CROSS-LINGUISTIC VARIATION IN THE DERIVATION OF ALTERNATIVE QUESTIONS: JAPANESE AND BEYOND*

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Abstract

In this paper, I submit two empirical claims regarding the cross-linguistic variation in alternative questions (AltQs). The first claim is that there are in principle two ways in which AltQs are derived: scope-shifting of the disjunction and disjoining PolQs. The other claim is that some languages, in particular Japanese, only allow the second option in forming an AltQ.

With these empirical results, as a theoretical proposal, I posit three kinds of disjunctions that differ from each other in (i) their scope with respect to the Q-operator and (ii) whether they locally disjoin questions or non-questions. Under this theory, the cross-linguistic variations in the derivation of AltQs and the distribution of disjunction-markers are captured in terms of the lexicalization patterns of the three disjunctions. For example, Japanese is argued to be a language that does not have an item corresponding to the disjunction that out-scopes the Q-operator. I show that the theory is compatible with three kinds of question semantics, specifically, Karttunen-style semantics, the standard Hamblin semantics and Flexible Hamblin semantics.

1 Introduction

The issues unique to the syntax and semantics of alternative questions (AltQs) among different interrogative constructions (e.g., polar questions, *wh*-questions) include (i) whether the disjunction

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The content of the current paper (specifically sections 2 and 3) partly overlaps with Uegaki (2014). The people mentioned here do not necessarily agree with the idea presented in this paper, and all errors are my own.

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undergoes a scope-shifting operation, and (ii) how large the disjunction is in the underlying structure. For example, there are (at least) three analytic possibilities for the compositional semantic derivation of an English AltQ. The structures of the AltQ *Do you want coffee or tea?* assigned by these analyses look like the following.

(1) a. Do you want coffee or tea?
b. [Do you want coffee] or [~~do you want~~ tea]?
c. Do [[you want coffee] or [~~you want~~ tea]]?

One possibility exemplified in (1a) is to analyze the disjunction *coffee or tea* as involving no deletion, and treat it as undergoing some form of scope-shifting operation which makes it take scope over the question-forming operator (Quantifying-in or Quantifier Raising in Karttunen 1977, Larson 1985; focus semantics in Beck and Kim 2006). The other two possibilities involve deletion in the second disjunct whose underlying structure is larger than its surface appearance. In (1b), the underlying structure of the AltQ is a disjunction of two questions, and no scope-shifting operation of the disjunction is needed to derive the AltQ meaning, given a suitable compositional semantics for the disjunction of multiple question-meanings (Pruitt and Roelofsen 2011). Another possibility exemplified in (1c) is to assume both a covert scoping operation and deletion. Han and Romero (2004) argue for this line of analysis based on Larson's (1985) argument for covert scoping and intonational and cross-linguistic evidence for the deletion in AltQs. The issue of deciding on which of these analyses for AltQs is correct is still under debate in the syntactic and semantic literature (see Beck and Kim 2006 and Pruitt and Roelofsen 2011 for concise reviews).

In this paper, I contribute to this debate in light of cross-linguistic variation in the derivation of AltQs. The empirical claims to be made in this paper are twofold. One claim is that Japanese AltQs are always disjoined PolQs (section 3, Uegaki 2014), and that they are not derived by a scope-shifting of the disjunction. The other claim is that the analysis for Japanese AltQs cannot be generalized cross-linguistically (section 4): the distributions of disjunctive markers in Basque and Finnish pose a problem for a position that universally applies the disjoined PolQ analysis to AltQs.

With these empirical results, as a theoretical proposal, I posit three kinds of disjunctions that differ from each other in (i) their scope with respect to the Q-operator and (ii) whether they locally disjoin questions or non-questions. Under this theory, the cross-linguistic variations in the derivation of AltQs and the distribution of disjunction-markers are captured in terms of the lexicalization patterns of the three disjunctions. For example, Japanese is argued to be a language that does not have an item corresponding to the disjunction that out-scopes the Q-operator (section 4.2). Finally, I show that the theory is compatible with three kinds of question semantics. I formulate the theory in a Karttunen-style semantics, the standard Hamblin semantics and Flexible Hamblin semantics (section 4.3). In the concluding section, the empirical and theoretical implications of the current proposal, as well as prospects for future research are discussed.

2 Scope-shifting analyses and disjoined PolQ analyses

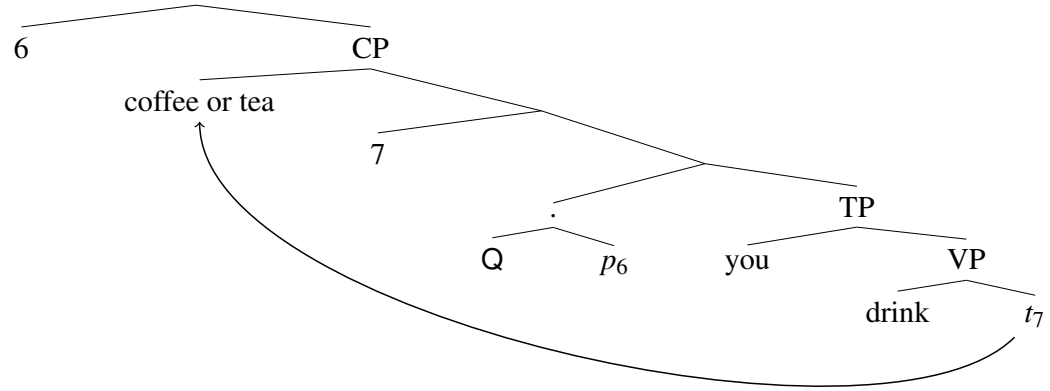
To set up the basis for the discussion, I briefly review the existing analyses of AltQs in this section. The analyses are classified into two general categories: the scope-shifting analyses and the disjoined PolQ analyses.

2.1 Scope-shifting analyses

In various forms (e.g., Larson 1985, Higginbotham 1991, Romero and Han 2003, Han and Romero 2004, Beck and Kim 2006, Nicolae 2013), AltQs have been analyzed as involving a shift in the scope of the disjunction. The fundamental idea common to the scope-shifting analyses is to let the disjunction take scope over the question-forming operator, thus deriving the question meaning that can be answered by either one of the alternative propositions introduced by the disjunction. A simple implementation of this idea uses the Karttunen-style semantics for questions. Concretely, I illustrate this with the proposal from Nicolae (2013), which follows Heim's (2012) LF-based reformulation of Karttunen's semantics.

In this analysis, the AltQ in (1a) has the LF in (2), where the disjunction *coffee or tea* is QRed above the Q-operator.[1]

(2)



The Q-operator is defined as the identity relation over propositions, as in (3). By giving a generalized quantifier meaning to the disjunction and abstracting over the propositional variable in the sister position of Q, we derive the desired meaning in (5).[2]

(3) $[\![\mathsf{Q}]\!] = \lambda p[\lambda q.p = q]$

(4) $[\![\text{coffee or tea}]\!] = \lambda P_{\langle e,t\rangle}.P(\mathbf{c}) \vee P(\mathbf{t})$[3]

(5) $[\![(2)]\!] = \lambda p.[p = \lambda w.\mathbf{like}(\mathbf{j},\mathbf{c},w) \vee p = \lambda w.\mathbf{like}(\mathbf{j},\mathbf{t},w)]$

Needless to say, the above approach is just one of the different formulations of the scoping analysis. In the literature, there are at least two other formulations. One formulation involves overt movement of *whether* (Larson 1985, Romero and Han 2003, Han and Romero 2004). This analysis follows Larson's idea that *whether* and *either* mark the scope position of a disjunction. Romero

[1] I use the LF notation from Heim and Kratzer (1998), where binder indices are interpreted as a λ-abstractor over the co-indexed trace/variable by the rule of Predicate Abstraction.

[2] The abstraction of the propositional variable achieves exactly what is obtained by the application of Karttunen's (1977) *wh*-quantification rule defined as follows.

(i) If $[\![\alpha]\!] \in D_{\langle et,t\rangle}$ and $[\![\beta]\!] \in D_{\langle e,\langle st,t\rangle\rangle}$, then $[\![\alpha\ \beta]\!] = \lambda p.[\![\alpha]\!](\lambda x.[\![\beta]\!](x)(p))$

[3] I treat the denotations of *coffee* and *tea* to be entities in order to make the derivations simpler. Nothing in this paper hinges on this particular assumption.

and Han (2003) provide a semantic implementation of this analysis by letting *whether/either* denote the existential closure over choice functions (cf. Reinhart 1997) and the disjunction denote a set of alternative objects which serves as the argument of such a choice function. Under this analysis, when *whether* is moved above the Karttunen-style Q-operator, we predict the same semantic value as the above analysis. In the unembedded case, it is assumed that *whether* is phonetically null.

