

Multiple accent in alternative questions¹

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Abstract. Alternative Questions (AltQs) are typically characterized by two prosodic cues: a final falling boundary tone and a pitch accent on each disjunct. Recent accounts in the literature have taken the final fall as the central surface cue for AltQ interpretation or have assigned a vacuous semantic contribution to the multiple accent on the disjuncts. Based on data from English and Turkish, we argue that both cues are equally important and require modelling in a unified account of AltQs. Combining ingredients from the literature (Roberts, 1996; Biezma, 2009; Westera, 2017), we propose that, essentially, the multiple accent shapes the Question under Discussion (QUD) and that the final fall, or the lack thereof, indicates restrictions on the content of the QUD via (un)satisfaction of Attention Maxims.

Keywords: Alternative Questions, prosody, discourse, focus, Q-particles, Turkish.

1. Introduction

It has long been known that the interpretation of a disjunctive question relies on its prosodic structure (Bartels, 1999):

- (1) a. Do you want coffee_{L*H-} or tea_{H*L-L%}?
Which one of the following do you want: coffee or tea? [AltQ]
- b. Do you want coffee or tea_{L*H-H%}?
Is it true that you want coffee or tea? [PolQ]

The Alternative Question (AltQ) interpretation, as in (1a), is associated with (i) an obligatory pitch accent on each disjunct (henceforth: multiple accent) and (ii) a final falling boundary tone. For the Polar Question (PolQ) interpretation in (1b), on the other hand, the multiple accent is not obligatory and the boundary tone is usually a rise (Bartels, 1999; Biezma and Rawlins, 2012; Han and Romero, 2004; Roelofsen and van Gool, 2010).²

Although the intonational realization of AltQs has been extensively discussed in the literature (Bartels, 1999; Schubiger, 1958), the meaning contribution of each intonational cue is still unclear. Though early approaches looked at the multiple accents (e.g., Han and Romero (2004)), current approaches reveal a bias towards the final fall. This bias is reflected both at the empirical and at the theoretical level. Firstly, experimental work has been taken to show that the crucial ingredient for the AltQ interpretation is the final fall (Pruitt and Roelofsen, 2013). Secondly, prominent theoretical accounts have only modelled the final fall as an ingredient of

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²The obligatoriness of the multiple accent in AltQs is the result of there being multiple intermediate phrases, one per disjunct (Bartels, 1999), since every intermediate phrase needs (at least) one pitch accent (Beckman and Pierrehumbert, 1986). PolQs consists of one single intermediate phrase including all disjuncts (Bartels, 1999) and, thus, a multiple accent is possible but not obligatory. Intermediate phrase boundaries are marked by - in the ToBi annotation system. Throughout the paper, ↑ indicates a rising pitch accent plus intermediate phrase boundary L*H-or, when used sentence final, the rising boundary tone L*H-H%; ↓ indicates the falling boundary tone H*L-L%.

AltQ interpretation (Biezma and Rawlins, 2012) or have taken the semantic contribution of the multiple accent to be vacuous (Roelofsen and van Gool, 2010).

The aim of this paper is to show that the multiple accent comes with a meaning contribution that is as integral a part of the AltQ interpretation as the final falling boundary tone is and, thus, it needs to be modelled. We will put forward two arguments: one on PolQ and AltQs in English and one on AltQs in Turkish. Based on these two arguments, and combining ideas in Roberts (1996), Biezma (2009) and Westera (2017), we will propose that the function of the multiple accent is, ultimately, to *shape the QUD* (Question under Discussion), while the function of the boundary tones is to further *restrict the content of the QUD*.

A disclaimer is in order at this point. It is beyond the aim of this paper to offer a full compositional analysis of the at-issue content and presupposition of AltQs. Unlike wh-questions, AltQs are known to presuppose that at least one (minimality) and at most one (exclusivity) of the alternatives in the Hamblin set is true (Belnap and Steel, 1976; Karttunen, 1977). However, several issues in the current literature need to be addressed before arriving at a proper compositional derivation of these effects.³ The aim of the present paper is simply to vindicate the importance of the multiple accent in AltQ interpretation and assign it an active role, which can later be combined with other ingredients in a full compositional derivation.

The structure of the paper is as follows. In section 2, we review two recent accounts by Biezma and Rawlins (2012) and Roelofsen and van Gool (2010) and a prominent experimental paper by Roelofsen and van Gool (2010). In section 3, we firstly put forward some exemplary data from English showing that the final fall cannot be the only ingredient for AltQ composition; secondly, we discuss data from Turkish, in which the multiple pitch accent that we observe for English is mirrored with a Q-particle (Kamali, 2015) and which cannot be explained by previous accounts. Section 4 presents the proposal. We conclude in section 5.

2. Background

2.1. Biezma and Rawlins (2012)

Biezma and Rawlins (2012) argue that the crucial difference between AltQs and (run-off-the-mill) PolQs lies in the presence vs. absence of a closure operator, signalled by the final fall: AltQs come with a final fall and the corresponding closure operator while (run-off-the-mill) PolQs do not. The main idea, due to Zimmermann (2000), is that a falling contour in English signals closure in list constructions in general, i.e., it indicates that nothing but the listed items has the property at hand, as in (2B); a rising contour, instead, signals lack of closure, i.e., it suggests that objects other than the listed items have the relevant property, as in (2B'):

- (2) A: Which tube stations are one stop from Oxford Circus?
 B: Piccadilly Circus, Bond Street, Tottenham Court Road, Green Park, Regents Park↓.
 B': Piccadilly Circus, Bond Street, Tottenham Court Road, Green Park, Regents Park↑

Biezma and Rawlins (2012) point out that AltQs and PolQs provide a parallel contrast: While the AltQ in (3) with a final fall indicates that only the listed alternatives are part of the current

³One issue concerns the exact size of the disjuncts: whether *or* in e.g. (1a) connects two NPs (von Stechow, 1991), two proposition-denoting constituents (Han and Romero, 2004) or two polar questions (Pruitt and Roelofsen, 2011; Uegaki, 2015). A second issue is the relation between *or* and interrogativity: whether the disjunctive phrase in AltQs has the semantics of a wh-phrase or of a declarative disjunctive phrase.

QUD –and thus answer (3B) is infelicitous–, the PolQ in (4) with a final rise allows for other alternatives to be part of the current QUD –thus making the answer (4B) acceptable.

- (3) A: What are you cooking for tomorrow’s party? Are you cooking pasta[↑] or stew[↓]?
B: # I’m making risotto, I think.
- (4) A: What are you cooking for tomorrow’s party? Are you cooking pasta[↑]?
B: I’m making risotto, I think.

