Structured Questions

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1. Introduction

Discourse is said to be structured by hierarchically related Questions Under Discussion (QUDs) (Roberts 2012 a.m.o.). I claim utterances themselves can contain QUD structure. In this paper, I discuss novel data in Turkish, that I call structured questions. While questions are traditionally thought to be associated with a single QUD, structured questions raise two hierarchically related QUDs.

(1) Su mu istiyor-sun, yoksa kahve mi, çay mı?
water mi want-2sg yoksa coffee mi tea mi
Do you want water, or else coffee, or tea?
Possible answers: water, coffee, tea

As seen in (1) Turkish structured questions are characterized syntactically by the position of the particle yoksa before at least two alternatives; semantically, by a sense that alternatives are separated by yoksa into two groups. To explain this grouping effect, I propose an analysis for yoksa as raising a QUD of its own, in addition to the one raised by the semantics of the question. For example, (1) raises the following two QUDs (represented as sets of alternatives (Hamblin 1973): QUD₀ = {water, coffee, tea}, from traditional semantics for alternative questions (Karttunen 1977); and QUD₁ = {water, caffeinated drink (or any relevant grouping of coffee and tea)}, from the semantics of yoksa.

A similar phenomenon is discussed by Wagner (2010), who looks at grouping effects in coordinations that arise from the effect of prosodic boundaries. I argue that the grouping effects of prosodic boundaries and those of yoksa are slightly different, and must be analyzed differently. I suggest that the former arises from a pragmatic inference that the coordination is non-associative, while the latter arises from the semantics of yoksa, that requires its prejacent to answer a QUD.

2. Background: prosodic grouping in coordination structures

Wagner (2010) observes grouping effects in English coordinations as a result of strong prosodic boundaries separating the groups, as in example (2):

(2) Mary || and Sarah and Annie arrived. (|| = strong prosodic boundary)
(3) Mary and Sarah and Annie arrived.
Consider a context in which M and S arrived together, separately from A; and one in which S and A arrived together, separately from M. (3) is felicitous in both contexts; (2) is only felicitous in the first.

The effect of prosodic boundaries can also have a truth-conditional effect:

(4) Abe || and Bill or Seth arrived.
(5) Abe and Bill || or Seth arrived.

Prosody appears to mark constituency: (4) corresponds to A and (B or S); (5) to (A and B) or S.

Wagner (2010) interprets and generalizes data such as (2)–(5) as follows:

(6) a. In an associative coordination, elements are separated by boundaries of equal strength.
   b. In a non-associative coordination, constituents that are more deeply embedded are separated from each other by weaker boundaries than constituents that are less deeply embedded.

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The string in (4)/(5) is non-associative: in order to interpret it, constituent boundaries must be prosodically marked. The string in (2)/(3) is associative: it is felicitous with boundaries of equal strength. However, if one does mark a prosodic boundary, as in (2), an inference that the coordination is non-associative arises. This is possible if the ands are different: e.g. in (2), the first and could correspond to a Boolean conjunction, and the second and to a mereological sum operator (Link 1983).

Wagner (2010) argues that coordinated elements separated by boundaries of equal prosodic strength are constructed within one phase (Chomsky 1999), and are by default left-branching. In contrast, coordinated elements separated by boundaries of different strength are constructed phase by phase, where weaker boundaries correspond to deeper embedding, as in the schematic example in (7).


Constituency affects the order of operations, explaining the effects observed in (2)–(5).

In this paper, I adopt Wagner (2010)’s account of relative boundary strength in coordinations as correlating semantically with non-/associativity, and syntactically with constituency, as described above.

3. Turkish structured questions: yoksa versus prosody

In this section I look at grouping effects in Turkish alternative questions arising from a non-standard position of the particle yoksa, and those arising from relative strength of prosodic breaks. I show that they differ in that yoksa only groups alternatives coming after it, while prosodic groupings require to be isomorphic to semantic groupings. Similarly to Wagner’s (2010) examples, prosodic boundaries between alternatives in AQs induce grouping effects, as shown in examples (8) and (9).

