An Analysis of the Intonation of Complex Sentences in Farsi[*]

Timothy Arbisi-Kelm
University of Wisconsin-Madison, arbisikelm@wisc.edu

1. Introduction

This paper examines the intonation patterns of Farsi produced in complex sentences. The elicitations of two native Farsi speakers, Sharon and Henry, were compiled and analyzed following the ToBI transcription system.
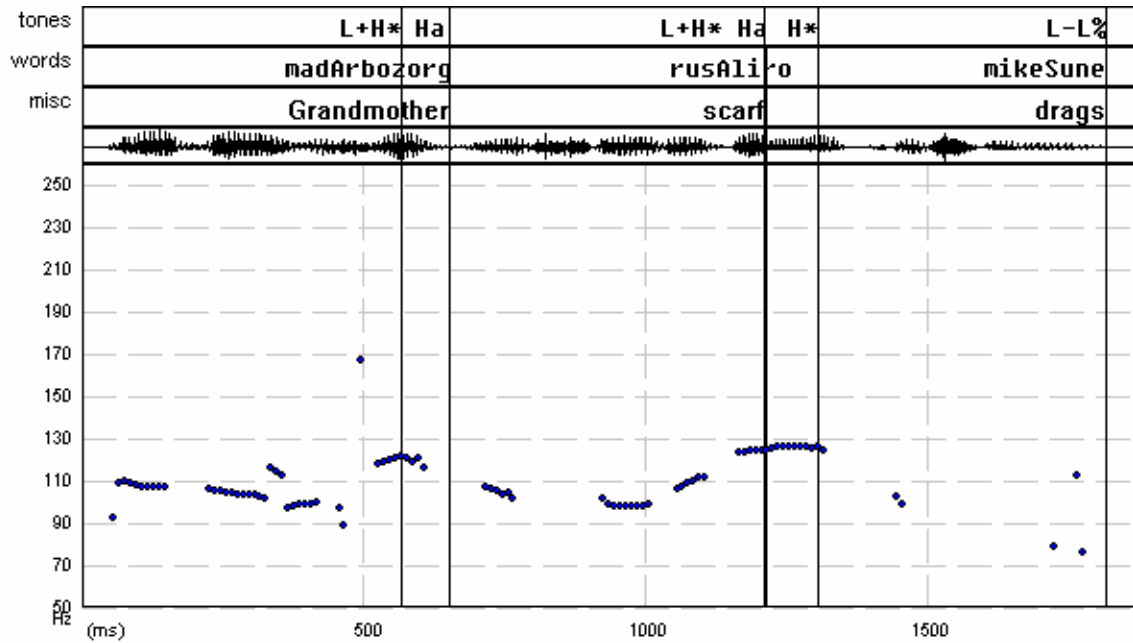
2. Simple Declaratives

It is proposed here that basic Farsi intonation structure consists of three levels, in increasing hierarchical order: the Accentual Phrase (AP), the intermediate phrase (ip), and the Intonation Phrase (IP). The end of the AP is often marked by a high tone, Ha, and rarely a low tone, La (La occurs vacuously utterance finally, marked by L-L%. In this paper, this type of La is not labeled). An AP has at most one pitch accent (L+H*, H*, or H*+L) and the most common type is L+H*. The end of an ip is marked by a boundary tone, H- or L-, and phrase-final lengthening. The end of an IP is also marked by H% or L%, but the degree of IP-final lengthening is stronger than that of ip-final lengthening.

As a highly inflected language, Farsi has relatively free word order, although SOV occurs most commonly. Farsi intonation is characterized by rising contour pitch accents realized on both open and closed-class words. Figure 1 displays the canonical pattern, in which L+H* contour pitch accents are produced on the final syllable of nouns and on the initial syllable of a verb.

Evidence for accentual phrases can also be identified in Figure 1 as a phonetically realized upstep following a pitch accented syllable. Except for cases when unbounded grammatical morphemes occur, each word boundary also represents an accentual phrase boundary (Ha or La). Declaratives terminate in low intermediate and intonational phrase boundary tones. The singleton high pitch accent (H*) could likely reflect the allotonic realization of an underlying bitonal L+H* pitch accent, given that very little material separates finally-stressed *rusArio* from the initially-stressed verb *mikeSune.*


Figure 1: f0 track of a simple declarative (Henry): 'Grandmother drags the scarf.'

3. Complex Declaratives—Basic Pattern

A look at a similarly structured complex sentence reveals the same contour stress pattern, though with a de-accenting of material within a relative clause:

Figure 2: f0 track of a complex declarative (Henry): 'Grandmother drags the scarf that Nanaz sees.'
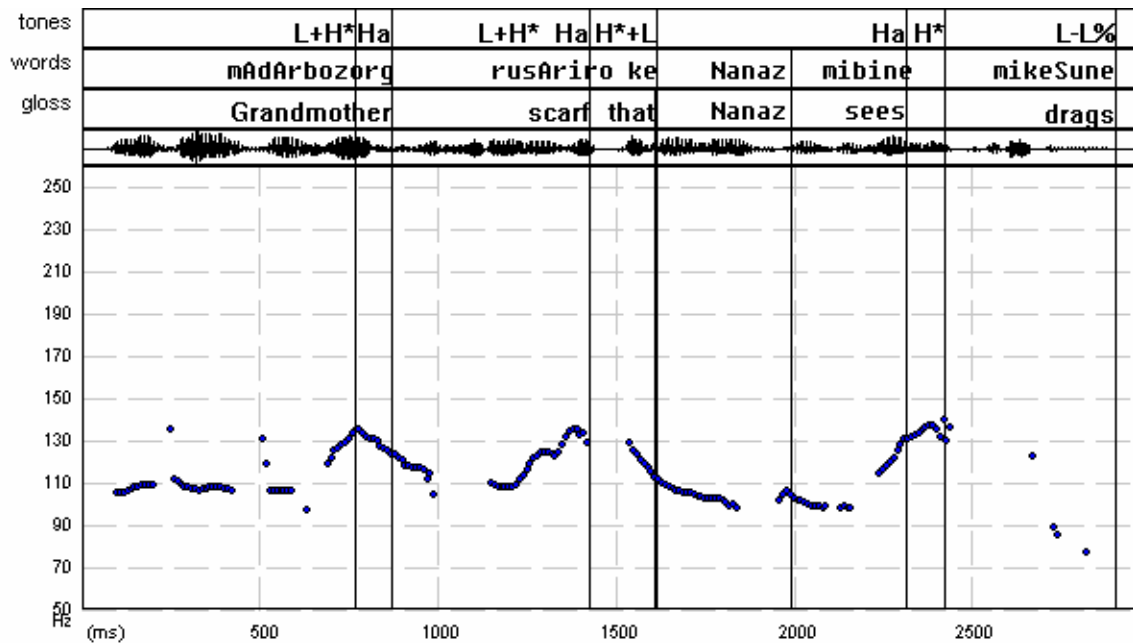
It will be tentatively hypothesized that the complementizer *ke* carries a falling contour pitch accent (H*+L). As a grammatical morpheme, it does not itself form an accentual phrase. Moreover, the complementizer functions as a trigger which de-accents what are normally pitch-accented content words, such as nouns like *Nanaz* (word-final stress) and verbs like *mibine* (word-initial stress). The final rise at the end of the relative clause, *ke Nanaz mibine* 'that Nanaz sees', marks the termination of an accentual phrase, Ha. Pitch accent on the initial syllable of the verb *mikeSune* 'drags' is higher than the preceding f0 peak (thus it can be labeled as ^H*, upstepped High pitch accent). But as will be shown later, the pitch accent on the sentence-final verb is not always fully realized.