Another formulation of the scoping analysis is the focus-semantic analysis by Beck and Kim (2006). This analysis extends Beck's (2006) focus-semantic analysis of *wh*-in-situ to AltQs: disjunction introduces focus alternatives just like in-situ *wh*-phrases. The focus alternatives are passed up via Point-wise Functional Application (Hamblin 1973) until the Q-operator is reached. The Q-operator in this formulation 'copies' the focus-semantic value of its prejacent to the ordinary semantic value. This formulation will be taken up later in the context of cross-linguistic variation.

The three different formulations of the scoping analysis make distinct predictions about the circumstances under which an AltQ reading is blocked. For example, as claimed in Larson (1985), the analysis where *whether* undergoes overt movement predicts an AltQ reading to be unavailable when movement of *whether* violates an island constraint. On the other hand, the focus semantic analysis predicts that the AltQ interpretation is disrupted when there is an INTERVENER between the Q-operator and the relevant disjunction. Beck and Kim (2006) claim that the apparent island effect in AltQs is in fact an intervention effect, contra Larson (1985).

Although the debate over which formulation of the scoping mechanism correctly predicts the detailed generalization is extremely important, I will focus on a different aspect of the analysis of AltQs in this paper, in particular, whether a scoping analysis in general is viable in the first place for specific languages. For this reason, in what follows, arguments for and against the scoping analysis will be formulated in general terms so that they apply to any of the three implementations.

2.2 Disjoined PolQ analyses

The second category of analyses deriving AltQs states that the AltQs are derived by a disjunction of PolQs, which are themselves syntactically CPs. Thus, the schematic structure of an AltQ is the one in (6).

(6) [[$_{CP}$ Q TP_1] Disj [$_{CP}$ Q TP_2]]

Under this analysis, what appears to be coordination of smaller items on the surface involves deletion in the second CP disjunct. For example, the AltQ *Do you drink coffee or tea* would involve the deletion in (7).

(7) [$_{CP}$ Do you drink coffee] or [$_{CP}$ ~~do you drink~~ tea]?

An important feature of this analysis in the context of the current paper is that it does not involve any scope-shifting operation. This is so because the disjunction already scopes above the two Q-operators, which reside in the complementizer position of each of the PolQs in the structure in (6).

Now, how does the structure of disjoined PolQs as in (7) receive an appropriate AltQ interpretation? In order to determine how disjoined PolQs are interpreted, we first need to know what the compositional semantics of PolQs looks like. In this paper, I analyze PolQs as denoting the singleton set of their prejacent proposition, following authors such as Roberts (1996) and Gunlogson (2003). Compositionally, this is done with the structure in (8) together with the denotation of the Q-operator from Karttunen (1977) in (3). The result of the composition is (9).

(8) $[_{\text{CP}}$ Q [John drank coffee]]

(3) $[\![\text{Q}]\!] = \lambda p[\lambda q.q = p]$

(9) $[\![(8)]\!] = \lambda q.[q = \lambda w.\mathbf{drank}(\mathbf{j},\mathbf{c},w)]$

Given this semantics for PolQs, (7) gets interpreted with the Generalized Disjunction (Partee and Rooth 1983) denotation for *or* in (10). Hence, we derive the desired semantic value for the AltQ in (7):

(10) $[\![\text{or}]\!] = \lambda Q_{\langle st,t\rangle}\lambda Q'_{\langle st,t\rangle}\lambda p.Q(p) \vee Q'(p)$

(11) $[\![(7)]\!] = \{\lambda w.\mathbf{drank}(\mathbf{j},\mathbf{c},w), \lambda w.\mathbf{drank}(\mathbf{j},\mathbf{t},w)\}$

Before concluding the section, I will address why I am using the singleton denotation for PolQs rather than somewhat more standard bipolar denotations (Hamblin 1973, Karttunen 1977). I will discuss how the bipolar answer set can still be derived from the singleton denotation, and provide an argument for the singleton analysis. The singleton analysis itself is defended extensively in the literature for reasons related to e.g., the behavior of answer particles and *doubt*-type question-embedding predicates. Here, I will present an argument for the singleton analysis that is directly relevant for the disjoined PolQ analysis of AltQs (see Biezma and Rawlins 2012 for a concise review of the literature, and for a similar argument to the one I will present for the singleton analysis based on disjoined PolQs).

First, here is how the singleton denotation works in my analysis. I assume that every matrix question comes with an operator which applies to the question denotation and returns a partition over worlds in the sense of Groenendijk and Stokhof (1984). The operator is defined as in (12) (cf. George 2011). Applying this to the singleton denotation of a PolQ, we derive the usual bipolar answer set, as in (13).

(12) $[\![\text{Part}]\!] := \lambda Q_{\langle st,t\rangle}.\{p' \mid p' = \lambda w\exists w'[\forall p{\in}Q[p(w) = p(w')]]\}$

(13) $[\![\text{Part}]\!](\{p\}) = \{p, \neg p\}$

The reason for adopting the singleton analysis has to do with the existence and uniqueness presuppositions of AltQs. It has been noted (e.g., Karttunen 1977) that AltQs presuppose that one and only one of the alternative propositions is true. This can be shown by the fact that an AltQ of the form in (7) presupposes that John drank either coffee or tea and not both, and that a 'both' answer and a 'neither' answer both sound odd unless accompanied by a discourse particle like *actually*.

The problem with the bipolar denotation for PolQs is that it cannot account for these presuppositions. Suppose the constituent PolQs in (7) had bipolar denotations. Then, the semantic value of (7) as a result of coordinating the two bipolar denotations by disjunction would consist of four propositions, as follows:

(14) $\{\lambda w.\mathbf{drank}(\mathbf{j},\mathbf{c},w), \neg\lambda w.\mathbf{drank}(\mathbf{j},\mathbf{c},w), \lambda w.\mathbf{drank}(\mathbf{j},\mathbf{t},w), \neg\lambda w.\mathbf{drank}(\mathbf{j},\mathbf{t},w)\}$

Given this meaning, there is no way to pick out the two propositions only one of which is presupposed to be true by (7), namely $\lambda w.\mathbf{drank}(\mathbf{j},\mathbf{c},w)$ and $\lambda w.\mathbf{drank}(\mathbf{j},\mathbf{t},w)$.

Importantly, my version of the singleton analysis assumes that Part is not applied to the interrogative CPs that are constituents of an AltQ. That is, we assume the structure as follows.

(15) [Part [[John drink coffee Q] Disj [John drink tea Q]]]

Also, the existence and uniqueness presuppositions are encoded in the Part operator, using Dayal's (1996) presupposition that the question denotation contains a strongest true member. The presupposition is encoded in the underlined part of the following denotation for Part.

(16) $[\![\text{Part}]\!](C) = \lambda Q : \underline{|Q| = 1 \vee \forall w'' \in C \exists p \in Q[p(w'') \wedge \forall p' \in Q[p'(w'') -> p \subseteq p']]]}. \{p \mid p = \lambda w \exists w'[\forall p' \in Q[p'(w) = p'(w')]]\}$

Here, C is the context set relative to which the question is evaluated. When Q is the set $\{p, q\}$ where p and q are logically independent, the presupposition requires that every world in C is such that either one of p and q is true and entails the other if it is true. This requirement rules out a C that includes a world in which neither p nor q is true. Furthermore, it also rules out C that includes a world in which both p and q are true since neither p nor q would be stronger than the other by assumption. Thus, we obtain the existence and uniqueness presuppositions from the definition in (16). One technical glitch here concerns the case where Q is a singleton. In this case, (16) is defined *not* to require that there be a true strongest answer in the set. This exception makes the treatment of the uniqueness presupposition compatible with my analysis of PolQs. If it were not for this exception, Part would be defined for $\{p\}$ only if p is true, which is not a desirable consequence: *Is it raining?* is a felicitous question even if it is not in fact raining.

2.3 The intonation of AltQs

In this final subsection on the existing analyses of AltQs, I briefly mention treatments of the intonational properties of English AltQs. In English, an AltQ has a specific intonational pattern, as illustrated in the following:

(17) Does John like [coffee]$_F\uparrow$ or [tea]$_F\downarrow$?

In AltQs, the relevant disjuncts have obligatory focus-markings and rising and falling intonational contours, as depicted with the arrows in (17). In contrast, when the same sentence receives the focus/intonation described below, it is interpreted as a PolQ.

(18) Does John like [coffee or tea]$_F\uparrow$?

In this section, I note that both the scope-shifting analysis and the disjoined PolQ analysis can offer an account of these intonation facts. Since parallel intonation facts do not obtain in Japanese, and I currently do not have access to enough relevant data for other languages, I will not discuss the role of intonation in the rest of the paper, assuming that the analyses I consider can be made compatible with the intonational facts.