Biezma and Rawlins (2012) implement this idea by making the final fall / closure operator on a question $[[Q]\alpha]$ introduce the presupposition that the set of alternatives generated by $[[Q]\alpha]$ equals the set of salient alternatives in a given context, i.e., the QUD of that context, as defined in (5). Accommodating this presupposition amounts to inferring what the questioner assumes the complete QUD is. For AltQs, since a final fall is produced, alternatives other than the ones mentioned are eliminated from the QUD, as in (6). For PolQs, unmentioned alternatives are allowed in the QUD, as in (7):

- (5) **Closure operator** (Biezma and Rawlins, 2012)
 $[[[[[Q]\alpha]_{H*L-L\%}]]^c =_{\text{def}} [[[[[Q]\alpha]]^c]$, defined only if $\text{SalientAlts}(c) = \text{def} [[[[[Q]\alpha]]^c]$.
- (6) QUD / $\text{SalientAlts}(c)$ for (3):
 $\{ \text{you are making pasta, you are making stew, } \underline{\text{you are making risotto, \dots}} \}$
- (7) QUD / $\text{SalientAlts}(c)$ for (4):
 $\{ \text{you are making pasta, you are making stew, you are making risotto, \dots} \}$

In sum, Biezma and Rawlins (2012) connect closure to the final fall. They do not model the multiple accent as an ingredient of AltQ composition.

2.2. Roelofsen and van Gool (2010)

Roelofsen and van Gool (2010) model the difference between AltQs and PolQs in the framework of Inquisitive Semantics, in which they distinguish three semantic layers: the set of possibilities $[[\cdot]]_P$, the set of highlighted possibilities $[[\cdot]]_H$, and the set of possible updates $[[\cdot]]_S$. In their account, disjunction introduces alternatives. For the examples (8)-(9) below, this means that, at the level of the IP α , we have the set of possibilities $\{ \text{Ann plays the piano, Bill plays the piano} \}$. The set of possibilities of the entire question, $[[Q\ \alpha]]_P$, consists of the possibilities of α itself and the possibilities that α excludes, both for PolQs and AltQs, as in (8a)-(9a). The first difference between PolQs and AltQs comes in $[[\cdot]]_H$, which is affected by the presence of a single vs. multiple accent. Roelofsen and van Gool (2010) propose that accents indicate focus and, in computing the $[[\cdot]]_H$ of a given constituent with focus, all the original alternatives of that constituent collapse, i.e., are merged via \cup . For PolQs, which only have mandatory accent on the second disjunct introducing a single focus on the entire disjunct, this means the original set $\{ \text{Ann plays the piano, Bill plays the piano} \}$ collapses into $\{ \text{Ann plays the piano} \vee \text{Bill plays the piano} \}$, as in (8b). For AltQs, since we have one focus per disjunct, the original singleton set of alternatives arising from the first disjunct, namely $\{ \text{Ann plays the piano} \}$, vacuously collapses into $\{ \text{Ann plays the piano} \}$, and similarly for the second disjunct. This leads to (9b). Hence, the netto effect of multiple accent is simply to leave the original set of alternatives untouched. Finally, $[[\cdot]]_S$ is affected by the final fall which, in their account, signals the presence

of an exclusive strengthening operator, resulting in (8c) and (9c):

- (8) Does [Ann or Bill]_F play the piano \uparrow ?
- $\llbracket(8)\rrbracket_P = \{a \text{ play}, b \text{ play}\} \cup \{\neg \text{play}(a), \wedge \neg \text{play}(b)\}$
 - $\llbracket(8)\rrbracket_H = \{a \text{ play} \vee b \text{ play}\}$
 - $\llbracket(8)\rrbracket_S = \{a \text{ play} \vee b \text{ play}\}$
- (9) Does [Ann]_F or [Bill]_F play the piano \downarrow ?
- $\llbracket(9)\rrbracket_P = \{a \text{ play}, b \text{ play}\} \cup \{\neg \text{play}(a), \wedge \neg \text{play}(b)\}$
 - $\llbracket(9)\rrbracket_H = \{a \text{ play}, b \text{ play}\}$
 - $\llbracket(9)\rrbracket_S = \{a \text{ play} \wedge \neg \text{play}(b), \neg \text{play}(a) \wedge b \text{ play}\}$

Thus, Roelofsen and van Gool (2010) model the multiple accent as making each of two singleton sets vacuously collapse, with the result that its netto semantic contribution is null.

2.3. Pruitt and Roelofsen (2013)

The results of an experimental study by Pruitt and Roelofsen (2013) suggest that the final fall is the crucial ingredient for AltQ composition. Their experiment served to investigate the role of the intonation contour (number of accents and final rise or fall) on the interpretation of an disjunctive question as AltQ or PolQ. They conducted a perception experiment with the following four conditions: Multiple Accent+Final Fall, Single Accent+Final Rise, Single Accent+Final Fall, Multiple Accent+Final Rise. Two of the conditions were original productions by a female native speaker of American English, namely, Multiple Accent+Final Fall (original AltQ) and Single Accent+Final Rise (original PolQ). The other two, Multiple Accent+Final Rise and Single Accent+Final Fall, were resynthesized as a result of splicing the initial part of one original recording with the final contour of the other recording in Praat (Boersma and Weenink, 2018). See Fig. 1.

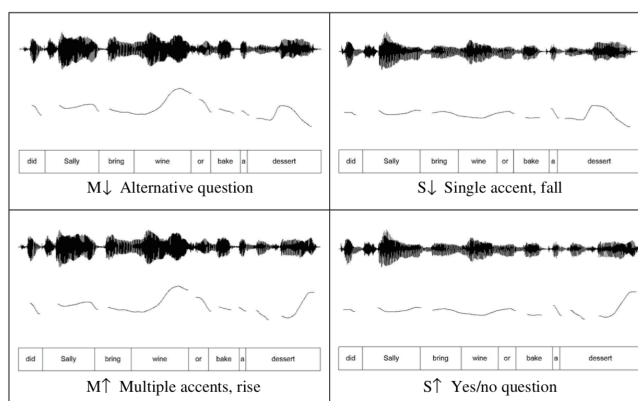


Figure 1: Exemplar intonation contours of one question in each of the four conditions used in the experiment. Upper left and lower right panels show original recordings, and upper right and lower left panels show the spliced versions, respectively (from Pruitt and Roelofsen (2013): 639).

Participants were presented with the auditory stimuli in all four conditions and had to choose the best paraphrase from the provided choices for each question on an answer sheet, as in (10):

- (10) Did Sally bring wine or bake a dessert [4 conditions]. (Pruitt and Roelofsen, 2013)
- a. Which of these things did Sally do: bring wine or bake a dessert? [AltQ]
 - b. Did Sally do any of these things: bring wine or bake a dessert? [PolQ]
 - c. Other:...