4. Relative Clauses

As seen in Figure 2 above, relative clauses are generally marked by a de-phrasing of the entire clause following the complementizer, with the de-accenting of all normally pitch-accented forms. However, there are several instances when this de-accenting pattern does not occur. In Sharon's data there is a relatively common tendency for relative clauses to resist de-accenting when they are uttered in sentence-final position:

Figure 3: Relative clause 1—no de-accenting sentence-finally (Sharon): 'Grandma drags the scarf that Nanaz sees.'
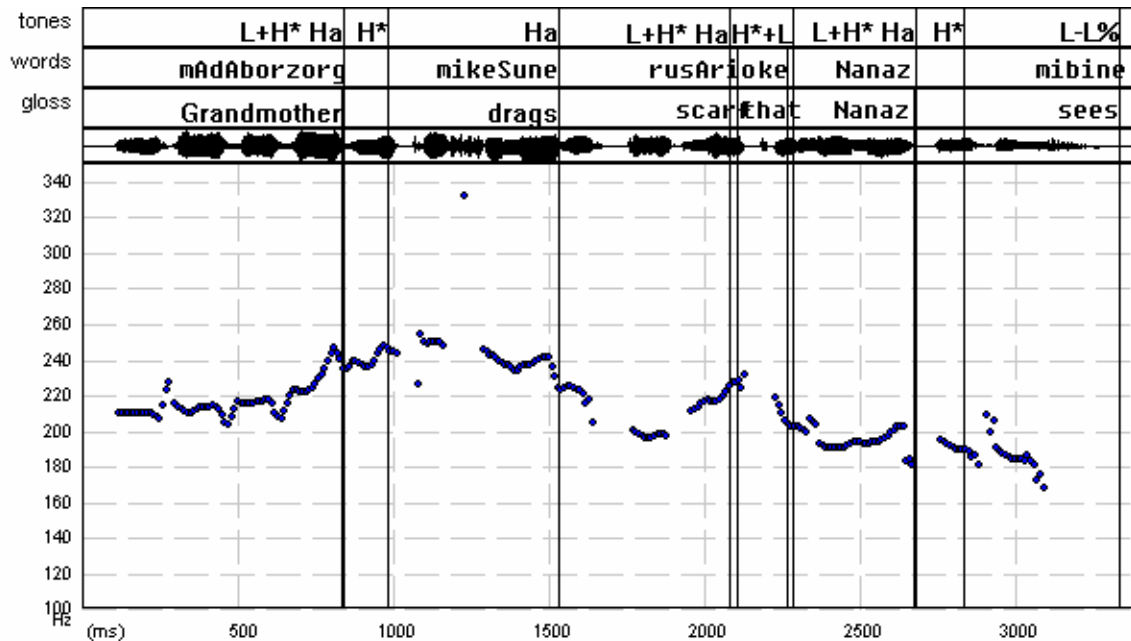

The major difference between Henry's and Sharon's production lies in the word order, which effectively alters the overall intonation pattern. In particular, the de-accenting of the relative clause *ke Nanaz mibine* 'that Nanaz sees' is prevented when the clause terminates the sentence. As Figure 3 shows, both the noun *Nanaz* and the verb *mibine* receive pitch accents, despite occurring within the relative clause. Each pitch accent in turn creates a separate accentual phrase. This is in contradistinction to the behavior of

both *Nanaz* and *mibine* in Figure 2, which are both de-accented and contained within the same AP.

The claim that suspension of de-accenting is not simply an unpredictable speaker idiosyncrasy can be confirmed in the following rearrangement of a sentence of identical structure, elicited from the same speaker:

Figure 4: Relative clause 2—de-accenting sentence-medially (Sharon): 'The chair that Nanaz sees I drag.'
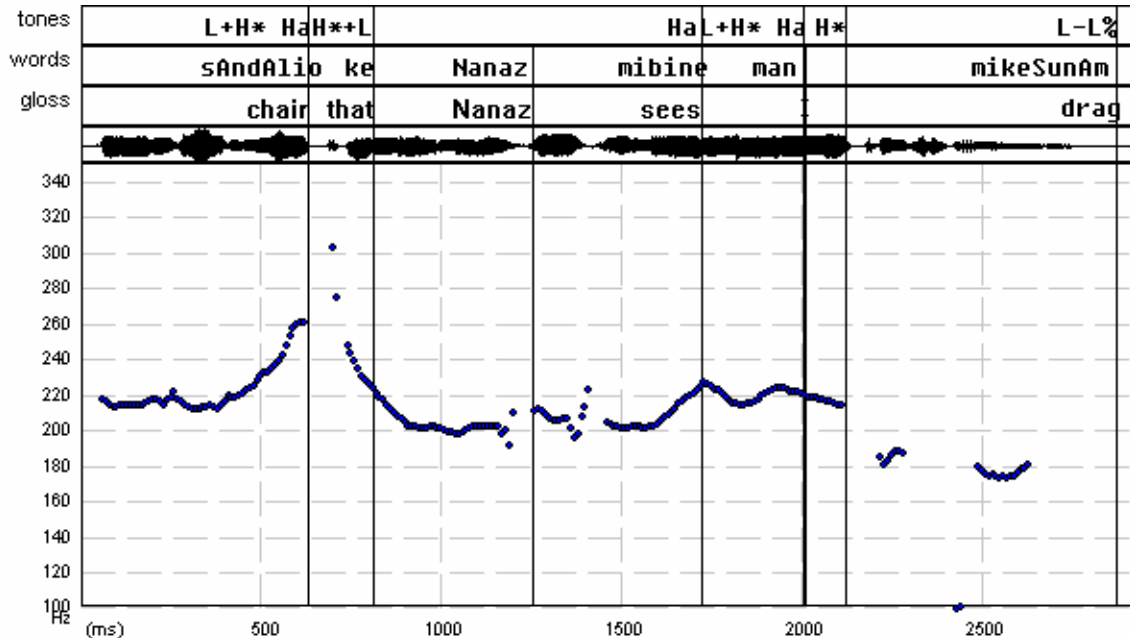
By relocating the relative clause to the beginning of the sentence, de-accenting is no longer suppressed. Thus, previously pitch-accented *Nanaz* is allowed to de-accent, and the entire relative clause is de-phrased, resulting in a single accentual phrase. For further emphasis, the default order of the exact same sentence from Figure 4 is shown below, again revealing the lack of de-accenting when relative clauses surface sentence-finally:

Once again, as in Figure 3, sentence-final relative clauses do not undergo either de-phrasing or de-accenting, revealed by the pitch accents surfacing on both *Nanaz* and *mibine.*

Interestingly, this behavior of sentence-final relative clauses can be overridden by focusing earlier words. Figure 6 shows a case in which the main verb *mikeSunAm* is contrastively focused, resulting in both the de-phrasing and de-accenting of all subsequent material:

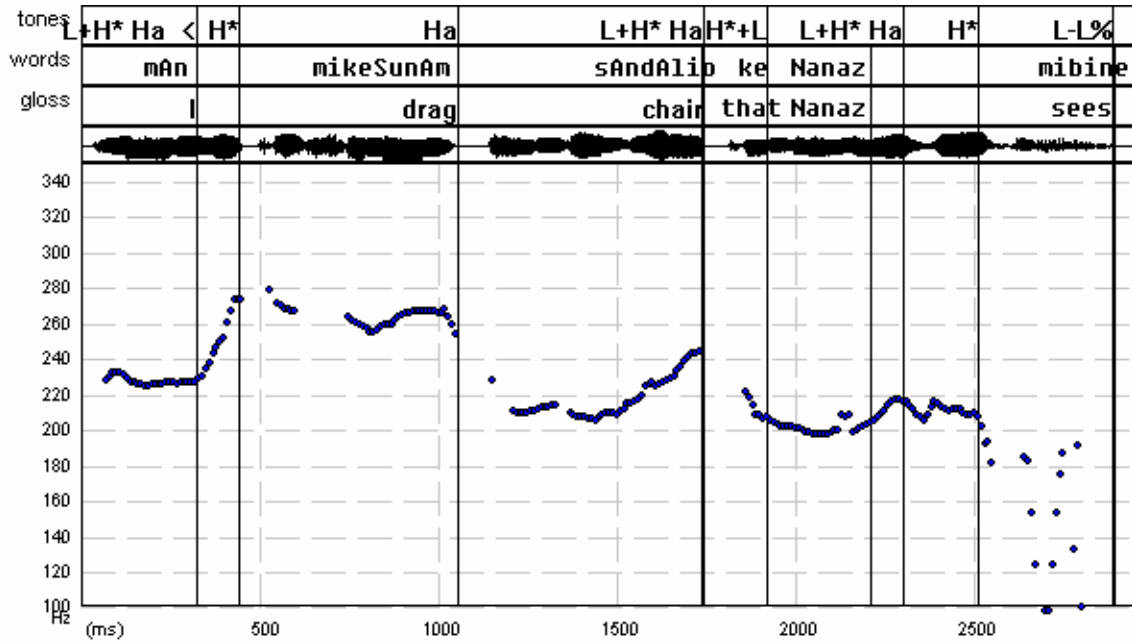Figure 5: Relative clause 3— no de-accenting sentence-finally (Sharon): 'I drag the chair that Nanaz sees.'

Figure 6: Complex declaratives—focus precedes relative clause (Sharon): 'I DRAG the chair that Nanaz does not see.'
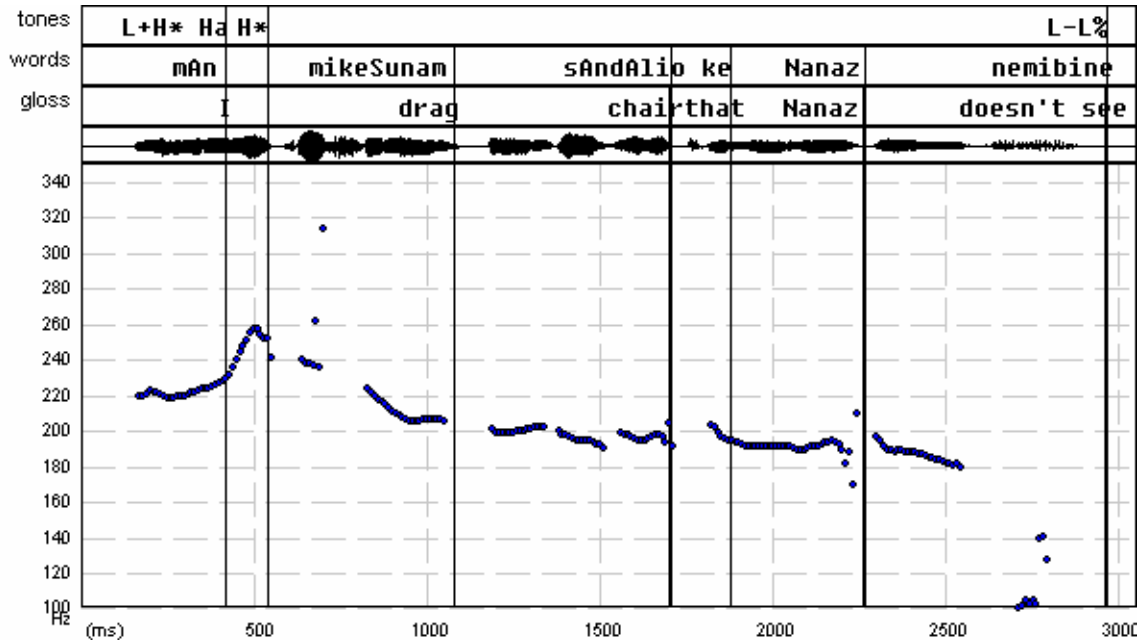
Based on the structurally identical data shown in Figures 3 and 5, the anticipated pattern is that de-accenting is thwarted by the sentence-final surfacing of the relative clause. Focusing a preceding word, however, takes precedence over any interactions between the relative clause and the rest of the sentence. The result is the de-accenting and de-phrasing

of all material that follows the focused (and nuclear pitch-accented) word. This includes de-accenting of the negatively-marked verb, *nemibine*, which in regular environments is realized with a very high f0 and is itself a trigger of de-accenting.

As observed in Figure 4, the location of the relative clause ultimately determines the type of intonation pattern that will result. Moving the relative clause to a position preceding the focused verb *mikeSunAm* once again allows canonical de-accenting to occur within the boundaries of the relative clause:
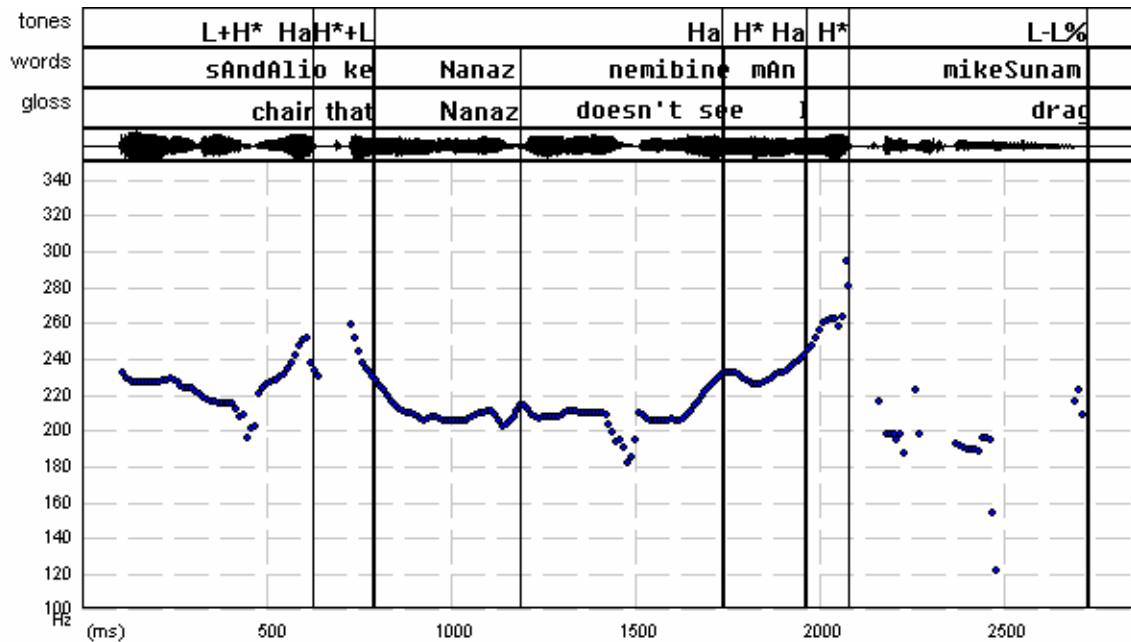
Figure 7: Complex declaratives—focus follows relative clause (Sharon): 'I DRAG the chair that Nanaz does not see.' (verb final order)

A second noteworthy outcome is the restoration of pitch accent on the complementizer *ke*, as well as the appearance of AP markers in their expected locations. Since the focused verb now appears sentence-finally, its de-phrasing and de-accenting effects are no longer manifest. Interestingly, however, the negative *nemibine* is still de-accented, which is evidence that even words that appear to attract some type of semantically-conditioned focus (and thus a high f0) will be de-accented when produced within a relative clause.