(8) Şarap mı istiyorsun, bira mı, || rakı mı?
   wine mi want.2sg beer mi rakı mi
   Do you want wine, or beer, || or rakı?
   Possible answers: wine, beer, rakı
   (the question asks if the addressee wants soft alcohol or hard liquor, with the options specified)

(9) Context: I have a good bottle of wine out on the table that I want to offer my friends. However, I don’t want to force them to have wine and tell them the other options I have.

Şarap mı istiyorsun, || bira mı, rakı mı, ...?
wine mi want.2sg beer mi rakı mi
Do you want wine, || or beer, or rakı...?
Possible answers: wine, beer, rakı...

In (8), alternatives are grouped in terms of alcohol type; in (9), they are grouped in terms of contextual prominence (what is out on the table and I want my friends to taste, versus the rest).

In standard Turkish AQs, there are prosodic boundaries of equal strength between each alternative. Moreover, yoksa commonly appears before the last alternative (“pre-finally”), not affecting interpretation.

(10) Şarap mı istiyorsun, bira mı, (yoksa) vodka mı?
   wine mi want.2sg beer mi yoksa vodka mi
   Do you want wine, beer or rakı?
   Possible answers: wine, beer, rakı

When yoksa appears before at least two alternatives (“non-pre-finally”), grouping effects are formed.

(11) Context: Same as in (9)

Şarap mı istiyorsun, yoksa bira mı, rakı mı, ...?
wine mi want.2sg yoksa beer mi rakı mi
Do you want wine, or else beer, or rakı...?
Possible answers: wine, beer, rakı...

1Prosodic boundary strength is encoded by various phonetic and phonological cues, such as pre-boundary lengthening, initial strengthening, pause, and presence of boundary tones (cf. Ladd 2008). I base my observations primarily on the length of the pause.

2I translate yoksa by or else, that sounds less natural, but conveys a similar meaning in structured questions.

3For all AQs, flat or structured, there seems to be an exclusivity inference, i.e. only one of the alternatives can be the answer to the question (this inference is a well-known fact about AQs).
has a similar grouping to [9] yoksa and the prosodic boundary in this position have a similar effect. However, this similarity is not recovered in pre-final position: [8] has grouping effects induced by pre-final boundary, [10] has no grouping effect with pre-final yoksa.

Non-pre-final yoksa generally produces a grouping effect, in fact, oddness arises when there is no contextually relevant grouping of post-yoksa alternatives, as observed in the contrast between [12a] and [12b].

(12) Context: You are at a food stand, thirsty and hungry, but only have a couple of coins. The vendor helps you out, listing the items you can buy with what you have.

a. Çay mı istiyorsun, kahve mı, yoksa elma mı, armut mı?
   tea mi want.2sg coffee mi, yoksa apple mi, pear mi
   ≈ Do you want tea, or coffee, or else an apple, or a pear?
   "Do you want something to drink, from the options water and orange juice, or a fruit to eat, from the options apple and pear?" (only one option available, given your money)

b. #Çay mı istiyorsun, portakal mı, yoksa elma mı, armut mı?
   tea mi want.2sg orange mi, yoksa apple mi, pear mi
   Do you want tea, or an orange, or else an apple or a pear?

Apple and pear form a fruit group in [12a] but not in [12b] since orange is also an option. Note apple and pear could form another relevant grouping (e.g. prominence-based, like in [9]), and make [12b] felicitous.

Furthermore, groupings arising from yoksa are asymmetrical: post-yoksa options must be grouped, while pre-yoksa options don’t have to be.