For the two conditions based on original recordings (Multiple Accent+Final Fall, Single Accent+Final Rise), Pruitt and Roelofsen (2013) found that participants chose the expected paraphrases: interrogatives with a multiple accent and a final fall were predominantly interpreted as AltQs, whereas recordings with a single accent and a final rise most often led to the perception of a PolQ, as shown in Fig. 2.

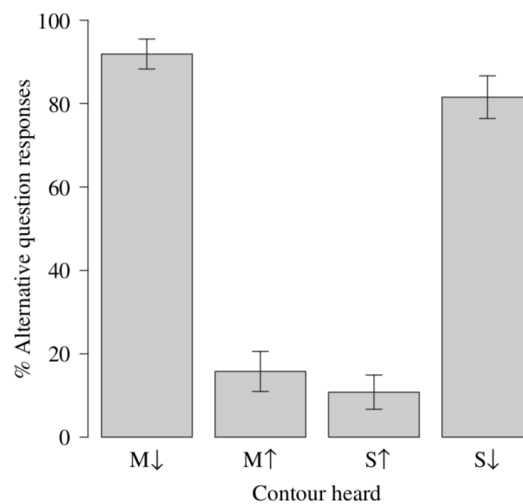


Figure 2: Proportion of alternative question responses for each presented contour, whiskers represent 95% confidence interval (from Pruitt and Roelofsen (2013): 642).

In the spliced condition based on the first part of an AltQ and the final contour of a PolQ (Multiple Accent+Final Rise), participants predominantly chose the PolQ paraphrase. The second spliced condition, resynthesized from the first part of a PolQ and the final contour of an AltQ (Single Accent+Final Fall), was more often interpreted as an AltQ. In other words, participants tend to judge a question with no multiple accent but with a final fall as an AltQ, based on which the authors concluded that the final fall is the crucial ingredient for AltQ composition.

2.4. Interim Summary

In this section, we reviewed two prominent theoretical accounts and one experimental study, showing that the consensus in both the theoretical and empirical literature is that the final fall is the most important ingredient for AltQ composition. Prominent theoretical accounts either do not model the multiple accent (Biezma and Rawlins, 2012) or take its netto semantic contribution to be null (Roelofsen and van Gool, 2010). Experimental work suggests that the final

fall is the crucial cue for interpreting a disjunctive question as an AltQ (Pruitt and Roelofsen, 2013).

In the remainder of this paper, we will argue that the multiple accent should be modelled with a non-null semantic contribution in a unified account of AltQs in English and Turkish.

3. The Multiple Accent

This section serves to present two arguments in favour of an analysis of AltQs in which there is a clear division of labour between the final fall and the multiple accent, and thus against analyses that take the final fall as the crucial cue. The first argument concerns falling questions in English and the second argument concerns AltQs in Turkish.

3.1. Revisiting Falling Questions in English

It has long been known that PolQs⁴ can be produced with a fall from any high nuclear tone (H*) to a L-L% boundary tone (e.g., Bartels (1999)), as shown in (11) and Fig. 3.

(11) Are you from New York ↓?

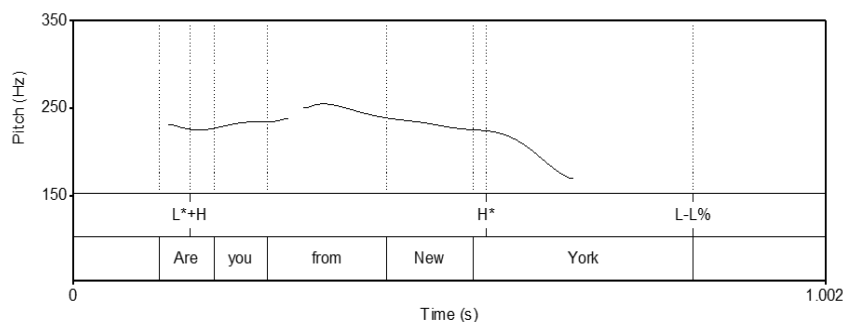


Figure 3: Pitch track of a falling PolQ by a native English speaker.

There is no reason why disjunctive PolQs should be different from non-disjunctive PolQs in this respect. Indeed, we can observe falling disjunctive PolQs, as in (12) and Fig. 4.

(12) Context: *You are teaching a class on popular culture and want to discuss a film. For the next discussion point, you need a student who has seen Kill Bill or Reservoir Dogs, no matter which one of them, To make sure this is the case, you ask every student before they start speaking:*

Did you see Kill Bill or Reservoir Dogs ↓?

Note that Pruitt and Roelofsen (2013) included a comparable intonation condition in their perception experiment (Multiple Accent+Final Fall) and participants predominantly interpreted questions with that intonation contour as an AltQ. The observation that falling disjunctive PolQs exist, however, automatically raises the question why the recordings in that condition

⁴We specifically refer to PolQs with interrogative syntax here. We do not consider rising declaratives or other types of PolQs.

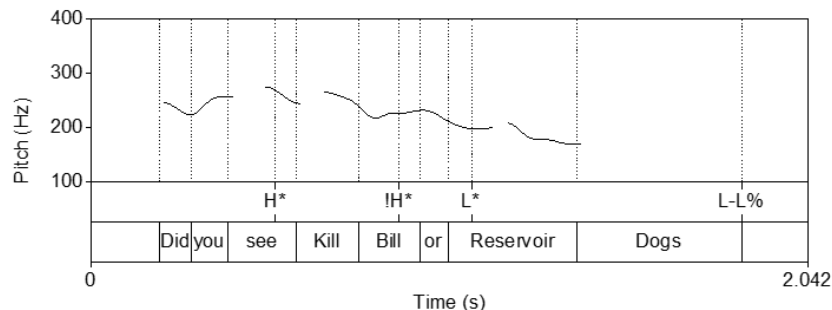


Figure 4: Pitch track of a falling disjunctive PolQ by a native English speaker.

were not interpreted as PolQs in their study. At this point, we consider two possible explanations for their experimental findings, as we will discuss in the following sections.

3.1.1. Acoustic properties

One possible reason why the participants in Pruitt and Roelofsen's (2013) experiment perceived and interpreted questions produced with no multiple accent and a final fall mostly as AltQs may lie in an acoustic difference between the exact shape of the final fall in AltQs vs. PolQs. Since Pruitt and Roelofsen (2013) used original recordings of falling AltQs and rising PolQs and digitally spliced the two recordings for the Multiple Accent+Final Fall condition, the final fall in this condition might be slightly different from the one English speakers would actually produce in a falling PolQ. One might hypothesize that a final fall alone does not trigger an AltQ interpretation, but that the interpretation is depending on the exact shape of the fall towards the low boundary tone. In some preliminary production data by a female native speaker of American English, we do see slight differences in the nuclear contour of falling PolQs and AltQs: in PolQs the nuclear accent tends to be a low tone (L*) combined with a L-L% boundary tone, whereas for the AltQ we do find a high nuclear accent (H*) and thus a steeper fall into the L-L% configuration. This can be seen if one compares the final nuclear accent (on *REsevoir dogs*) of Fig. 4 with the corresponding final part of Fig. 5.

