

## RESEARCH

# The syntax-phonology mapping of intonational phrases in complex sentences: A flexible approach

Fatima Hamlaoui<sup>1</sup> and Kriszta Szendrői<sup>2</sup><sup>1</sup> ZAS, Schützenstrasse 18, 10117 Berlin, DE<sup>2</sup> University College London, Gower Street, London, WC1 6BT, GBCorresponding author: Fatima Hamlaoui ([hamlaoui@zas.gwz-berlin.de](mailto:hamlaoui@zas.gwz-berlin.de))

In this paper, we extend to complex sentences the proposal that the notion of *clause* in ALIGN/MATCH constraints related to the syntax-prosody mapping of the intonational phrase should be determined in each language (and each construction) by making reference to the highest syntactic phrase whose head is overtly filled by the verb (or verbal material) (Hamlaoui & Szendrői 2015). We propose that while root-clauses have a privileged status from the syntax-to-prosody mapping perspective, all clauses are equal in the prosody-to-syntax mapping. In the spirit of the Minimalist Program (Chomsky 2005), we bring in extragrammatical motivation for the proposed mapping principles from parsing and learnability. This allows us to account for the fact that, whereas in many languages like Bàsàá (Bantu) and Hungarian (Finno-Ugric), only root clauses normally map onto intonational phrases, additional intonational phrase edges can be found under the pressure of high-ranked prosodic, processing or information-structural requirements. This is the case with Hungarian embedded foci and Bàsàá embedded topics where, we argue, embedded  $\iota$  edges are meant to satisfy STRESSFOCUS and ALIGNEDTOPIC, respectively. In languages where embedded clauses seem to map onto their own intonational phrases more generally, such as Japanese or Luganda, further independent constraints should be evoked.

**Keywords:** complex sentences; intonational phrasing; tone; focus movement; topicalization

## 1 Introduction

In a recent paper (Hamlaoui & Szendrői 2015), we engaged with a “central question for [...] any theory of the syntactic-prosodic constituency relation” (Selkirk 2011: 17) how to best characterize the notion of *clause* in ALIGN/MATCH constraints related to the syntax-prosody mapping of the intonational phrase.<sup>1</sup> We proposed that the notion of *clause* should be determined in each construction by making reference to the highest projection of the root clause (see Downing 1970), to which the verbal material (i.e. the verb itself, the inflection, an auxiliary, a question particle) is overtly moved or inserted, together with the material in its specifier (see Szendrői 2001). This gives rise to the following state of affairs. In (1a), a constituent moves to a functional specifier position accompanied by verb movement to the head. By assumption the syntax-prosody mapping principles refer to the highest position of the verb. The whole phrase will, as indicated, map onto an  $\iota$ . The situation is different if the XP is not accompanied by verb movement (or insertion), as in (1b). In this case, the XP will fall outside the core  $\iota$  by the proposed syntax-prosody mapping principles.

(1) a. ( $\iota$  XP V ...  $t_v$   $t_{XP}$ )

<sup>1</sup> For detail on Edge-based and Match Theories, we refer the reader respectively to Selkirk (1986, 1996) and Selkirk (2009, 2011) and discussion in Elfner (2012, 2015) and Ito & Mester (2013). As far as we can tell, nothing in this paper hinges on the difference between the two theories.

b. XP ( $\iota$ ... V ...  $t_{XP}$ )

We showed that the state of affairs in (1a) applies to left-peripheral focus movement in Hungarian, illustrated in (2). The focus fronts to a left-peripheral position, accompanied by verb movement (in bold), and as a result the focus ends up as the leftmost constituent within the core  $\iota$ . This, we show, is the position where main prominence is assigned. As a result, the focus constituent satisfies Reinhart’s (1995, 2006) Stress-Focus correspondence principle, which states that foci must bear main prosodic prominence.

- (2) Péter<sub>i</sub> [<sub>FocP</sub> ( $\iota$  Marit<sub>j</sub> **szerette**<sub>k</sub> meg  $t_k$   $t_i$   $t_j$ .)]  
 Peter Mary-ACC loved PRT  
 ‘It was Mary that Peter started loving.’

We also showed that the state of affairs in (1b) applies to zero-coded passive left-dislocation in Bàsàá (Bantu A43), illustrated in (3). Here, the object is located in a specifier position higher than Spec,TP (an inflectional domain-internal TopP), while the verb (in bold) remains in T. As a result, the object falls outside the core  $\iota$ . We will describe the tonal process that corroborates the prosodic phrasing in (3) in the next section.

- (3) 6-òòngé 6ó-6á-sò<sub>i</sub> [<sub>TP</sub> ( $\iota$  sóyól<sub>j</sub> **à-ñ-téhé**<sub>k</sub>  $t_j$   $t_k$  6ó<sub>i</sub>.)]  
 2-children 2.PRO-2.CONN-all 1.grandfather 1.AGR-PST1-see 2.PRO  
 ‘All the children were seen by the grandfather.’

So, we argued that no particular functional head plays a role in the theory of intonational phrasing, rather we must allow for a certain flexibility in the syntax-prosody mapping. Direct reference to some specific functional projection, such as TP or CP will not do. This is because a constituent may be prosodically outside the core  $\iota$  even though its syntactic position is relatively low, so long as the verb is even lower and, conversely, a constituent may be phrased inside the core  $\iota$  even if it is in a syntactically high position, so long as the verb also moves high.

In this paper, we would like to extend our flexible proposal to complex clauses. In particular, we would like to address the long noted asymmetry between root and non-root clauses. It was already noted by Downing (1970) (see also Truckenbrodt 2015 for a recent take-up of this idea), that root clauses seem to have a special role for the syntax-prosody mapping. For precisions’ sake, let us reproduce Downing’s original formulation.

- (4) Obligatory Boundary Insertion (OBI) (Downing 1970: 31)  
 “Phonological phrase boundaries are inserted as leftmost and rightmost immediate constituents of every root S node [...].”

- (5) Root sentence (Downing 1970: 30)  
 “A root sentence is any sentence which is not dominated by a predicative sentence.”

In today’s language, the immediate effect of Downing’s OBI rule would be that clauses that are not dominated by predicative material form their own  $\iota$ . This would apply to main clauses, but not to complement clauses, or even adjunct clauses that are part of the highest projection whose head hosts the root verb.

Note that prosodic integration of complement clauses (and non-extraposed adjunct clauses) does not seem to be restricted to English. The same is possible and even preferred

in Turkish (Kan 2009), Swedish (Myrberg 2010, 2013), Catalan (Feldhausen 2010), Xhosa (Jokweni 1995) and Durban Zulu (Cheng & Downing 2007). In this paper, we will show that this is also the case in Hungarian and Bàsàá. At the same time, in other languages, even embedded complement clauses seem to form separate *is*. For instance, Ishihara (2014; in press) showed that Japanese embedded clauses form separate *is*. Similarly, Pak (2008) showed that Luganda embedded clauses introduced by a complementizer form their own *is*. More recently, a similar claim was made by Kandybowicz & Torrence (2015) and Kandybowicz (in press) about the Tano languages Krachi and Bono, i.e. that complement clauses also introduce *ι* boundaries.<sup>2</sup> The authors also argue that the closely related languages Wasa and Asante Twi have prosodically integrated embedded clauses.

So it seems to us that there is considerable cross-linguistic variation in this area. The question that arises is whether the unmarked case is that languages have prosodically integrated embedded clauses or that the default is that all clauses (embedded and matrix) map onto their own *is*. We do not think that there is an a priori case for choosing one approach over the other. Both possibilities strike us as being equally plausible.

In this paper, we adopt the former approach and set ourselves the task to primarily account for those languages where embedded clauses are prosodically integrated. In other words, we try to account for the common denominator amongst languages, i.e. derive those boundaries that are always there: the *ι*-boundaries corresponding to the root clause. In doing so, we will also attempt to provide some independent motivation for our proposed syntax-prosody mapping principles. In line with the Minimalist Assumption (Chomsky 1995) we try to motivate these principles by requirements placed upon the grammar by extragrammatical cognitive considerations. In particular, we propose that integrated embedded clauses in the syntax-prosody mapping facilitate parsing, while learnability considerations motivate a certain kind of prosody-syntax mapping. For us, then, it is the embedded clause boundaries, in those languages that have them, that require additional explanations. The alternative position would be to assume that *ι*-boundaries are present at every clause edge. This approach would provide an immediate account for the state-of-affairs in Japanese, Luganda, Huave, Krachi and Bono. The challenge for this approach is to explain why they appear to be missing in languages like English, German, French, Turkish, Wasa, Asante Twi and, we will argue, Hungarian and Bàsàá.

Let us now turn to our proposed mapping constraints and our motivations for assuming them. There is one important difference between Downing's original formulation and standard generalised alignment constraints (McCarthy & Prince 1993). Downing's principles require alignment in only one direction, namely, his formulation is in the direction of syntax-to-prosody, rather than prosody-to-syntax. It is customary to separate syntax-to-prosody and prosody-to-syntax mapping constraints (Cheng & Downing 2009; Selkirk 2009, 2011; Myrberg 2010, 2013), but these proposals do not actually treat them differently. In (6) below, we propose that while root-clauses have a privileged status from the perspective of syntax-to-prosody mapping, all clauses are equal in prosody-to-syntax mapping.

The reason why these constraints differ is that they have different motivations. In our view, the syntax-to-prosody mapping constraints are primarily motivated by parsing considerations. We follow Downing's insight that only root clauses but not embedded clauses map onto separate *is* (see (6a) below). In terms of parsing, it seems to us that what helps a listener is that the sense units correspond to intonational units. Rather than marking every single clause including embedded, relative clauses etc., it seems more useful for parsing to

---

<sup>2</sup> In Krachi and Bono, the complementizer phrases together with the main clause, unlike in Luganda and Japanese. This would be problematic for analyses that rigidly map CPs onto *is* such as Pak's (2007, 2008).

map root sentences and/or speech acts onto intonational units. To clarify, we understand a root clause to be any clause that is not dominated by other clauses in the sense that it is neither the complement of a verb, nor does it modify a predicate.

Regarding the prosody-to-syntax mapping, one of the primary motivations for alignment between  $\iota$  and the *clause* is undoubtedly from infant language acquisition. By now, a substantial body of experimental work exists that shows that the identification of prosodic boundaries is directly used by infants to make generalisations about syntactic structure. Starting with the classic Hirsch-Pasek et al. (1987) study, where it was shown – using the headturn preference procedure – that American infants as young as 7–10 months prefer to listen to speech material showing a coincidence of the typical acoustic cues occurring at clausal boundaries compared to materials in which the coincidence of pauses with other prosodic cues had been disrupted, even if the material was low-pass-filtered. The same effect was demonstrated in various languages (e.g. in German, see Schmitz 2008, or in Japanese, see Hayashi & Mazuka 2002). Nazzi et al. (2010) and Soderstrom et al. (2005) showed that prosodic boundary cues directly support the *segmentation* of clauses within a passage of sentences. These studies show that infants rely substantially on a correct alignment of  $\iota$  and *clauses*. But importantly, what offends them is not if some clauses do not get marked by an  $\iota$  boundary.<sup>3</sup> Rather, their segmentation processes would be significantly hindered by  $\iota$  boundaries that occur clause-internally. This specifically motivates the kind of prosody-to-syntax alignment constraints that map  $\iota$  boundaries to syntactic units (i.e. clause).

The specific formulation of our proposed syntax-prosody mapping constraints is given in (6).<sup>4</sup> As (6a) shows, our proposed syntax-to-phonology mapping constraints aim to mark the edges of the root clause by  $\iota$  edges. In contrast, as (6b) shows, the phonology-to-syntax mapping constraints ensure that  $\iota$  edges coincide with (any) clausal edges.<sup>5</sup>

(6) Syntax-prosody correspondences on the *clause*-level

a. *Syntax-to-prosody mapping*

(i) ALIGN-L (HVP,  $\iota$ )

Align the left edge of the highest projection whose head is overtly filled by the **root** verb, or verbal material with the left edge of an  $\iota$ .

(ii) ALIGN-R (HVP,  $\iota$ )

Align the right edge of the highest projection whose head is overtly filled by the **root** verb, or verbal material with the right edge of an  $\iota$ .

<sup>3</sup> Although, admittedly if languages did not mark clauses by  $\iota$ -edges at all, that would also be problematic, so in this sense language acquisition also provides a motivation for (6a-i), and (6a-ii). We thank an anonymous reviewer for pointing this out.

<sup>4</sup> As Elfner (2012) discusses at length, following and extending discussion by Selkirk (2011), having a framework that uses alignment constraints together with the Strict Layer Hypothesis (SLH) is demonstrably incorrect. In this paper, we are not in a position to explore the potential difference between Match and an SLH-free version of Edge-based Theory. We simply note that all the data we discuss is compatible with a formulation in terms of Match constraints, since none of our accounts hinges on a ranking between ALIGN-LEFT and ALIGN-RIGHT constraints. We refer the reader to Elfner (2012) for differences between the two approaches and leave this issue open for future research.

<sup>5</sup> Given (4a), the syntax-phonology mapping must have access to information such as which one is the matrix or root verb. It seems to us that it will be hard to derive the data discussed in this paper, involving complex sentences with no (systematic)  $\iota$  edge at the edge of the embedded clause, without allowing the syntax-phonology mapping to be sensitive to this kind of information. Also, this information does not seem to us to be qualitatively different from information that is generally assumed to be available to the mapping, such as which projection is functional or lexical, which clause is a CP or a TP, or indeed, for mapping phonological phrases and their prosodic heads, what is a syntactic head or a dependent of the head. These are all very much syntactic notions, some of which seem to be necessary for the mapping to take place appropriately.

- b. *Prosody-to-syntax mapping*
  - (i) ALIGN-L ( $\iota$ , HVP)  
Align the left edge of an  $\iota$  with the left edge of the highest projection whose head is overtly filled by the verb or verbal material.
  - (ii) ALIGN-R ( $\iota$ , HVP)  
Align the right edge of an  $\iota$  with the right edge of the highest projection whose head is overtly filled by the verb or verbal material.

In addition to the proposed mapping constraints, we will use two additional constraints to derive the data we discuss. We propose that both the semantic notion of Speech Act and the syntactic notion of *clause*, understood as the highest phrase whose head is overtly filled by the verb or verbal material (HVP), are relevant for prosodic phrasing. Truckenbrodt (2015) and Selkirk (2011) proposed that the embedded clauses that form their own  $\iota$  are those that constitute a speech act. Also inspired by Downing (1970), Truckenbrodt proposes that undominated clauses form their own  $\iota$  if and only if they constitute a Speech Act (SpA). Selkirk and Truckenbrodt’s conclusions strike us as very insightful. So, we agree that there must be an additional mapping constraint that ensures that speech acts correspond to  $\iota$ s. There are various formulations of this type of constraint in the literature. Selkirk (2011) proposes a MATCH (CLAUSE) constraint (based on Illocutionary Clauses/Force<sup>0</sup>), while Truckenbrodt (2005, 2015) proposes a combination of ALIGN (CP) and WRAP (CP). We remain agnostic as to the exact formulation of this constraint, and adopt a short-hand notation SPA- $\iota$  for a constraint (or a group of constraints) that is violated whenever a speech act is not contained in a single  $\iota$ .

- (7) SPA- $\iota$   
Each Speech Act is contained in a single  $\iota$ .

