

Study on the *wh*-feature of disjunctive connectives*

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Abstract

Most languages have a way to express disjunction, but there seems to be significant cross-linguistic variations. While the English language includes only one disjunctive connective (i.e., *or*), some languages have multiple lexical items that encode disjunction. In addition, one of the main distinctions of disjunctive connectives is between interrogatives and declaratives. In this paper, we investigate languages that have two disjunctive connectives and propose a new logical structure for interrogative disjunctions across languages.

1. INTRODUCTION

A question with a disjunctive phrase can be ambiguous between alternative question reading and *yes-no* question reading. This ambiguity has been considered as the scope interaction phenomenon in which the former includes a wide scope in relation to the question marker, whereas, the latter consists of a narrow scope. This scope ambiguity has been explained in terms of *wh*-movement (Larson 1985, Schwarz 1999, and Han & Romero 2004). In alternative question reading, the scope indicator moves to the complementizer phrase (CP), whereas, it does not in *yes-no* question reading. However, some languages do not include this type of ambiguity. Instead, they have different lexical items that encode the two readings. According to Haspelmath (2007) and Winans (2013), Mandarin Chinese, Finnish, Basque, and Egyptian Arabic distinguish interrogative disjunctions from declarative ones. Hence, alternative question reading is formed by interrogative disjunctive connectives while *yes-no* question reading is formed by *yes-no* question markers. Therefore, this paper shows how *wh*-movement analysis cannot account for the data from languages with more than one disjunctive connective. In addition, it proposes a new logical structure for interrogative disjunctions.

2. *WH*-MOVEMENT ANALYSIS

In this section, we show that *wh*-movement analysis can account for the data from English, while it fails to explain the data from languages having more than one disjunctive connective.

2.1. English data

In English, a question with a disjunctive phrase is ambiguous between alternative question reading and *yes-no* question reading. When it is interpreted as an alternative question, the hearer is required to select one of the choices provided by the disjunctive phrase, whereas, the hearer is required to answer the truth value of the proposition when it is interpreted as a *yes-no* question. The two readings can be paraphrased as (2a) and (2b), respectively.

- (1) Does John eat beans or rice?
(2) a. Which of these two things does John eat: beans or rice?
b. Is it true or false that John eats any of these two things: beans or rice?"

These two readings are disambiguated by the different stresses on the disjunctive phrase; that is, the former stresses each disjunct while the latter does not. The difference also surfaces in the different response patterns in which the former requires answers like (3a); whereas, the latter requires answers like (3b).

- (3) a. John eats beans./John eats rice.
b. Yes, John eats beans or rice./No, John doesn't eat beans or rice.

According to Han & Romero (2004), *or* in English includes a scope indicator that marks the left periphery of its scope. In embedded clauses, it can also surface as *whether*, although it may have no phonological form. They suppose that *whether* and its covert counterpart¹ are classified as *wh*-words and propose a *wh*-movement analysis in order to explain the ambiguity of (1). The alternative question reading is available when the CP of the main clause hosts the scope indicator *whether* or its covert counterpart. Conversely, if the CP of the main clause already includes a *yes-no* question operator (or hosts the question operator from the phrase *or not*) then a *yes-no* question reading can be obtained. In other words, the interrogative mood is derived by the scope indicator (SI) in alternative question reading; otherwise, it comes from the *yes-no* question operator. In the following examples, SI is base-generated at the left periphery of the inflection phrase (IP) co-ordination structure, as it is assumed that the disjunctive connective conjoins two IPs with the subject and verb deleted from the second IP by coordination reduction.

- (4) a. SI_i Does t_i [_{IP} John eat beans or ~~John eat~~ rice]?
b. Q_i Does SI [_{IP} John eat beans or ~~John eat~~ rice] (or not)_i.

The crucial point of their analysis is that there are two *ors*: one includes a SI with a *+wh* feature, while the other has a SI with a *-wh* feature. The scope indicator with the *+wh* feature moves to the CP, while the scope indicator with the *-wh* feature remains in situ.

One of the strongest evidence that supports the *wh*-movement analysis is that the scope of *or* obeys the island constraint conditions. In (5), *or* appears in a complex noun phrase (NP) and it does not have the alternative question reading. In other words, the SI cannot be extracted out of a complex NP on par with *wh*-words in (6).