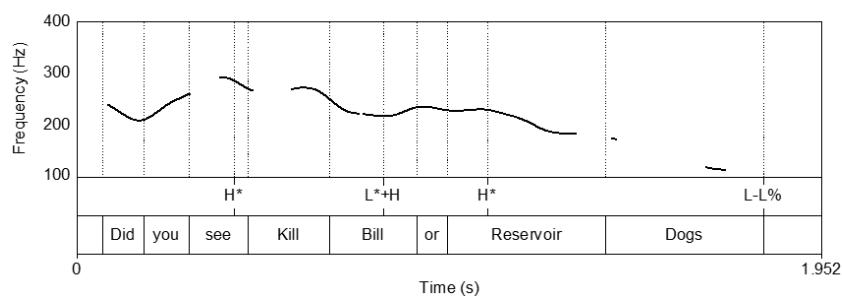


Figure 5: Pitch track on an AltQ by a native English speaker.

Testing this hypothesis, however, outreaches the scope of this paper. At this point, we use this observation as a pointer towards a possible alternative explanation of the results by Pruitt and Roelofsen (2013).

3.1.2. Pragmatic licensing

An alternative hypothetical explanation of the experimental results by Pruitt and Roelofsen (2013) is the fact that falling PolQs in general require very specific pragmatic licensing. Schubbiger (1958) already observed that falling PolQs are more restricted than their rising counterparts, in that rising PolQs are the default and that falling ones require special pragmatic contexts without which they are infelicitous. Such contexts are, for instance, contexts in which the speaker is only interested in the proposition questioned, and not in any alternative proposition, as illustrated in (13) from Bartels (1999):

- (13) a. *In a guessing game*
Is it green↓? Does it grow here↓?
b. *To spouse who is unpacking the suitcase:*
Did you find my camera↓? Did you leave it in Edinburgh↓?

In the experiment by Pruitt and Roelofsen (2013), the test items were presented in isolation, with no supportive context licensing the falling intonation. Hence, the likeliness that participants would get a falling PolQ interpretation decreased.

3.1.3. Embedded AltQs

In the previous two subsections, we presented two possible explanations for the findings by Pruitt and Roelofsen (2013). There is one additional relevant observation concerning the importance of the multiple accent in AltQs: When embedding within a declarative sentence, as in (14), both AltQs and PolQs are produced with a final fall, as can be seen in Fig. 6 and Fig. 7.

- (14) John is wondering whether you saw Kill Bill or Reservoir Dogs ↓.

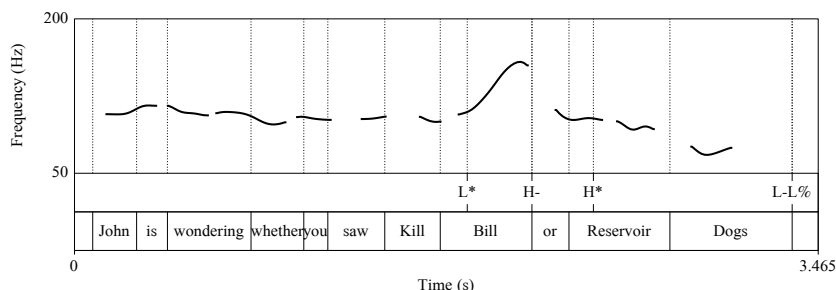


Figure 6: Pitch track of an embedded AltQ by a native English speaker.

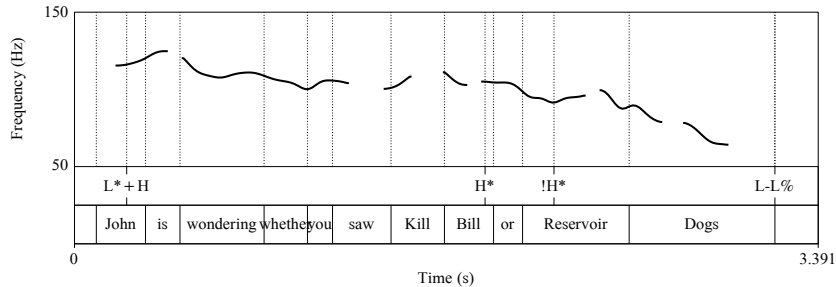


Figure 7: Pitch track of an embedded PolQ by a native English speaker.

Thus, the main cue distinguishing an AltQ from a PolQ in embedded position is not the final fall, but the obligatory multiple accent concomitant to the multiple intermediate phrases.⁵ If the final fall is the most important ingredient for AltQ composition, this observation requires an additional explanation.

Altogether, this section has shown so far that PolQs and AltQs are not distinguished by the final fall alone, based on two data points. First, (matrix) PolQs can have a final fall as well. The fact that Pruitt and Roelofsen (2013) did not find the corresponding PolQ interpretation in their experiment can be potentially explained by the acoustic difference between the PolQ fall and the AltQ fall or by the fact that falling PolQs are pragmatically restricted. Second, when embedded within a declarative clause, both AltQs and PolQs are produced with a final fall, the distinguishing cue being the accents.

3.2. Q-Particles in Alternative Questions in Turkish

In Turkish, the distribution of accents in AltQ and PolQ parallels that in English. Furthermore, the multiple accent is mirrored by occurrences of the Q-particle *mI* (Kamali, 2015). This is shown in (15): If an occurrence of the Q-particle accompanies each disjunct, we have an AltQ interpretation; PolQs, instead, are formed with one single occurrence of the Q-particle (and, if disjunctive, with the disjunction form *veya* ‘or’):

- (15) a. Ali iskambil **mi** (oynadi) yoksa futbol **mu** oynadi?
 Ali cards Q play.past or_{alt} football Q play.past
 ‘Did Ali play cards or football?’ [AltQ]
- b. Ali iskambil veya futbol oynadi **mu**?
 Ali cards or_{decl/pol} football play.past Q?
 ‘Did Ali play cards or football?’ [PolQ]

The composition of Turkish AltQs makes two important points. First, it shows that, crosslinguistically, multiple marking on the disjuncts is of great importance in AltQ composition. Without *mI* in each disjunct in (15a), the sentence cannot be interpreted as an AltQ.