Further proof of the robustness of this pattern can be seen in the default elicitation of the same sentence by Henry, who, by more reliably maintaining SOV order, produces the relative clause before the main verb of the matrix clause. Presumably, the earlier surfacing of the relative clause allows the complementizer *ke* to carry out its function as grammatical focus marker, precipitating de-accenting in the rest of the relative clause:

Figure 8: Complex declaratives—focus follows relative clause (Henry): 'I DRAG the chair that Nanaz does not see.'
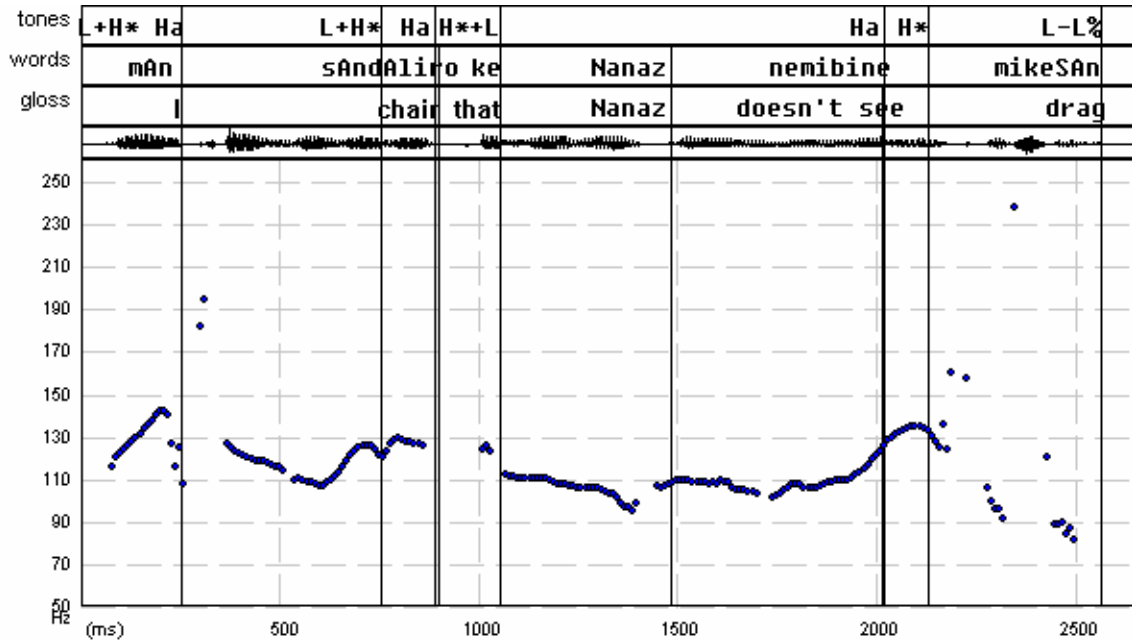

As in Figure 6, the focused verb *mikeSunam* in Figure 9 receives nuclear pitch accent and, as a focused element, clearly triggers de-phrasing and de-accenting of subsequent material, overriding the tendency of sentence-final relative clauses to preserve pitch accents.

Figure 9: Focus precedes relative clause—de-accents complementizer (Sharon): 'I DRAG the man who sees Nanaz.'
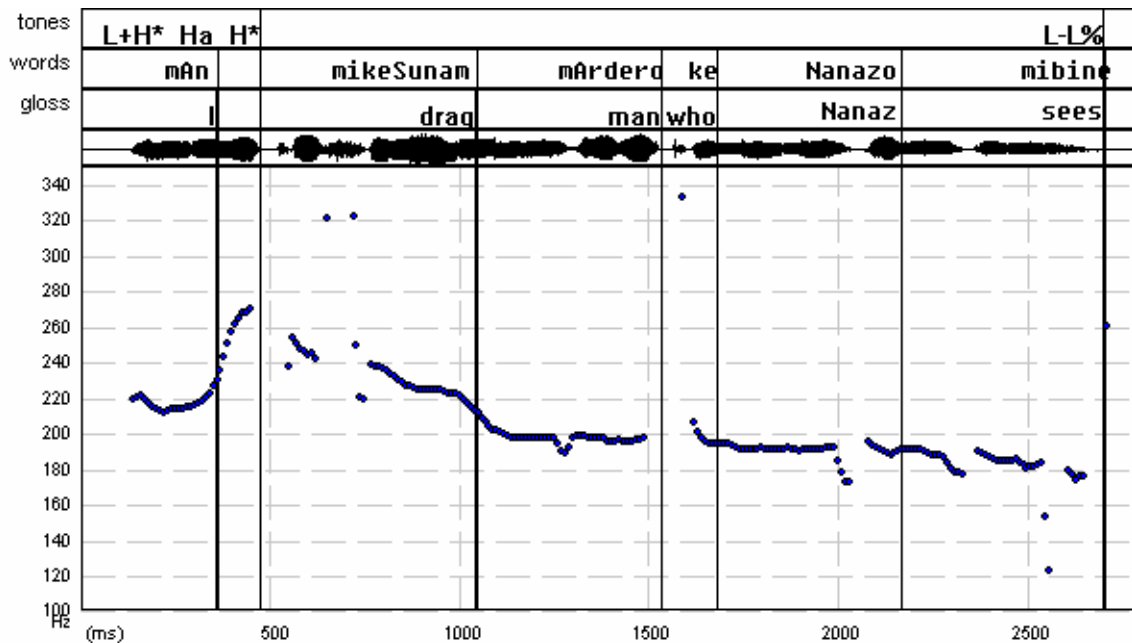
Once again, this outcome can be changed only when the relative clause is generated before any focus markers. This is exactly what we see when Sharon re-arranges the same sentence in the figure below:

Figure 10: Focus follows relative clause—no de-accenting of complementizer (Sharon): 'I DRAG the man who sees Nanaz.' (verb-final order)
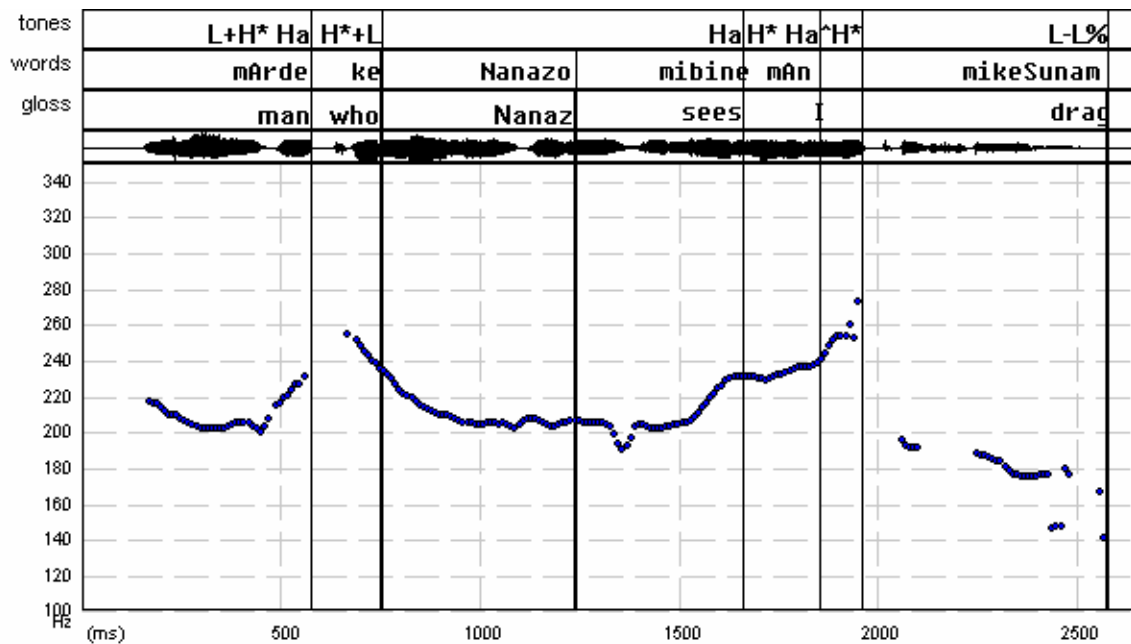
A canonical relative clause pattern results from its pre-main-verb position, despite the continued prominence of the focused verb which surfaces after the accentual phrase boundary terminates the relative clause. This pitch track pattern is structurally identical to that of the negation example in Figure 7, which crucially generates the focused verb in its regular post-object position.