The other additional constraint we assume regulates recursivity. In line with many existing studies on the syntax-phonology interface (a.o Ladd 1986, 1992, Selkirk 1995, 2011; Wagner 2005; Myrberg 2013), we do not assume the Strict Layer Hypothesis (a.o. Selkirk 1981, 1984; Nespor & Vogel 1986), so recursive  $\iota$ s can sometimes arise in case of complex syntactic structure. But we will see that recursive phrasing is sometimes dispreferred. We will invoke the constraint \*REC in such cases (Selkirk 1995; Truckenbrodt 1995, 1999), which is given in (8). The existence of this constraint was recently questioned, due to the seemingly systematic presence of recursion in prosodic representation (Elfner 2015; Selkirk & Lee 2015). Note that if we are on the right track, complex sentences with an in situ complement or a low adjunct clause of the type represented in Table 1 (Section 2.2) and 3 (Section 3.2) constitute empirical evidence for the existence of this constraint.

- (8) \*REC Selkirk (1995)  
“Assign one violation mark for every prosodic constituent of type  $n$  that contains another prosodic constituent of the same level.”

	$[_{TP} V [_{CP} [_{TP} V ]]]$	SPA- $\iota$	HVP-L/R	$\iota$ -L/R	*REC
$\mathcal{S}$	a. $(_{i1} [_{TP} V [_{CP} [_{TP} V ]]])$				
	b. $(_{i1} [_{TP} V [_{CP} (_{i2} [_{TP} V ]]])$				!*
	c. $(_{i1} (_{i2} [_{TP} V ]) [_{CP} [_{TP} V ]]])$			) <sub>i2</sub>	*
	d. $(_{i1} [_{TP} V ]) [_{CP} (_{i2} [_{TP} V ])]$	!*		) <sub>i1</sub>	
	e. $(_{i1} (_{i2} [_{TP} V ]) [_{CP} (_{i3} [_{TP} V ])])$			) <sub>i2</sub>	*
	f. $[_{TP} V [_{CP} (_{i1} [_{TP} V ])]$	!*	HPV-L		

**Table 1:** Complex sentence with in situ complement.



It is important to note that by distinguishing the syntax-to-prosody mapping constraints from the prosody-to-syntax ones, we do not propose that they apply at different places in the grammar. What distinguishes them from each other is simply their underlying motivations. All four proposed mapping constraints apply at the same time to determine syntax-prosody correspondences at the level of the *clause* (in addition to any other mapping constraints such as SPA- $\iota$  or \*REC).

In Sections 2 and 3, we will show that the proposed constraints account for the observed prosodic phrasing for Hungarian and Bàsàá complex clauses. To preview, we will show that (i) in situ complement and low adjunct clauses do not form their own  $\iota$  (9a), (ii) clauses extraposed to a high right-peripheral position give rise to recursive phrasing as in (9b), and (iii) clauses extraposed to a high left-peripheral position give rise to recursive phrasing as in (9c).

- (9) a. ( $\iota$  [ $\iota$  TP ... V ... [ $\iota$  CP ...]])  
 b. ( $\iota$  ( $\iota$  [ $\iota$  TP [ $\iota$  TP ... V ...]) [ $\iota$  CP ...]))  
 c. ( $\iota$  [ $\iota$  TP [ $\iota$  CP ...]) ( $\iota$  [ $\iota$  TP ... V ...]))

Given the extragrammatical motivations (parsing and learnability) we provide, it is expected that the proposed syntax-prosody mapping principles should apply universally. This is not to say that they should always be followed on the surface. The proposed mapping principles are violable or *soft* constraints. In Section 4, we discuss the implications of this for Hungarian and Bàsàá complex sentences with embedded topic and focus. More generally, some so far unknown CONSTRAINT X could be evoked in languages like Japanese, Luganda, Huave, Krachi and Bono to ensure the appearance of  $\iota$ -boundaries aligned with embedded clausal edges, with CONSTRAINT X ranked higher than \*REC. We are not in the position to make specific suggestions about what this constraint might be in the languages in question, as we simply do not have enough knowledge about these languages. But we would like to stress that the factorial typology that is necessary to account for the cross-linguistic variation between Hungarian/Bàsàá on the one hand and Japanese/Luganda on the other does not involve our proposed mapping constraints, but rather the relative ranking of \*REC and some constraints that favor structures displaying embedded clausal edge marking. In other words, as we will show in detail (see e.g. Table 1 and fn. 10), our proposed mapping constraints are equally satisfied by the presence or the absence of an  $\iota$  boundary at the edge of an embedded clause.

In addition, although we do not discuss such cases in this paper, languages often have prosodically (and pragmatically) marked constructions where the syntax-to-prosody or the prosody-to-syntax mapping principles can be violated. For instance, Hamlaoui and Szendrői (2015) argued that this is the case in Hungarian sentences involving contrastive focus on a universal quantifier, as in (10).

- (10) Hamlaoui & Szendrői (2015: 95, ex. 25)  
 A vizsgán mindenki MINDENT megoldott egy óra alatt  
 the exam.on everyone everything.ACC PRT.solved an hour under  
 ‘At the exam, everyone solved EVERYTHING in an hour.’

In such constructions, the core  $\iota$  encompasses the focussed universal despite the fact that the focus fronting is not accompanied by verb movement. However, such constructions are highly restricted (i.e. universal quantifiers are independently banned from the pre-verbal focus position on semantic grounds), pragmatically marked and thus do not constitute a disturbance to the parsing and learnability considerations spelt out above.

To sum up, this formulation of the mapping principles in (6) is consistent with the idea that by default,  $\iota$ s correspond to root clauses and not to embedded clauses, and that  $\iota$  boundaries are normally aligned with clausal edges. It makes the following predictions:

(i) *is* by default correspond to edges of *root* clauses; (ii) If extra *ι* edges are inserted, for instance to satisfy information-structural needs or other higher-ranked constraints, they are not inserted randomly: they are licit at both root or embedded clausal edges (or at the edges of speech acts). In the following sections, we will demonstrate that these predictions are borne out for Hungarian and Bàsàá complex clauses.

## 2 Bàsàá complex clauses

### 2.1 Diagnosing *ι* edges

Before examining the intonational phrasing of complex clauses, let us first introduce the tonal rule that will be used to diagnose *ι* edges in Bàsàá.<sup>6</sup>

On the surface, Bàsàá displays a 5-way contrast between High (H), Low (L), down-stepped High (<sup>4</sup>H), Falling (HL) and Rising (LH) tones. Underlyingly, it however only distinguishes High and Low tones; the three other tonal specifications are the results of various surface associations of underlying H and L tones (a.o. Dimmendaal 1988; Bitijaa Kody 1993; Hyman 2003; Makasso 2012).

Two tone rules have been particularly discussed in Bàsàá. The first, High Tone Spread (HTS), is a process by which a High tone underlyingly associated with one mora spreads rightwards and associates with one or more subsequent moras (a.o. Dimmendaal 1988; Hyman 2003). Hamlaoui et al. (2014) have argued that HTS applies within phonological phrases (*φ*). The second tone rule, Falling Tone Simplification (FTS) (a.o. Bitijaa Kody 1993; Hyman 2003), which will here be crucial to diagnose *ι* edges, turns a HL-H sequence into a H-<sup>4</sup>H sequence when, as proposed in Hamlaoui & Szendrői (2015), no *ι* left edge intervenes. FTS is illustrated in (11) and (12) with the word [bɔ́-bá-sò] ‘all’.<sup>7</sup> Whenever this word is followed by a H tone as in (11) or (12), the HL simplifies and its delinked L creates a downstep of the following H.<sup>8</sup>

- (11) ( *ι* b-ɔ̀ɔ̀ŋgɛ́ bɔ́-bá-sò́ <sup>4</sup>bá-m-bárá mángòlò.)  
 b-ɔ̀ɔ̀ŋgɛ́ bɔ́-bá-sò́ bá-m-bárá mángòlò  
 2-children 2.PRO-2.CONN-all 2.AGR-PST1-pick.up 6.mangoes  
 ‘All the children picked up the mangoes.’

- (12) ( *ι* sóyól à-n-tí b-ɔ̀ɔ̀ŋgɛ́ bɔ́-bá-sò́ <sup>4</sup>kwémbé.)  
 sóyól à-n-tí b-ɔ̀ɔ̀ŋgɛ́ bɔ́-bá-sò́ kwémbé  
 1.grandfather 1.AGR-PST1-give 2-children 2.PRO-2.CONN-all 7.box  
 ‘The grandfather gave all the children the box.’

We have however seen in Hamlaoui & Szendrői (2015) that the application of FTS is blocked between the fronted object of a zero-coded passive left-dislocation and the following subject, as in (13).

<sup>6</sup> Bàsàá is a Bantu language (A43) spoken in Cameroon by over 300,000 speakers (SIL 2005). The present data and judgments stem from the Northern variety of Bàsàá spoken by Emmanuel-Moselly Makasso.

<sup>7</sup> There are various tonal processes by which Falling tones are derived. Bitijaa Kody (1993) observes that they can either be derived through the doubling/spreading of an underlying tone (i.e. HTS) or through the historical loss of a mora, by re-association of a delinked L to the left. The latter case is illustrated in (i).

(i) Bitijaa Kody (1993: 66)  
 Proto-Bantu \*-bédè → -bê ‘udder’ (in Bàsàá): H + (L) → HL

We are aware of the fact that the way by which an HL tone is derived determines its ability to simplify (this is however beyond the scope of the present paper). As pointed out to us by Emmanuel Makasso and as corroborated by Lemb & de Gastines (1973), it is likely that the HL on [sò] ‘all’, which stems from [sónà], is derived by the latter process rather than by HTS, as previously stated in Hamlaoui & Szendrői (2015).

<sup>8</sup> Bàsàá does not display any type of obligatory sentence final lowering (e.g. sentences (13), (51) and (52) illustrate the fact that sentence-final H tones are found in this language). Declarative sentences with only High tones display a slight declination, but no evidence for the presence of a final L% boundary tone (Makasso et al. 2016).

- (13) (  $\iota$  ɓ-ð̀ŋgɛ́ ɓɔ́-ɓá-sò (  $\iota$  sóyól à-̀n-téhé ɓɔ́.))  
 ɓ-ð̀ŋgɛ́ ɓɔ́-ɓá-sò` sóyól à-n-téhé ɓɔ́  
 2-children 2.PRO-2.CONN-all 1.grandfather 1.AGR-PST1-see 2.PRO  
 ‘All the children were seen by the grandfather.’

We have proposed that in accordance with our constraints in (6), the prosodic structure of (13) is thus as represented in (14), where the fronted object sits outside the  $\iota$  formed by the core-clause, rather than as in (15), where the entire sentence forms an  $\iota$ .<sup>9</sup>

- (14) (  $\iota$  ɓ̀ð̀ŋgɛ́ ɓɔ́-ɓá-sò (  $\iota$  sóyól à-̀n-téhé ɓɔ́.))

- (15) \*(  $\iota$  ɓ̀ð̀ŋgɛ́ ɓɔ́-ɓá-sò ‘sóyól à-̀n-téhé ɓɔ́.)

In our view, the structuring in (14) is due to the fact that the fronted object sits outside the syntactic domain that is mapped onto an  $\iota$ : the highest projection that hosts the overt verb. Following standard assumptions as to the syntactic representation of simple sentences in Bantu languages (among others Krifka 1995; Zerbian 2006; Polinsky & Hyman 2009), we assume that the verb moves from v/V to T. This is supported by the fact that in this language adverbials systematically follow the verb (Pollock 1989). The internal arguments of the verb are hosted by vP and its highest XP raises to the specifier of TP, as illustrated in (16) (see Hamlaoui & Szendrői 2015) for more detail on the basic clause structure of Bàsàá).

- (16) [<sub>TP</sub> sóyól<sub>i</sub> à-̀n-téhé<sub>j</sub> [<sub>vP</sub> [<sub>vP</sub> t<sub>i</sub> t<sub>j</sub> [<sub>vP</sub> t<sub>j</sub> ɓ-̀sɔ́ŋgɛ́] í ‘ndáp.]]  
 1.grandfather 1.AGR-PST1-see 2-children LOC 9.house  
 ‘The grandfather saw the children at home.’

Additionally, in (14), the fronted object of a zero-coded passive, in its turn, occupies the specifier position of a topic projection within the inflectional domain, i.e. lower than CP (see Hamlaoui 2014; Hamlaoui & Szendrői 2015 and references therein for more details on this structure). The absence of verb movement from T to Topic is what leads to the lack of prosodic integration of the fronted object into the core- $\iota$  formed by the remainder of the sentence.

Let us now turn to the intonational phrasing of complex sentences.

## 2.2 The $\iota$ -phrasing of root and non-root clauses

Relative clauses aside (Makasso 2010; Jenks et al. 2012), little work has been done on embedded clauses in Bàsàá. *That*-clauses are introduced by the complementizer *lé*, which according to Bassong (2010), is simply located in C.

<sup>9</sup> Note that in this language Falling tones are often found clause medially (as well as word-initially/medially), usually preceding a L tone, and some Falling tones altogether fail to simplify, no matter their location. The occurrence of a Falling tone thus does not *per se* constitute evidence for the right-edge of an  $\iota$ . If sentences with a fronted object display the structure as in (i), suggested by one of our reviewers and which we cannot presently exclude, Bàsàá would turn out to be like Xitsonga (Selkirk 2011) rather than like Northern Sotho (Zerbian 2007), as we claimed in Hamlaoui & Szendrői (2015).

(i) (  $\iota$  (  $\iota$  ɓ-̀ð̀ŋgɛ́ ɓɔ́-ɓá-sò) (  $\iota$  sóyól à-̀n-téhé ɓɔ́.))

The idea that topics have a rightward  $\iota$  boundary following them would however not be problematic for our approach, as the object would still be located where we expect it to be located, namely immediately outside the core  $\iota$  as determined by the highest position of the verb, and a prosodic constraint like STRONGSTART (Selkirk 2011) or EQUALSISTERS (Myrberg 2010, 2013) could simply be responsible for it forming an  $\iota$  of its own rather than a  $\phi$ . See Section 4.2 for more detail on this issue. Note, however, that in a structure with clausal extraposition, such as (21), the right edge of a main clause fails to block FTS, supporting the view that in topic structures it is the left-edge of the  $\iota$  that follows that blocks FTS.



As the complementizer underlyingly carries a H tone, it allows us to assess the prosodic structure of a complement clause and more particularly whether it is preceded by an  $\iota$ -boundary (corresponding to the embedded CP). The phrasing observed in Bàsàá patterns with what is observed in English as well as in Hungarian: a complement clause fails to introduce  $\iota$  breaks. This is shown in (17), in which the Falling tone on *lóngé* ‘well’ (here used as an adverb) undergoes simplification and creates a downstep on the complementizer. The sentence in (14) thus involves a simple  $\iota$ , encompassing the entire sentence.

- (17) [<sub>TP</sub> ( $\iota$  mè ní-sòmból jí lóngé [<sub>CP</sub> ‘lé [<sub>TP</sub> mbómbó à-n-lò.))]]  
 mè ní-sòmból jí lóngé lé mbómbó à-n-lò  
 I want to.know well that 1.grandmother 1.AGR-PST1-MH-arrive  
 ‘I really want to know that the grandmother came.’

The same phrasing is observed with adjunct clauses in canonical postverbal position, in (18) and (19). The adjunct clauses considered here are *when*-clauses. They are introduced by the prepositional phrase *í ‘ngéŋ* ‘at hour’. We assume that these clauses attach lower than TP, somewhere in the core-clause (although we have not yet been able to find evidence of this in Bàsàá, in the next Section we give syntactic arguments for the low position of such adjunct clauses in Hungarian). The Falling tone occurring on the last syllable of the monosyllabic verbs *arrive* and *leave* (visible here when the verb is in sentence final position, as it is not followed by a H tone) is obtained by the association of a melodic H (noted MH in the glosses) that accompanies certain TAM structures such as the recent past (PST1) and an underlying L tone on the last mora of these verbs (see Makasso 2012, 2014 and references therein concerning melodic H tones in Bàsàá and more generally in Bantu languages).