In a Hamblin-style scoping treatment of AltQs in English, Roelofsen and van Gool (2010) provide an account of the intonation patterns described above. In their analysis, a disjunction introduces focus alternatives, just as in Beck and Kim's (2006) analysis, but focus-marking has a special semantic function of 'collapsing' the alternatives. If focus is marked on each disjunct, as in (17), we get the set of alternatives consisting of the objects denoted by the disjuncts. This set will be passed up until it meets the Q-operator, resulting in an AltQ interpretation. On the other hand, if the whole disjunction is focused, the set of alternatives introduced by the disjunction is collapsed into a singleton set that has as its sole member the generalized disjunction of the disjuncts. This results in a PolQ interpretation.[4]

[4]Presumably, Roelofsen and van Gool (2010) assume that simply having no focus-marking whatsoever on the disjunction is ruled out in an AltQ due to an information-theoretic constraint.

In a movement scoping account as in Nicolae (2013), the focus-marking pattern of AltQs can be thought of as the phonological manifestation of the syntactic feature that makes the disjunction move to Spec CP at LF. This assumption can be partly derived from the hypothesis that a disjunction in AltQs shares the [+WH] feature with *wh*-items in questions (as will be detailed in section 4.2), given that moved *wh*-items are obligatorily focused. Indeed, this account still needs to account for why the relevant manifestation of the [+WH] feature is the focus-marking on each disjunct (together with the raising and falling intonation), as opposed to the focus on the disjunction as a whole. Presumably, the double focus pattern reflects the *contrast* between alternatives, but I leave this issue for future studies.

Finally, Han and Romero's (2004) account for the focus pattern in AltQs can be carried over to the disjoined PolQ analysis. Under the disjoined PolQ analysis, an AltQ is derived from a structure like the following, where the contrasting DPs receive foci, and the non-contrasting elements are deleted in the second disjunct.

(19) Does John like [coffee]$_F$ or ~~does John like~~ [tea]$_F$?

This process results in the multiple focus structure as illustrated in (17). In other words, under the disjoined PolQ analysis, the elements in the disjunction that remain in the surface are the contrasting elements in the underlying structure, each of which is necessarily focused. Thus, the multiple focus structure of AltQs is naturally explained under the disjoined PolQ analysis. The final falling contour can be associated with the exhaustification operation that results in the uniqueness presupposition (see Zimmermann 2000 and Pruitt and Roelofsen 2011 for similar ideas).

3 Japanese alternative questions

In the previous section, I reviewed two kinds of semantic analyses for AltQs: scope-shifting and movement. I argue that cross-linguistic data provides a way to adjudicate between the different analyses. In this section, I focus on AltQs in Japanese.

3.1 The syntactic restriction and the disjoined PolQ analysis

Japanese AltQs are syntactically more constrained than their English counterparts: in Japanese, object DP disjunction does not induce an AltQ reading, as shown in (20a). In contrast, when VPs are disjoined, an AltQ reading is available, as in (20b).

(20) *Japanese*

a. [Taro-ga [koohii ka ocha]-o non-da-ka] (-ga mondai-da).
Taro-Nom coffee Disj tea-Acc drink-Past-Q (-Nom question-Cop)
'(It is a question) whether Taro drank coffee or tea.' (*AltQ; ✓PolQ)

b. [Taro-ga [koohii-o **non-da**-ka ocha-o non-da-ka]].
Taro-Nom coffee-Acc drink-Past-KA tea-Acc drink-Past-Q
'whether Taro drank coffee or Tea.' (✓AltQ; ?✓PolQ)

Two notes are in order here. First, the question particle *ka* is stylistically most natural in an embedded context. For this reason, (20a) is shown with the embedding predicate 'It is a question...'. However, this restriction is only stylistic, and the relevant facts in the embedded clause with *ka* in principle apply to the matrix questions as well. In the examples to follow, the embedding context is

omitted for space reasons. Secondly, the disjunction marker *ka* is homophonous with the question particle *ka*. In the circumstances where I stay neutral as to whether a certain instance of *ka* is a question particle or a disjunction marker, I use neutral gloss KA.

In Uegaki (2014), I have argued that the above syntactic restriction follows as a natural consequence of the disjoined PolQ analysis of Japanese AltQs. My claim was that disjunctions c-commanded by the Q-operator in the surface syntax, as in (20a), cannot out-scope the Q-operator in Japanese. Thus, a sentence like (20a) cannot receive an AltQ reading. On the other hand, (20b) can be analyzed as disjoined PolQs, as follows.

(21) [Taro-ga koohii-o non-da-ka] (soretomo) [~~Taro-ga~~ ocha-o non-da-ka]]
Taro-Nom coffee-Acc drink-Past-Q Disj tea-Acc drink-Past-Q
'Which is true: Taro drank coffee or he drank tea.'

Here, *soretomo* is a specialized disjunction marker that is used to disjoin PolQs, and is optionally covert in an embedded environment. In (21), *soretomo* occurs with *ka*, which makes it clear that the *ka* is actually a Q-operator, and not a disjunction marker. This is why the *ka* in (21) is glossed as Q, as opposed to KA.

Importantly, the sentence in (20a) cannot be analyzed as involving the disjoined PolQ structure since it would have to have undergone an illicit deletion if it were derived from disjoined PolQs, as in the following:

(22) *[Taro-wa koohii-~~o~~ ~~non-da~~ ka], [~~Taro-wa~~ ocha-o non-da-ka]
Taro-Top coffee-Acc drink-Past Q tea-Acc drink-Past-Q

What is illicit in (22) is the gapping of a material in the first disjunct that is not at the right edge, i.e., *non-da*. As seen from the following examples involving a conjunction, gapping cannot target a constituent that is not in the right edge of a coordinate in Japanese.[5]

(23) a. [Taro-ga doko-e ~~it-ta-ka~~], sosite [~~Taro-wa~~ dare-to itta-ka]
where-to go-Past-Q, Conj who-with go-Past-Q
b. *[Taro-ga doko-e ~~it-ta~~-ka], sosite [~~Taro-wa~~ dare-to itta-ka]
where-to go-Past-Q, Conj who-with go-Past-Q
'Where Taro went and with whom he went'

However, the contrast in (20) alone does not rule out the possibility that Japanese AltQs as in (20b) still involve scope-shifting of the disjunction, and that the size of the disjunct matters as to whether the scope-shifting is possible. Indeed, Han and Romero (2004) propose an analysis along these lines given similar data in Hindi and Korean. Under their analysis, an AltQ interpretation is derived from the movement of *whether* as a scope-marker (Larson 1985), but it is also assumed that the size of a disjunct is clausal. Thus, when the surface appearance of the disjunction in an AltQ is smaller than a clause, it is assumed that one of the disjuncts involves deletion. Thus, the structure for AltQs under their analysis can be schematized as in (24a) and exemplified as in (24b).

(24) a. [$_{CP}$ whether ...Q... *t* [TP_1 Disj TP_2]]

[5] Although the restriction makes sense under the Right-Node Raising (RNR) analysis of Japanese gapping (Saito 1987, Koizumi 2000) given the Right Edge Restriction on RNR (Postal 1974, Sabbagh 2007), I remain neutral as to the proper explanation of the restriction. What is crucial is that the independently observable restriction on Japanese gapping accounts for the ungrammaticality of (22).

b. [$_{CP}$ whether Q *t* [[you drink coffee] or [~~you drink~~ tea]]]

The counterpart of the contrast between (20a) and (20b) in Hindi and Korean is then accounted for in terms of the constraint against deleting a non-right-edge material. I refer the reader to Han and Romero (2004) for the details.

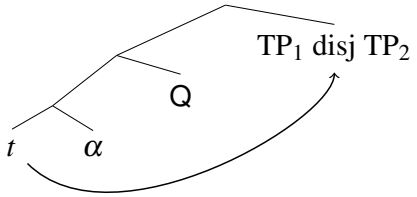
In what follows, I discuss two further data points that cast doubt on a scoping analysis of Japanese AltQs, including the H&R-style analysis sketched above. It will be also shown that each of these data points receives straightforward analysis in the disjoined PolQ analysis.