Thus, the generalization remains that minimally separating the clause from sentence-final position, as well as—when relevant—pre-posing the relative clause before focused elements, ensures that the underlying structure of the relative clause surface as a single accentual phrase.

5. Complementizer Phrases

Complex noun phrases, as a whole, appear to follow the same patterns as relative clauses. If there are no markers of lexical or grammatical focus, then a complementizer phrase will de-accent all clause material following the complementizer, provided the clause itself does not surface sentence-finally. If other words attract prominence, then the clause must precede these competing focus markers if it is to maintain canonical de-accenting within a single accentual phrase. Looking at a minimal pair illustrates this distinction by comparing the intonation phrases generated with two different verbs: *midune* 'to know' and *mige* 'to say'. When preceding a complementizer, the verb *midune* behaves

differently from other verbs in that it acts like a focused element even in default production. This includes the same complete de-accenting observed with the previous examples in which the verb of the matrix clause was focused:

Figure 11: Complemetizer phrase after the verb 'know' (Henry): 'Grandmother knows that the pineapple is ripe'.
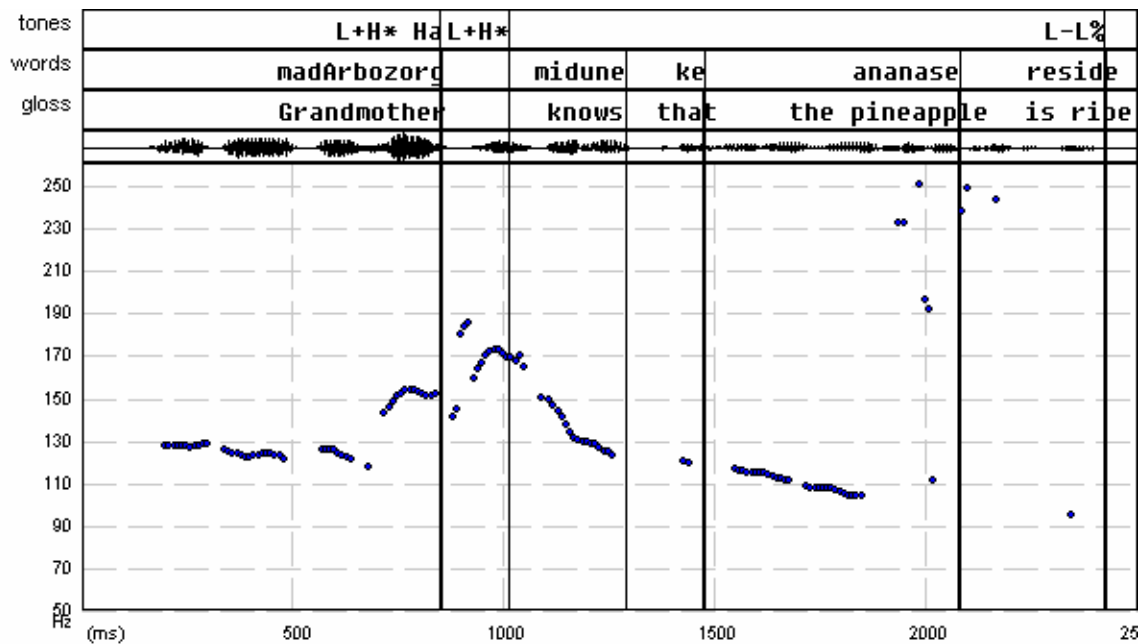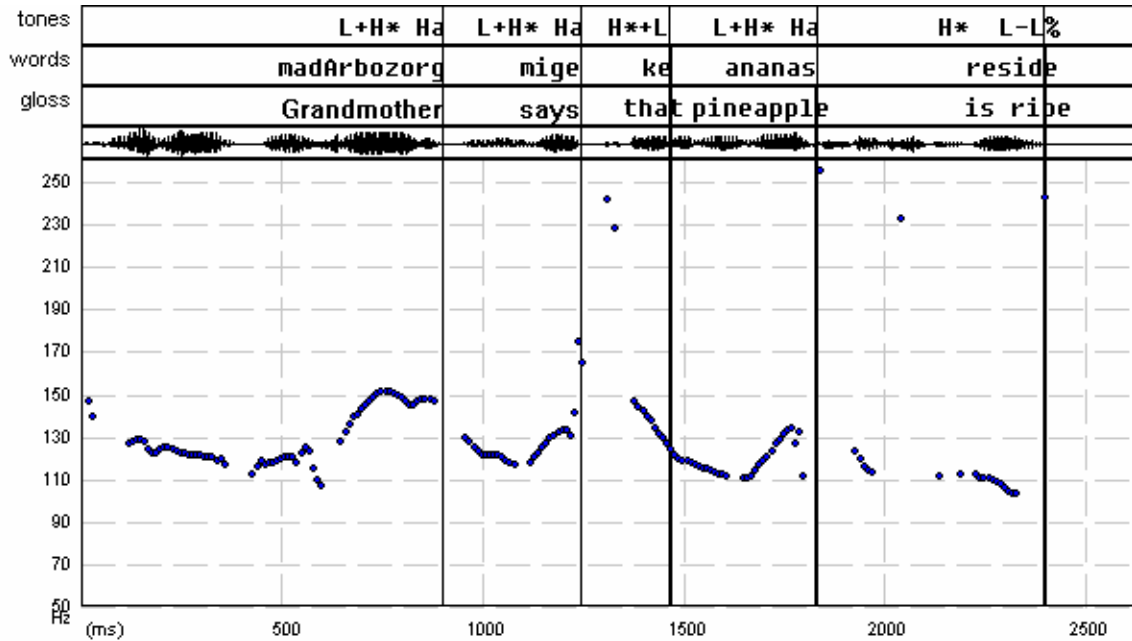

Replacing *midune* with a verb lacking this semantically-conditioned focus, while crucially keeping the same word order, will generate not a canonical de-accented clause, but rather restore the pitch accents expected in a sentence-final clause.