(13) Context: Breakfast items are served on a table, there are three plates: one of simits (Turkish bagels), one of eggs, and one of fruit, of two types–apples and pears. Only one item is included in the price; the server tells you the options.

a. Simit mi istiyorsun, yumurta mı, yoksa elma mı, armut mı?
   simit mi want.2sg egg mi, yoksa apple mi, pear mi
   Do you want a simit, or an egg, or an apple or a pear?

b. #Elma mi istiyorsun, armut mu, yoksa simit mi, yumurta mı?
   apple mi want.2sg pear mi, yoksa simit mi, egg mi
   int. Do you want an apple or a pear, or simit or an egg?

This asymmetry is not replicated with prosody: a strong prosodic boundary that replaces yoksa in both [13a] and [13b] is infelicitous. However, we can add a strong boundary in [13a] to have three prosodic groupings corresponding to the semantic groups, as in [14] making the utterance felicitous.

(14) Simit mi istiyorsun, #(||) yumurta mı, || elma mı, || armut mı?
   simit mi want.2sg egg mi, apple mi, pear mi
   Do you want a simit, or an egg, or an apple or a pear?

Yoksa can appear several times. In such cases, the interpretation depends on prosody. If the boundaries between each alternative are equal, no grouping effect arises:

(15) Şarap mı istiyorsun, yoksa bira mı, yoksa rakı mı?
   wine mi want.2sg yoksa beer mi, yoksa rakı mi
   Do you want wine, beer or rakı? (same as [10])

On the other hand, a strong prosodic boundary before or after the first yoksa induces a grouping effect:

(16) Şarap mı istiyorsun, (||) yoksa (||) bira mı, yoksa rakı mı?
   wine mi want.2sg yoksa beer mi, yoksa rakı mi
   Do you want wine, if not would you like beer or rakı? (same as [11])
Finally, strong prosodic boundaries counteract grouping effects created by *yoksa*. The question in (17) is (11) with a strong boundary before the last alternative – there is no longer a grouping effect.

(17) Şarap mı istiyorsun, *yoksa* bira mi, || raki mi?
    wine mi want.2sg *yoksa* beer mi raki mi
    *Do you want wine, beer or raki?*

In summary, data shows that groupings formed by *yoksa* and prosody are similar in some cases but not all. I have replicated Wagner’s (2010) observations in a new language and coordination type, where prosodic groupings must be isomorphic to semantic groupings. On the other hand, *yoksa* only requires alternatives that follow it to be grouped together, allowing a pre-final *yoksa* to produce no grouping effect. Moreover, when strong prosodic boundaries and *yoksa* interact, they are not on equal standing.

### 4. Proposal

In this section, I propose an analysis for the effects described above. I first lay out my assumptions, then propose a semantics for *yoksa*, and finally give derivations that account for the data of interest.

#### 4.1. Preliminary assumptions

**Alternative semantics.** I assume alternative semantics (Hamblin, 1973; Karttunen, 1977). Following Beck and Kim (2006), I assume a $\mathcal{Q}$ operator (present in $\mathbb{C}$ for all questions) to lift the focus semantic value of its complement into an ordinary semantic value: $\mathcal{J}\mathcal{Q}\mathcal{K}\mathcal{O} = \mathcal{J}\mathcal{K}\mathcal{F}$.

**Clausal coordination.** I follow Gračanin-Yüksek (2014) in treating alternatives in Turkish AQS as coordinating TPs, and allowing ellipsis (the chosen placement of the verb in the first coordinate in all the examples above makes this syntax relatively uncontroversial, assuming the law of coordination of likes).

**The question particle *mi*.** The focus semantic value of a *mi*...*mi* coordination is the set of ordinary semantic values of the members of the coordination. Its ordinary semantic value is undefined.

(18) $[A_1 \text{ mi}, ..., A_n \text{ mi}]^f = \{A_1, ..., A_n\}; \quad [A_1 \text{ mi}, ..., A_n \text{ mi}]^o$ undefined (for $n > 1$)

**Question relevance.** (Roberts, 2012; Büring, 2003)

(19) A question $q$ must be relevant, i.e. directly address a QUD: $[q] \subseteq [\text{QUD}_0]$

**A pragmatic principle.**

(20) Minimize QUDs: Don’t raise more QUDs than required by the semantics of the utterance.