Secondly, Turkish opens a window into the semantic contribution of the multiple marking on the disjuncts. It is known that *mI* also appears in PolQs, signaling that the constituent it attaches

⁵See footnote 2. Note that *Kill Bill* bears an accent with an intermediate phrase boundary in Fig. 6 and an accent without intermediate phrase boundary in Fig. 7.

to is focused (Kamali, 2015), as illustrated in (16).⁶ Thus, the placement of the particle in PolQs has a direct semantic/pragmatic impact.

- (16) a. Ali iskambil oynadi **mi**?
 Ali cards play Q
 ‘Did Ali play cards?’ [neutral]
- b. Al *mi* iskambil oynadi?
 Ali Q cards play
 ‘Was it Ali who played cards?’ [focus on Subject]
- c. Ali iskambil **mi** oynadi?
 Ali cards Q play
 ‘Was it cards what Ali played?’ [focus on Direct Object]

Hence, *mi* makes a non-null contribution in PolQs. Assuming parsimoniously that *mi*’s contribution remains constant throughout the grammar, we conclude that *mi* has a non-null semantic contribution in AltQs as well.

3.3. Interim Summary

Altogether, in section 3, we have shown that an analysis of AltQs encompassing English and Turkish data should model the multiple accent, based on the observations that (a) AltQs and PolQs in English are not solely distinguished by whether the final contour is falling or rising and (b) that the multiple Q-particle in Turkish makes its own non-null semantic/pragmatic contribution.

4. Towards an Analysis

In this section, we aim at a unified analysis of the multiple accent/Q-particle that accounts for (i) the semantic effect of *mi* in Turkish PolQs, (ii) the mandatory status of the occurrence of the Q-particle *mi* in each disjunct in Turkish AltQs, and (iii) the mandatory status of the multiple accent in English AltQs. Key will be the (parsimonious) assumption that the contribution of the Turkish Q-particle *mi* is exactly the same in PolQs and AltQs. By extending Biezma’s (2009) account of focal accent in English PolQs to *mi* in Turkish PolQs and exploiting the equation “*mi* in PolQs = *mi* in AltQ”, we arrive at an analysis of multiple accent / Q-particle in AltQs.⁷

4.1. Ingredients from the literature

To this end, we will use three ingredients, all available in the literature. The first ingredient is the hierarchical organization of discourse in terms of QUDs (Roberts, 1996; Büring, 2003). The second ingredient is Focus-marking (Rooth, 1992), which is realised by a focal accent in English and by the Q-particle *mi* in Turkish (Kamali, 2015). Biezma (2009) proposes that the position of Focus-marking in English PolQs determines the general shape of the QUD. We will extend this idea to Focus-marking signaled by the position of the Q-particle *mi* in Turkish PolQs. Our third and final ingredient is Westera’s (2017) A(ttention) Maxims. Westera (2017)

⁶There are similar patterns in other languages, such as Sinhala (Slade, 2011) and Macedonian (Rudin et al., 1999; Jordanoska and Meertens, 2018).

⁷See Westera (2017: 284ff.) for a parallel extension of Biezma’s (2009) account of English PolQs to English AltQs based on the shape of the accents.

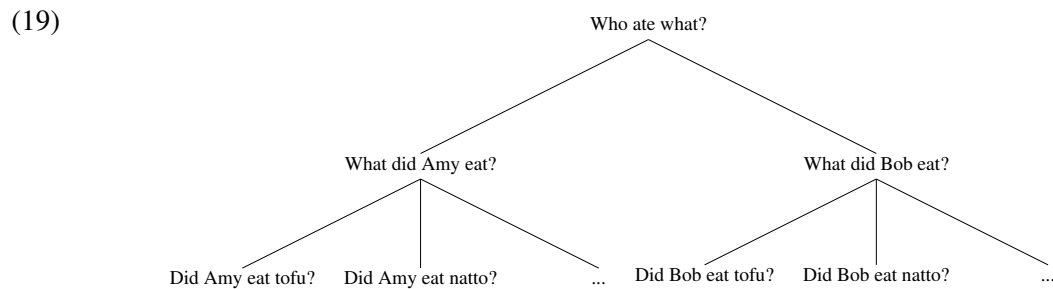
proposes that the satisfaction vs. unsatisfaction of A-Maxims is encoded via falling vs. rising boundary tones in English, which we will extend to AltQs in Turkish.

Let us introduce each of these ingredients in some more detail.

First, we follow Roberts (1996) and take discourse structure to include, among other things, a stack of (often implicit) QUDs. This produces, after a move m at a given point of discourse, a set of hierarchically ordered and yet-to-be-answered questions. The order is based on the contextual entailment relation $<$ relating questions q to subquestions q' , as defined in (17)-(18). An example is provided in (19), where the question ‘Who ate what?’ has as subquestions ‘What did Amy eat?’ and ‘What did Bob eat?’, which in turn have their own subquestions:

(17) For all q and $q' \in \text{QUD}(m)$, if $q < q'$, then the complete answer to q' contextually entails a partial answer to q .

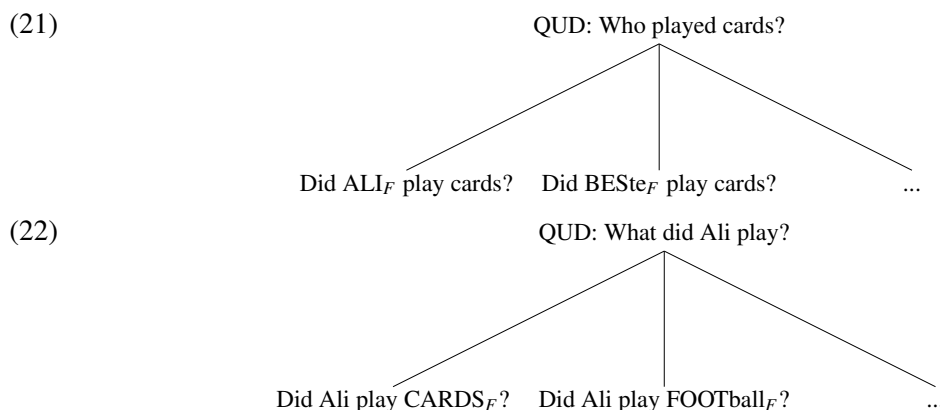
(18) A question q_1 contextually entails another q_2 iff answering q_1 in a discourse context with common ground C is such that $C \cup \text{Ans}(q_1)$ (i.e., the answer to q_1) entails a complete answer to q_2 .