- (5) Do you believe [the claim that Bill resigned or retired]?
 a. *SI_i Do you believe [the claim that_i [Bill resigned or retired]]?
 b. Q_i Do you believe [the claim that SI [Bill resigned or retired]] (or not)_i?
 (6) *Who_i do you believe [the claim that Bill saw t_i]?

In the next section, languages that include both interrogative and declarative disjunctions are examined to show that the *wh*-movement analysis does not sustain cross-linguistically. As for the English translation of these languages, the paraphrases shown in (2) are applied in order to clearly distinguish the two readings, even though these expressions are awkward in English.

2.2. The data from Mandarin Chinese

Mandarin Chinese includes two disjunctive connectives: *haishi* (which forms interrogatives) and *huozhe* (which forms declaratives).

- (7) a. Zhangsan lai haishi Lisi lai?
Zhangsan come or Lisi come
 “Which of these two persons will come: Zhangsan or Lisi?”
 b. Zhangsan lai huozhe Lisi lai.
Zhangsan come or Lisi come
 “Either Zhangsan or Lisi comes.”

Yes-no questions with disjunctive phrase are formed by attaching the *yes-no* question particle *ma* to the end of disjunctive declaratives.²

- (8) Ni xiang kao Tuofu huozhe Tuoye ma?
you want take TOEFL or TOEIC Q
 “Is it true or false that you want to take any of these tests, the TOEFL or TOEIC?”

The *yes-no* question particle *ma* is mutually exclusive with other interrogative words. For example, it usually does not appear in *wh*-questions. If it attaches to a *wh*-question, then the *wh*-word is interpreted as indefinite, not as interrogative.

- (9) Ni yao chi shenme ma?
you want eat what Q
 “Do you want to eat something? / #What do you want to eat?”

Since *haishi* includes an interrogative feature, it cannot co-occur with *ma*.

- (10) Ni xiang kao Tuofu haishi Tuoye (*ma)?
*you want take TOEFL or TOEIC (*Q)*
 “Which of these tests do you want to take: the TOEFL or TOEIC?”

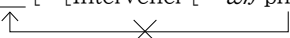
Adopting the analysis proposed by Han and Romero (2004), it is possible to suppose that the covert SI of *haishi* includes the +*wh* feature, while the covert SI of *huozhe* has the –*wh* feature. Then, the incompatibility of *ma* and *haishi* can be explained as follows. *Ma* is located in the CP and it includes a *yes-no* question feature so that the CP does not host elements with the +*wh* feature. On the other hand, there is no conflict of feature value between *huozhe* and *ma* since *huozhe* includes the –*wh* feature and it remains in situ. There is much evidence to support this

analysis. For example, the behavior of SI is parallel to *wh*-words, in that both can be extracted out of a complex NP (Huang, Li & Li 2009).

- (11) Ni jintian jiang de shi [_{NP} [_{Rel} zai Meiguo haishi Yingguo liuxue de] zhuyi shixiang]?
you today talk COMP COP LOC USA or UK study-abroad COPM caution matter
 “Which do you talk about today: the precaution for studying in USA or the precaution for studying in UK?”
- (12) Ni jintian jiang de shi [_{NP} [_{Rel} zai neige guojia liuxue de] zhuyi shixiang]?
you today talk COMP COP LOC which country study-abroad COMP caution matter
 “As for the precaution for studying abroad, which country are you going to talk about today?”

If we assume a long-distance binding between the SI and its trace, then it is not surprising that the SI can be extracted from complex NPs on par with *wh*-words.

One of the tests that judge the existence of movement is the intervention effect proposed by Beck (2006). An intervention effect occurs whenever a *wh*-phrase attempts to move over an intervener. The possible candidates for interveners are focus-sensitive operators, such as negation, *wh*-phrases, and focus.

- (13) [CP _____ [···[Intervener [···*wh*-phrase···]]]]


In Erlewine (2011), he investigates the alternative questions in Mandarin Chinese and points out that the expansion of the scope of *haishi* obeys the intervention effect. The negation intervenes the movement of the SI of *haishi* in (14), a *wh*-phrase intervenes it in (15), and a focus operator intervenes it in (16).