- (18) [<sub>TP</sub> ( $\iota$  sóyól à-ŋ-ké [<sub>VP</sub> [<sub>VP</sub> ...] [<sub>CP</sub> ‘í ‘ngéŋ Lingom à-n-lò.))]]  
 sóyól à-ŋ-ké í ‘ngéŋ Lingom à-n-lò  
 1.grandfather 1.AGR-PST1-MH-leave at hour Lingom 1.AGR-PST1-MH-arrive  
 ‘The grandfather left when Lingom arrived.’
- (19) ( $\iota$  sóyól à-ɕék má-kàlà mój-má-só ‘í ‘ngéŋ Lingom à-n-lò.)  
 sóyól à-ɕék ma-kàlà mój-má-sò í ‘ngéŋ Lingom  
 1.grandfather 1.AGR-eat 6-doughnuts 6.PRO-6.CONN-all at hour Lingom  
 à-n-lò  
 1.AGR-PST1-MH-arrive  
 ‘The grandfather ate all the doughnuts when Lingom arrived.’

What we see in (18) and (19) is that the L tone of the root verb and the complement, respectively, delinks and creates a downstep on the first H tone of *when*, indicating that the adjunct clause does not introduce an  $\iota$  edge of its own.

The same pattern is found in purpose clauses, as illustrated in (20). They are also introduced by the complementizer *lé*, and we assume that they also attach below TP. As shown by the application of FTS, they do not insert an  $\iota$ -edge.

- (20) ( $\iota$  Lingom à-n-lò ‘lé bá-tí né βiɕék.)  
 Lingom à-n-lò lé bá-tí né βiɕék  
 Lingom 1.agr-pst1-mH-arrive that 2.agr-subj.give 1.pro 8.food  
 ‘Lingom came so that they give him food.’

The  $\iota$ -phrasing observed in sentences (17) to (20) is consistent with our mapping constraints in (6): only the highest projection hosting the root verb maps onto an  $\iota$ . In Table 1, we give an illustration of how our proposed mapping principles account for the intonational phrasing of complex sentences involving an in situ complement (or an adjunct clause attached below T). To aid the reader, we put the syntactic brackets that correspond to the highest position filled by the root verb with bold italics, and the highest position filled by a non-root verb in bold. Alignment with these positions is favoured by some of our proposed mapping constraints (ALIGN-L/R (HVP- $\iota$ ), ALIGN-L/R ( $\iota$ -HVP)). We also number the  $\iota$ s to be able to refer to the specific edges that incur a violation on the mapping constraints. The proposed ranking of our mapping constraints will not be motivated until more elaborate data is considered below. Note that ALIGN-L/R (HVP- $\iota$ ) and ALIGN-L/R ( $\iota$ -HVP) (respectively notated HVP-L/R and  $\iota$ -L/R in the tableaux) are evaluated categorically.<sup>10</sup>

Additional evidence that embedded clauses do not (necessarily) form their own  $\iota$  but rather sit outside the  $\iota$  formed by the core-clause comes from right extraposed clausal subjects (note in passing that preverbal clausal subjects are generally unacceptable in the present variety of Bàsàá, as stated in Hamlaoui & Makasso 2015). In (21), the extraposed clause attaches high, i.e. somewhere above TP. The constraint ALIGN-R (HVP,  $\iota$ ) predicts that it is separated from the core-clause by the right-edge of an  $\iota$ , corresponding to the right-edge of the core-clause. As shown in (21), FTS applies between the two clauses. This is important in two respects: first it is consistent with the idea that FTS is not sensitive to  $\iota$  right edges and, second, it shows that the extraposed clause fails to introduce an  $\iota$  left edge of its own.<sup>11</sup>

- (21)  $[_{TP} [_{TP} ( ( \text{hálà à-jè lónǵé} ) ] [_{CP} \text{ʼlé} [_{TP} \text{sóyól à-n-ǵé jǵ} ] ] ] ]$   
 hálà à-jè lónǵé lè sóyól à-n-ǵé jǵ  
 so 1.AGR-be.PRES well that 1.grandfather 1.AGR-PST1-eat 9.PRO  
 ‘This is good that the grandfather ate it.’

The same pattern is observed with extraposed adjunct clauses. In contrast with sentences (17) to (20), whenever an adjunct clause surfaces outside its canonical postverbal position and linearly precedes the main clause, what we observe, as in (22), is that FTS fails to apply and thus that the adjunct clause is separated from the main clause by an  $\iota$  boundary.

<sup>10</sup> Note that our proposed constraints do not distinguish between candidates *a* and *b*, the latter being attested in languages like Japanese, Huave and Luganda. This is because these mapping constraints would be violated if (i) the root clause edges were not marked by  $\iota$  edges, or (ii) if the speech act was not marked by  $\iota$  edges, or (iii) if an  $\iota$ -boundary occurred in a position other than at a clausal edge (for instance under the influence of prosodic constraints of the type STRONGSTART, from Selkirk 2011 or EQUALSISTERS, from Myrberg 2010, 2013). Rather, it is the constraint \*REC that penalises the recursive phrasing in *b*. Therefore, and assuming that these embedded clauses do not form their own speech act in the Japanese-type languages either, it follows that in such languages there must be a further constraint that favours recursive phrasing, which must be ranked higher than \*REC. We leave a closer analysis of these languages for future research.

<sup>11</sup> An anonymous reviewer, pursuing the idea that FTS might apply *within*  $\iota$ s, notes that the application of FTS between matrix clause and embedded clause in (21) might be due to the fact that no  $\iota$  right-edge is actually realized at the end of the matrix clause (rather than supporting, as we argue, that FTS only provides a diagnostic for  $\iota$  left-edges and is not sensitive to  $\iota$  right-edges). In order to adjudicate between the reviewer’s position and ours one would need to find a phonological process that would allow us to establish whether an  $\iota$  right edge is realized in a particular position (see also fn. 9 on this point). As discussed for instance in Selkirk (2011), certain languages however only provide direct evidence for one edge of certain prosodic domains, leading phonologists to posit the presence of boundaries for which there is no direct evidence. Until the prosodic evidence shows that no boundary is present following the matrix clause in (21), we follow the null-hypothesis that prosodic structure reflects (certain aspects of) the syntactic structure, that the syntax-prosody mapping takes place as specified by the mapping constraints in (6) and posit the presence of an  $\iota$  right edge at the end of the matrix clause.

- (22)  $[_{TP} [_{CP} ( \iota \text{ 'ngéŋ } \text{Lingom } \grave{\text{a}}\text{-}\eta\text{-kê} ] [_{TP} ( \iota \text{ sóyól } \grave{\text{a}}\text{-}\grave{\text{n}}\text{-l}^{\text{ó}}.))] ]$   
 $\hat{\iota}$  ngéŋ Lingom à-η-kè sóyól à-n-'lò  
 at hour Lingom 1.AGR-PST1-MH-leave 1.grandfather 1.AGR-PST1-MH-arrive  
 ‘When Lingom left, the grandfather arrived.’

As seen in Table 2, ALIGN-L (HVP,  $\iota$ ) favors the presence of a left  $\iota$  boundary at the left-edge of the root clause which, in (22), sets off the adjunct clause from the rest of the sentence. There is no clear evidence in Bàsàá (or in Hungarian) that the adjunct clause is additionally aligned with the right-edge of an  $\iota$  corresponding to the right edge of the extraposed clause, so candidate *b* is favoured over candidate *e*. A phrasing comparable to *e* is however attested in other languages (e.g. Swedish). Myrberg (2013) argues that the choice between these two candidates is regulated by the ranking of EQUALSISTERS, given in (23), relative to the \*STR-constraint \* $\iota$ , that favors candidates with fewer  $\iota$ s. For candidate *b* (2  $\iota$ s) to win over *e* (3  $\iota$ s), \* $\iota$  has to outrank EQUALSISTERS in Bàsàá (and Hungarian).

- (23) EQUALSISTERS (Myrberg 2013: 75)  
 ‘‘Sister nodes in prosodic structure are instantiations of the same prosodic category.’’

The argument against the idea (offered by one of our reviewers) that FTS would be blocked by rightward  $\iota$  edges can be further strengthened. The sentence in (24) additionally shows that FTS also takes place between a HL tone at the end of a relative clause contained in the first object of a ditransitive verb and a H tone at the beginning of the second object. Together with example (21), (24) casts further doubt on the idea that FTS is generally sensitive to the right edge of  $\iota$ s rather than to their left edge, in particular if one assumes that all clauses introduce  $\iota$  edges.<sup>12</sup>

- (24)  $[_{TP} \text{bá-n-tí} \quad [_{CP} \text{í-}^{\text{ó}}\text{sóyól} \quad \grave{\text{a}}\text{-}\grave{\text{n}}\text{-l}^{\text{ó}}] \quad \text{'ndáp.}]$   
 2.AGR-PST1-give AUG-1.grandfather 1.AGR-PST1-come 9.house  
 ‘They gave the house to the grandfather who came.’

	$[_{TP} [_{CP} [_{TP} \vee ] ] [_{TP} \vee ] ]$	SPA- $\iota$	HVP-L/R	$\iota$ -L/R	*REC
	a. $( \iota [_{TP} [_{CP} [_{TP} \vee ] ] [_{TP} \vee ] ] )$		!HVP-L		
$\mathbb{E}$	b. $( \iota [_{TP} [_{CP} [_{TP} \vee ] ] ( \iota [_{TP} \vee ] ] ) )$				*
	c. $( \iota ( \iota [_{TP} [_{CP} [_{TP} \vee ] ] ) [_{TP} \vee ] ] )$		!HVP-L		*
	d. $( \iota [_{TP} [_{CP} [_{TP} \vee ] ] ) ( \iota [_{TP} \vee ] ] )$	!*			
$\mathbb{E}$	e. $( \iota ( \iota [_{TP} [_{CP} [_{TP} \vee ] ] ) ( \iota [_{TP} \vee ] ] ) )$				*
	f. $[_{TP} [_{CP} [_{TP} \vee ] ] ( \iota [_{TP} \vee ] ] )$	!*	HPV-L		

**Table 2:** Complex sentence with left extraposed complement or adjunct.

<sup>12</sup> According to E.-M. Makasso (*p.c.*), FTS is obligatory in (24), which contrasts with what is observed in relative clauses that are part of a subject, as in (i). In that case, FTS between the last tone of the relative clause and the subject agreement is optional. A way of accounting for this fact that would be consistent with our findings so far is that whenever FTS is blocked, the subject is actually located in a higher syntactic, perhaps topical, position, crucially, outside the HVP. We leave this issue open for future research.

- (i) a. í-b-ððŋgé bá-n-lò bá-n-téhé sóyól.  
 b. í-b-ððŋgé bá-n-lò <sup>ó</sup>bá-n-téhé sóyól.  
 AUG-2-children AGR-PST1-come 2.AGR-PST1-see 1.grandfather  
 ‘The children who came saw the grandfather.’

As pointed out by one of our reviewers, our account predicts that if an  $\iota$ -boundary is to be found in an embedded clause, it might actually correspond to the edge of TP rather than the edge of CP. In order to test this, we would need to observe the behaviour of a complementizer carrying a Falling tone. To the best of our knowledge, no Bàsàà complementizer displays this tonal specification. Evidence for the absence of  $\iota$  boundary between C and TP is however found in restrictive relative clauses. Bàsàà relative clauses are marked by means of an optional relative operator, which is identical to the *near speaker* demonstrative (Makasso 2010; Jenks et al. 2012). This demonstrative, which according to Jenks et al. is located under Spec,CP, exhibits a HL tone in all noun classes except for class 9. Whenever the demonstrative pronoun is realized and followed by a H tone, its HL tone simplifies and creates a downstep. This is the case in (25), from Makasso (2010), and (26), adapted from Jenks et al. This shows that no  $\iota$  boundary intervenes between embedded C and T, as predicted by our mapping constraints.

(25) í-ḃ-ḏḏḡḡé      ḃá      'ḃá-ń-'jǐ      hók      ḃá-ń-tùk      í      'páḡ lép.  
 AUG-2-children 2.REL 2.AGR-pres-know swim 2.AGR-pres-play LOC side river  
 'The children who can swim play near the river.'

(26) í-m-ààḡḡé      nú      'ḡḡwḡ jé'é      ì-ḃí-kòḡḡǐ      mê  
 AUG-1-child 1.REL 9.dog 9.POSS 9.AGR-pst2-bite me  
 'the child whose dog bit me.'

For the sake of completeness, example (27) (also adapted from Jenks et al.) shows that the head of the relative clause is not separated by an  $\iota$ -boundary from the embedded clause either, as the Falling tone of a demonstrative in the head of the relative clause also simplifies when followed by a subject agreement marker carrying a H tone.

(27) lí-'wándá      lí      'lí-ḃí-'ḡḡé      ḃíḡḡék  
 AUG.5-friend 5.dem 5.AGR-PST2-eat 8.food  
 'this friend that ate the food.'

In sum, what we have shown in this section, through the application of the FTS rule, is that Bàsàà is similar to languages like English, French, Zulu or Xhosa in that only certain types of clauses map onto  $\iota$ s, i.e. root clauses. Embedded clauses fail to introduce their own  $\iota$  edges. If they are not dominated by the highest projection hosting the root verb, they can however sit outside the core  $\iota$ . Let us now turn to Hungarian, which provides further evidence for this asymmetry between root and non-root clauses.

### 3 Hungarian complex clauses

#### 3.1 Diagnosing $\iota$ edges in Hungarian simple clauses

Let us start with a short overview of simplex clauses in Hungarian, but the reader is referred to Szendrői (2001) for more details. Traditionally, Hungarian grammars distinguish so-called neutral (28) and non-neutral sentences (29), with the latter involving a left-peripheral, fronted focal constituent (appearing in small caps). Importantly, focus fronting is accompanied by verb movement, as indicated by the stranded particle (PRT) in (29). As a result, our mapping principles in (6) will have the effect that left-peripheral topics, which are not accompanied by verb movement, are phrased outside the core  $\iota$ , while fronted foci appear as the leftmost  $\phi$  in the innermost  $\iota$ .

(28) [<sub>TopP</sub> ( $\iota$  A maláj lány<sub>k</sub> [<sub>VP</sub> ( $\iota$  elmenekül<sub>i</sub> [<sub>VP</sub>  $t_i$   $t_k$  Eleonóra elöl Emíliá-hoz.)]])]]  
 the Malay girl away-flees Eleonora from Emilia-to  
 'The Malay girl escapes from Eleonora to Emilia.'

(29)  $[_{TopP} ( \iota$  A maláj lány  $[_{FocP} ( \iota$  ELEONÓRÁ-HOZ  $[_{VP}$  el  
the Malay girl Eleonora-to flees away  
 $[_{VP} t_i t_i t_k t_j$  Emília elől.))]]]  
Emilia from  
‘The Malay girl escapes from Emilia to ELEONORA.’