3.2 Two arguments for the disjoined PolQ analysis

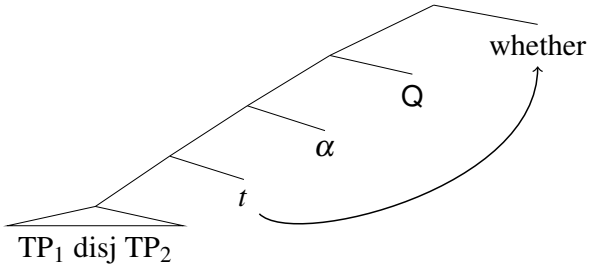
3.2.1 No 'shared' reading of operators

If an AltQ is derived by scoping, it should be possible for some operator α to be in a position above (the base position of) the disjunction and below the Q-operator in an AltQ. Such a structure will be analyzed as follows in the two previously mentioned scoping analyses:

(25) a. *Covert movement analysis*



b. *Larson/H&R-style analysis*



The structures are made head-final to make them compatible with Japanese, and α is the relevant operator sitting between the base position of the disjunction and the Q-operator. Whichever analysis in (25) we choose, the semantic value of the structure will be the interpretation where α is 'shared' in both disjuncts, as shown in the following.

(26) $\{[\![\alpha]\!]([\![\mathrm{TP}_1]\!]), [\![\alpha]\!]([\![\mathrm{TP}_2]\!])\}$

However, the reading corresponding to (26) is in fact not available in sentences that should conform to the structures in (25). In the following sentences, the epistemic modal *hazu* and the politeness marker *desu* are immediately followed by the sentence-final question particle *ka*; *hazu* and *desu* correspond to the operator α in (25). Recall from (20b) that without these operators, the sentence licenses an AltQ reading. However, the following sentences lack the relevant AltQ reading where the modal/politeness meaning is 'shared' in both disjuncts.

(27) Taro-ga koohii-o nomu ka ~~Taro-wa~~ ocha-o nomu-**hazu**-ka
Taro-Nom coffee-Acc drink KA tea-Acc drink-must-Q
*'Which is true: Taro must drink coffee or he must drink tea?'
✓'Is it true that Taro must drink coffee or tea?'
✓'Which is true: Taro drinks coffee or he must drink tea?'

(28) Taro-wa koohii-o non-da ka ~~Taro-wa~~ ocha-o non-da-no-**desu**-ka?
Taro-Top coffee-Acc drink-Past KA tea-Acc drink-Past-Nmnl-Polite-Q

*'POLITE(Which is true: Taro drank coffee or he drank tea)?'
✓'POLITE(Is it true that Taro drank coffee or Tea)?'
#'Which is true: Taro drank coffee or POLITE(he drank tea)?'[6]

That the relevant operators can appear in a position higher than coordinated TPs can be independently shown in the following TP conjunctions, which indicates that there is no syntactic problem with (27–28) having the structures in (25).

(29) Taro-wa koohii-mo non-da shi ~~T.-wa~~ ocha-mo non-da-**hazu**-da
Taro-Nom coffee-Acc.even drink-Past Conj tea-Acc.even drink-Past-must-Cop
'It must be the case that Taro drank coffee and he drank tea.'

(30) Taro-wa koohii-mo non-da shi ~~T.-wa~~ ocha-mo non-da-no-**desu**.
Taro-Top coffee-Acc.even drink-Past Conj tea-Acc.even drink-Past-Nmnl-Polite
'POLITE(Taro drank coffee and he drank tea)?'

Thus, any kind of scoping analysis—whether it is the one in (25a) or the one in (25b)—predicts that the AltQ readings should be available for (27–28) with the interpretation where the modal/politeness operates on both disjuncts. The fact that these readings are not available for (27–28) is problematic for any analysis of Japanese AltQs that can make use of a scoping mechanism.

In the rest of this section, I address two possible responses against the above argument. One possible response is to say that the lack of the relevant AltQ readings in (27–28) is due to an INTERVENTION EFFECT (e.g., Beck 2006, Beck and Kim 2006). That is, the modal/politeness operator intervenes in the association between the Q-operator and the disjunction, resulting in the lack of AltQ readings with the shared interpretation. However, this worry is unwarranted since the operators that cause the effect exemplified in (27–28) are not restricted to the class of operators that have been identified in the literature as interveners. In fact, the effect is observed when there is any kind of operator syntactically in the position of α in the structures in (25), including any kind of modal (e.g., *beki* 'should' (deontic), *kamo-shirenai* 'might' (epistemic possibility)) and evidential markers like reportatives (*rashii*). Some of these operators (concretely, existential epistemic modals and politeness operators, at least) are not identified as interveners in the literature, and do not have the semantic properties characteristic of interveners, such as focus-association (Beck 2006) and non-additivity (Mayr 2013).

The second response goes as follows: we could rule out the structures in (25) by positing a syntactic restriction on the minimum size of a disjunct in an AltQ, i.e., that it has to include projections of modals and politeness. Then, (27–28) have to be derived from the structure below to receive the intended AltQ interpretation.[7]

(31) [[[TP ~~politeness/modal~~] disj [TP politeness/modal]] t Q whether]$_{CP}$

[6] In contrast to the modal case in (27), the AltQ reading in which the politeness operator in (28) only operates on the second disjunct is infelicitous. This is presumably for pragmatic reasons: pragmatically, the degree of politeness has to be uniform throughout an utterance. This uniformity is violated in the third reading of (28).

[7] The fact that the structure in (31) is *possible* is not a problem for my argument here, as long as the structure in (25) is possible as well. For, if (25) is possible at all, H&R should expect the relevant AltQ reading to be possible, contrary to fact.

Then, it could be further argued that this structure is ruled out due to the constraint against backward gapping. Nevertheless, this restriction on the minimum size of a disjunct is purely stipulative. Under any kind of scoping analysis considered in the previous section (whether it is covert movement of the disjunction, overt movement of *whether*, or the focus-semantic analysis), there is no principled reason to expect that there is a constraint on the minimum size of a disjunct in an AltQ. An analysis which gives a principled explanation for *why* a disjunct in an AltQ has to have a certain syntactic size is conceptually preferable.

The disjoined PolQ analysis offers a principled account for the size effect. Since both disjuncts in an AltQ in this analysis are underlyingly CPs, they include any projections that are smaller than a CP, including the politeness and the modal projection. Thus, in order for an operator to be interpreted in both disjuncts, it has to be underlyingly present within each disjunct, as below:

(32) [Taro-ga koohii-o nomu ~~**hazu**~~-ka] [~~T.-ga~~ ocha-o nomu-**hazu**-ka]
Taro-Nom coffee-Acc drink must-Q tea-Acc drink-must-Q

But, for (27) to be derived from this structure, the relevant operator *hazu* has to be gapped in the first disjunct, as indicated. This violates the right-edge restriction on Japanese gapping. Hence, we correctly predict that the shared reading of operators is impossible in sentences like (27).

3.2.2 The matching requirement for clause-final particles

Another piece of data that argues against a scoping analysis comes from the distribution of particles *ka* and *no*. As discussed above, *ka* is a question particle, but is homophonous with the disjunction particle. On the other hand, *no* is syntactically a clausal nominalizer which can appear instead of *ka* in the sentence-final position of matrix questions in a casual discourse. A question ending with *no* is normally analyzed as the shortened form of a question with the *no-ka* ending. For our purposes, it suffices to assume that a *no*-ending question is a stylistic variant of a *ka*-ending question (without the *no-ka* sequence) (Miyagawa 1987). Another important fact is that *no*, unlike *ka*, is not homophonous with a disjunction particle, i.e., there is no disjunction marker in Japanese that is pronounced as *no*.

The data to be considered in this section is the correlation between the choice of particles in the end of the first disjunct and the possibility of an AltQ reading, as shown in the following.

(33) a. Taro-wa koohii-o nonda-**no** ~~T.-wa~~ ocha-o non-da-**no**?
Taro-Top coffee-Acc drink-Q tea-Acc drink-Past-Q
'Which is true: Taro drank coffee or he drank tea?' (✓AltQ; *PolQ)

b. Taro-wa koohii-o nonda-**ka** ~~T.-wa~~ ocha-o non-da-**no**?
Taro-Top coffee-Acc drink-KA tea-Acc drink-Past-Q
'Is it true that Taro drank coffee or tea' (*AltQ; ✓PolQ)

Both questions in (33) use *no* as their sentence-final particle, but differ in the particle at the end of the first disjunct. When the first disjunct ends with *no*, the same particle as the sentence-final one, the sentence only receives an AltQ reading. On the other hand, when the first disjunct ends with *ka*, the sentence only receives a PolQ reading. This fact can only be accounted for if the sentence-internal particle *ka* in an AltQ is a question particle rather than a disjunction marker,

assuming a parallelism requirement between the two question particles in an AltQ, i.e., that the choice of question particle in the first disjunct and the second has to stay the same.[8]

Since *no* cannot be a disjunction marker, (33a) can only be parsed as a sequence of two PolQs. In the disjoined PolQ analysis, this structure is correctly predicted to be interpretable only as an AltQ. On the other hand, in (33b), the sentence-internal *ka* must be a disjunction marker rather than a question particle due to the parallelism requirement. Thus, (33b) has a structure in which a single question involves a disjunction, which will only be analyzed as interpretable as a PolQ in the proposed analysis. Importantly, this is not the case in a scoping analysis. If scoping the disjunction above the question operator is possible, an AltQ interpretation would be available in (33b) with the sentence-internal *ka* being analyzed as a disjunction marker.