- (14) *Ni bu xiang kao Tuofu haishi Tuoye?
you NEG want take TOEFL or TOEIC
 “#Which test don’t you want to take: the TOEFL or TOEIC?”
- (15) *Ni xiang zhidao shei kao Tuofu haishi Tuoye?
you want know who take TOEFL or TOEIC
 “#Which do you want to know: who takes the TOEFL or who takes the TOEIC?”
- (16) *Zhiyou Zhangsan kao Tuofu haishi Tuoye?
only Zhangsan take TOEFL or TOEIC
 “#Which does only Zhangsan take: the TOEFL or TOEIC?”

All of the aforementioned data suggests the following: *haishi* is involved with the movement to the CP. Such movement is prohibited if there is an intervener between the surface position of *haishi* and the target CP.

However, the *wh*-movement analysis cannot account for some behavior of disjunctive connectives. In Ito (2014), this author shows that two disjunctive connectives alternate in scope of the universal quantifier and in scope of negation. Besides, it is widely known that the alternation is always accepted in the context of *wulun* (*no matter*), which includes both a universal quantifier and a negation (You 1990, Hou 2004, and Fang 2008, among others).

- (17) Wulun ni qu haishi/huozhe ta qu dou keyi.
no-matter you go or he go all OK.
 “It doesn’t matter whether you go or he goes.”

2.3. Finnish data

Finnish includes two disjunctive connectives: *vai* (which forms interrogatives) and *tai* (which forms declaratives).

- (18) a. Juot-ko kahvia vai teetä?
drink.2SG.PRES-Q coffee.PAR or tea.PAR
 “Which do you drink: coffee or tea?”
 b. Juon kahvia tai teetä.
drink.1SG.PRES coffee.PAR or tea.PAR
 “I drink coffee or tea.”

Yes-no questions in Finnish are formed by attaching the second-position particle *-ko* to the first word that occurs at the periphery of a finite clause (Huhmarniemi 2012). Therefore, if the first word of the declarative disjunctive takes *-ko*, then the sentence turns into a *yes-no* question.

- (19) Juot-ko kahvia tai teetä?
drink.2SG.PRES-Q coffee.PAR or tea.PAR
 “Is it true or false that you drink any of these, coffee or tea?”

What is surprising here is that a *vai*-phrase must also be headed by *-ko*. In Kenesei (1994), he observes that *-ko* is mutually exclusive with other interrogative elements and when it attaches to a *wh*-question, the sentence is interpreted as an echo question, not as a *wh*-question.

- (20) Mitä-kö Pekka osti?
what.PAR-Q Pekka.NOM buy.3sg.PERF
 “Did you ask what Pekka bought?” / “#What did Pekka buy?”

If we suppose that the SI of *vai* includes the *+wh* feature, then we need to explain why the *yes-no* question particle *-ko* is allowed to appear in the CP. It might be solved by setting a default feature where *-ko* is an interrogative particle (which is not defined as the *wh*-feature value), and if it hosts an element with the *+wh* feature, then it acquires the *+wh* feature. Otherwise, it has the *-wh* feature and the sentence is interpreted as a *yes-no* question by default.

There is evidence that shows a *vai*-phrase involvement with the *wh*-movement. The interrogative disjunction in Finnish cannot expand its scope out of a complex NP. This is parallel to the fact that the extraction of *wh*-words from complex NPs is prohibited in Finnish (Huhmarniemi 2012).

- (21) Uskot-ko tietoa, että hän on sairas *vai/tai haavoittunut?
believe.2SG.PRES-Q information.ACC that s/he be.3SG.PRES sick or injured
 “Do you believe the information that s/he is in any of these conditions, sick or injured?”

(22) *Minkä uskot väitteen että Pekka osti?

what.ACC believe.PRES.2SG claim.ACC that Pekka.NOM buy.3SG.PERF

“#What do you believe the claim that Pekka bought?”

However, this analysis runs into a problem when their behavior in embedded contexts is examined.

The *yes-no* question particle *-ko* also functions as an interrogative complementizer. In the following example, *tiedän* (know) selects an interrogative clause headed by *menee-kö* (go-whether).

(23) Tiedän, menee-kö hän teatteriin vai puistoon.

know.1SG.PRES go.3SG.PRES-Q s/he theatre.ILL or park.ILL

“I know whether s/he goes to a theatre or a park.”

Example (23) is not an interrogative. If we attach *-ko* to the first word of the main clause, then it is interpreted as an alternative question. In other words, the *vai*-phrase expands its scope across clause boundaries only if every CP contains *-ko*.