Ladd (1996) proposed a useful diagnostic for the  $\iota$  in Hungarian. In *yes/no*-questions, which are syntactically unmarked in Hungarian, the intonational contour (H-)L\*H-L% carries the semantic force. It starts with an optional (L)H(L) accent on preverbal elements in neutral clauses and prefocal elements in non-neutral clauses. The L\* is anchored on the PRT (or if there is no PRT, then on the verb itself) in neutral clauses (as in Figure 1), and on the focal element in non-neutral clauses (as in Figure 2).<sup>13</sup> We assume that this is because these elements constitute the leftmost  $\phi$  within the core  $\iota$ . The right edge of the contour is marked by a H- phrasal and a L% boundary tone, which are aligned with the penultimate and final syllables of  $\iota$  respectively. Word-level and phrase-level stress are always on the initial syllable in Hungarian. In declarative sentences, discourse-new, non-topical phrases have been observed to generally show falling pitch movements (see Genzel et al. 2015 and references therein). In questions, we predominantly observe rise or rise-fall movements (noted L-H(L)). Importantly, no postverbal phrasal accents occur in non-neutral utterances (as seen e.g. in Figure 2).<sup>14</sup>

### 3.2 Prosody of Hungarian complex clauses

Hungarian CP complement clauses and adjunct clauses associate with a D-type head, *az*. The function of such elements is unclear, with some arguing that it provides a nominal shell for the CP, which allows case marking the complement Kenesei (1994). This D-like

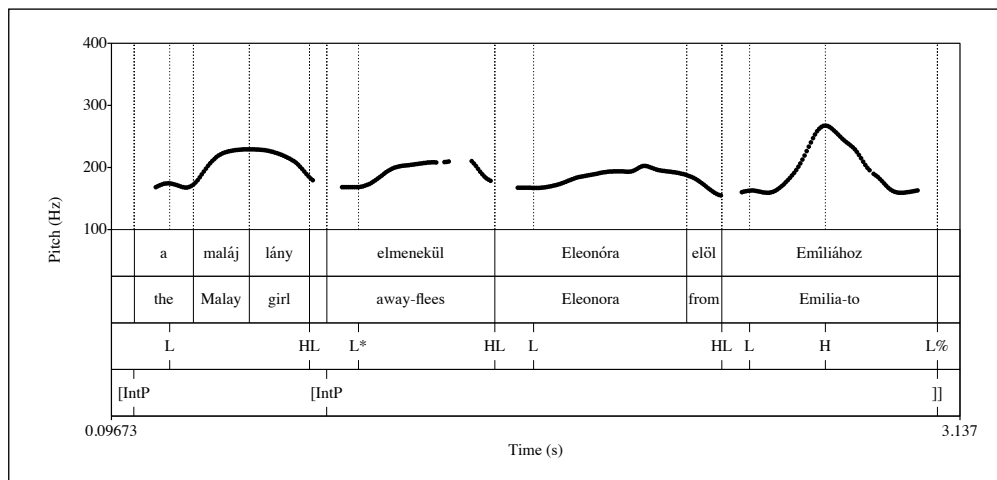


Figure 1: Neutral *yes-no* question in Hungarian.

<sup>13</sup> The sounds illustrated in Figure 1 to 11 were recorded by the same speaker (the second author). Additional recordings were obtained from one female and one male speaker by elicitation, which did not significantly vary in the relevant aspects. According to the intuitions of the native-speaker author of the paper, the relevant aspects of the pitch patterns referred to in the text are obligatory except when stated. i.e. relevant variation exists with respect to the possibility of involving two question contours on the matrix and embedded clauses respectively, cf. Figure 11. The data should be supplemented in the future by a study involving more speakers, in an experimental setting (to the best of our knowledge no such study presently exists).

<sup>14</sup> As a systematic study by Gyuris & Mády (2014: 9) reveals, there is considerable variation as to whether the topic contour is a flat high (most common), a fall or a rise in Hungarian. They did not manage to correlate the variation with a number of factors including contrastivity and NP-type. We therefore think that the falling intonation in Figure 1 is not a good diagnostic for an  $\iota$  right edge. But even if it was proposed that there is a well-defined subset of topics in Hungarian, displaying the fall contour, and this subset of topics form their own  $\iota$ , that would not effect the argument made here, which is that the *position* of topics is at the edge of the core intonational phrase.



element either shows up in a position directly left-adjacent to the clause itself (*az, hogy* ... ‘D that ...’) or the clause might be extraposed into a left-peripheral or right-peripheral position, with the D-like element appearing in a topic or focus position. If there is A-bar movement across the CP from the embedded clause into the main clause (see (38) in Section 4.1), the D-head must be dropped.

Figure 3 illustrates the pitch track of the complex *yes-no* question in (30), with the main verb *megkérdezte* ‘PRT-asked’ and its complement clause. As we can see, the initial L\* is on the PRT-main verb complex, while the right boundary of the  $\iota$  (marked by H L%) appears at the end of the utterance. Phrasal accents appear throughout the sentence. Thus, it appears that the intonational phrasing is as given at the bottom of Figure 3.<sup>15</sup> As can be seen in Table 3, ALIGN-L/R(HVP,  $\iota$ ) are satisfied by the  $\iota$  boundaries in front of the main verb and at the right edge of the  $\iota$  sentence; SPA- $\iota$  is satisfied by the outer  $\iota$  boundaries

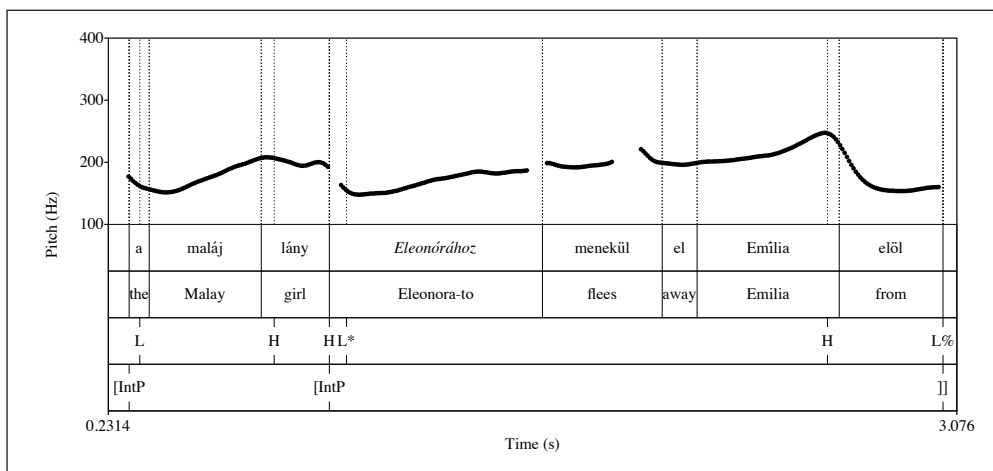


Figure 2: Non-neutral *yes-no* question in Hungarian.

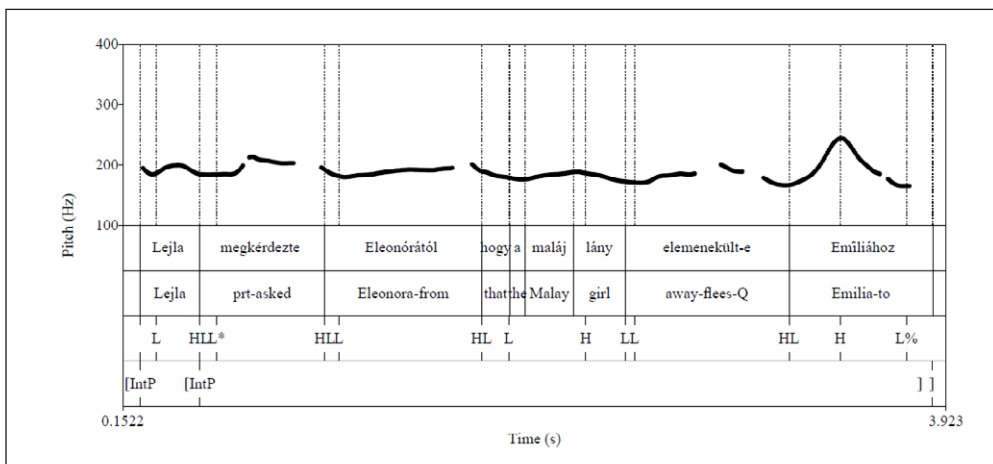


Figure 3: Neutral complex *yes-no* question in Hungarian.

<sup>15</sup> Note that as Figure 3 and 4 show, embedded topics are not necessarily aligned with  $\iota$  edges in Hungarian. There are two possible accounts for this state of affairs. First, it is possible that in embedded clauses, subjects can occupy a low Spec,vP position, while in the main clause, Spec,TopP must be filled (cf. É. Kiss 1995 on Hungarian as a topic prominent language). This would explain why ALIGN-TOPIC (Section 4) does not apply in the embedded clause: the subject NP in the embedded clause is not a topic. Another possibility is that ALIGN-TOPIC is ranked lower than \*REC in Hungarian, giving rise to a non-recursive phrasing and non-alignment for topics inside embedded clauses. We will leave this issue open for future research.

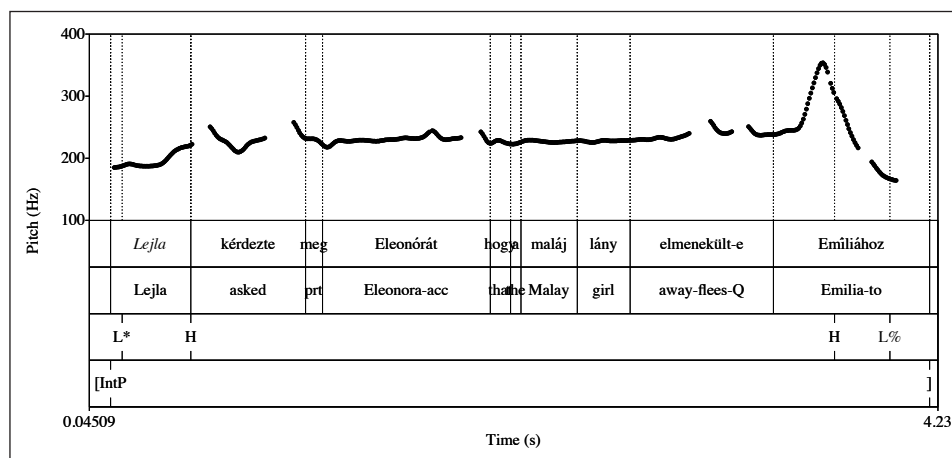
wrapping the whole sentence, which constitutes a Speech Act. The left edge of this latter boundary violates ALIGN-L( $\iota$ , HVP), but the other boundaries satisfy ALIGN-L/R( $\iota$ , HVP).<sup>16</sup>

- (30)  $[\text{TopP}]$  Lejla<sub>j</sub>  $[\text{VP}]$  megkérdezte<sub>i</sub>  $[\text{VP}]$   $t_i t_j$  Eleonórától  $[\text{CP}]$  hogy  $[\text{TopP}]$   
 Lejla PRT-asked Eleonora-from that  
 a maláj lány<sub>l</sub>  $[\text{VP}]$  elmenekült<sub>k-e</sub>  $[\text{VP}]$   $t_k t_l$  Emíliához? ]]]]]]  
 the Malay girl PRT-escaped-Q Emilia-to  
 ‘Did Lejla ask Eleonora whether the Malay girl escaped to Emilia?’

In Figure 4, corresponding to sentence (31), we see the same question in a non-neutral form. Here the main clause focus occupies the leftmost position in the  $\iota$ . This is a non-neutral sentence: there is pitch reduction on the elements following the main clause focal element, realized as a high plateau before the final question rise and fall at the end of the embedded clause. This prosodic pattern is consistent with our proposal that complement clauses do not form their own  $\iota$  in Hungarian.

	$[\text{TopP}]$ Topic $[\text{VP}]$ V $[\text{CP}]$ $[\text{VP}]$ V ]]]]	SPA- $\iota$	HVP-L/R	$\iota$ -L/R	*REC
a.	$(_{i1} [\text{TopP}] \text{Topic } [\text{VP}] \text{ V } [\text{CP}] [\text{VP}] \text{ V } ]]]])$		!HVP-L	$(_{i1}$	
b.	$(_{i1} [\text{TopP}] \text{Topic } (_{i2} [\text{VP}] \text{ V } [\text{CP}] [\text{VP}] \text{ V } ]]]])$			$(_{i1}$	*
c.	$(_{i1} [\text{TopP}] \text{Topic } [\text{VP}] \text{ V } [\text{CP}] (_{i2} [\text{VP}] \text{ V } ]]]])$		!HVP-L	$(_{i1}$	*
d.	$(_{i1} [\text{TopP}] \text{Topic } (_{i2} [\text{VP}] \text{ V } [\text{CP}] (_{i3} [\text{VP}] \text{ V } ]]]])$			$(_{i1}$	*!*
e.	$(_{i1} (_{i2} [\text{TopP}] \text{Topic } ) [\text{VP}] \text{ V } [\text{CP}] [\text{VP}] \text{ V } ]]]])$		!HVP-L	$(_{i1'} (_{i2'})_{i2}$	*
f.	$(_{i1} (_{i2} [\text{TopP}] \text{Topic } ) (_{i3} [\text{VP}] \text{ V } [\text{CP}] [\text{VP}] \text{ V } ]]]])$			$(_{i1'} ! (_{i2'})_{i2}$	*
g.	$(_{i1} [\text{TopP}] \text{Topic } ) (_{i2} [\text{VP}] \text{ V } [\text{CP}] [\text{VP}] \text{ V } ]]]])$	!*		$(_{i1'})_{i1}$	
h.	$(_{i1} [\text{TopP}] \text{Topic } ) (_{i2} [\text{VP}] \text{ V } ) [\text{CP}] (_{i3} [\text{VP}] \text{ V } ]]]])$	!*		$(_{i1'})_{i1'}_{i2}$	
i.	$(_{i1} (_{i2} [\text{TopP}] \text{Topic } [\text{VP}] \text{ V } ) [\text{CP}] (_{i3} [\text{VP}] \text{ V } ]]]])$		!HVP-L	$(_{i1'} (_{i2'})_{i2}$	*
j.	$(_{i1} (_{i2} [\text{TopP}] \text{Topic } ) (_{i3} [\text{VP}] \text{ V } ) [\text{CP}] (_{i4} [\text{VP}] \text{ V } ]]]])$			$(_{i1'} ! (_{i2'})_{i2'} )_{i3}$	*
k.	$[\text{TopP}] \text{Topic } [\text{VP}] \text{ V } [\text{CP}] (_{i1} [\text{VP}] \text{ V } ]]]])$	!*	HVP-L		
l.	$[\text{TopP}] \text{Topic } (_{i1} [\text{VP}] \text{ V } [\text{CP}] [\text{VP}] \text{ V } ]]]])$	!*			

**Table 3:** Complex sentence with in situ complement clause and a sentence-initial topic.



**Figure 4:** Non-neutral complex yes-no question in Hungarian.

<sup>16</sup> As above, the candidate with an additional  $\iota$  boundary at the edge of the embedded clause, candidate *d* in Table 3, would have to be promoted by some constraint that is ranked higher than \*REC. Presumably, this would apply to languages like Japanese or Luganda.

(31) [<sub>FocP</sub> LEJLA<sub>k</sub> kérdezte<sub>i</sub> [<sub>VP</sub> meg<sub>j</sub> [<sub>VP</sub> t<sub>i</sub> t<sub>j</sub> t<sub>k</sub> Eleonórától [<sub>CP</sub> hogy [<sub>TopP</sub> a maláj lány<sub>i</sub> [<sub>VP</sub> elmenekült<sub>k-e</sub> [<sub>VP</sub> t<sub>k</sub> t<sub>l</sub> Emíliához?]]]]]]]]  
 Lejla asked PRT Eleonora-from that the Malay girl PRT-escaped-Q Emilia-to  
 ‘Was it LEJLA who asked Eleonora whether the Malay girl escaped to Emilia?’

An environment where complement clauses do seem to form separate *is* in Hungarian is direct quotation. As shown in Figure 5, corresponding to sentence (32), here the main clause is followed by an obligatory pause, and both the D-like element and the complementizer must be omitted (cf. Figure 3, which illustrates the same utterance with reported speech rather than direct quotation).