In other words, as seen also in Figures 3 and 5, de-accenting and de-phrasing normally triggered by the complementizer will be blocked if the clause surfaces sentence-finally. But if the verb is of a class which triggers a semantically-conditioned focus, as in Figure 11, then the suspension of de-accenting in final clauses is overridden by the complete de-phrasing and de-accenting of all post-focus material. One clear difference between the verbs in these examples is that the verb with focus-like behavior, *midune*, attracts a pitch accent on the first syllable, as opposed to the second syllable for *mige*. It is possible that verbs like *midune* pattern like verbs marked with negation, and trigger a semantically-conditioned focus: both attract high f0 on the initial syllable and de-accent following material. Further analysis of similar verbs is necessary in order to confirm this relationship.
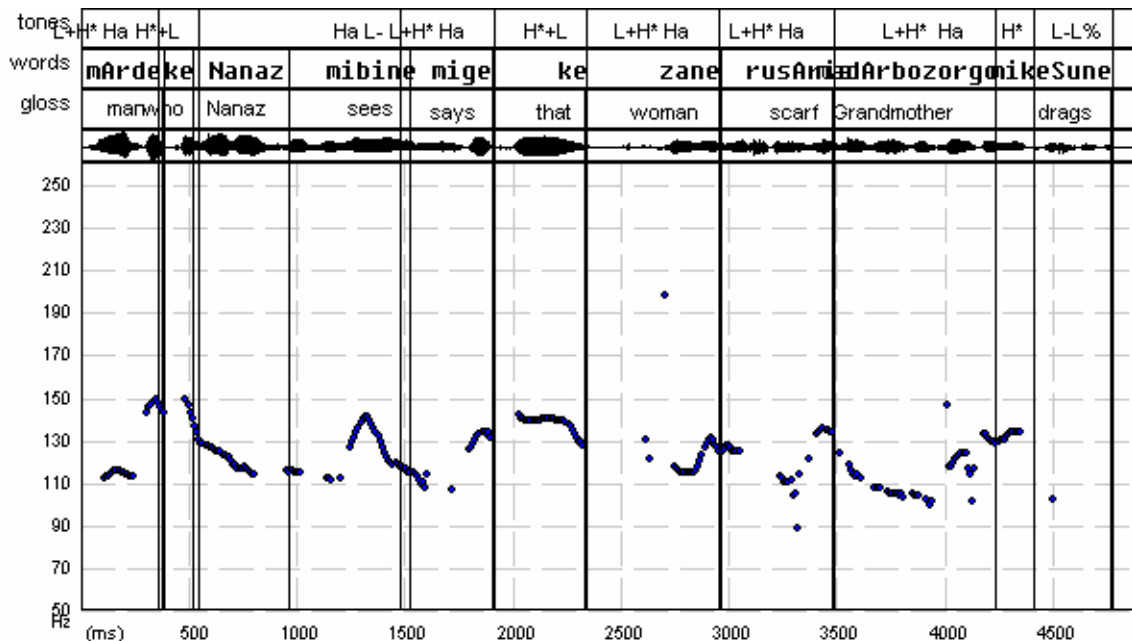
With relative clauses, we were unable to verify this pattern in Henry's data, since relative clauses never surface sentence-finally in canonical SOV word order. However, we can see that both speakers, when generating clauses at the end of the utterance, will block the de-accenting that normally follows the complementizer in both relative clauses and complementizer phrases.

Figure 12: Complementizer phrase after the verb 'say' (Henry): 'Grandma says that the pineapple is ripe.'

tones		L+H* Ha	L+H* Ha	H*+L	L+H* Ha	H* L–L%
words		madArbozorg	mige	ke	ananas	reside
gloss		Grandmother	says	that	pineapple	is ripe

One more relevant example shows the interesting interaction between both a complementizer phrase and a relative clause in the same sentence. In Figure 13, a short relative clause modifies the subject of the matrix clause, while the direct object is composed of a complementizer phrase that terminates the utterance:

Figure 13: Complementizer phrase + relative clause (Henry): 'The man who Nanaz sees says that the woman drags grandma's scarf.'

| tones	L+H* Ha H*+L		Ha L– L+H* Ha	H*+L	L+H* Ha	L+H* Ha	L+H* Ha	H*	L–L%
words	mArde ke	Nanaz	mibine mige	ke	zane	rusAmi madArbozorg	mikeSune		
gloss	manwho	Nanaz	sees says	that	woman	scarf Grandmother		drags	

Despite the complexity of this sentence, with its competing grammatical focus markers and pitch accents, both subordinate clauses behave as predicted. The relative clause, surfacing before any other focus markers, de-accents its constituents and subsumes them within an AP. A clear intermediate phrase separates this clause from the following verb *mige*, which is not surprising when the considerable length of the sentence is taken into account. Evidence for the immediate phrase can be found in the contrast of phrasal tones: the Ha of the AP is followed by a clear low tone (labeled L-), with both occurring on the phrase-final syllable of the verb *mibine*. In addition, this final syllable is lengthened, providing a bigger juncture. Shortly after, the complementizer *ke* initiates a clause which, predictably, does not de-accent its constituents since the clause is sentence-final. This is clearly observable in the L+H* peaks on *rusArie* 'scarf' and *mAdArbozorgo* 'grandma'.

6. Sentential clauses

The sentential clauses that were elicited presented a special challenge, as the matrix clause included the semantically prominent word *AsAbani* 'angry'. Similar to the semantically-conditioned focus discussed above, this word also appears to have a focus-like function in pressuring subsequent material to de-accent. However, as Figure 14 reveals, the result is a bit ambiguous, since there appears to be evidence of both focus-triggered de-accenting and sentence-final clausal resistance to de-accenting:

Figure 14: Sentential clause (Henry): 'I get angry when the man who sees me drags the chair.'

> *Man AsAbani miSam [vaxtike mArde [ke mano mibine] sAndAliro mikeSune]*
> I   angry   get   when   man who me sees   chair   drag
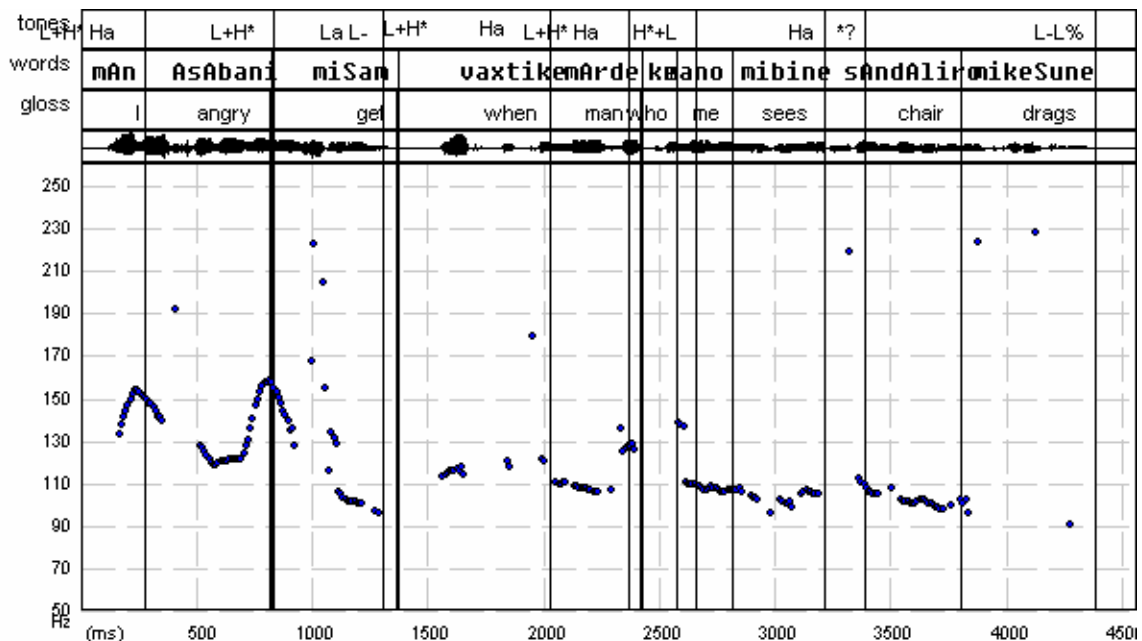
In this doubly embedded clause, the nuclear pitch accent lies unequivocally on *AsAbani*, but the apparent intermediate phrase boundary seems to allow for pitch re-setting—albeit within a reduced range. Neither of the complementizers *vaxtike* 'when' nor *ke* 'who' generate clear pitch accents, though *ke* appears slightly prominent. Such is also the case with *sAndaliro*, which would be expected to surface with pitch accent in the absence of a previous focus marker.

An interesting and somewhat clearer picture emerges when both Henry and Sharon pre-pose the entire sentential "when"-clause—together with its embedded relative clause—before the matrix clause. Perhaps in order to disambiguate this particularly complex sentence, speakers tend to produce intermediate phrase breaks to delimit the clause boundaries. Figure 15 shows that these ip breaks occur in precisely the locations where they would be expected: at the accentual phrase boundaries of both the relative and sentential clauses:

Figure 15: Sentential clause—preposed (Henry): 'When the man who sees me drags the chair, I get angry.'

