topic phrase to the right edge of a prosodic phrase (either ip or IP). This constraint guarantees the obligatory right boundary of CLLDs, but does not call for a left boundary (in contrast to Topic Prosodic Domain or Topic, see (46) and (47), respectively). This constraint also has an advantage over Downing's (1970) OBI analysis, since he encounters problems accounting for the obligatory prosodic boundary preceding an embedded CLLD in data such as the one from Murcia Spanish or in sentences with several left-dislocated constituents.

(52) Align-Topic,R (Feldhausen 2010: 174)

Align the right edge of a topic constituent to the right edge of a prosodic phrase.

Align-Topic,R can be reranked in order to account for the attested patterns in several Romance and Bantu languages (see Patin et al. 2017 for an implementation of that idea) and it has been adapted for Hungarian (Surányi et al. 2012) and in a slightly revised version for the Bantu language Bàsàá (Hamlaoui & Szendrői 2017: 23). The constraint Align-CP,L, which calls for the alignment of the left edge of a CP to the left edge of a prosodic phrase (Feldhausen 2010: 113, Feldhausen 2011: 1954), accounts for the cases in which a boundary occurs between the matrix clause and the embedded left-dislocation. A high-ranked Align-CP,L leads to an obligatory boundary preceding the embedded CLLD, whereas a low-ranked Align-CP,L allows for an optional boundary in that position. In order to account for the frequency-dependent patterns, Feldhausen uses Stochastic Optimality Theory (Boersma & Hayes 2001), a variant of the classical Optimality Theory. The combination of Align-Topic,R and Align-CP,L suggests that the boundary directly preceding the embedded left-dislocation is triggered by the sentential nature of the verb's complement rather than by the mere existence of an (embedded) left-dislocation.

In her approach on LDs in Bantu languages, Downing (2011) also refers to the sentential nature of the verb's complement by proposing a constraint which is similar to Align-CP,L (p. 781). However, she does not assume a constraint specific for topics nor a stochastic candidate evaluation. Instead, she proposes two different syntactic positions for the topic constituent, see (53). LDs without a right boundary are located in the sentence-internal position $Topic_2$, while LDs with a right boundary are located in the position $Topic_1$. The position $Topic_1$ is the structural position for embedded topics in Tumbuka, since they phrase with preceding but not with following material.

(53) Topic positions in Downing (2011: 780)

)( )	Prosody
[$_{FP}$ Topic$_1$ [$_{CP}$ [$_{TP}$ Subject [$_{TopP}$ Topic$_2$ [$_{vP}$…]]]]]	Syntax

This analysis seems to work well for Bantu languages, but it encounters problems when dealing with Romance languages. Not only are sentence-internal topic positions reserved for right-dislocations (see, e.g., Cecchetto 1999, López 2009a,b, Villalba 2009, Feldhausen 2010: ch.4; see Ott & de Vries 2014, Ott & Onea 2015 for a different view based on a biclausal analysis), but the proposal can neither account for the pattern found in Murcia Spanish nor for any other languages in which the left-dislocation has a right and a left boundary in embedded clauses. While the right boundary is generated by Downing's version of Align-CP,L, there is no possibility to generate the left boundary, which separates the entire embedded clause (FP in (53)) from the matrix clause.

A recent approach to embedded left-dislocations is proposed in Hamlaoui & Szendrői (2017). They assume a flexible AlignLeft constraint which calls for the alignment of the left edge of an IP with the left edge of the highest projection whose head is overtly filled by the verb or verbal material (Hamlaoui & Szendrői 2017: 5). The left-dislocation is either inside that highest projection (and no boundary occurs after the LD, as in Northern Sotho) or it is outside (and the LD is immediately followed by that boundary, as in Bàsàá). They additionally assume a version of Align-Topic that is fulfilled when a topic is adjacent to a boundary inserted by AlignLeft (Hamlaoui & Szendrői 2017: 23). As in Downing, this approach encounters difficulties when the embedded LD is preceded by a boundary (as in Murcia Spanish). Hamlaoui & Szendröi's version of Align-Topic cannot introduce the necessary boundary, because it is already saturated by the boundary introduced by AlignLeft.