(24) Tiedät-kö, menee-kö hän teatteriin vai puistoon.

know.1SG.PRES-Q go.3SG.PRES-Q s/he theatre.ILL or park.ILL

“Which do you know s/he goes to: a theatre or a park?”

This is a problem if we apply the default *wh*-feature analysis. When the SI of *vai* checked *-ko* in the embedded CP, it is no longer possible to check *-ko* in the main clause. The analysis relying on the *wh*-feature value does not account for the multiple occurrence of *-ko*.

In addition, Finnish allows the alternation between declarative and interrogative disjunctions, which is similar to the data from Mandarin Chinese. This alternation is also difficult to explain by the *wh*-movement analysis.³

(25) Et-kö tiedä, tulee-ko hän tänään vai/?tai huomenna?

NEG-Q know come.3SG.PRES-Q s/he today or tomorrow

“Don’t you know that she comes any of these days, today or tomorrow?”

In summary, the analysis relying on the different *wh*-feature value is difficult to explain for all the Finnish data. Still, some findings indicate that the interpretation of *vai*-phrases involves movement.

2.4. The data from Egyptian Arabic

Egyptian Arabic includes two disjunctive connectives: *wallaa* (which forms interrogatives) and *aw* (which forms declaratives).

(26) a. ʔandak kalb wallaa oṭṭa?

have.2SGM dog or cat

“Which do you have: a dog or a cat?”

b. ʔandak kalb aw oṭṭa.

have.2SGM dog or cat

“You have a dog or a cat.”

In Egyptian Arabic, intonation plays a crucial role in determining the mood of a sentence. For example, a rise in intonation at the end of a sentence means an interrogative. In this regard, if (26b) is pronounced with a rising intonation, then it is interpreted as a *yes-no* question (Winans 2013).

It is possible to analyze the rise in intonation as a *yes-no* question marker and define the different *wb*-feature value for the SIs of *wallaa* and *aw*, respectively, to explain the distinction between interrogative and declarative disjunctions. However, if we embed the disjunctive phrase conjoined by *wallaa* in a clause, an unexpected nuance emerges: the *wallaa*-phrase implies other choices, which is not implied by the *aw*-phrase.

- (27) a. iftakart ?inn-u baa? il-?arabiyya wallaa ?ahan il-beet.
think.1SG.PAST that-he sell.3SGM.PAST the-car or mortgage.3SGM.PAST the-house
 “I thought that he had sold the car or mortgaged the house or did something like that.”
- b. iftakart ?inn-u baa? il-?arabiyya aw ?ahan il-beet.
think.1SG.PAST that-he sell.3SGM.PAST the-car or mortgage.3SGM.PAST the-house
 “I thought that he had sold the car or mortgaged the house.”

This difference in nuance cannot be explained by the *wb*-movement analysis.

There is another linguistic phenomenon which the *wb*-movement analysis fails to explain. According to Winans (2013), both *wallaa* and *aw* can appear in an embedded clause headed by the interrogative complementizer *law* and describe the alternative reading. In other words, in embedded contexts, *wallaa* and *aw* alternate without any change in meaning, just like *baishi* and *huozhe* in Mandarin Chinese.

- (28) a. hoda sa?alat law Fiona rashahat morsi wallaa ali.
Hoda ask.3SGFPAST if Fiona vote.3SGFPAST Morsi or Ali
 “Hoda asked which Fiona voted for: Morsi or Ali.”
- b. hoda sa?alat law Fiona rashahat morsi aw ali.⁴
Hoda ask.3SGFPAST if Fiona vote.3SGFPAST Morsi or Ali
 “Hoda asked if Fiona voted for any of these, Morsi or Ali.”
 “Hoda asked which Fiona voted for: Morsi or Ali.”

At this point, the data seems to contradict one another. For example, the possibility of expansion of the scope of *or* and the intervention effects indicate that interrogative disjunction is involved with movement. Conversely, the alternation of disjunctive connectives in some embedded contexts and the co-occurrence of the *yes-no* question particle with interrogative disjunction in Finnish are mysteries. The following section defines the denotation of alternative questions and shows that the *wb*-feature is not relevant with the movement of disjunctive phrases.

3. SEMANTICS OF ALTERNATIVE QUESTIONS

This section introduces Hamblin/Karttunen-style semantics for questions and applies it to alternative questions in order to show that previous analyses did not obtain the correct meaning of alternative questions.