3.3 Interim summary

In this section, I provided several arguments that Japanese AltQs are underlyingly disjoined PolQs. Not only does this analysis account for the syntactic restriction on Japanese AltQs (that the disjunction has to be as big as a VP), but it also provides a straightforward explanation for two facts that are problematic for a scoping analysis: that there is no 'shared' interpretation of operators that are structurally higher than the disjunction, and that the sentence-final particle and the particle at the end of the first disjunct have to match.[9]

[8] Although the current analysis proposed here simply stipulates this requirement, it would be nicer if we could derive this requirement from independent grounds. One way to explain it might be to use the same kind of pragmatic constraint suggested in footnote 6. Since *no* and *ka* differ in their stylistics, AltQs involving two different question particles violate a constraint that requires the degree of casualness to be constant throughout an utterance.

[9] One prediction of the current analysis of Japanese AltQs is that, if the *ka*-disjunction overtly occupies a position above the Q-operator, the AltQ interpretation will arise. It is difficult to assess this prediction empirically since there is no way to guarantee that a disjunction is structurally higher than the Q-operator, independently from the possibility of an AltQ reading. For example, the following example in (i), where the disjunctive object DP is scrambled to left, lacks an AltQ reading. However, there is no independent way to tell if the scrambled object has moved out of the scope of the Q-operator.

(i) [Koohii-ka ocha]$_1$-o John-wa t_1 non-da-ka
coffee-KA tea-Acc John-Top drink-Past-Q
*'Which is true: John drank coffee or he drank tea?' (*AltQ, ✓PolQ)

The example in (ii) below, on the other hand, only has the AltQ reading, seemingly verifying the prediction.

(ii) [Koohii-ka ocha], John-wa dochira-o non-da-ka
coffee-KA tea John-Top which-Acc drink-Past-Q
'Which is true: John drank coffee or he drank tea?' (✓AltQ, *PolQ)

However, it is not clear if the disjunction in (ii) serves as the disjunction in the LF for the scope-shifting analysis. Rather, the disjunction in (ii) might be an adjunct that serves as an explicit domain restriction for the *which*-question. What is relevant in this connection is the WH-Licensing Principle to be presented in the next section, one of whose consequence is that *ka*-disjunctions never occupy the specifier position of CPs headed by Q. Given this principle, a consistent view about (i-ii) is that neither (i) nor (ii) involves a *ka*-disjunction scoping above Q. In (i), it is below Q, while in (ii), it is an adjunct restricting the domain for the *which*-question.

4 Cross-linguistic variation

A question that naturally arises at this point is whether the disjoined PolQ analysis applies to AltQs cross-linguistically. Although there are proposals about the AltQs of specific languages other than Japanese that they are best analyzed as disjoined PolQs (Gračanin-Yuksek 2014), there is simply not enough evidence to conclude that the analysis can be applied universally. In fact, we will see that there is preliminary evidence that the disjoined PolQ analysis cannot be extended to languages like Basque and Finnish, where there are two kinds of disjunction markers. The resulting typology is a hybrid one where scope-shifting and disjunction of PolQs are both available to languages to derive AltQs, but some languages, like Japanese, only make use of the latter option. In this section, I will discuss this evidence and present three ways to formulate the cross-linguistic typology of AltQs.

4.1 Preliminary evidence against the universal disjoined PolQ analysis

It is reported that a number of languages have two disjunction markers exhibiting a different set of interpretations when they are used in a question. Basque (Saltarelli 1988) and Egyptian Arabic (Winans 2012), for instance, have distinct disjunction markers, one forcing a PolQ reading, and the other forcing an AltQ reading as the only interpretation in a question. The following examples from Saltarelli (1988) illustrate that a Basque question with *ala* only gives rise to an AltQ reading, as in (34a), while one with *edo* only has the PolQ reading, as in (34b).

(34) a. Te-a **ala** kafe-a nahi duzu?
tea-Art or coffee-Art want you.it
'Which is true: Do you want tea or do you want coffee?' (✓AltQ, *PolQ)

b. Te-a **edo** kafe-a nahi duzu?
tea-Art or coffee-Art want you.it
'It is true that you want tea or coffee?' (*AltQ,✓PolQ)

In other languages, including Mandarin Chinese (Li and Thompson 1981) and Finnish (Kaiser 2004), one of the two disjunction markers can be used both in an AltQ or PolQ while the other can be used only in an AltQ. Finnish, for example, has the disjunction disjunction makers *tai* and *vai*. The question in (35a) with *tai* is ambiguous between PolQ and the AltQ readings, whereas the question in (35b) with *vai* forces the AltQ reading.

(35) a. Huomasiko Pekka miehen **tai** naisen?
Noticed-Q Pekka-Nom man-Acc or woman-Acc
'Did Pekka notice man or woman?' (✓AltQ, ✓PolQ)

b. Huomasiko Pekka miehen **vai** naisen?
Noticed-Q Pekka-Nom man-Acc or woman-Acc
'Did Pekka notice man or woman?' (✓AltQ, *PolQ)

Now, if AltQs are derived from disjoined PolQs universally, and the choice of disjunction markers is not affected by a deletion, we predict the following in these languages.

(36) **A prediction of a universal disjoined PolQ analysis**
A disjunction marker α can be used in an AltQ iff α can be used in an overt disjunction of PolQs.

That is, if a disjunction marker α is acceptable in the construction in (37a) with an AltQ reading, it will also be acceptable in (37b) with the same reading, and vice versa. This is so because the disjoined PolQ analysis derives (37a) from (37b) through deletion, and we assume that the deletion does not affect the acceptability of the disjunction marker.

(37) a. Do you drink coffee α tea? (AltQ)
b. Do you drink coffee α do you drink tea? (Overt disjoined PolQ)

This prediction is not borne out in Basque and Finnish, in different ways, as seen from the acceptability of each disjunction marker in the overt disjunction of PolQs, i.e., the (37b)-type construction. In Basque, *edo* induces a PolQ reading in a non-CP coordination structure, but can participate in the overt PolQ disjunction, and licenses an AltQ reading, as in (38).

(38) Kafe-a nahi duzu, **ala/edo** te-a nahi duzu? (Basque)
coffee-Abs want Aux.2ps Disj tea-Abs want Aux.2ps
'Do you want coffee, or do you want tea?'

In contrast, in Finnish, *tai* allows an AltQ reading in a non-CP coordination structure, as in (35a), but cannot participate in an overt PolQ disjunction.

(39) Haluatko kahvia **vai/*tai** haluatko teetä? (Finnish)
want-Q coffee Disj want-Q tea
'Do you want coffee, or do you want tea?'

These facts go against the prediction in (36), and thus are problematic for a position that universally analyzes AltQs as disjunctions of two PolQs.

Given the difficulty with universally extending the disjoined PolQ analysis, I make central proposal that languages in principle allow two strategies to derive AltQs: one is by disjoining PolQs and the other by shifting the scope of the disjunction. I call this view the 'hybrid picture'. Some languages like Japanese only allow the former option, but languages like Basque and Finnish use both options, as will be detailed below.

4.2 The hybrid picture and its Karttunen-style implementation

In the hybrid picture I propose, we can theoretically categorize disjunctions into three types according to two dimensions: (i) what they disjoin and (ii) their scopal property. Here, the first property pertains to whether the disjuncts are locally questions or non-questions, that is, whether they do or do not individually contain a Q-operator, while the second property pertains to whether they out-scope the Q-operator.