In summary, while Downing (1970) analyzed the prosody of left-dislocations in terms of a prosodic demand by the root sentence following the left-dislocated constituent, more recent literature has analyzed it in terms of prosodic requirements stemming from the topic (e.g. Topic Prosodic Domain, Topic or Align-Topic). The difference may be interesting for future research when the speech-act perspective is extended into this domain: Is this boundary related to a speech-act nature of the following sentence, or to a speech-act nature of the left-dislocated topic, or both?

Following ideas by Endriss (2009) and Bianchi & Frascarelli (2010), Ishihara (2022) comments on the idea that (certain types of) topics perform a speech act. If topics express a separate speech act, MatchSA would generate an IP boundary at its edges – regardless of whether dislocations are sentential or not. The

advantage of this analysis is obvious: it is no longer necessary to refer to the syntactic structure of the dislocation or its environment. Moreover, MatchSA provides a broader generalization than a constraint that refers only to topic (such as Topic Prosodic Domain, Topic or Align-Topic). However, several points are open. What evidence is there that dislocations/topics really do constitute speech acts in their own right? Can embedded dislocations also express speech acts? MatchSA generates both a left and a right boundary, but there are several languages in which the left boundary is typically not realized or in which boundaries are optional; how is the empirical issue resolved?[12] How does MatchSA deal with varying nature of the prosodic boundary strength?

While the previous studies more or less explicitly assume that structures with dislocations are monoclausal, there are approaches that argue that the structures consist of two sentences. Ott (2014, 2015), for example, has argued for this at length, giving prosodic reasons for the analysis in addition to syntactic ones. For reasons of space, we briefly present only the core idea of the analysis and then address prosodic aspects.

Ott (2015: 239) assumes that a structure as the Italian one in (54) (taken from Cinque 1983) consists of two separate CPs (55) that are directly adjacent to each other (juxtaposition). Since these CPs are maximally redundant, material is deleted on PF ((56), as typical for ellipsis), yielding the surface pattern. The two separate sentences are connected by endophoric relations (the resumptive element is connected by anaphoric linkage to the dislocation; the ellipsis in CP_1 is connected by a cataphoric link to its postcedent domain in CP_2. (See Ott 2014, 2015 for the question whether the dislocation moves to the edge of CP_1 prior to deletion or not).

(54) Su questo lavoro, non riesco a concentrarmici.
On this work not I.can to concentrate.on-it
'This work, I can't concentrate on it.'

(55) [$_{CP1}$ non riesco a concentrarmi su questo lavoro][$_{CP2}$ non riesco a concentrarmici]

(56) [$_{CP1}$ ~~non riesco a concentrarmi~~ [su questo lavoro]$_i$][$_{CP2}$ non riesco a concentrarmi[ci]$_i$]

[12] Ishihara & Myrberg (2023) deal extensively with this issue, which they call the Asymmetry Problem, and propose an analysis within the framework of Match Theory. They argue "that prosodic asymmetry arises from the directionality of prosodic heads (i.e., right- or leftheadedness) rather than asymmetric syntax–prosody mapping, and that asymmetry can be explained through the interaction of Match constraints with markedness constraints that determine the distribution of prosodic heads" (p. 1).

(57) ( )$_{\iota}$ (
[$_{CP1}$ ~~non riesco a concentrarmi~~ [su questo lavoro]$_i$] [$_{CP2}$ non riesco a
)$_{\iota}$
concentrarmi[ci]$_i$]

Ott (2015: 244–246) assumes that LDs are prosodically separated from the host clause and that this typically occurs at the level of the IP (marked by ι in the example). With Selkirk (2011, 2005) and Downing (1970), he assumes that IPs are the prosodic correlates of root clauses, and since LD (= CP_1) and the host clause (= CP_2) are distinct root clauses in his account, the syntax-prosody mapping is straightforward in his approach, (57). The fact that the prosodic boundary between the LD and the rest of the sentence is not always an IP and sometimes does not even exist (as also described in the previous paragraphs of this subsection) is attributed to prosodic restructuring by him (see Ott 2015: 244, fn. 27).

Ott (2015: 272–280) also applies his approach to embedded LD and always takes as a standard result the prosodic (not the syntactic!) structure in (49). The fact that the languages of the world also show prosodic patterns as in (50) and (51) is mentioned by him (see fn. 57), but pushed aside with a reference to the occurrence of prosodic regrouping. What is desirable now is a detailed elaboration of the syntax-prosody mapping of his approach for it is unclear, for example, whether one can really speak of prosodic restructuring when languages like Haya and Northern Sotho never show a prosodic boundary at the right edge of a LD.