3.1. Hamblin/Karttunen-style semantics for alternative questions

In Hamblin (1973), he considers the denotation of a question and suggests that a question denotes a set of propositions that count as answers to it. Karttunen also supports Hamblin’s analysis, with a slight modification, that a question denotes the set of propositions of its true answers (Karttunen 1977). Formally, in *wh*-question $\phi(a)?$, ϕ is a one-place predicate and a is a *wh*-word, and it denotes a set of propositions $\phi(x)$ in which all individuals are replaced with the variable x . In addition, in *yes-no* question $\psi?$, ψ is a proposition, and it denotes the set whose members are ψ and the negation of ψ . The following includes the rules of translation and examples from English.

- (29) a. If X is translated as $\phi(a)$, then $[_{CP}[_{IP}X]?)$ is translated as
 $\lambda p \exists x [p = \wedge \phi(x)]$, where p is a variable over propositions.
 b. If X is translated as ψ , then $[_{CP}[_{IP}X]?)$ is translated as
 $\lambda p [p = \wedge \psi \vee p = \wedge \sim \psi]$, where p is a variable over propositions.

- (30) Who came?
 a. $\lambda p \exists x [\text{person}(x) \ \& \ p = \text{came}(x)]$
 b. {John came, Mary came, Bill came, ...}

- (31) Is it raining?
 a. $\lambda p [p = \text{it-is-raining} \ \vee \ p = \sim p]$
 b. {It is raining, It is not raining}

As shown in Section 2.1, alternative questions and *yes-no* questions have different answers, and thus, they include different denotations. The former denotes the set presented in (32a); whereas, the latter denotes the set presented in (32b).

- (32) Does John eat beans or rice? = (1)
 a. {John eats beans, John eats rice}
 b. {John eats beans or rice, John does not eat beans or rice}

The denotation of a *yes-no* question reading is easy to be presented as a logical formula. In this regard, adding a *yes-no* question operator to the clause yields the correct meaning.

- (33) $[p \vee q]?$
 a. $\lambda r [r = p \vee q \ \vee \ r = \sim (p \vee q)]$
 b. $\{p \vee q, \sim (p \vee q)\}$

Conversely, it is cumbersome to obtain the denotation of alternative questions. In Ito (2007), this author argues that the logical structure of alternative questions is $[p?] \vee [q?]$ in Mandarin Chinese, based on the fact that each disjunct can include the interrogative particle *ne*.

- (34) Zhangsan lai ne haishi Lisi lai ne?
Zhangsan come Q or Lisi come Q
 “Which person will come: Zhangsan or Lisi?”

However, this analysis is incorrect for two reasons. One reason is that it does not correctly capture the meaning of *ne*. Although *ne* attaches to a *wh*-question in order for a speaker to

present a question based on some claim, expectation or belief on the part of the hearer, it does not turn a declarative clause into a question (Li & Thompson 1981).

(35) Ta qu nar ne?

He go where Q

“(In that case,) where is he going?”

(36) Ta qu shangke ne.

He go lecture Q

“He is going to give a lecture. / #Is he going to give a lecture?”

The second reason is its theoretical incorrectness. In Krifka (2001), he argues that disjoining two interrogatives is impossible, as interrogatives belong to speech acts and the disjunction of such acts would lead to disjunctive sets of commitments, which are difficult to keep track of, as shown in (37).

(37) ?Which dish did Al make or which dish did Bill make?

With the two problems at hand, the denotation of an alternative question cannot be regarded as a disjunction of two interrogatives.

Krifka also argues that conjunction is the only possible way to conjoin interrogatives. If this analysis is applied, then we obtain two sets of propositions, each of which consists of an affirmative proposition and a negative one.

(38) a. [p?] & [q?]

b. $\lambda r[r=p \vee r=\sim p]$ & $\lambda r[r=q \vee r=\sim q]$

c. {p,~p} & {q,~q}

However, this is a misanalysis since the denotation of an alternative question does not include a negation of the proposition stated by each disjunct. For example, if we answer (1) with *John doesn't eat beans*, then it does not count as a direct answer because it requires two steps to be properly understood: canceling the presupposition that *John eats something*, and stating the proposition that *John doesn't eat beans*, which actually provides more than just the required information. To conclude, either defining them as a disjunction of questions or a conjunction of questions cannot capture the true meaning of alternative questions.