(32) [<sub>TopP</sub> Lejla [<sub>VP</sub> megkérdezte<sub>k</sub> [<sub>VP</sub> t<sub>k</sub> Eleonórát: [<sub>CP</sub> [<sub>TopP</sub> “A maláj lány<sub>j</sub> [<sub>VP</sub> elmenekült<sub>i</sub> [<sub>VP</sub> t<sub>i</sub> t<sub>j</sub> Emíliához?.”]]]]]]]]  
 Lejla PRT-asked Eleonora-ACC the Malay girl  
 PRT-escaped Emilia-to  
 ‘Lejla asked Eleonora: “Did the Malay girl escape to Emilia?”’

Finally, Figure 6, corresponding to (33), illustrates the fact that if the main clause contains a focal element, then accent reduction only affects the main clause in direct quotation,

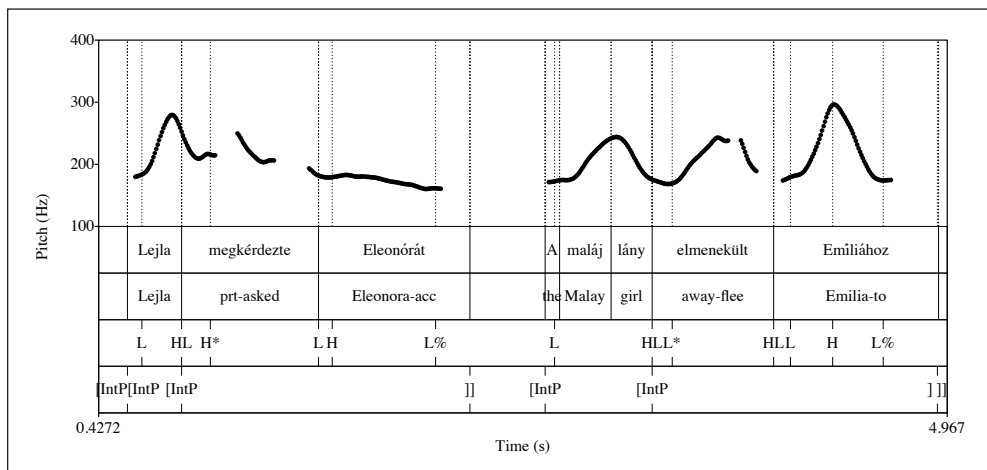


Figure 5: Complex neutral yes-no question in Hungarian (direct quotation).

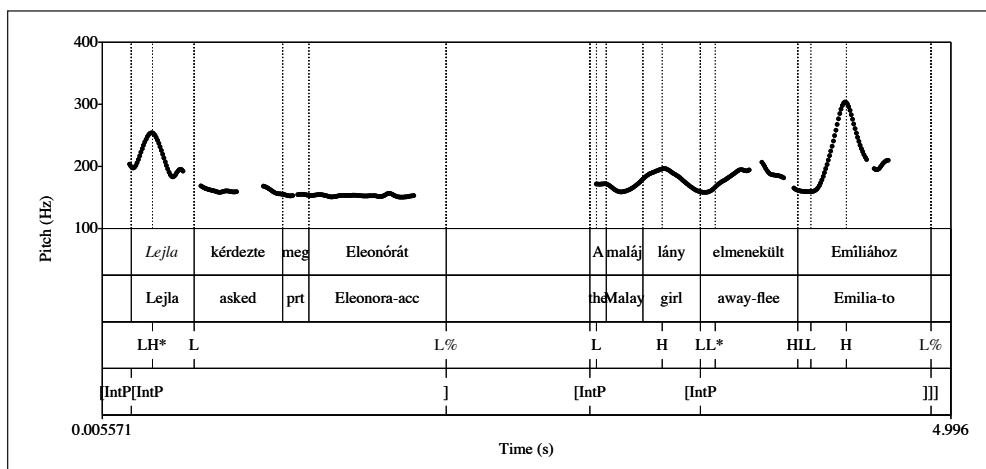


Figure 6: Non neutral complex yes-no question in Hungarian (direct quotation with focus in main clause).

supporting further that the two are independent *is* (cf. Figure 4, where the embedded clause is not a direct quotation, and consequently undergoes pitch reduction).

- (33) [<sub>FocP</sub> LEJLA<sub>m</sub> kérdezte<sub>k</sub> [<sub>VP</sub> meg<sub>l</sub> [<sub>VP</sub> t<sub>k</sub> t<sub>l</sub> t<sub>m</sub> Eleonórát: [<sub>CP</sub> [<sub>TopP</sub> “A maláj  
 Lejla asked PRT Eleonora-ACC: the Malay  
 lány<sub>j</sub> [<sub>VP</sub> elmenekült<sub>i</sub> [<sub>VP</sub> t<sub>i</sub> t<sub>j</sub> Emíliához?”.]]]]]]]  
 girl PRT-escaped Emilia-to  
 ‘It was LEJLA who asked Eleonora: “Did the Malay girl escape to Emilia?”’

Thus, from these data it seems that the left edge of the embedded clause does not create its own *ι*, unless the embedded clause constitutes a direct quotation. This is consistent with the proposed syntax-to-prosody mapping principles, in which only the highest projection hosting the root verb maps onto an *ι*.

When it comes to adjunct clauses, a parallel state-of-affairs to Bàsàá obtains in Hungarian. The example (34) (shown in Figure 7) involves an adjunct clause with *amíg* ‘while’. The canonical position of such clauses is either VP internal (often VP-final), as shown in (34), or adjoined to VP with the D-like associate inside the core VP intermingled with the verb’s nominal arguments, as in (35). As the phrasing indicates, in both cases, the adjunct clause is integrated into the *ι* corresponding to the main clause, as expected.<sup>17</sup>

- (34) (<sub>ι</sub> [<sub>TopP</sub> Péter<sub>j</sub> (<sub>ι</sub> [<sub>VP</sub> el-viszi<sub>i</sub> [<sub>VP</sub> t<sub>i</sub> t<sub>i</sub> a gyerekeket a múzeumba  
 Peter PRT-takes the children-ACC the museum-to  
 [<sub>DP</sub> (addig) [<sub>CP</sub> amíg Mari dolgozik?]]]]))  
 D while Mary works  
 ‘Does Peter take the children to the museum, while Mary is working?’

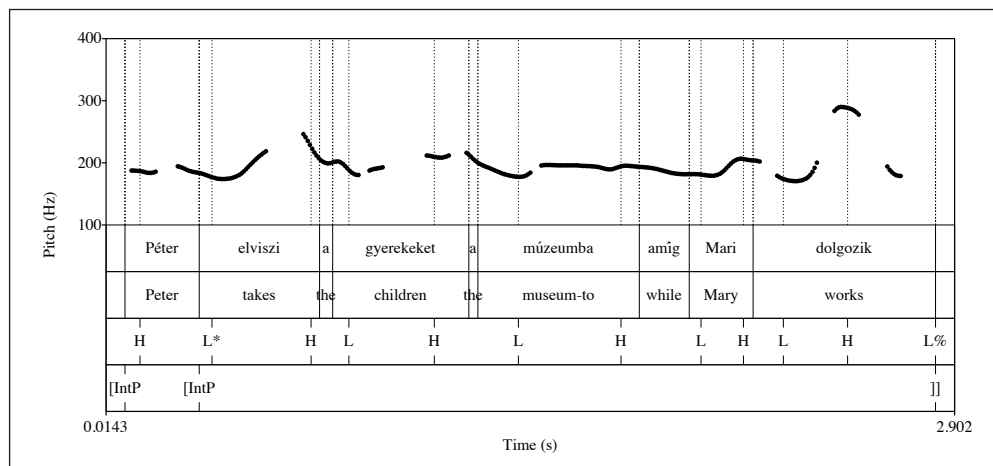


Figure 7: Hungarian yes-no question involving an adjunct clause.

<sup>17</sup> We conclude that the adverbial clause can be attached low, inside or attached to the VP or vP in Hungarian, because a focal adverbial can take scope over it, as in (i).

- (i) [<sub>TopP</sub> Péter<sub>k</sub> [<sub>FocP</sub> kétszer<sub>j</sub> vitte<sub>i</sub> [<sub>VP</sub> [<sub>VP</sub> el [<sub>VP</sub> t<sub>i</sub> t<sub>j</sub> t<sub>k</sub> a gyerekeket a parkba]] [<sub>CP</sub> amíg Mari  
 Peter twice brought PRT the kids-acc the park-to while Mary  
 dolgozott.]]]]  
 worked  
 One possible reading: ‘There were two occasions that Peter took the kids to the park while Mary was working.’

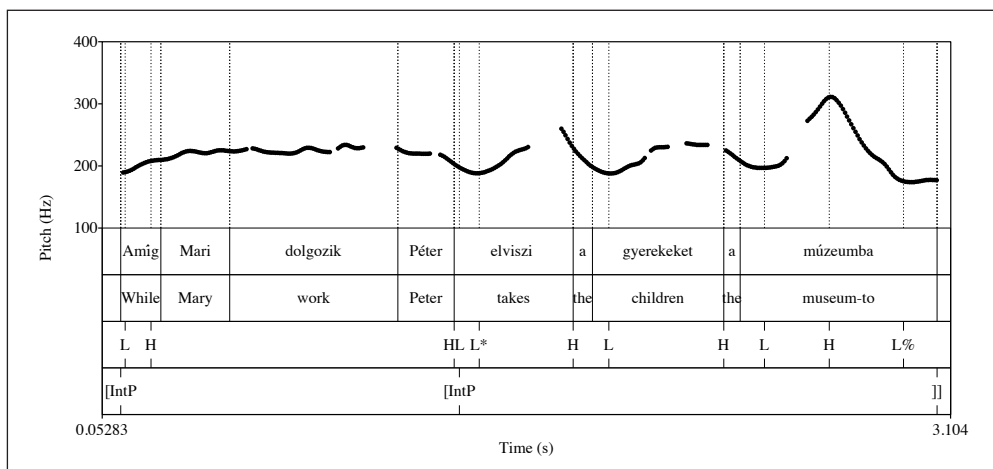
- (35) (  $\iota$  [<sub>TopP</sub> Péter (  $\iota$  [<sub>vP</sub> [<sub>vP</sub> el-viszi addig a gyerekeket a múzeumba]  
 Peter PRT-takes D the children the museum-to  
 [<sub>CP</sub> amíg Mari dolgozik?]]]))  
 while Mary works  
 ‘Does Peter take the children to the museum, while Mary is working?’

Let us now consider a third option, namely when the adjunct clause is extraposed to the left-peripheral position.<sup>18</sup>

As we see from (36b), topics cannot precede extraposed clauses. This means that the extraposed clause is outside the highest projection whose head is overtly filled by verbal material.

- (36) a. (  $\iota$  [<sub>TopP</sub> [<sub>CP</sub> Amíg Mari dolgozik], ([ addig<sub>i</sub>) [<sub>TopP</sub> Péter<sub>j</sub> [<sub>vP</sub> (  $\iota$  el-viszi a  
 while Mary works (D) Peter PRT-takes the  
 gyerekeket a múzeumba  $t_i t_j$ ?]]]]))  
 children-ACC the museum-to  
 ‘While Mary is working, does Peter take the children to the museum?’
- b. \*Péter amíg Mari dolgozik, addig el-viszi a gyerekeket a  
 Peter while Mary works D PRT-takes the children-ACC the  
 múzeumba?  
 museum-to  
 ‘While Mary is working, does Peter take the children to the museum?’

It is either in the C-domain or adjoined to whatever projection hosts topics. The intonational contour of such a complex *yes-no* question is as indicated in Figure 8 (corresponding to (36a)). Here we see that the material preceding the main verb, which bears main stress, is assigned its own phrasal contour. This contour, however, does not signal the presence of an  $\iota$ . Rather, it is a phrasal contour expressing non-finality. This is also the contour that is associated with contrastive topics (Kálmán 2001: 25). Note also that the contour spreads onto the D-like element and the main clause topic, supporting further the idea that the adjunct clause does not form its own  $\iota$ . It simply fails to be integrated to the core- $\iota$  formed by the root clause.



**Figure 8:** Hungarian *yes-no* question with extraposed adjunct clause.

<sup>18</sup> The D-like associate can occur in various places, but that is irrelevant for us here.



### 4 Extra *ι*-edges

So far we have seen that in Bàsàá and Hungarian there is generally no *ι* boundary at the edge of complement and adjunct clauses. It is normally only the root clause whose edges are obligatorily matched by *ι* edges. In this section, we would like to turn to cases where such an *ι* boundary seems to be present at the edge of the embedded clause. We will argue that embedded clause boundaries *can* be marked in Hungarian and Bàsàá under pressure from higher ranked information structural constraints such as ALIGN-TOPIC and STRESSFOCUS.

#### 4.1 Hungarian embedded foci

In Hamlaoui & Szendrői (2015), we adopted earlier proposals and argued that certain information structural constraints play a role in determining the prosodic status of certain elements. This is the case of the constraint in (37), noted STRESSFOCUS in Table 4.

- (37) Focus Rule or Stress-Focus Correspondence Principle (Reinhart 1995, 2006; Szendrői 2001, 2003)  
 “The focus of a clause is a(ny) constituent containing the main stress of the Intonational Phrase, as determined by the stress-rule.”

In particular, we argued that in Hungarian, syntax is responsible for placing the focal element into a position that will satisfy the constraint in (37) – the left-edge of a clause – while conforming with the default syntax-prosody mapping constraints and the default prosodic stress rules. In this language, information-structural requirements are primarily satisfied by non-canonical syntactic constructions with regular syntax-prosody mapping (and default stress). This was illustrated in (29), repeated below for convenience.

- (29) [<sub>TOPP</sub> ( <sub>ι</sub> A maláj lány<sub>k</sub> [<sub>FocP</sub> ( <sub>ι</sub> ELEONÓRÁ-HOZ<sub>j</sub> menekül<sub>ι</sub> [<sub>VP</sub> el [<sub>VP</sub> t<sub>ι</sub> t<sub>k</sub> t<sub>j</sub> the Malay girl Eleonora-to flees away Emília elől.))]]]]  
 Emilia from  
 ‘The Malay girl escapes from Emilia to ELEONORA.’

As for complex clauses, we predict that foci in Hungarian can target the edge of the root clause, even if they originate in the embedded clause, as in (38). This is because our syntax-prosody mapping principles place the left edge of the core *ι* at the left edge of the highest overt position of the root verb. Such long focus constructions are indeed possible (in long focus movement the D-like associate of the embedded clause must be omitted, as stated in Kenesei 1994). Comparing Figure 9 (corresponding to (38)) to focus movement in the main clause of a complex *yes-no* question, as in Figure 4 reveals that their prosodic structure is identical.