> *[Vaxtike mArde [ke mano mibine] sAndAliro mikeSune] mAn AsAbani miSam*
> When   man   who me   sees   chair   drag   I   angry get
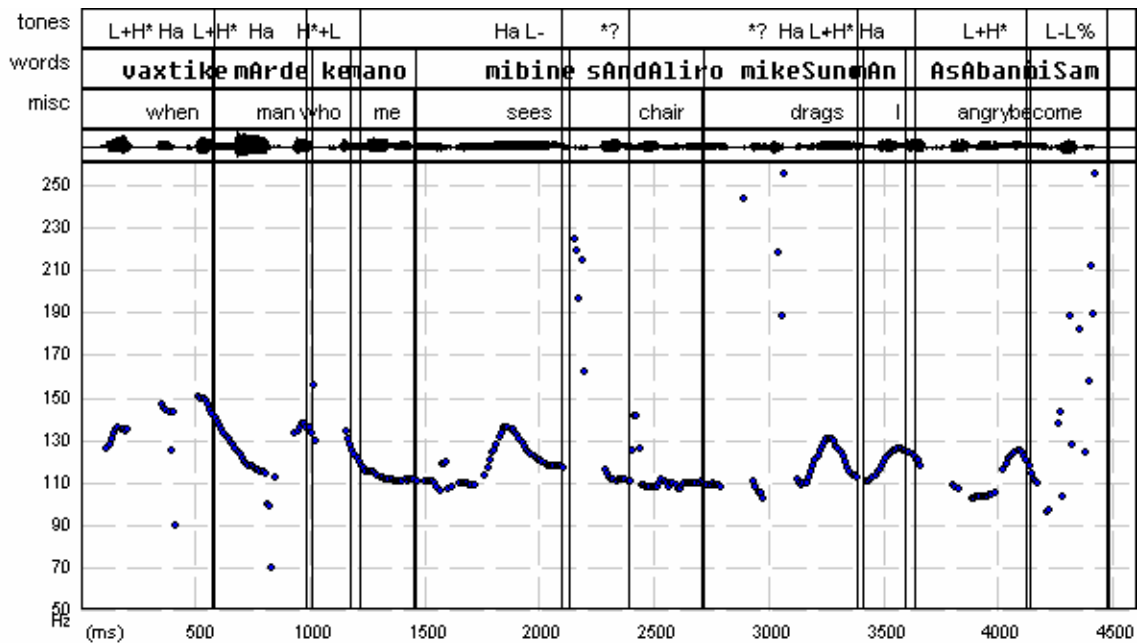
The embedded clause *ke mano mibine* 'who sees me' de-accents to create a perfectly canonical accentual phrase, and doing so within the larger sentential clause creates a conflict in that the normal tonal indicators of relative clause boundaries—a falling tone H*+L and final rising Ha—must compete with the de-accenting triggered by the complementizer (in this case *vaxtike*) of the larger sentential clause. The solution appears to be a utilization of intermediate phrase boundaries: the longer junctures both allow the constituents within the larger sentential clause to remain de-accented, as well as the tonal cues of the embedded relative clause be fully realized.

While in Figure 14 the larger sentential clause coincided with the end of the utterance, and thus showed slight evidence of maintaining pitch accent, here the sentential clause constituents *sAndAliro*'chair' and *mikeSunAm* 'drags' de-accent. It is not completely obvious whether *sAndAliro* is receiving some prominence to reset pitch after an intermediate phrase break, since the competing influence would be the de-accenting required from the sentential clause complementizer *vaxtike* 'when'. However, if de-accenting triggered by the sentential clause complementizer *vaktike* is not blocked by the intervening relative clause, then this would create an accentual phrase with no pitch accent between the ip boundaries following *mibine* and *mikeSunAm*. While the evidence suggests that de-accenting is indeed preserved in the sentential clause following the relative clause, more examples of such complex embedded clauses are needed to examine this tendency.

Thus, in summary, the tonal cues of the relative clause, which presumably require de-accenting to phonologically contrast with their clause constituents, are preserved in their salience by not requiring pitch reset after the first ip break after *mibine*. But the ip break, unnecessary in previous examples, seems to be crucial in this case in order to allow realization of the tonal cues distinguishing the relative clause from the de-accented region of the larger sentential clause.

7. Parenthetical clauses

The final type of clause that is introduced here is the parenthetical clause. As follows from the observations and predictions of this analysis, all the same behaviors observed in other clause types are also exhibited by parenthetical clauses. Another multiple-claused example reflects several of these tendencies at once. When parenthetical and relative clauses are combined in a non-embedded fashion, complementizer-triggered de-accenting follows predictably for non-sentence-final clauses:

Both complementizers *qad* 'who' and *ke* 'that' trigger de-accenting and both clauses terminate with a high AP tone. The parenthetical clause is terminated by an ip boundary (L-), while the relative clause constitutes simply an accentual phrase. As shown in Figure 17, eliciting an otherwise identical sentence with a longer pause after the parenthetical clause produced the exact same pattern, though with a H% intonation phrase boundary in place of the L- intermediate phrase boundary:

Figure 16: Parenthetical clause + relative clause (Henry): 'Nanaz, who is tall, drags the chair that Grandmother sees.'

Nanaze qAd   bolAnd sandAliro   ke   madArbozorg mibine mikeSune
Nanaz   who   tall   chair   that Grandmother sees   drags
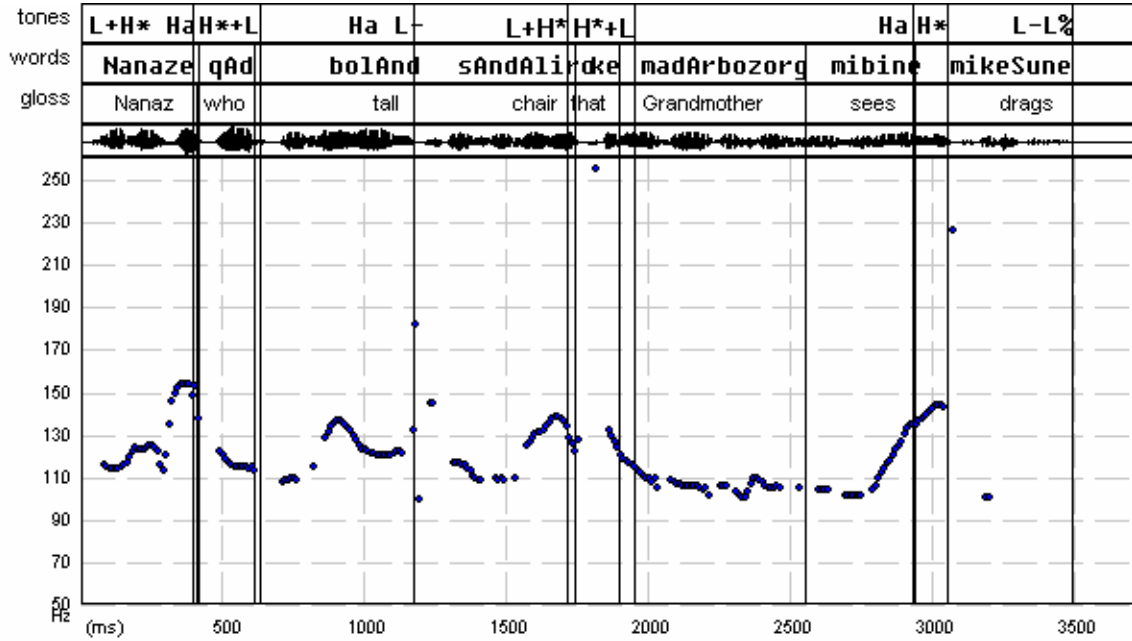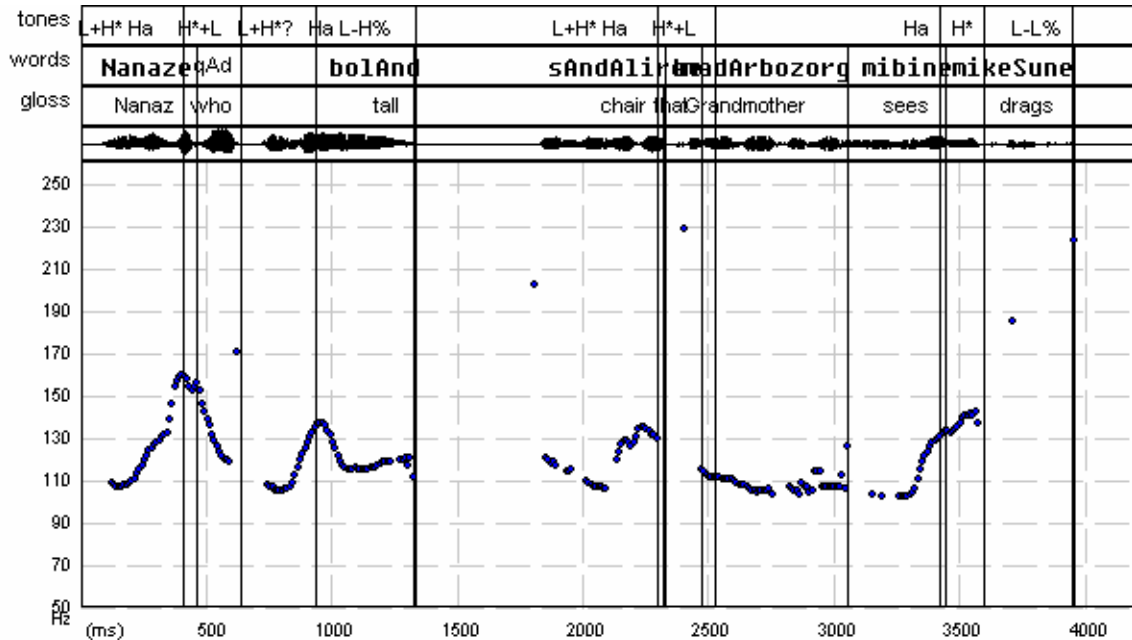