For our second ingredient, we follow Rooth’s (1992) analysis of Focus and Biezma’s (2009) idea to apply it to QUD structure. Besides its (ordinary) semantic value, an expression ϕ has a focus semantic value $\llbracket \phi \rrbracket^f$ built from substituting the denotation of the Focus-marked element(s) within ϕ with alternative denotations of the same semantic type. An example is given in (20a), where the subscript F indicates Focus-marking. This $\llbracket \cdot \rrbracket^f$ is used to constrain the value of certain free variables C via the focus felicity condition of the squiggle operator \sim , defined in (20b):

- (20) a. $\llbracket \text{Ali}_F \text{ played cards} \rrbracket^f = \{a \text{ played cards, } b \text{ played cards, } c \text{ played cards, } \dots\}$
 b. $\llbracket \phi \sim C \rrbracket$ is felicitous only if $\llbracket C \rrbracket \subseteq \llbracket \phi \rrbracket^f$

In our case, and following Biezma (2009), the location of Focus-marking will be used to constrain the general shape of the immediately higher question in the QUD stack. For example, the same string *Did Ali play cards?* will function as subquestion of different questions depending on what element bears Focus-marking: If the focus is on the subject, the immediately higher question will be ‘Who played cards?’, as in (21); if the focus is on the direct object, the immediately higher question will be ‘What did Ali play?’, as in (22); and so on:



The third and final ingredient is Westera's (2017) A-Maxims. Parallel to Grice's (1975) Information Maxims governing the delivery of information, Westera (2017) defines A(ttention)-Maxims governing attentional intents, that is, governing the set of possibilities or states of affairs that the speaker may draw the audience's attention to. For our analysis, we will use the Maxims of A-Quality and of A-Relation in (24), parallel to the traditional Information Maxims in (23):

- (23) Grice's (1975) (Information) Maxims:
- a. Quality: Assert only information that you consider true.
 - b. Relation: Assert only information that you consider relevant.
- (24) Westera's (2017) Attention Maxims:
- a. A-Quality: Intend to draw attention only to states of affairs that you consider epistemically possible.
 - b. A-Relation: Intend to draw attention only to states of affairs that you consider relevant.

Westera (2017) proposes that the speaker's attitude towards the A-Maxims is reflected in the boundary tones. When an utterance ends in a final fall, it signals that the speaker believes that all A-Maxims are satisfied, that is, that there are no relevant epistemically live possibilities other than the ones that the speaker has drawn attention to in the sentence. The final rise, on the other hand, signals that the speaker considers the possibility that not all A-Maxims are satisfied.

Let us examine this distinction closer with an example:

- (25)
- a. Are you from New York[↑]?
 - b. Are you from New York[↓]?

The form with a final rise in (25a) signals that the speaker considers the possibility that there are relevant epistemically live alternatives other than the addressee being from New York, for example the addressee being from Los Angeles or from Boston. Hence, a speaker would use this form e.g. if what she is after is where the addressee is from and, even though she is right now asking about New York, she wants to signal to the addressee that she is interested in any other epistemically live possibility as well (so that, if the addressee is not from New York, he can volunteer the information of where he is from). In contrast, the question with a final fall in (25b) signals that the speaker believes that the only relevant epistemically live possibility

is whether or not the addressee is from New York. This would be appropriate, for example, if the speaker is checking whether the addressee complies with the prerequisite of being from New York to qualify for some insurance or contract (where being from Los Angeles or being from Boston would not help and, thus, constitute live but *irrelevant* possibilities); or it could be used in a quiz show where the rules dictate that the speaker can only posit PolQs and the addressee can only answer with bare ‘yes’ and ‘no’, hence making the other epistemically live possibilities *irrelevant* (since the addressee is not allowed to volunteer any further information beyond ‘yes’ and ‘no’).

Importantly, the relationship between rise vs. fall and the speakers obedience of the A-Maxims can be applied to sub-sentential constituents as well, as illustrated in (26):

(26) Barbara visited Loulou[↑], Sophie[↑], and Mila[↓] for Christmas.

In this case, the rises signal that the speaker, till that point, still considers other relevant live possibilities to be available. The concluding fall signals that the speaker is finished listing what she thinks are the relevant live possibilities in the context (cf. Biezma and Rawlins, 2012).

4.2. Combining the ingredients

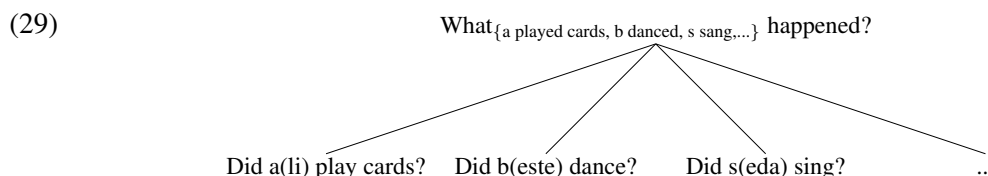
We propose (i) that *mI* in Turkish and focal accent in a question *Q* have the same semantic contribution, namely F-marking, (ii) that the free variable *C* refers to the immediate superquestion of *Q* in the QUD structure, and (iii) that the value of this *C* is shaped by the squiggle operator \sim –which we propose attaches to the IP node of *Q*– à la Biezma (2009) and is restricted via the un/satisfaction of A-Maxims indicated by boundary tones à la Westera (2017).

In the following, we will illustrate how this works for different PolQ forms and for AltQs in English and Turkish.

Our first group of question forms is **PolQs with broad focus**, that is, PolQs where the entire IP is Focus-marked. As we saw in section 3.1, English PolQs can be pronounced with a final rise, as in (27), or with a final fall, as in (30) below. (27) with a **final rise** is analysed in (28). The \sim -operator is attached under the Q-morpheme at LF, as in (28a). This determines, via the focus felicity condition (20b) and following Biezma (2009), the general shape of the value of *C*, that is, of our immediately higher QUD. The result is (28b), by which our $\llbracket C \rrbracket / \text{QUD}$ is required to be a subset of the set $\{a(\text{li}) \text{ played cards, } b(\text{este}) \text{ danced, } s(\text{eda}) \text{ sang, ...}\}$ containing alternative values to the Focus-marked IP. Finally, following Westera (2017), the final rise signals that our $\llbracket C \rrbracket / \text{QUD}$ may contain (relevant epistemically live) possibilities other than the one expressed by the original IP, thus imposing no further restrictions on $\llbracket C \rrbracket / \text{QUD}$, as in (28c). The end result is that sentence (27) with broad focus and with a final rise is understood as being a sub-question of the QUD ‘What happened?’, where ‘what’ ranges over several IP values, producing the QUD structure in (29):

(27) Did $[\text{Ali play cards}]_F \uparrow$?

(28) a. LF: $[\text{Q} [_{IP} \text{Ali play cards}]_F \sim C]$
 b. $\llbracket C \rrbracket / \text{QUD} \subseteq \llbracket [\text{Ali played cards}]_F \rrbracket^f = \{ a \text{ played cards, } b \text{ danced, } s \text{ sang, ...} \}$
 c. $\llbracket C \rrbracket / \text{QUD} = \{ a \text{ played cards, } b \text{ danced, } s \text{ sang, ...} \}$
 = ‘What $_{\{ a \text{ played cards, } b \text{ danced, } s \text{ sang, ...} \}}$ happened?’