	[ <sub>VP</sub> V [ <sub>CP</sub> [ <sub>FocP</sub> Focus V ]]]]	STRESSFOC	SPA- <i>ι</i>	HVP-L/R	<i>ι</i> -L/R	*REC
	a. ( <sub>ι1</sub> [ <sub>VP</sub> V [ <sub>CP</sub> [ <sub>FocP</sub> Focus V ]]] )	!*				
ΕΣ	b. ( <sub>ι1</sub> [ <sub>VP</sub> V [ <sub>CP</sub> ( <sub>ι2</sub> [ <sub>FocP</sub> Focus V ]]] )					*
	c. ( <sub>ι1</sub> ( <sub>ι2</sub> [ <sub>VP</sub> V ] [ <sub>CP</sub> [ <sub>FocP</sub> Focus V ]]] )	!*			) <sub>ι2</sub>	*
	d. ( <sub>ι1</sub> ( <sub>ι2</sub> [ <sub>VP</sub> V ] [ <sub>CP</sub> ( <sub>ι3</sub> [ <sub>FocP</sub> Focus V ]]] )				!) <sub>ι2</sub>	*
	e. ( <sub>ι1</sub> ( <sub>ι2</sub> [ <sub>VP</sub> V ] [ <sub>CP</sub> ( <sub>ι3</sub> [ <sub>FocP</sub> Focus V ] ] ] )				!) <sub>ι2</sub> ) <sub>ι3</sub>	*
	f. ( <sub>ι1</sub> ( <sub>ι2</sub> [ <sub>VP</sub> V ] [ <sub>CP</sub> [ <sub>FocP</sub> Focus V ]]] )	!*			) <sub>ι2</sub>	*
	g. ( <sub>ι1</sub> [ <sub>VP</sub> V ] [ <sub>CP</sub> ( <sub>ι2</sub> [ <sub>FocP</sub> Focus V ]]] )		!*		) <sub>ι1</sub>	
	h. [ <sub>VP</sub> V [ <sub>CP</sub> ( <sub>ι1</sub> [ <sub>FocP</sub> Focus V ]]] )		!*	HVP-L		

Table 4: Complex sentence with an embedded focus.

(38)  $[_{\text{TopP}} ( (_{\text{Lejla}} [_{\text{FocP}} ( (_{\text{A}} \text{MALÁJ LÁNYT}_k \text{mondta}_i [_{\text{VP}} t_i t_j [_{\text{CP}} \text{hogy} [_{\text{VP}} \text{elmenekült}$   
 $\text{Lejla} \quad \text{the Malay girl-ACC said} \quad \text{that} \quad \text{PRT-escaped}$   
 $[_{\text{VP}} t_k t_l \text{Emíliahoz?})])])])])]$   
 Emilia-to  
 ‘Was it THE MALAY GIRL that Lejla said that she escaped to Emilia?’

However, presumably due to processing difficulties, it is a dispreferred option for many speakers (at least in the case of Hungarian, as shown in Gervain 2002, 2005; no large-scale study on this topic exists yet on topicalization in Bàsàá). Even for those speakers that allow it, long focus movement is often only possible with certain matrix predicates, such as the bridge verb *mondta* ‘said’, as in (38). For those speakers and those predicates that disallow long focus movement, an alternative construction is evoked. In this alternative construction, embedded foci target the left edge of the embedded clause, accompanied by verb movement inside the embedded clause. See (39) and Figure 10.

39  $[_{\text{FocP}} \text{ARRA}_k \text{mutatott}_j [_{\text{VP}} \text{rá}_i [_{\text{VP}} t_j t_k t_l [_{\text{CP}} \text{hogy} [_{\text{FocP}} \text{EMÍLIÁHOZ}_o \text{menekült}_m$   
 D-onto showed PRT that Emilia-to escaped  
 $[_{\text{VP}} \text{el}_n [_{\text{VP}} t_m t_n t_o?]])])])]$   
 PRT  
 ‘Was what she indicated that she escaped to EMILIA?’

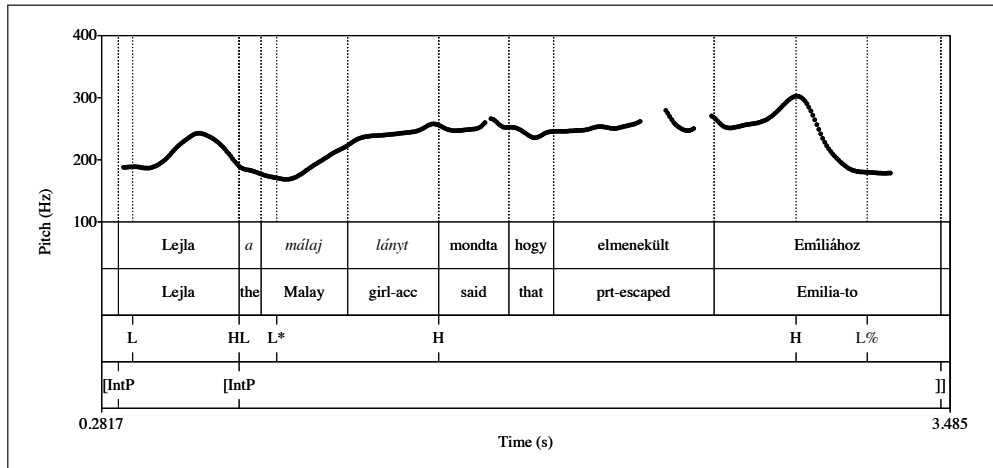


Figure 9: Yes-no question with long focus in Hungarian.

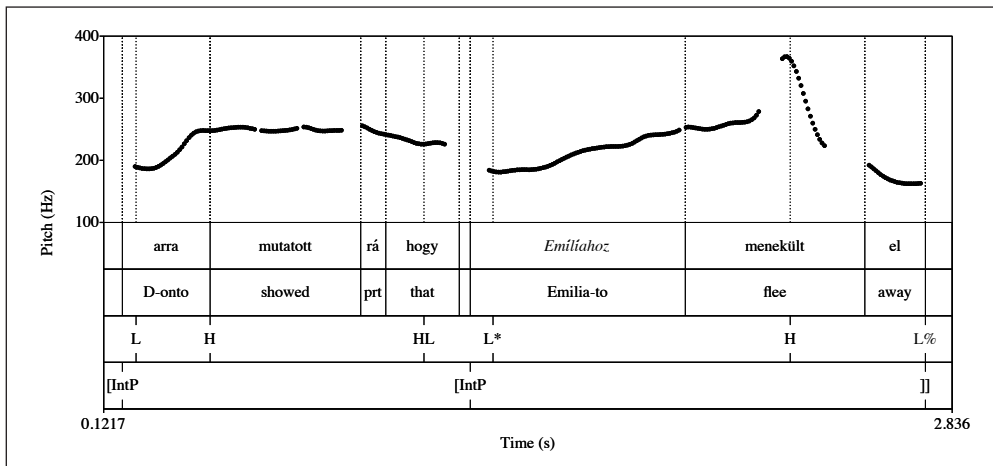


Figure 10: Yes-no question with an embedded focus in Hungarian.

Note that in Hungarian, a left-peripheral focus may occur in an embedded sentence so long as the D-like associate of the embedded clause also occurs in a prominent position, either focused itself, or in a contrastive topic position, but in the latter case, some other element must occur in the matrix focus position. As shown in (40) (a and b), this holds for bridge verbs, like *mond* ‘say’, stress-requiring main clause predicates like *utál* ‘hate’ and verbs that have prefixes, like the factive verb *megbán* ‘regret’.

- (40) a. Péter AZT mondta/utálta/bánta meg, hogy MARY választottuk  
 Peter D-ACC said/hated/regretted PRT that Mary-ACC selected  
 be a bizottságba.  
 PRT the committee-to  
 ‘What Peter said/ hated/ regretted was that we selected MARY to the committee.’
- b. AZT, Péter mondta/utálta/bánta meg, hogy MARY választottuk  
 D-ACC Peter said/hated/regretted PRT that Mary-ACC selected  
 be a bizottságba.  
 PRT the committee-to  
 ‘As for the statement that we selected MARY to the committee, it was PETER who said/ hated/regretted it.’

We would like to propose that in these cases, STRESSFOCUS is satisfied by the selection of a prosodic structure that displays an extra  $\iota$  boundary at the left-edge of the embedded clause (see Table 4). While this is an extra boundary, whose presence is only justified by the need to satisfy STRESSFOCUS, note that it does not violate any of our syntax-prosody or prosody-syntax mapping constraints. This is because our syntax-prosody mapping constraints would only be violated by the absence of an  $\iota$ -boundary at the edge of the root clause, and because the position of the extra  $\iota$  boundary satisfies our prosody-syntax mapping constraints (i.e. ALIGN-L/R ( $\iota$ , HVP)), as it is at the edge of the XP that contains the highest position the embedded verb overtly occupies. Thus, a welcome corollary of our proposal is that although it is possible to have extra  $\iota$  boundaries to satisfy information-structural needs, the position of such boundaries is regulated by the prosody-syntax mapping constraints. As a result, these extra  $\iota$  edges are preferably realized at existing syntactic clausal edges. In other words, given the prosody-syntax mapping constraints we propose, it is not an option to leave topics/foci completely in situ and satisfy the information-structural constraints by inserting extra  $\iota$  boundaries somewhere inside the embedded clause.<sup>19</sup> Such boundaries would always be dispreferred compared to boundaries that align with some syntactic clausal edge.

So, if focus movement is short, then the main stress and corresponding L\* accent falls on the embedded focus, as indicated by the pitch track in Figure 10. This is consistent with the fact that a sentence like the one in (40a) answers a question such as ‘Who was it that Peter said/hated/regretted that we selected to the committee?’. The material involving the main clause and the complementizer associate with a rising pitch contour that is characteristic of contrastive topics in Hungarian (Kálmán 2001: 25). This is a non final contour, which cannot occur independently. This suggests that the phrasing of examples with embedded focus is as in (41).

<sup>19</sup> This is not to say that in situ focusing is not possible in other languages. In languages like English, where the prosodic operation of stress shifting applies to satisfy STRESSFOCUS, candidate *a* would satisfy the constraint without the necessary insertion of an embedded  $\iota$  edge. See Szendrői (2001) or Samek-Lodovici (2005).

- (41) (<sub>i</sub> AZT bánta meg, hogy (<sub>i</sub> MARI-t választottuk be a bizottságba?))  
 D-ACC regretted PRT that Mary-ACC selected PRT the committee-to  
 ‘What he regretted was that we selected MARY to the committee?’

Such a phrasing satisfies both SPA-*ι* and ALIGN-L/R (HVP, *ι*), and since no topic occurs in the matrix clause, ALIGN-L/R (*ι*, HVP) are also satisfied by all the boundaries.

Interestingly, there is an alternative intonation available to *yes-no* questions with embedded foci. As the pitch track in Figure 11 shows, in such cases the question contour is in fact repeated. Indeed, this intonation feels somewhat marked and seems to emphasize the question. We take the presence of the two question contours to show that there are two independent *ι*s. But crucially, the right-edge of the higher *ι* boundary coincides with the last element of the first clause. We believe that this boundary, as well as the lefthand boundary of the second *ι*, is there to satisfy SPA-*ι*. This is consistent with the intended interpretation that the matrix and the embedded clauses constitute two separate speech acts. This comes at the cost of violating ALIGN-R (*ι*, HVP) and ALIGN-L (*ι*, HVP), respectively. The other boundaries satisfy all the constraints. So, the phrasing is as given in (42). In fact, the exact syntactic analysis of such an example is unclear. It is possible that the embedded clause is extraposed to a right-peripheral position, indicating afterthought.<sup>20</sup> If so, the phrasing does not even violate ALIGN-R (*ι*, HVP), only ALIGN-L (*ι*, HVP).

- (42) (<sub>i</sub> AZT bánta meg,) (<sub>i</sub> hogy MARI-t választottuk be a bizottságba?)  
 D-ACC regretted PRT that Mary-ACC selected PRT the committee-to  
 ‘What did he regret? Was it that we selected Mary for the committee?’

To sum up, we have shown how the syntax and prosody of Hungarian complex clauses with an embedded focal constituent can be explained by the interaction of STRESSFOCUS and our proposed mapping constraints. In doing so, we do not follow proposals according to which foci directly introduce their own prosodic edges (Kanerva 1990; Frascarelli 2000; Kenesei 2009). In our view, at least in languages with a stress system, like Hungarian, foci simply tend to occur at the edges of prosodic domains, here *ι*, because this is where sentence stress, i.e. the head of *ι*, is assigned. In addition, we argue against theories that link the position of foci to specific (rigid) syntactic positions (including proposals invok-

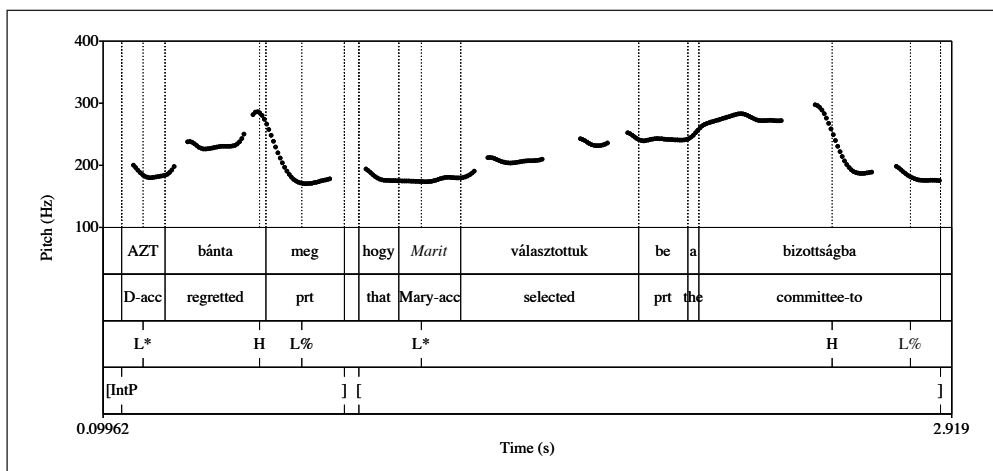


Figure 11: *Yes-no* question with an embedded focus in Hungarian (alternative intonation).

<sup>20</sup> Extraposition to the left is also possible in Hungarian with the same intonation as in Figure 8. Here too, the interpretation seems to be that the extraposed clause clarifies the exact referent of the D-like element, i.e. ‘THAT’s what he regretted, that we chose MARY?’.

ing the notion of syntactic phases, e.g. Bošković 2014). The syntactic position of foci is crucially dependent on the position of the verb in our proposal, precluding a rigid syntactic treatment in terms of designated positions (cf. Rizzi 1997). In our proposal, the position of the verb determines the size of the clause for the purposes of the syntax-prosody mapping of *is*, which in turn has repercussions for the position of the focus, as the focus needs to occupy a position where the head of *ι* can be assigned by the grammar.

#### 4.2 *Bàsàá* embedded topics

Here, we would like to propose that the same type of general interface requirement that applies to foci applies to topics. This requirement is given in (43).

- (43) ALIGN-TOPIC  
Align the left or right edge of a topic with the left or right edge of an *ι*.

Our primary goal here is to account for the position of topical constituents rather than their prosodic category (i.e. whether they form an *ι* of their own, as they seem to do in some languages, or whether they can also constitute a prosodic category lower in the prosodic hierarchy. We come back to this issue subsequently). In our view, topics primarily acquire prosodic prominence by being located at clausal edges, and this is so because this is where intonational phrase edges are naturally inserted.<sup>21</sup> This will give rise to the following typology:

- (44) a. Topic (*ι*     )  
      b. (*ι* Topic     )  
      c. (*ι*     ) Topic  
      d. (*ι*     Topic)

In (44a) and (44b), the topic is external to the core *ι*. These configurations arise when the topic is structurally higher than the highest position occupied by the verb. In particular, (44a) arises when the topic is left-peripheral, as in zero-coded object dislocation in *Bàsàá*, or in sentences with left-peripheral topics in Hungarian and Sotho (Zerbán 2006). (44c) arises if topics are right-peripheral, as in Aghem (Polinsky & Hyman 2009) or French Lambrecht (1994). (44b) and (44d) are configurations where the topic is internal to the core *ι*. We showed in Hamlaoui & Szendrői (2015) that (44b) arises in German V2 clauses, where topics, even contrastive topics, can fill the leftmost  $\phi$  within the core *ι*. The configuration in (44b) is also found in Durban Zulu (Cheng & Downing 2007). The configuration in (44d) is to the best of our knowledge unattested. This is because many languages place main prominence on the final phonological phrase of the core *ι*. In such languages, this position is actually the natural position for focus and leads topics to satisfy (43) from one of the three other possible positions. In addition, it seems to us that right-peripheral topics are much rarer than left-peripheral ones. So, a combination of left-peripheral main prominence (like Hungarian) and right-peripheral topic (like Aghem) would be necessary to potentially allow for the configuration in (44d), both of which seem independently rare.