To sum up, we conclude that (clitic) left-dislocations are not minimally and exhaustively contained in an IP. First, the relevant prosodic level can also be lower, namely the intermediate phrase (or the phonological phrase). Second, there are languages that do not show a right boundary at all (like Northern Sotho and Haya). Third, in several languages the embedded CLLD constituent creates a prosodic unit together with the preceding main clause – indicating that the left boundary is not obligatory either (like in Catalan, Peruvian Spanish, Chichewa, and Tumbuka). We further conclude that the combination of Align-Topic,R and Align-CP,L (Feldhausen 2010, 2016a, Patin et al. 2017) accounts for the empirical facts in a more appropriate way than the competing approaches. This approach together with a constraint like StrongStart or EqualSister might account for the correct picture concerning the prosodic category (ip vs. IP) of the dislocated element (as proposed in Selkirk 2011 and Hamlaoui & Szendrői 2017). Ott's (2015) highly interesting syntactic approach still requires a detailed elaboration of the integration of the prosodic features of LD attested across languages.

7 Conclusion

The principled OBI convention by Downing (1970) in which root sentences require obligatory prosodic divisions (that we may take to be intonation phrase boundaries today) at their edges, is still relevant today, and deserves renewed attention in the context of the more recent suggestions of Selkirk (2011, 2009), Kan (2009) and Ishihara (2022) that these root sentences, or something close to them, are syntactic constituents corresponding to speech acts. In that perspective, obligatory intonation phrase boundaries derive from a syntactic distinction that also has consequences at the syntax-semantics interface. The prosodic separation of coordinated clauses, of non-restrictive relative clauses, and a range of other constituents can be traced back to this underlying distinction. Clauses that are not root sentences have also been reported to show an affinity to intonation phrase boundaries, which has been captured in terms of additional constraints. Unlike Downing's boundaries, these can be overridden by prosodic consequences of focus assignment.

Coordinated root sentences thus show obligatory intonation phrase boundaries between them (and apparent exceptions seem to be related to unexpected syntax which exempts them from the relevant constraints). Coordinated genuinely embedded clauses on the other hand, show a weaker and more irregular tendency to showing intonation phrase divisions.

In the domain of relative clauses, non-restrictive relatives show the OBI-demands of obligatory intonation phrase boundaries, while restrictive relatives seem to exhibit only the weaker and optional effects of the affinity of clause-boundaries to intonation phrase edges. Parsing preferences show that a boundary preceding a restrictive relative clause supports an interpretation of high attachment in case of attachment ambiguities and in case the relative clause is long.

For a variety of other syntactically and/or semantically detached elements, here discussed under the label of parentheticals, this analysis on its own is clearly not enough. A rich literature that is independent of the OBI and related claims has developed. From a generative perspective, we think that the division between class 0 and class 1 elements of Bing (1979, 1985) provides useful descriptive elements for structuring this terrain: Class 0 elements are special parentheticals that are allowed to lack pitch accents and/or the nuclear stress when not occurring in initial position. While Bing argued that class 0 elements are nevertheless intonation phrases, other authors have taken a different stand, given the prosodic and intonational incompleteness of the assumed intonation phrases. Whichever approach is correct, it seems that a generative analysis that invokes something

related to the OBI or the modern version Match-iCP needs additional analysis for deriving the special behavior of class 0 elements. We outlined a possible path for such additional analysis.

Phonetic studies have shown a range of details on the prosody of parentheticals. They have also shown that a range of languages exhibit such parentheticals that are not fully regular intonation phrases. Furthermore, a repertoire of different cues is employed by speakers to signal the presence of such a parenthetical construction.

Finally, left-dislocations, which also often show an intonation phrase division, have been looked at from different perspectives: While the OBI analysis related the boundary to the left edge of the sentence following the dislocated constituent, more recent literature has analyzed it in terms of prosodic demands stemming from the left-dislocated topic. The modern approaches allowed for accounting for the complex picture that emerges when considering embedded dislocations. Moreover, we presented ideas on the relationship between dislocations and speech acts, thus closing the circle between this extra-sentential element and the role of speech acts discussed in the paper.

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