Example (30), with the same broad focus but with a **final fall**, is analysed in (31). Steps (31a) and (31b) are exactly the same as steps (28a) and (28b). The only difference comes in step (31c): Since the speaker used a final fall, she indicates that there are no (relevant epistemically live) possibilities in the immediately higher QUD other than the one expressed by the original IP. Formulating the QUD again as a wh-question, the end result is that sentence (30) with broad focus and with a final fall is understood as being a sub-question of the QUD ‘What happened?’ where ‘what’ ranges only over the possibility ‘ali played cards’, as represented in the QUD structure (32):

(30) Did [Ali play cards]_F ↓?

- (31)
- LF: $[Q]_{IP} \text{Ali play cards}]_F \sim C]$
 - $\llbracket C \rrbracket / \text{QUD} \subseteq \llbracket [\text{Ali played cards}]_F \rrbracket^f = \{a \text{ played cards, } b \text{ danced, } s \text{ sang, } \dots\}$
 - $\llbracket C \rrbracket / \text{QUD} = \{a \text{ played cards, } \cancel{b \text{ danced}}, \cancel{s \text{ sang}}, \dots\}$
= ‘What_{a played cards} happened?’

(32)

$$\begin{array}{c} \text{What}_{\{a \text{ played cards}\}} \text{ happened?} \\ | \\ \text{Did a(li) play cards?} \end{array}$$

PolQs with broad focus in **Turkish** are formed by placing the particle *mi* at the end of the sentence, as in (39). Steps (a) and (b) in the analysis are the same and in the cases (28) and (31) above. However, when it comes to the intonation contour, we have found only a final fall reported in the literature.

See Fig. 8. Thus, we do not presently know whether and, if so, how Westera’s (2017) distinction between satisfaction vs. unsatisfaction of A-maxims is encoded in Turkish PolQs. For the time being, we tentatively conclude that (39) might be mandatorily interpreted as in (28), mandatorily interpreted as in (31), or optionally interpreted as either of the two options.

- (33) [Ali iskambil oynadi]_F **mi**?
[Ali cards play]_F Q?
‘Did Ali play cards?’ (= (16a))

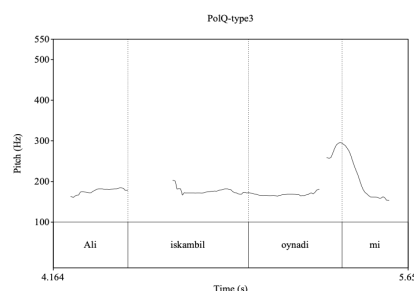


Figure 8: Turkish PolQ with broad focus.

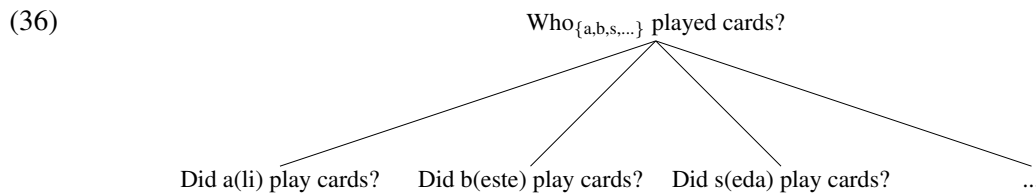
Our second group of question forms are

PolQs with narrow focus, which for the sake of illustration we will place on the subject. First, we will tackle the form with a **final rise**, exemplified in (34). Now only the subject *Ali* is Focus-marked, as indicated in the LF (35a), which means that $\llbracket [\text{Ali}_F \text{ played cards}] \rrbracket^f$, and thus our $\llbracket C \rrbracket / \text{QUD}$, consists of propositions that share the same VP property and differ solely in the

value of subject, as shown in (35b). Given that the final boundary tone is a rise, no further constraints are imposed on our $\llbracket C \rrbracket / \text{QUD}$, leading to (35c). The result is that (34) with narrow focus on the subject and a final rise is understood as a sub-question of the QUQ ‘Who (out of ali, beste, seda,...) played cards?’, as shown in the QUD structure (36):

(34) Did [Ali]_F play cards ↑?

- (35) a. LF: $[Q[_{IP} \text{Ali}_F \text{ play cards}] \sim C]$
 b. $\llbracket C \rrbracket / \text{QUD} \subseteq \llbracket \text{Ali}_F \text{ played cards} \rrbracket^f = \{a \text{ play cards, } b \text{ play cards, } s \text{ play cards, } \dots\}$
 c. $\llbracket C \rrbracket / \text{QUD} = \{a \text{ played cards, } b \text{ played cards, } s \text{ played cards, } \dots\}$
 = ‘Who_{a,b,s,...} played cards?’



If, instead of a rise, the PolQ with narrow focus was pronounced with a **final fall**, as in (37), steps (a) and (b) in the analysis would be the same. The only difference, again, would come in step (37c): Given that the speaker used a fall, the QUD is further constrained as to include only the expressed alternative ‘ali played cards’, since the speaker has signalled that there is no other relevant epistemically live alternative. Hence, sentence (37) is understood as a sub-question of the QUD ‘Who (of out ali) played cards?’, as represented in the tree (38):

- (37) a. LF: $[Q[_{IP} \text{Ali}_F \text{ play cards}] \sim C]$
 b. $\llbracket C \rrbracket / \text{QUD} \subseteq \llbracket \text{Ali}_F \text{ played cards} \rrbracket^f = \{a \text{ play cards, } b \text{ play cards, } s \text{ play cards, } \dots\}$
 c. $\llbracket C \rrbracket / \text{QUD} = \{a \text{ played cards, } b \text{ played cards, } s \text{ played cards, } \dots\}$
 = ‘Who_{a} played cards?’