#### 4.2. Yoksa: marking a possible answer to a QUD

I propose that the particle *yoksa* does two things: semantically, it states that its prejacent is an answer to the QUD; phono-syntactically, it groups constituents on either side via prosody as described by Wagner (2010). The following diagram of an AQ summarizes these two effects.

![Diagram of an AQ with yoksa](image)
4.2.1. The semantics of yoksa

I assume the at-issue semantics of yoksa to be trivial. Skipping a compositional account for reasons of space, the at-issue effect of adding yoksa to a mi...mi disjunction is null[^4]

\[ [A_1 \text{ mi} \ldots A_i \text{ mi} \text{ yoksa } A_{i+1} \text{ mi} \ldots A_n \text{ mi}] = \{A_1, \ldots, A_n\} \text{ (for } n > 1) \]

The presuppositional content of yoksa is the one that is of interest:

\[ [\text{yoksa } p] \text{ presupposes that there is a qud}_1 \text{ such that } [p]^o \in [\text{qud}_1] \]

4.2.2. The prosodic effect of yoksa

In Turkish AQs, there is a prosodic boundary between each alternative. I assume that yoksa is always preceded by a prosodic boundary that is stronger than that of the default prosodic boundaries between alternatives, but weaker than a marked prosodic boundary[^5] Using Wagner’s (2010) algorithm, we can derive the constituency of AQs based on the position of the particle yoksa and prosodic boundaries (as in example (7)). Results for AQs with three alternatives are summarized in Table 1.

<table>
<thead>
<tr>
<th>string</th>
<th>constituency</th>
<th>boundaries of equal strength</th>
<th>boundaries of different strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) a b c</td>
<td>[a [bc]]</td>
<td>boundaries of equal strength</td>
<td>boundaries of different strength</td>
</tr>
<tr>
<td>(ii) a Yb Yc</td>
<td>[[a [Yb] [Yc]]]</td>
<td>▶ default left-branching structure</td>
<td></td>
</tr>
<tr>
<td>(iii) a b Yc</td>
<td>[[ab] Yc]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) a b Yc</td>
<td>[[ab] Yc]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) a b c</td>
<td>[a [bc]]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) a Yb Yc</td>
<td>[[a [Yb] [Yc]]]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ix) a</td>
<td></td>
<td>b Yc</td>
<td>[a [b [Yc]]]</td>
</tr>
<tr>
<td>(x) a</td>
<td></td>
<td>b Yc</td>
<td>[a [b [Yc]]]</td>
</tr>
<tr>
<td>(xi) a</td>
<td></td>
<td>b Yc</td>
<td>[a [b [Yc]]]</td>
</tr>
</tbody>
</table>

Table 1: The constituency of AQs with three alternatives
(where a, b, c = alternatives of the form "x mi"; Y = yoksa; || = prosodic boundary)

4.3. Derivations

We begin with regular, "flat" AQs. A possible flat AQ is one in which there is no yoksa, like in example (10). Based on Table 1, such questions have a right-branching coordination structure.

\[ [Q[A \text{ mi } [B \text{ mi } C \text{ mi}]]]^o = \{A, B, C\} \]

This question raises qud_0 = \{A, B, C\} (from the principle of question relevance), and no other QUD.

Another way to express a flat AQ is with the particle yoksa right before the last alternative (see example (10)). This structure is left-branching, as show in (iii) in Table 1.

\[ [Q[[A \text{ mi } B \text{ mi}] \text{ yoksa } C \text{ mi}]] = \{A, B, C\} \]

The at-issue meaning is the same as in \[23\] therefore the question raises the same qud_0 = \{A, B, C\}. [yoksa] requires that C answers a qud_1. Since C \in [qud_1], we have qud_0 = qud_1 by the Minimize QUDs principle. The resulting meaning is therefore the same as in \[23\] as desired.