Figure 17: Parenthetical clause + relative clause—longer pause (Henry): 'Nanaz, who is tall, drags the chair that Grandmother sees.'

Nanaze qAd   bolAnd sandAliro   ke   madArbozorg mibine mikeSune
Nanaz   who   tall   chair   that Grandmother sees   drags


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While it is possible that the high AP accent (Ha) is actually a pitch accent on the second syllable of *bolAnd*, this seems unlikely if *bolAnd* functions as a verb in this relative clause, since verbs in Farsi generally realize lexical stress on the first syllable. Thus, it can be argued that the absence of an F0 peak on the first syllable is a result of the de-accenting triggered by *qAd*, and the F0 peak occurring on the second syllable represents the realization of the high tone of the AP phrasal accent. At the same time, since it was shown earlier that verbs such as *mige* do have final stress, the tonal evidence in the relative clauses of Figures 16 and 17 is opaque with respect to this question of de-accenting.

Comparing these examples with the re-ordered sentence produced by Sharon, we can see that, once again, clause placement and word order are crucial in determining accentual phrase patterns.

Figure 18: Parenthetical clause + relative clause—longer pause (Sharon)

Nanaze	*ke*	*qAd*	*bolAnd*	*mikeSune*	*sandAliro*	*ke*	*madArbozorg*	*mibine*
Nanaz	who	?who	tall	drags	chair	that	Grandmother	sees
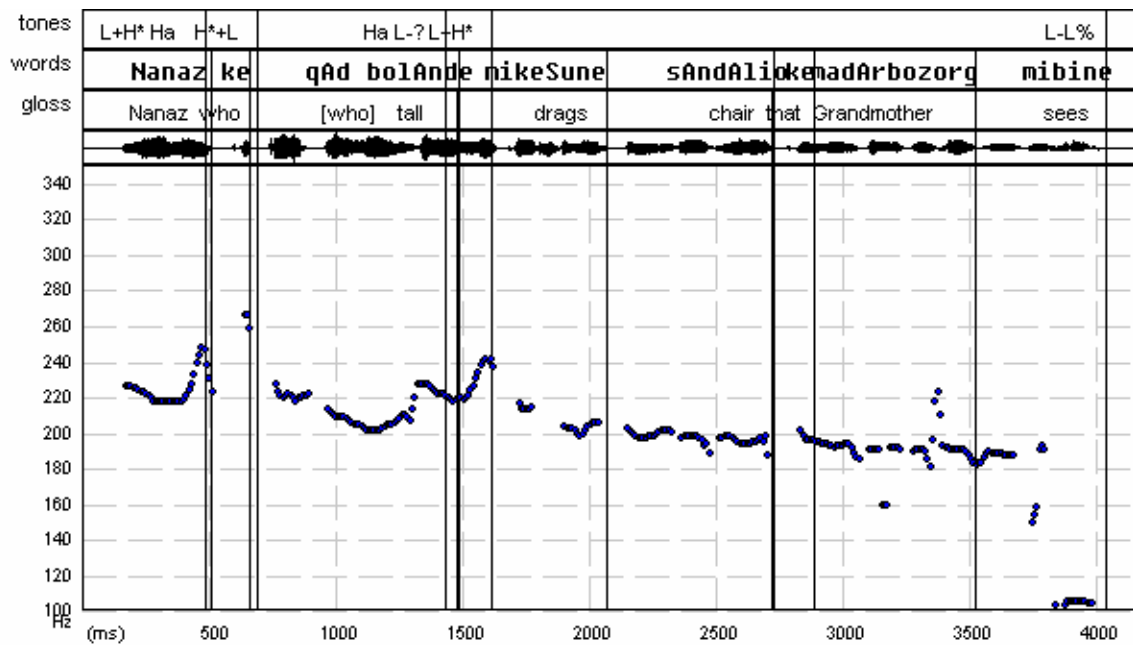
The failure to produce the focused verb *mikeSune* sentence-finally means that its prominence will trigger de-accenting of all subsequent material, overriding the tendency of sentence-final clauses to resist de-accenting from the complementizer.

A second difference can be seen in the use of complementizers. While Henry omits *ke* in both parenthetical clause examples, Sharon produces both *ke* and *qad* to initiate the parenthetical clause. In all cases, however, the falling tone pitch accent is realized on the first element of the clause.

Finally, revisiting the de-accenting question, Sharon's use of the longer form *bolAnde* provides evidence that de-accenting is indeed triggered within these short parenthetical clauses. Unlike the shorter form *bolAnd* produced in Figures 16 and 17, the tone on *bolAnde* is realized on the third syllable rather than the second. Thus, in both cases the tone is realized on the final syllable, suggesting that the tone represents not a pitch accent but a phrase accent—specifically a high tone of an accentual phrase.

8. Conclusion

In summary, we have seen that complex sentences in Farsi follow relatively robust intonation patterns. In the canonical complex clause default pattern, the complementizer of the clause takes grammatical focus, which triggers de-accenting and de-phrasing of the following constituents of the clause, creating an accentual phrase. When a clause surfaces in sentence-final position, de-accenting will not be triggered by the complementizer. On the other hand, if a focused element precedes a subordinate clause—whether the clause is sentence-final or not—then all post-focus material will de-accent, collapsing into an accentual phrase.

All clause types—relative, complex noun, sentential, and parenthetical—obey these constraints in a similar fashion, even when interacting in multiply-embedded sentences. Competing influences, however, such as when relative clauses occur within sentential clauses, seem to negotiate these pressures in interesting ways: in the aforementioned case, intermediate phrase breaks are utilized in signaling clause boundaries without eradicating the contour cues of clause boundary tones. Further analysis of these more complicated multiply-embedded complex sentences—in the context of both declaratives and interrogatives—would shed light on these subtler interactions and the constraints underlying them.