<sup>21</sup> This preference for edge positions of topics might be related to the serial position effect (Ebbinghaus 1913), that is, the fact that the first and last items in a list are better recalled than items in medial positions. This is generally explained by primacy and recency effects respectively, that is, the fact that items that come first in a list are stored and retrieved from the long term memory and items that come last are present in the short term memory (Murdock 1962). Prosodic prominence acquired by the contiguity with an *ι*-edge (signifying a non-medial position in the speech stream) could potentially facilitate processing and help with both the storage and retrieval of the *file cards* (in Reinhart's 1982 view of topics) under which information is saved. This however extends the scope of the present paper considerably and we leave it open for further research.



Our proposal is agnostic as to the prosodic category of the topic itself. In other words, it is consistent with our ALIGN-TOPIC constraint whether the topic is only a  $\phi$ -phrase or forms an  $\iota$  in itself. The latter can be achieved under the influence of prosodic constraints such as STRONGSTART or EQUALSISTERS, for instance. It contrasts with a previous formulation of ALIGN-TOPIC proposed by Feldhausen (2010), as given in (45). This constraint was put forward to account for left-dislocated topics in Catalan, which tend to align with the right-edge of an  $\iota$  (or intermediate phrase) to the left of the core  $\iota$ . In contrast, there is no place to accommodate languages with left-peripheral topics that do not form their own  $\iota$  in Feldhausen's formulation, and the consistent location of topics at clausal-edges rather than in any position within the core- $\iota$  seems accidental. So, our proposal is empirically preferable as it accounts for attested cross-linguistic variation.

- (45) ALIGN-TOPIC, R (Feldhausen 2010)  
 “Align the right edge of a [dislocated] topic constituent with the right edge of a prosodic phrase [ $\iota$ /Intermediate phrase].”

The constraint in (43) is equally satisfied in sentences (46) to (48), where a Xitsonga topic forms its own  $\iota$  (46) (just like in Italian, in Frascarelli 2000, and in Catalan, in Feldhausen 2010), where a topical expression occupies Spec,CP in German and is prosodically integrated by forming an  $\iota$  together with the remainder of the clause (47), and where a Bàsàà topic sits outside the core- $\iota$  (48) without forming its own  $\iota$ .

- (46) *Xitsonga* (Kisseberth 1994: 154)  
 (  $\iota$  **ti-ho:mú** ) (  $\iota$  hi-hontlovila x-<sup>1</sup>á-xá:v-a.)  
 10-cow 7-giant 7.SM-tense-buy-FV  
 ‘As for the cattle, the giant is buying.’

- (47) *German* (adapted from Frey 2005)  
 (  $\iota$  **Nächtes Jahr** wird der Hans zum Glück eine reich Frau heiraten.)  
 next year will the Hans with luck a rich woman marry  
 ‘Next year, Hans will luckily marry a rich woman.’

- (48) (  $\iota$  **tòlò** (  $\iota$  sínḡâ ì-ṅ-ḡḡé nḡ.))  
 1.mouse 9.cat 9.AGR-PST1-eat 1.PRO  
 ‘The mouse, the cat ate it.’  
 (= The mouse was eaten by the cat.)

(43) is also satisfied by right-peripheral topics as found in Aghem (Polinsky & Hyman 2009) and illustrated in (49). According to Polinsky & Hyman, these expressions are base-generated in the right periphery of the clause and adjoin either to TP or CP. Our constraints in (6) predict the phrasing in (49), in which they sit outside the  $\iota$  constituted by the core clause. Note that they would also satisfy (43) if prosodic evidence eventually reveals that they belong to the core  $\iota$ .

- (49) *Aghem* (Polinsky & Hyman 2009: 216)  
 (  $\iota$  (  $\iota$  bʋá 'tí m̀ zí á'zʒó ) bḡ 'kó.)  
 dogs D PST2 eat yesterday fufu D.OBL  
 ‘The dogs ate fufu YESTERDAY.’

If we are on the right track, then what topics have in common is their location at a clausal edge which, to us, is related to the fact that this is where an intonation phrase boundary

naturally occurs. Recall that the prosody-syntax mapping constraints prevent the random insertion of  $\iota$ -edges within clauses. Together with our syntax-prosody and prosody-syntax mapping constraints, the constraint in (43) favors structures in which topical phrases are located at the edge of syntactic clauses, as this is where  $\iota$  breaks are inserted by default or can be inserted at all (as all clauses are equal from the prosody-syntax perspective).

Just like Hungarian embedded foci, Bàsàá embedded topics involve more prosodic structure than what is predicted on the basis of our mapping constraints in (6). What is illustrated by the Bàsàá examples (50) and (51) is that an  $\iota$  break separates the left-dislocated XP from the embedded clause from which it is extracted.<sup>22</sup>

- (50) [TP [TP (  $\iota$  hálà à-jè lóngé)] [CP 'lé [TP sǐngâ [TP (  $\iota$  sóyól à-n-ǝ́é [VP t<sub>i</sub> jǝ́.)]]]]]]  
 hálà à-jè lóngé lé sǐngâ sóyól à-n-ǝ́é jǝ́  
 so 1.AGR-be.PRES well that 9.cat 1.grandfather 1.AGR-PST1-eat 9.PRO  
 ‘This is good that the cat the grandfather ate it.’  
 (= This is good that the cat was eaten by the grandfather.)

- (51) (  $\iota$  Lingom à-n-lò 'í 'ngéŋ mà-kàlà mǝ́-má-sǝ́ (  $\iota$  sóyól à-ǝ́ék mǝ́.))  
 Lingom à-n-lò í ngéŋ mà-kàlà mǝ́-má-sǝ́  
 Lingom 1.AGR-PST1-arrive at hour 6-doughnuts 6.PRO-6.CONN-all  
 sóyól à-ǝ́ék mǝ́  
 1.grandfather 1.AGR-PST1-eat 6.PRO  
 ‘Lingom arrived when all the doughnuts, the grandfather was eating them.’  
 (= Lingom arrived when all the doughnuts were being eaten by the grandfather.)

The alternative phrasing in (52), in which the embedded clause fails to introduce the left edge of an  $\iota$ , is judged ill-formed by our speaker of Bàsàá.

- (52) \*(  $\iota$  (  $\iota$  hálà à-jè lóngé) 'lé sǐngâ 'sóyól à-n-ǝ́é jǝ́.)  
 hálà à-jè lóngé lé sǐngâ sóyól à-n-ǝ́é jǝ́  
 so 1.AGR-be.PRES well that 9.cat 1.grandfather 1.AGR-PST1-eat 9.PRO  
 ‘This is good that the cat the grandfather ate it.’  
 (= This is good that the cat was eaten by the grandfather.)

In our view, the extra  $\iota$  edge observed in (50) and (51), which marks the highest projection hosting the embedded verb, is related to the need for the extracted topic to align with an  $\iota$  edge (ALIGNTOP in (43)). Although this constitutes an extra edge, one that, due to its non-root location, was not required to satisfy our syntax-prosody constraints, it satisfies the prosody-syntax constraint ALIGN-L ( $\iota$ , HVP). This is visible in Table 5.

Again, like in Hungarian, what we generally observe in Bàsàá is that, aside from clauses that constitute their own Speech Act, only root clauses come with their own  $\iota$  boundaries. Additional  $\iota$  boundaries can sometimes be found, for instance to accommodate embedded topics in Bàsàá. Even these boundaries will satisfy the prosody-to-syntax constraint that ensures that  $\iota$  boundaries mark the edges of the highest projection that host overt verbal material (rather than being inserted in a clause-internal position).

<sup>22</sup> Note that Feldhausen (2010: 93) observes a comparable lack of prosodic integration of embedded left-dislocated phrases in Catalan, a language in which complement clauses normally do not form a separate  $\iota$ . He however analyses the observed prosodic break as marking the right edge of the topical phrase (cf. constraint (45)).

	$[_{TP} V [_{CP} [_{Topic} [_{TP} V]]]]$	ALIGN-TOP	SPA- $\iota$	HVP-L/R	$\iota$ -L/R	*REC
	a. $(_{i_1} [_{TP} V [_{CP} [_{Topic} [_{TP} V]]]])$	!*				
$\text{Bàsàá}$	b. $(_{i_1} [_{TP} V [_{CP} [_{Topic} (_{i_2} [_{TP} V]]]])$					*
	c. $(_{i_1} [_{TP} V (_{i_2} [_{CP} [_{Topic} [_{TP} V]]]])$				! $(_{i_2}$	*
	d. $(_{i_1} [_{TP} V [_{CP} (_{i_2} [_{Topic} (_{i_3} [_{TP} V]]]])$				! $(_{i_2}$	**
	e. $(_{i_1} (_{i_2} [_{TP} V]) [_{CP} [_{Topic} [_{TP} V]]])$				!) $_{i_2}$	*
	f. $(_{i_1} [_{TP} V [_{CP} (_{i_2} [_{Topic} [_{TP} V]]]])$				! $(_{i_2'})_{i_2}$	*
	g. $(_{i_1} (_{i_2} [_{TP} V]) [_{CP} (_{i_3} [_{Topic} [_{TP} V]]]])$				!) $_{i_2'} (_{i_3}$	*
	h. $(_{i_1} [_{TP} V] [_{CP} (_{i_2} [_{Topic} [_{TP} V]]]])$	!*			) $_{i_1'} (_{i_2}$	
	i. $(_{i_1} [_{TP} V] [_{CP} (_{i_2} [_{Topic} (_{i_3} [_{TP} V]]]])$	!*			) $_{i_1'} (_{i_2'})_{i_2}$	
	j. $(_{i_1} (_{i_2} [_{TP} V] [_{CP} [_{Topic} (_{i_3} [_{TP} V]]]])$				!) $_{i_2}$	*
	k. $(_{i_1} (_{i_2} [_{TP} V]) [_{CP} (_{i_3} [_{Topic} (_{i_4} [_{TP} V]]]])$				!) $_{i_2'} (_{i_3'})_{i_3}$	*
	l. $[_{TP} V [_{CP} [_{Topic} (_{i_1} [_{TP} V]]]])$	!*		HVP-L		
	m. $[_{TP} V [_{CP} [_{Topic} (_{i_1} [_{TP} V]]]])$	!*		HVP-L	$(_{i_1}$	

**Table 5:** Complex sentence with topic in the in situ embedded clause.

## 5 Conclusion

In this paper, we have elaborated on our proposal that syntax-prosody mapping constraints that relate syntactic clauses to  $\iota$ s do not rigidly refer to specific syntactic categories, but rather, that what constitutes a clause is the highest projection whose head is overtly filled by the root verb. We have argued that, in conjunction with a distinction of the syntax-prosody requirements from the prosody-syntax ones, this approach allows us to capture the well-known asymmetry between root and non-root clauses. More specifically, we proposed that while root-clauses have a privileged status from the syntax-to-prosody mapping perspective, all clauses are equal in prosody-to-syntax mapping. This has the effect that, whereas in many languages like Bàsàá and Hungarian only root clauses normally map onto  $\iota$ s, additional  $\iota$  edges can be found under the pressure of high-ranked prosodic, processing or information-structural requirements. This is the case with Hungarian embedded foci and Bàsàá embedded topics, where embedded  $\iota$  edges are meant to satisfy STRESSFOCUS and ALIGNEDTOPIC, respectively. Importantly, if they are ranked high enough, the prosody-syntax mapping constraints simply favor extra  $\iota$  edges that correspond to (embedded) clausal edges over clause-internal ones.

## Abbreviations

ACC = accusative, AGR = agreement, AUG = augment, CONN = connective, D = determiner, DEM = demonstrative, FTS = Falling tone simplification, HTS = High tone spread, HVP = highest overt projection of the verb, LOC = locative, PRES = present, PRO = pronoun, PRT = particle, PST = past, SPA = speech act, SM = subject marker, SUBJ = subjunctive

## Acknowledgements

We would like to thank our editors and reviewers for the constructive critique and useful suggestions, with special thanks to Emily Elfner for extensive helpful comments. Our thanks are also due to Lisa Selkirk and Laurent Roussarie for feedback on earlier versions of this paper, and Emmanuel-Moselly Makasso and Carole Ngo Sohna for the Bàsàá data and judgments. The usual disclaimers apply.

## Competing Interests

The authors have no competing interests to declare.

## References

- Bassong, Paul Roger. 2010. *The structure of the left-periphery in Bàsàà*. Yaoundé: Université de Yaoundé 1 MA thesis.
- Bitjaa, Kody & Zaché Denis. 1993. Le système tonal du basaa. *Journal of West African Languages* 23(1). 65–72.
- Bošković, Željko. 2014. Now I'm a Phase, now I'm not at Phase: On the variability of Phases with extraction and ellipsis. *Linguistic Inquiry* 45(1). 27–89. DOI: [https://doi.org/10.1162/LING\\_a\\_00148](https://doi.org/10.1162/LING_a_00148)
- Cheng, Lisa Lai-Shen & Laura Jo Downing. 2007. The prosody and syntax of Zulu relative clauses. *SOAS Working Papers in Linguistics* 15. 51–63.
- Cheng, Lisa Lai-Shen & Laura Jo Downing. 2009. Where's the topic in Zulu. *The Linguistic Review* 26. 207–238. DOI: <https://doi.org/10.1515/tlir.2009.008>
- Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press. DOI: <https://doi.org/10.7551/mitpress/9780262527347.001.0001>
- Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36(1). 1–22. DOI: <https://doi.org/10.1162/0024389052993655>
- Dimmendaal, Gerrit. 1988. *Aspects du basaa*. Peeters/SELAF. [translated by Luc Bouquiaux].
- Downing, Bruce. 1970. *Syntactic structure and phonological phrasing in English*. Austin, TX: University of Texas at Austin dissertation.
- Ebbinghaus, Hermann. 1913. *Memory: A contribution to experimental psychology*. Columbia University: Teachers College. Über das Gedächtnis, 1885.
- É. Kiss, Katalin. 1995. *Discourse configurational languages*. Oxford: Oxford University Press.
- Elfner, Emily. 2012. *Syntax-prosody interactions in Irish*. Amherst, MA: University of Massachusetts Amherst dissertation.
- Elfner, Emily. 2015. Recursion in prosodic phrasing: Evidence from Connemara Irish. *Natural Language and Linguistic Theory* 33. 1169–1208. DOI: <https://doi.org/10.1007/s11049-014-9281-5>.
- Feldhausen, Ingo. 2010. *Sentential form and prosodic structure of Catalan*. Amsterdam: John Benjamins. DOI: <https://doi.org/10.1075/la.168>
- Frascarelli, Mara. 2000. *The syntax-phonology interface in focus and topic constructions in Italian*. Dordrecht: Kluwer Academic Publishers. [http://dx.doi.org/10.1007/978-94-015-9500-1\\_4](http://dx.doi.org/10.1007/978-94-015-9500-1_4).
- Frey, Werner. 2005. Pragmatic properties of certain German and English left peripheral constructions. *Linguistics* 43. 89–129. DOI: <https://doi.org/10.1515/ling.2005.43.1.89>
- Genzel, Susanne, Shinichiro Ishihara & Balázs Surányi. 2015. The prosodic expression of focus, contrast and givenness: A production study of Hungarian. *Lingua* 165. 183–204. DOI: <https://doi.org/10.1016/j.lingua.2014.07.010>
- Gervain, Judit. 2002. *Linguistic methodology and microvariation in language: the case of operator-raising in Hungarian*. Szeged: Szeged University MA thesis.
- Gervain, Judit. 2005. Two strategies of focus-raising: movement and resumption. In Chris Pinón & Péter Siptár (eds.), *Approaches to Hungarian* 9. Budapest: Akadémiai Kiadó.
- Gyuris, Beáta & Katalin Mády. 2014. Contrastive topics between syntax and pragmatics in Hungarian: An experimental analysis. In *Proceedings from the Annual Meeting of the Chicago Linguistic Society*, vol. 46. 147–162.