PolQs with narrow focus in **Turkish** are formed by placing *mi* right after the constituent intended to be in focus, as illustrated in (39). The derivation is parallel up to the steps (a) and (b) that we just saw. However, again we have only found a final fall for these questions forms, shown in Fig. 9. We leave open what step (c) looks like for narrow focus PolQs in Turkish. Nevertheless, let us note that Karatas (2017) discusses a use of the question form (39) as ‘surprise’ question: The speaker hears the news that Seda, Beste, Ali and others played cards last night, she is surprised to hear this about Ali and then asks (39). For this use, an analysis along the lines of (37c)/(38) would be appropriate, since the only (epistemically live) possibility that the speaker

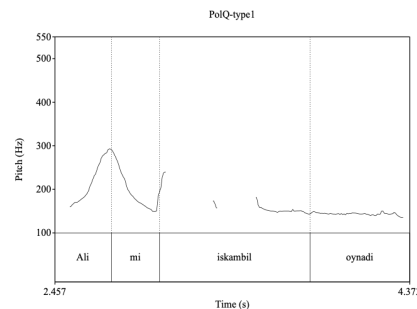


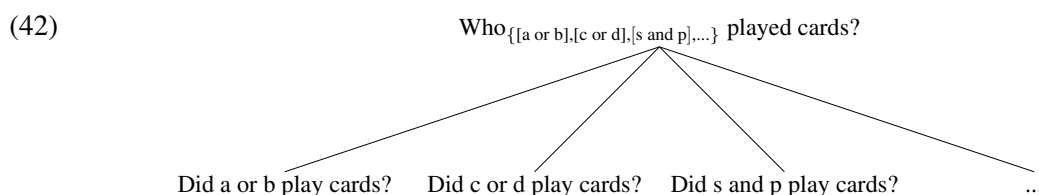
Figure 9: Turkish PolQ with narrow focus.

cares about at the time of the utterance is that of *Ali* having played cards.

- (39) *Ali mi iskambil oynadi?*
 Ali Q cards play
 ‘Was it Ali who played cards?’ (= (16b))

We come to our third group of question forms. What happens if, instead of Focus-marking on the simple subject *Ali_F*, we have Focus-marking on the disjunctive subject [*Ali or Beste*]_F, as in (40)? That is, how are **PolQs with (a single) narrow focus over an entire disjunctive phrase** analysed? No matter whether they are produced with a final rise or fall, the only difference with respect to the analysis of the second group is that the focus alternatives of the subject are of type *e* for simple *Ali_F* but of generalized quantifier type $\langle\langle e,t \rangle, t \rangle$ for [*Ali or Beste*]_F, which allows for more complex alternative denotations like ‘*curt or david*’, ‘*seda and patrick*’, etc. In the case of a final rise in (40), the derivation proceeds as in (41) and leads to the QUD tree (42):

- (40) Did [*Ali or Beste*]_F play cards ↑?
- (41) a. LF: $[Q_{IP}[\text{Ali or Beste}]_F \text{ play cards}] \sim C$
 b. $[[C]] / \text{QUD} \subseteq [[[\text{Ali or Beste}]_F \text{ played cards}]]^f =$
 {a or b played cards, c or d played cards, s and p played cards,...}
 c. $[[C]] / \text{QUD} = \{a \text{ or } b \text{ played cards, } c \text{ or } d \text{ played cards, } s \text{ and } p \text{ played cards, } \dots\}$
 = ‘Who_{[a or b],[c or d],[s and p],...} played cards?’



In the case of a final fall in (43), the derivation proceeds as in (44) and results in the QUD structure (45):

- (43) Did [*Ali or Beste*]_F play cards ↓?
- (44) a. LF: $[Q_{IP}[\text{Ali or Beste}]_F \text{ play cards}] \sim C$
 b. $[[C]] / \text{QUD} \subseteq [[[\text{Ali or Beste}]_F \text{ played cards}]]^f =$
 {a or b played cards, c or d played cards, s and p played cards,...}
 c. $[[C]] / \text{QUD} = \{a \text{ or } b \text{ played cards, } c \text{ or } d \text{ played cards, } s \text{ and } p \text{ played cards, } \dots\}$
 = ‘Who_{[a or b]} played cards?’



We come to our fourth and final group of question forms: **AltQs** in English and Turkish, illustrated in (46)-(47):

- (46) Did [*Ali*]_{F↑} or [*Seda*]_{F↓} play cards?
- (47) [*Ali*] mi↑ yoksa [*Seda*] mi↓ iskambil oynadi
 Ali Q or_{alt} Seda cards play.PAST cards
 ‘Which of the two, Ali or Seda, played cards?’

Two aspects of the this question form are crucial for the analysis. First, each disjunct receives its own focal accent in English and its own *mI*-marking in Turkish, resulting in multiple accent and multiple *mI*-marking. This will be modelled as having two F-markings at LF, one per disjunct. We assume without argument that the disjunction involves partially elided propositional disjuncts –e.g., the disjunction of two IPs– (Han and Romero (2004), Erschler (2018), a.o.) and attach a \sim -operator at the top of each disjunct, as in (48a). This means that each Focus-marking and associated \sim -operator will contribute separately to the shaping of $\llbracket C \rrbracket$ /QUD, as sketched in (48b). Second, the boundary tone on the first disjunct is a rise and the boundary tone on the final disjunct is a fall, both in English (Bartels, 1999) and Turkish (see Fig. 10).

In terms of Westera’s (2017) A-maxims, boundary tones at sub-sentential constituents are analysed as in (26) above: the rise on *Ali* indicates that there are relevant epistemically live alternatives other than the ones mentioned up to this point, while the fall on *Seda* signals that there are no further relevant epistemically live alternatives at this latter point. This leads to the further pruning in (48c). The result is that the AltQ (46)/(47) is understood as a sub-question of the QUD ‘Who (out of ali and seda) played cards?’, as represented in the QUD structure (49):

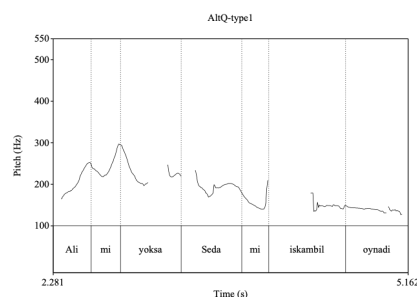


Figure 10: Turkish AltQ.

- (48) a. LF: $\llbracket Q \llbracket IP_1 \text{ Ali}_F \text{ play cards} \rrbracket \sim C \rrbracket$ or $\llbracket IP_2 \text{ Seda}_F \text{ play cards} \rrbracket \sim C \rrbracket$
 b. $\llbracket C \rrbracket \subseteq \llbracket IP_1 \rrbracket^f = \llbracket IP_2 \rrbracket^f = \{a \text{ played cards, s played cards, c played cards, ...}\}$
 c. $\llbracket C \rrbracket = \text{QUD} = \{a \text{ played cards, s played cards, e played cards, ...}\}$
 = ‘Who_{a,s} played cards?’

- (49) $\text{Who}_{\{a,b\}} \text{ played cards?}$
 |
 Did $\text{Ali}_F \uparrow$ or $\text{Seda}_F \downarrow$ play cards?

5. Conclusion

We have shown that both the final fall and the multiple accent contribute to AltQ interpretation and need to be modelled in a unified analysis of English and Turkish AltQs. Extending Biezma (2009) on focus accent in PolQs to multiple accent in AltQs, we proposed that the contribution of the multiple accent is to shape the QUD via focus marking, and, following Westera (2017), that the final fall restricts the content of the QUD via (un)satisfaction of the A-Maxims.

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