One kind of disjunction, which I call Disj[–WH], disjoins locally non-question objects, and does not out-scope the Q-operator at LF. The Japanese disjunctions with *ka*, under the current analysis, are examples of Disj[–WH]. Disj[+WH], on the other hand, disjoins locally non-question objects, but the disjunction obligatorily out-scopes the Q-operator. In other words, a question involving a (sub-CP) Disj[+WH] disjunction always induces an AltQ reading. One function of Basque *ala* can be thought of as an instance of this disjunction. Finally, the third kind of disjunction, which I call SORETOMO, disjoins locally question-type objects. The properties of the three disjunctions are summarized in Table 1. Below, I discuss the properties of these three disjunctions in the Karttunen-style semantics for questions.

	disjuncts	scopal property	example
Disj[–WH]	non-questions	doesn't out-scope the Q-operator	Japanese *ka*
Disj[+WH]	non-questions	out-scopes the Q-operator	Basque *ala*
SORETOMO	questions	(underlyingly wider scope than Q)	Japanese *soretomo*

Table 1: Three kinds of disjunctions in the hybrid picture

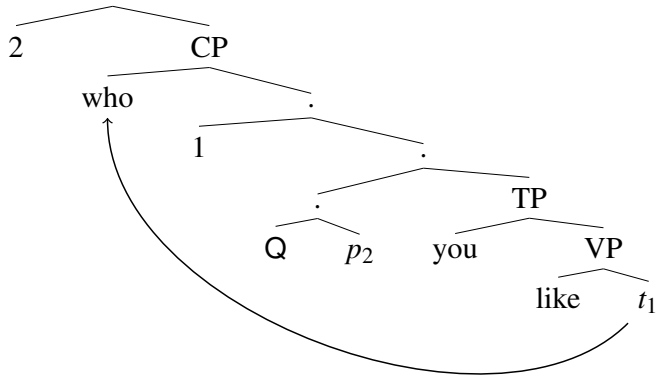
4.2.1 Disj[+WH] and Disj[–WH]

The feature [±WH] in Disj[+WH] and Disj[–WH] is used in analogy with the role of the [WH]-feature in Heim's (2012) reformulation of Karttunen's (1977) semantics. In Karttunen (1977), *who* and *someone* in English have exactly the same denotation, being that of an existential quantifier, as shown in (40). Their difference is captured by their scopal properties: *who* always out-scopes a Q-operator while *someone* never does. Thus, the semantic difference between *Who do you like?* and *Do you like someone?* is captured by the difference in the scopes of the existential quantifier denoted by *who* and *someone* in the respective sentences. The LFs and the semantic values of *Who do you like?* and *Do you like someone?* are illustrated in the following.

(40) $[\![\text{who}]\!]^w = [\![\text{someone}]\!]^w = \lambda P.\exists x[\mathbf{person}(x)(w) \wedge P(x)(w) = 1]$

(41) a. Who do you like?

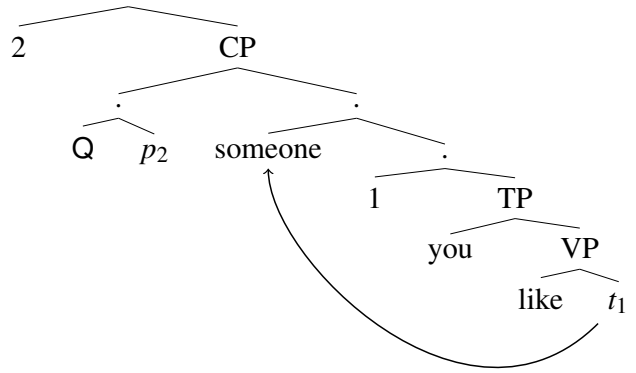
b.



c. $[\![(41b)]\!]^w = \lambda p.\exists x[\mathbf{person}(x)(w) \wedge p = \lambda w'.\mathbf{like}(x)(\mathbf{you})(w')]$

(42) a. Do you like someone?

b.



c. $[\![(42b)]\!]^w = \lambda p.[p = \lambda w'.\exists x[\textbf{person}(x)(w') \wedge \textbf{like}(x)(\textbf{you})(w')]]$

Generally, the LF position of a *wh*-item like *who*, as opposed to a non-*wh*-item like *someone*, is constrained by the following principle:

(43) **WH-Licensing Principle** (Heim 2012)
A phrase α has the feature [+WH] iff it is in the specifier position of a CP headed by Q at LF.

Disj[+WH] is to Disj[–WH] what *who* is to *someone*. That is, although Disj[+WH] and Disj[–WH] have the same denotation as the generalized disjunction in (44), their scopal properties are constrained by the WH-Licensing Principle.

(44) $[\![\text{Disj[+WH]}]\!] = [\![\text{Disj[–WH]}]\!] = \lambda X \lambda Y.X \sqcup Y$
($\sqcup$ is the generalized disjunction from Partee and Rooth 1983)[10]

Thus, Disj[+WH] always scopes above the Q-operator as in (41b), inducing an AltQ interpretation. On the other hand, Disj[–WH] stays below the Q-operator, leading to a PolQ interpretation.[11]

It should be noted at this point that I cannot answer the syntactic question of why the disjunction with Disj[+WH] is not overtly moved in AltQs across languages. I assume that the syntactic features of Disj[+WH] make it stay in-situ in the overt syntax, just like the *wh*-items in *wh*-in-situ languages. Of course, this does not account for why the disjunction with Disj[+WH] in English, for instance, is not obligatorily moved while other [+WH] items are moved in matrix questions. I have to leave this issue for future research.

[10] $\sqcup$ is defined as follows (where τ is any conjoinable type, i.e., a type that 'ends with t'):

(i) $X \sqcup Y = \begin{cases} X \vee Y & \text{if } X \in D_t \text{ and } Y \in D_t \\ \lambda z \in D_\sigma.X(z) \sqcup Y(z) & \text{if } X \in D_{\langle\sigma,\tau\rangle} \text{ and } Y \in D_{\langle\sigma,\tau\rangle} \end{cases}$

[11] The distributions of *wh*-items and the Q operator are syntactically constrained, so that, for example, a structure that contains a *wh*-item without a Q-operator is ruled out. The constraints can be implemented using the feature checking mechanism from Chomsky (2001) in the following way. Q_{wh} has the interpretable feature iQ[+] and the uninterpretable feature uWH[ ]. *Wh*-items (including Disj[+WH]) have the interpretable feature iWH[+] and the uninterpretable uQ[ ]. This feature distribution results in the requirement that Q_{wh} and a *wh*-item co-occur. In order to treat PolQs, I have to posit a distinct operator Q_{pol} that has the same denotation as Q_{wh}, but only has the interpretable feature iQ[+]. This enables a Q-operator semantically defined as in (3) to appear in a PolQ although the structure does not contain a *wh*-item. This syntactic assumption also holds for the Hamblin-semantic implementation discussed in the next section.

4.2.2 SORETOMO

The third kind of disjunction exemplified by Japanese *soretomo* differs from the first two in disjoining question-type objects. Since this disjunction already scopes above the two Q-operators contained in each of its disjuncts at the surface, there is no relevant variation in the scopal property. In other words, there is no way in which the disjunction is made to scope *below* the Q-operators. I will simply call this kind of disjunction SORETOMO, and define it as follows.

(45) $[\![\text{SORETOMO}]\!] = \lambda Q \in D_{\langle st,t\rangle} \lambda Q' \in D_{\langle st,t\rangle} \lambda p.Q(p) \vee Q'(p)$

4.2.3 Lexicalization patterns of disjunctions

Given the view presented here, we can analyze languages as lexicalizing different disjunctions from the above inventory in different ways. The current analysis of Japanese entails that it lexicalizes Disj[–WH] as *ka* and SORETOMO as *soretomo* while simply lacking Disj[+WH]. On the other hand, English can be analyzed as lexicalizing every kind of disjunctions as *or*.

The Basque and Finnish cases, which turned out to be problematic for the universal disjoined PolQ analysis can also be analyzed in the current picture: In Basque, *ala* lexicalizes Disj[+WH] and SORETOMO while *edo* lexicalizes Disj[–WH] and SORETOMO. In Finnish, *tai* is Disj[±WH], or it lexicalizes both Disj[+WH] and Disj[–WH]. On the other hand, *vai* lexicalizes Disj[+WH] and SORETOMO. This accounts for the semantic difference between the pair of disjunctions in each language in a question involving a sub-CP disjunction, while capturing their (un)accptability in an overt PolQ disjunction construction at the same time. These lexicalization patterns are summarized as follows.

(46) **Japanese** $\boxed{ka}$ = Disj[–WH]; $\boxed{soretomo}$ = SORETOMO

English $\boxed{or}$ = Disj[±WH] + SORETOMO

Basque $\boxed{ala}$ = Disj[+WH] + SORETOMO; $\boxed{edo}$ = Disj[–WH] + SORETOMO

Finnish $\boxed{tai}$ = Disj[±WH]; $\boxed{vai}$ = Disj[+WH] + SORETOMO

Of course, the theory presented here is a powerful one, and the analysis of the lexicalization patterns summarized in (46) is nothing beyond a description of the facts. It is yet to be seen if there are any non-trivial cross-linguistic universals in the lexicalization patterns of disjunctions, and if some refinement of the current theory can explain such a universal.

4.3 Hamblin-semantic implementations

In the previous section, I presented a Karttunen-style implementation of the analysis. However, the Karttunen-style implementation is not the only way in which the distinction among the three disjunctions can be formulated. In this section, I show how the three disjunctions can be implemented in a standard Hamblin-style semantics for questions (Hamblin 1973, Kratzer and Shimoyama 2002, Rawlins 2008), as well as in an alternative Hamblin-based compositional system in which questions and non-questions are semantically distinguished.