[^4]: Yoksa can also be treated as a disjunction, derived from -sa ("if") and yok ("not"). In AQs, yoksa is redundant with the mi...mi disjunction, hence its optionality. This contrasts with English or, that is neither redundant nor optional.

[^5]: A flat AQ is associative, with or without yoksa. This leads us to reformulate the associativity generalization in \[6\] by replacing "equal" with "default". Since the boundary before yoksa is default, it falls within the associative description.
Finally, a flat AQ can also be achieved with yoksa before each alternative with the constituency structure in (ii), as in example (15). Each yoksa requires that its prejacent be a possible answer to QUD\(_1\); these match QUD\(_0\), therefore yielding the same meaning.

A three-alternative structured question, with groupings, is one in which yoksa has a prejacent consisting of more than one alternative, as in (11). The constituency structure is as in (vii).

\[(25) \quad \{Q[A \land \text{yoksa} \land B \land C \land D]\} = \{A, B, C, D\}\]

\[\text{yoksa}\] requires that \[\{B \land C \land D\}^* = B \lor C\] be an answer to QUD\(_1\). The question raises QUD\(_0\) = \{A, B, C\}. \(B \lor C\) does not fully answer QUD\(_0\), therefore QUD\(_1\) \neq QUD\(_0\), in which QUD\(_1\) is a sub-QUD to QUD\(_0\) (based on the assumption that QUD\(_0\) and QUD\(_1\) partition the same common ground). Both are raised by (25).

If a boundary is inserted before the last alternative like in (17), this affects constituency (see (v)), and yoksa’s prejacent is only \(B\), which is part of the original QUD\(_0\), thus rendering the question flat.

In AQs with four alternatives, with yoksa in the middle, pre-yoksa alternatives may be grouped or not, as in examples (12a) and (13a). Yoksa affects constituency by coordinating two nested coordinations:

\[(26) \quad \{Q[A \land \text{yoksa} \land C \land D \land M]\} = \{A, B, C, D\}\]

The question raises QUD\(_0\) = \{A, B, C, D\}. \[\text{yoksa}\] requires that there is a QUD\(_1\) such that \(C \lor D \in \{\text{QUD}\_1\}\). QUD\(_1\) is therefore a sub-QUD of QUD\(_0\); both are raised by (26). Given these requirements, there are the following two possibilities for QUD\(_0\): 1) \(\{A \lor B, C \lor D\}\) (corresponds to (12a)); 2) \(\{A, B, C \lor D\}\) (corresponds to (13a)). Neither violates Minimize QUDs, because there are only two QUDs in each case.

As for structured questions arising from prosody, I follow Wagner (2010) in saying that a difference in boundary strength indicates that the coordination is non-associative. Non-associativity in coordinations may have different sources, as briefly presented in section 2 in AQs, it may be most naturally correlated with QUD structure. Importantly, such a non-associativity inference has no reason to not be symmetrical. The specifics of the nature between non-associativity in AQs and internal QUD structure, and exactly how the prosody-semantic grouping isomorphism arises, are left for future work.

5. Conclusion

I have presented new data and proposed a prosodo-semantic account for grouping effects in a special type of coordination: structured alternative questions. These can be formed in two ways: from differences in strength of prosodic boundaries, that induce a non-associativity inference; from the semantics of the particle yoksa, that requires its prejacent to be a possible answer to a QUD: if this prejacent makes up more than one alternative, a second QUD is raised, subordinate to the one raised by the question.

This short paper points towards exciting lines of work in largely unexplored domains: utterance-internal QUD structure; the link between prosody and semantics in coordinations; the prosody and semantics of the ubiquitous pre-final connectives in coordinations, and how it compares across languages.

References