- Hamlaoui, Fatima. 2014. A note on bare-passives in selected Bantu and Nilotic languages. In Fatima Hamlaoui (ed.), *Proceedings of the workshop BantuSynPhonIS: Preverbal domains* (ZASPiL 57). 160–182.
- Hamlaoui, Fatima & Emmanuel-Moselly Makasso. 2015. Focus marking and the unavailability of inversion structures in the Bantu language Bàsàá. *Lingua* 154. 35–64. DOI: <https://doi.org/10.1016/j.lingua.2014.10.010>
- Hamlaoui, Fatima & Kriszta Szendrői. 2015. A flexible approach to the mapping of intonational phrases. *Phonology* 32(1). 79–110. DOI: <https://doi.org/10.1017/S0952675715000056>
- Hamlaoui, Fatima, Siri Gjersøe & Emmanuel-Moselly Makasso. 2014. High tone spreading and phonological phrase in Bàsàá. In Carlos Gussenhoven, Yiya Chen & Dan Dediú (eds.), *Proceedings of the 4th international symposium on Tonal Aspects of Languages*. 27–31. ISCA Archive: [http://www.isca-speech.org/archive/tal\\_2014](http://www.isca-speech.org/archive/tal_2014).
- Hayashi, Akiko & Reiko Mazuka. 2002. Developmental change in infants' preferences for continuousness in Japanese speech. Paper presented at the 13th Biennial International Conference on Infant Studies, Toronto.
- Hirsch-Pasek, Kathy, Deborah G. Kemler-Nelson, Peter W. Jusczyk, Kimberly Wright Cassidy, Benjamin Druss & Lori Kennedy. 1987. Clauses are perceptual units for young infants. *Cognition* 26. 269–286. DOI: [https://doi.org/10.1016/S0010-0277\(87\)80002-1](https://doi.org/10.1016/S0010-0277(87)80002-1)
- Hyman, Larry. 2003. Basaá (A43). In Derek Nurse & Gérard Philippson (eds.), *The Bantu languages*, 257–282. Routledge.
- Ishihara, Shinichiro. 2014. On Match constraints. Presented at the Workshop on the prosodic hierarchy in a typological perspective, Stockholm University.
- Ishihara, Shinichiro. in press. Wh- and yes/no-question in Tokyo Japanese. In Chungmin Lee, Ferenc Kiefer & Manfred Krifka (eds.), *Contrastiveness in information structure, alternatives and scalar implicatures*. New York/Heidelberg: Springer.
- Ito, Junko & Armin Mester. 2013. Prosodic subcategories in Japanese. *Lingua* 124. 20–40. DOI: <https://doi.org/10.1016/j.lingua.2012.08.016>
- Jenks, Peter, Emmanuel-Moselly Makasso & Larry Hyman. 2012. Accessibility and demonstrative operators in Basaá relative clauses. To appear in a volume on relative clauses in the languages of Cameroon.
- Jokweni, Mbulelo. 1995. *Aspects of IsiXhosa phrasal phonology*. Champaign and Urbana, IL: University of Illinois at Urbana Champaign dissertation.
- Kálmán, László. 2001. *Magyar leíró nyelvtan: Mondattan i [Hungarian descriptive grammar: Syntax 1]*. Budapest: Tinta Publishing House.
- Kandybowicz, Jason & Harold Torrence. 2015. The prosodic licensing of wh-in-situ: Evidence from Krachi and Wasa. In Ruth Kramer, Elizabeth Zsiga & Boyer One Tlale (eds.), *Selected proceedings of the 44th Annual Conference on African Linguistics*. 146–157. Somerville, MA: Cascadilla Proceedings Projects.
- Kandybowicz, Jason. in press. On prosodic variation and the distribution of wh-in-situ. *Linguistic Variation*. <https://kandybowicz.commons.gc.cuny.edu/files/2016/03/Tano-Prosodic-Variation.pdf>.
- Kanerva, Jonni. 1990. Focusing on phonological phrases in Chichewa. In Sharon Inkelas & Draga Zec (eds.), *The phonology-syntax connection*, 145–162. Chicago, IL: The University of Chicago Press.
- Kan, Seda. 2009. *Prosodic domains and the syntax-prosody mapping in Turkish*. Istanbul: Boğaziçi University MA thesis.
- Kenesei, István. 1994. Subordinate clauses. In Ferenc Kiefer & Katalin É. Kiss (eds.), *The syntactic structure of Hungarian* (Syntax and Semantics 27), 275–354. Leiden: Brill.



- Kenesei, István. 2009. Quantifiers, negation, and focus on the left periphery in Hungarian. *Lingua* 119(4). 564–591. DOI: <https://doi.org/10.1016/j.lingua.2007.11.004>
- Kisseberth, Charles. 1994. On domains. In *Perspectives in phonology*, 133–166. Stanford: CSLI Publications.
- Krifka, Manfred. 1995. Swahili. In Joachim Jacobs, Arnim von Stechow, Wolfgang Sternefeld & Theo Vennemann (eds.), *Syntax: An international handbook of contemporary research*, 1397–1418. Berlin: De Gruyter.
- Ladd, Robert. 1986. Intonational phrasing: The case of recursive prosodic structure. *Phonology Yearbook* 3. 311–340. DOI: <https://doi.org/10.1017/S0952675700000671>
- Ladd, Robert. 1992. Compound prosodic domains. *Occasional paper*. Edinburgh: University of Edinburgh.
- Ladd, Robert. 1996. *Intonational phonology*. Cambridge: Cambridge University Press.
- Lambrecht, Knud. 1994. *Information structure and sentence form: Topic, focus, and the mental representation of discourse referents*. Cambridge: Cambridge University Press. DOI: <https://doi.org/10.1017/CBO9780511620607>
- Lemb, Pierre & François de Gastines. 1973. *Dictionnaire Basaá-Français*. Collège Libermann Douala.
- Makasso, Emmanuel-Moselly. 2010. Processus de relativisation en Basàa: de la syntaxe à la prosodie. In Laura Downing, Annie Rialland, Jean-Marc Beltzung, Sophie Manus, Cédric Patin & Kristina Riedel (eds.), *Papers from the Workshop on Bantu relative clauses (ZASPiL 53)*. 145–158.
- Makasso, Emmanuel-Moselly. 2012. Metatony in Basaa. In Michael Marlo (ed.), *Selected proceedings of the 42nd Annual Conference on African Linguistics*. 15–22. Somerville, MA: Cascadilla Proceedings Project.
- Makasso, Emmanuel-Moselly. 2014. The melodic tone pattern in Basaa. *Africana Linguistica* 20. 225–241.
- Makasso, Emmanuel-Moselly, Fatima Hamlaoui & Seunghun Julio Lee. 2016. Aspects of the intonational phonology of Basàá. In Laura Jo Downing & Annie Rialland (eds.), *Intonation in African tone languages*, 167–194. Berlin: Mouton de Gruyter. DOI: <https://doi.org/10.1515/9783110503524-006>
- McCarthy, John & Alan Prince. 1993. Generalized alignment. Tech. rep. Rutgers Center for Cognitive Science, Rutgers University New Brunswick. DOI: [https://doi.org/10.1007/978-94-017-3712-8\\_4](https://doi.org/10.1007/978-94-017-3712-8_4)
- Murdock, Bennet B. 1962. The serial position effect of free recall. *Journal of Experimental Psychology* 64(5). 482–488. DOI: <https://doi.org/10.1037/h0045106>
- Myrberg, Sara. 2010. *The intonational phonology of Stockholm Swedish* (ACTA Universitatis Stockholmiensis 53 Stockholm Studies in Scandinavian Philology New Series). Stockholm: Department of Scandinavian Languages, Stockholm University dissertation.
- Myrberg, Sara. 2013. EQUALSISTERS and prosodic branching. *Phonology* 30(1). 73–124. DOI: <https://doi.org/10.1017/S0952675713000043>
- Nazzi, Thierry, Deborah G. Kemler-Nelson, Peter W. Jusczyk & Ann Marie Jusczyk. 2010. Six-month-olds' detection of clauses embedded in continuous speech: Effects of prosodic well-formedness. *Infancy* 1(1). 123–147. DOI: [https://doi.org/10.1207/S15327078IN0101\\_11](https://doi.org/10.1207/S15327078IN0101_11)
- Nespor, Marina & Irene Vogel. 1986. *Prosodic phonology*. Dordrecht: Foris.
- Pak, Marjorie. 2007. Relative clauses without CPs in Luganda. Presented at the Western Conference on Linguistics (WECOL), University of California, San Diego.
- Pak, Marjorie. 2008. *The postsyntactic derivation and its phonological reflexes*. Philadelphia, PA: University of Pennsylvania dissertation.



- Polinsky, Maria & Larry Hyman. 2009. Focus in Aghem. In Malte Zimmermann & Caroline Féry (eds.), *Information structure: Theoretical, typological, and experimental perspectives*, 206–233. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/acprof:oso/9780199570959.001.0001>
- Pollock, Jean-Yves. 1989. Verb-movement, Universal Grammar, and the structure of IP. *Linguistic Inquiry* 20. 356–424.
- Prince, Ellen. 1981. Topicalization, focus-movement, and Yiddish movement: A pragmatic differentiation. In *Proceedings of the Seventh Annual Meeting of the Berkeley Linguistics Society*. 249–264.
- Reinhart, Tanya. 1982. Pragmatics and linguistics – An analysis of sentence topics. Tech. rep. IULC, Bloomington, IN.
- Reinhart, Tanya. 1995. Interface strategies. In *OTS Working Papers in Theoretical Linguistics*, 55–109. Utrecht: OTS, Utrecht University.
- Reinhart, Tanya. 2006. *Interface strategies: Optimal and costly computations*. Cambridge, MA: MIT press. DOI: <https://doi.org/10.1017/S0022226707005075>
- Rizzi, Luigi. 1997. The fine structure of the left periphery. In Liliane Haegeman (ed.), *Elements of grammar*, 281–337. Dordrecht: Kluwer. DOI: [https://doi.org/10.1007/978-94-011-5420-8\\_7](https://doi.org/10.1007/978-94-011-5420-8_7)
- Samek-Lodovici, Vieri. 2005. Prosody-syntax interaction in the expression of focus. *Natural language and Linguistic Theory* 23. 687–755. DOI: <https://doi.org/10.1007/s11049-004-2874-7>
- Schmitz, Michaela. 2008. *The perception of clauses in 6- and 8-month-old German-learning infants: Influence of pause duration and the natural pause hierarchy*. Potsdam: Universitätsverlag Potsdam.
- Selkirk, Elisabeth. 1981. On the nature of phonological representation. In Terry Myers, John Laver & John Anderson (eds.), *The cognitive representation of speech*, 379–388. Amsterdam: Elsevier. DOI: [https://doi.org/10.1016/s0166-4115\(08\)60213-7](https://doi.org/10.1016/s0166-4115(08)60213-7)
- Selkirk, Elisabeth. 1984. *Phonology and syntax. The relation between sound and structure*. Cambridge, MA: MIT press.
- Selkirk, Elisabeth. 1986. On derived domains in sentence phonology. *Phonology Yearbook* 3. 371–405. DOI: <https://doi.org/10.1017/S0952675700000695>
- Selkirk, Elisabeth. 1995. The prosodic structure of function words. In *Papers in Optimality Theory*, 439–470. Amherst, MA: GLSA. DOI: <https://doi.org/10.1002/9780470756171.ch25>
- Selkirk, Elisabeth. 1996. The prosodic structure of function words. In James L. Morgan & Katherine Demuth (eds.), *Signal to syntax: Bootstrapping from speech to grammar in early acquisition*, 186–214. New York, NY: Psychology Press.
- Selkirk, Elisabeth. 2009. On clause and intonational phrase in Japanese: The syntactic grounding of prosodic constituent structure. *Gengo Kenkyu* 136. 35–73.
- Selkirk, Elisabeth. 2011. The syntax-phonology interface. In John Goldsmith, Jason Riggle & Alan Yu (eds.), *The handbook of phonological theory*, 485–532. Oxford: Blackwell Publishing. DOI: <https://doi.org/10.1002/9781444343069.ch14>
- Selkirk, Elisabeth & Seunghun Julio Lee. 2015. Constituency in sentence phonology: An introduction. *Phonology* 32(1). 1–18. DOI: <https://doi.org/10.1017/S0952675715000020>
- Soderstrom, Melanie, Deborah Kemler-Nelson & Peter Jusczyck. 2005. Six month-olds recognize clauses embedded in different passages of fluent speech. *Infant Behavior and Development* 28(1). 87–94. DOI: <https://doi.org/10.1016/j.infbeh.2004.07.001>
- Szendrői, Kriszta. 2001. *Focus and the syntax-phonology interface*. London: University College of London dissertation.

- Szendrői, Kriszta. 2003. A stress-based approach to the syntax of Hungarian focus. *The Linguistic Review* 20. 37–78. DOI: <https://doi.org/10.1515/tlir.2003.002>
- Szendrői, Kriszta. in press. The syntax of information structure and the PF interface. *Glossa*. DOI: <https://doi.org/10.5334/gjgl.140>
- Truckenbrodt, Hubert. 1995. *Phonological phrases: Their relation to syntax, focus, and prominence*. Cambridge, MA: Massachusetts Institute of Technology dissertation.
- Truckenbrodt, Hubert. 1999. On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30(2). 219–282. DOI: <https://doi.org/10.1162/002438999554048>
- Truckenbrodt, Hubert. 2005. A short report on intonation phrase boundaries in German. *Linguistische Berichte* 203. 273–296.
- Truckenbrodt, Hubert. 2015. Intonation phrases and speech acts. In Marlies Kluck, Dennis Ott & Mark de Vries (eds.), *Parenthesis and ellipsis. Crosslinguistic and theoretical perspectives*, 301–349. Berlin: Walter de Gruyter. DOI: <https://doi.org/10.1515/9781614514831.301>
- Wagner, Michael. 2005. *Prosody and recursion*. Cambridge, MA: Massachusetts Institute of Technology dissertation.
- Zerbian, Sabine. 2006. *Expression of information structure in the Bantu language Northern Sotho* (ZASPiL 45). Berlin: Humboldt-Universität zu Berlin dissertation.
- Zerbian, Sabine. 2007. Subject/object-asymmetry in Northern Sotho. In Kerstin Schwabe & Susanne Winkler (eds.), *Information structure and the architecture of grammar: A typological perspective*, 323–346. Amsterdam: John Benjamins.

**How to cite this article:** Hamlaoui, Fatima and Kriszta Szendrői. 2017. The syntax-phonology mapping of intonational phrases in complex sentences: A flexible approach. *Glossa: a journal of general linguistics* 2(1): 55.1–31, DOI: <https://doi.org/10.5334/gjgl.215>

**Published:** 14 June 2017

**Copyright:** © 2017 The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC-BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. See <http://creativecommons.org/licenses/by/4.0/>.

]u[ *Glossa: a journal of general linguistics* is a peer-reviewed open access journal published by Ubiquity Press.

OPEN ACCESS 