4.3.1 Standard Hamblin semantics

In the standard single-tier Hamblin semantics I employ in this section,[12] *wh*-items denote the set of objects that would be the domain of the corresponding *wh*-quantifier in the Karttunen semantics. Thus, the denotation of *who* looks like (47).

(47) $[\![\text{who}]\!]^w = \{x \mid \textbf{person}(x)(w)\}$

Lexical items other than *wh*-items denote the singleton set of their standard denotation. For example, the denotation of *likes* is the following:

(48) $[\![\text{likes}]\!]^w = \{\lambda x \lambda y \lambda w'.\textbf{likes}(x)(y)(w')\}$

These denotations are composed by the rule of Point-wise Functional Application, defined in (49):

(49) **Point-wise Functional Application**
Let γ be a node whose daughters are $\{\alpha, \beta\}$, and $[\![\alpha]\!]^w \subseteq D_{\langle\sigma,\tau\rangle}$ and $[\![\beta]\!]^w \subseteq D_\sigma$. Then, for any w,[.3mm] $[\![\gamma]\!]^w = \{y \mid \exists f \in [\![\alpha]\!]^w \exists x \in [\![\beta]\!]^w [y = f(x)]\}$

Following Kratzer and Shimoyama (2002), I also define two operators that operate on the Hamblin denotations. These operators are defined syncategorematically, as follows:

(50) $[\![\mathsf{Q}\ \phi]\!]^w = [\![\phi]\!]^w$

(51) $[\![\exists\ \phi]\!]^w = \{\lambda w'.\exists p[p \in [\![\phi]\!]^w \wedge p(w') = 1]\}$

The operators Q and $\exists$ occupy the positions of the interrogative complementizer and the declarative complementizer, respectively. Given this setup, a *wh*-question is analyzed as denoting the same set of propositions as in the Karttunen semantics, as shown in (52).[13]

(52) $[\![\mathsf{Q}\ \text{John likes whom}]\!]^w = \{p \mid \exists x[\textbf{person}(x)(w) \wedge p = \lambda w'.\textbf{like}(x)(\textbf{j})(w)]\}$

On the other hand, declarative sentences, which involve the $\exists$ operator, are analyzed as denoting a singleton set of a proposition, as in (53). An independent pragmatic principle guarantees that when a declarative sentence with a singleton denotation is uttered, the unique proposition in the denotation is asserted to be true.

(53) $[\![\exists\ \text{John likes someone}]\!]^w = \{\lambda w'.\exists x[\textbf{person}(x)(w) \wedge \textbf{like}(x)(\textbf{j})(w)]\}$

The three disjunctions introduced in the previous section can be straightforwardly implemented in the Hamblin semantics. In analogy to the denotation of *wh*-items in (47), the denotation of Disj[+WH] can be defined as in (54). That is, Disj[+WH] is analyzed as introducing a set of Hamblin alternatives consisting of its disjuncts. On the other hand, Disj[–WH], being a non-*wh* item, is defined as the singleton set of its standard denotation of the generalized disjunction, as shown in (55).

(54) $[\![\alpha\ \text{Disj[+WH]}\ \beta]\!]^w = [\![\alpha]\!]^w \cup [\![\beta]\!]^w$

[12] It is easy to extend the system to a two-tier Hamblin/Alternative semantics as proposed in Beck and Kim (2006) and AnderBois (2011). In this paper, I will take a conservative approach and keep the analysis compatible with the single-tier Hamblin semantics, which is theoretically simpler than the two-tier semantics.

[13] Here, I assume that a *wh*-question is interpreted with the *wh*-item in the in-situ position. I make this simplified assumption because a lambda-abstraction associated with movement in Hamblin semantics is known to have theoretical difficulties (Shan 2004).

(55) $[\![\text{Disj[–WH]}]\!]^w = \{\lambda X \lambda Y.X \sqcup Y\}$

With these definitions for disjunctions, the desired semantic value for an AltQ is derived as in (56). In contrast, a matrix PolQ involving a Disj[–WH] is analyzed as in (57), where the disjunction does not introduce alternatives, but rather induces the simple boolean disjunction involved in each proposition in the set.

(56) $[\![\text{Q Did John drink coffee Disj[+WH] tea?}]\!]^w = \{\lambda w'.\mathbf{drank}(\mathbf{c})(\mathbf{j})(w'), \lambda w'.\mathbf{drank}(\mathbf{t})(\mathbf{j})(w')\}$

(57) $[\![\text{Part [Q John drinks coffee Disj[–WH] tea]?}]\!]^w$
$= \{\lambda w'.\mathbf{drink}(\mathbf{c})(\mathbf{j})(w') \vee \mathbf{drink}(\mathbf{t})(\mathbf{j})(w'), \lambda w'.\neg[\mathbf{drink}(\mathbf{c})(\mathbf{j})(w') \vee \mathbf{drink}(\mathbf{t})(\mathbf{j})(w')]\}$

The third kind of disjunction, SORETOMO, has the same syncategorematic semantic definition as Disj[+WH], as given in (58) below.

(58) $[\![\phi \text{ SORETOMO } \psi]\!]^w = [\![\phi]\!]^w \cup [\![\psi]\!]^w$

Under this analysis, the fact that SORETOMO can only disjoin questions is not captured in its semantic definition. It is also not enough to specify that the disjuncts ϕ and ψ denote proposition-sets since declarative clauses denote proposition-sets as well. In other words, there is no distinction in semantic types between a declarative and an interrogative clause in the standard Hamblin semantics. For this reason, the constraint on what SORETOMO can disjoin has to be stated syntactically. One way of implementing this is to posit features on Q and SORETOMO so that SORETOMO can only coordinate CPs headed by Q.

In the next section, I will present an alternative formulation of the theory that is in line with Hamblin's (1973) analysis of questions, but crucially differs from the standard Hamblin semantics in distinguishing questions and non-questions in the model. In this formulation, the selectional restriction of SORETOMO can be stated in its semantic definition.

4.3.2 Flexible Hamblin semantics

In the alternative formulation of Hamblin-semantics I present in this section, Flexible Hamblin semantics, questions and non-questions are ontologically distinguished. Basically, questions are sets whereas non-questions are either atomic objects (truth values or entities) or functions thereof. I refer to the semantic type for the former kind of objects as the HAMBLIN-TYPE and the latter as the NON-HAMBLIN TYPE. Thus, unlike in the common practice in formal semantics, this system does not conflate sets and their characteristic functions. Formally, the model of this semantics (given D as the set of entities) looks like the following:

(59) **Types**

a. e and t are types. (basic types)
b. If σ and τ are types then $\langle\sigma,\tau\rangle$ is a type. (functional/Non-Hamblin types)
c. If τ is a type, then $\{\tau\}$ is a type. (Hamblin types)

(60) **Domains**

a. $D_e := D$ (the domain of entities)
b. $D_t := \{0,1\}$ (truth values)
c. $D_{\langle\sigma,\tau\rangle} := D_\tau^{D_\sigma}$ (the domain of functions)
d. $D_{\{\tau\}} := Pow(D_\tau)$ (the domain of Hamblin-type objects)

The composition in the system is defined so that the plain Functional Application rule is used when there is no Hamblin-type object involved in the composition, while Point-wise Functional Application is used for the composition of each node in the LF above the point that involves either a *wh*-item or a Q-operator. Formally, the compositional system is defined as follows (See Hagstrom 1998, Slade 2011 for similar compositional systems).

(61) Let γ be a node whose daughters are $\{\alpha, \beta\}$. Then, for any w,

$$[\![\gamma]\!]^w = \begin{cases} [\![\alpha]\!]^w([\![\beta]\!]^w) & \text{if } [\![\beta]\!]^w \in dom([\![\alpha]\!]^w) \quad \text{(a)} \\ \{y \mid \exists f \in [\![\alpha]\!]^w \exists x \in [\![\beta]\!]^w [y = f(x)]\} & \text{if } \forall f \in [\![\alpha]\!]^w \forall x \in [\![\beta]\!]^w [x \in dom(f)] \quad \text{(b)} \\ \{y \mid \exists f \in [\![\alpha]\!]^w [y = f([\![\beta]\!]^w)]\} & \text{if } \forall f \in [\![\alpha]\!]^w [[\![\beta]\!]^w \in dom(f)] \quad \text{(c)} \\ \{y \mid \exists x \in [\![\beta]\!]^w [y = [\![\alpha]\!]^w(x)]\} & \text{if } \forall x \in [\![\beta]\!]^w [x \in dom([\![\alpha]\!]^w)] \quad \text{(d)} \end{cases}$$

When either α or β or both are Hamblin-type expressions, one of the rules in (b-d) is used, whichever is defined. When both α and β are non-Hamblin-type expressions, rule (a) is used. Also, (a) can be used when α is a non-Hamblin type and β is a Hamblin-type, if defined. This is so because the system allows a function to have Hamblin-type objects as its domain, and α can be such a function whose domain includes the Hamblin-type denotation of β.

The definition of a *wh*-item in this system will be the same as in the standard Hamblin-semantics, namely the one in (47) below, repeated from above. On the other hand, a non-*wh*-expression like *likes* has the standard denotation in (62).

(47) $[\![\text{who}]\!]^w = \{x \mid \textbf{person}(x)(w)\}$

(62) $[\![\text{likes}]\!] = \lambda x \lambda y \lambda w'.\textbf{likes}(x)(y)(w')$

We have to posit two Q-operators in this system: one for *wh*-questions and the other for PolQs. This is so because the arguments of the Q-operators in the two cases are different: $\{\langle s,t\rangle\}$ (set of propositions) in the former, but $\langle s,t\rangle$ in the latter. Thus, we define the following two Q-operators.

(63) $[\![\mathsf{Q_{wh}}]\!] = \lambda Q \in D_{\{\langle s,t\rangle\}}.Q$

(64) $[\![\mathsf{Q_{pol}}]\!] = \lambda p \in D_{\langle s,t\rangle}.\{p\}$

In both cases, the type of the output is $\{\langle s,t\rangle\}$, but (63) is an identity function while (64) is a function that returns the singleton set of its input.

Now, we can define the three disjunctions within this system. I will present the definitions below, and then give an illustration in the following. Below, the subscripting h and o to a variable indicates that the domain of the variable is restricted to Hamblin and non-Hamblin/Ordinary-types, respectively.

(65) $[\![\text{Disj[–WH]}]\!] = \lambda x_o \lambda y_o.x \sqcup y$

(66) $[\![\text{Disj[+WH]}]\!] = \lambda x_o \lambda y_o.\{x,y\}$

(67) $[\![\text{SORETOMO}]\!] = \lambda x_h \lambda y_h.x \cup y$

In contrast to the analysis in the standard Hamblin semantics discussed above, the three disjunctions are differentiated in terms of the semantic types of their input (disjuncts) and the output. Disj[–WH] is a function from non-Hamblin-type objects to non-Hamblin-type objects. Disj[+WH] is a function from non-Hamblin-type objects to Hamblin type objects. Finally, SORETOMO is a function from Hamblin-type objects to Hamblin-type objects. So, the two

properties used to categorize the three disjunctions correspond to the semantic types of their input and output: whether the disjuncts are questions or not corresponds to the semantic type of the input while whether the disjunction out-scopes the Q-operator or not corresponds to the semantic type of the output.

Since the compositional system is less standard, I describe below the derivations of an AltQ involving a Disj[+WH] and a PolQ involving a Disj[–WH], together with the denotations for the intermediate nodes. The rules used to compute each step are stated in parentheses. Although I do not present it below, the derivation of an AltQ with SORETOMO should be clear: it combines two PolQs, such as (69), with SORETOMO using the rule in (61a).

(68) LF: [Q [John drank [coffee Disj[+WH] tea]]]

a. $[\![\text{coffee Disj[+WH] tea}]\!]^w = \{\mathbf{c}, \mathbf{t}\}$ (two applications of (61a))

b. $[\![\text{John drank [coffee Disj[+WH] tea}]\!]^w = \{\lambda w'.\mathbf{drank}(\mathbf{c})(\mathbf{j})(w'), \lambda w'.\mathbf{drank}(\mathbf{t})(\mathbf{j})(w')\}$ (applications of (61d) and (61c) in order)

c. $[\![\text{Q John drank coffee Disj[+WH] tea}]\!]^w = \{\lambda w'.\mathbf{drank}(\mathbf{c})(\mathbf{j})(w'), \lambda w'.\mathbf{drank}(\mathbf{t})(\mathbf{j})(w')\}$ (an application of (61a))

(69) LF: [Q [coffee Disj[–WH] tea] [1 [John drank t_1]]]

a. $[\![\text{coffee Disj[–WH] tea}]\!]^w = \lambda P.P(\mathbf{c}) \vee P(\mathbf{t})$ (two applications of (61a))

b. $[\![\text{[coffee Disj[–WH] tea] 1 [John drank } t_1]]\!]^w = 1$ iff $\mathbf{drank}(\mathbf{c})(\mathbf{j})(w) \vee \mathbf{drank}(\mathbf{t})(\mathbf{j})(w)$ (applications of (61a) and Predicate Abstraction)

c. $[\![\text{Q [coffee Disj[–WH] tea] 1 [John drank } t_1]]\!]^w = \{\lambda w'.\mathbf{drank}(\mathbf{c})(\mathbf{j})(w') \vee \mathbf{drank}(\mathbf{t})(\mathbf{j})(w')\}$ (intensionalized version of (61a))

To wrap up, I briefly compare the analysis of disjunctions in Flexible Hamblin semantics presented in this section with the one in the standard Hamblin semantics. As discussed above, Flexible Hamblin semantics differs from the standard Hamblin semantics in being able to distinguish questions from non-questions in the semantics. In the standard Hamblin semantics, the difference between non-questions and questions is a syntactic one, and hence the selectional restriction of SORETOMO has to be stated in syntactic terms. On the other hand, in the present system, the selectional restrictions are stated in terms of the semantic type of the disjuncts. A similar trade-off between syntactic complexity and semantic complexity can be seen in the analysis of the Q-operators. Even in the standard Hamblin semantics where the Q-operators for *wh*-questions and PolQs are semantically unified, we need two Q-operators with different syntactic specifications to account for the distributions of *wh*-items and the Q-operator, as stated in footnote 11. One kind of Q-operator, Q_{wh} has to agree with a *wh*-item to satisfy its feature requirements, while the other kind of Q-operator, $\mathsf{Q}_{\mathsf{pol}}$, cannot agree with a *wh*-item. This distinction is translated into the semantic difference between Q_{wh} and $\mathsf{Q}_{\mathsf{pol}}$ in Flexible Hamblin semantics. The former requires a Hamblin-type object as its input, and hence requires some object that introduces Hamblin-alternatives, such as a *wh*-item, in its prejacent. The latter requires an input that is of a non-Hamblin type, i.e., it does not want a *wh*-like item in its prejacent.

5 Conclusions

In this paper, I submitted two claims regarding the cross-linguistic variation in alternative questions (AltQs). The first claim, which I call the hybrid picture, is that there are in principle two ways in

which AltQs are derived: scope-shifting of the disjunction and disjoining PolQs. The other claim is that some languages, in particular Japanese, only allow the second option in forming an AltQ (see Gračanin-Yuksek 2014 for a similar proposal for Turkish). Although the first claim *per se* might not be surprising,[14] there has not been an explicit argument in the literature that shows both (i) the existence of a language that only derives AltQs as disjoined PolQs and (ii) the problem for treating AltQs as disjoined PolQs universally. In this way, this paper contributes to the current debate on the proper derivation of AltQs (Han and Romero 2004, Beck and Kim 2006, Pruitt and Roelofsen 2011) by putting forward a new perspective in the light of cross-linguistic variation.

As a theoretical proposal, I posited three kinds of disjunctions that can be present in a language, Disj[+WH], Disj[–WH] and SORETOMO, which are distinguished in terms of whether they locally disjoin questions and whether they can out-scope the Q-operator. The difference between Disj[+WH] and Disj[–WH] in the scopal property is analogous to the difference between a *wh*-item and its corresponding existential quantifier in Karttunen's (1977) semantics for questions. Hence the names Disj[+WH] and Disj[–WH]. In contrast to these two kinds of disjunctions, SORETOMO disjoins locally question-type objects, and forms an AltQ when the disjuncts are PolQs.

A compositional semantics involving these three kinds of disjunctions is implemented in three formulations, the Karttunen-style semantics, the standard Hamblin semantics, and Flexible Hamblin semantics. Although it is a future task to compare these different formulations in light of their distinct empirical predictions, one interesting domain of investigation concerns the cross-linguistic lexicalization patterns of the three disjunctions. The next step of the current research is to investigate if there is a non-trivial universal in the lexicalization patterns, and if any of the theoretical formulations presented in this paper can be extended to capture such a universal.

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[14] After all, once one assumes that a scope-shifting is involved in some AltQs, one has to adopt some form of the hybrid picture since there exist AltQs that have the explicit structure of disjoined PolQs, such as (i).

(i) Is it a bird, or is it a plane?

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