3.2. Or as a canceling device

The previous section discussed the ungrammaticality of (37) in regard to the disjunction of interrogatives. However, according to Szabolcsi (1997), (37) is grammatical if it is interpreted as canceling the truth value of the first sentence and replacing it with the second. In this context, *or* can be replaced by *otherwise* and this function of disjunctive connectives is referred to as a “canceling device.” Our findings show that disjunctive connectives in Mandarin Chinese and Egyptian Arabic can function as canceling devices. In Mandarin Chinese, both *haishi* and *huozhe* function as canceling devices (Xing 1993, Xiao & Zhang 2006), while in Egyptian Arabic, only *wallaa* can be interpreted in this manner (Winans 2013).

(39) Xuyao dazhen ma? Haishi / Huozhe xuyao chi dian yao ma?

Need inject Q or need eat CL medicine Q

“Do I need an injection? Or do I need to take some medicine?”

(40) *ʔaiz takamil akl-ik wallaa/*aw ʔaiz-nii haddarab-ik*

Want finish food.sgm or want-1sgm hit-2sgm

“Do you want to finish your food or do you want me to hit you?”

These sentences are interpreted as instances of exclusive disjunction ($(p \vee q) \& \sim(p \& q)$), not as a standard disjunction ($p \vee q$). This interpretation probably emerges through the interaction between disjunction and other higher levels of speech, as seen in the discourse structure in (39) and the speech act in (40).

4. THE NEW LOGICAL STRUCTURE FOR ALTERNATIVE QUESTIONS

So far, we have seen that the interpretation of an alternative question might involve a movement, and the denotation of alternative questions cannot be derived only by logical constants. Thus, this paper proposes the restructuring of logical structures of alternative questions, which is not driven by the *wb*-feature but is driven by the accommodation of presupposition. For example, if a speaker utters an alternative question, then alternative choices are usually presupposed. Even in the context that does not presuppose them, the hearer is required to accommodate them in the presupposition in order to answer the question properly. Contrary to the traditional analysis in which disjuncts are considered to be the foci of question in alternative questions, we assume that the existence of each disjunct is presupposed, and only the interrogative mood remains in focus. Formally, the disjunctive phrase is formed with disjuncts and the sum operator \oplus , which forms individual sums, according to Link (1983). \oplus differs from the Boolean *and* ($\&$) in that it conjoins individuals and propositions in a manner by which parts of it can be separated. The set of disjuncts conjoined by \oplus then moves to the left periphery of the clause where presupposed elements usually appear. As a result, the movement leaves a trace, which is translated as a variable (Heim & Kratzer 1998).

(41) $[\phi([a \oplus b])] \rightarrow [a \oplus b]_i [\phi(t_i)]$

Here, we see the parallel between alternative questions and *wb*-questions: an alternative question is a *wb*-question with a restriction on variables. The moved part $[a \oplus b]$ is first quantified by the existential quantifier like (42a), then integrated into the restriction domain of the variable like (42b) by means of existential disclosure. This procedure is applied automatically if the set X consists of individuals.

(42) a. $\exists X[X=\{a, b\}] \& \lambda y[\phi(y) \& y \in X]$

b. $\lambda y \exists X[X=\{a, b\} \& \phi(y) \& y \in X]$

(43) Does John love Mary or Kate?

= $[_{CP} [Mary \oplus Kate]_i [_{IP} \text{does John love } t_i]]$

= $\lambda y \exists X[X=\{Mary, Kate\} \& \text{John loves } y \& y \in X]$

However, if the set X consists of plural nouns or mass nouns, we need another modification, as

they cannot be arguments of stage level predicates. The following is the logical structure and semantic meaning of the alternative question reading of (1). According to the interpretation of (44), the food which John eats is not the whole substance of *beans* or *rice*, but a part of them.

$$\begin{aligned}
 (44) \text{ Does John eat beans or rice?} &= (1) \\
 &= [_{CP} [\text{beans} \oplus \text{rice}]_i [_{IP} \text{does John eat } t_i]] \\
 &= \lambda y \exists X [\exists x \in X [x \in \text{beans} \vee x \in \text{rice}] \& \text{John eats } y \& y=x]
 \end{aligned}$$

The alternative choices can be propositions, as shown in the Mandarin Chinese example (7). However, if the propositions move to the restrictive domain, then it leaves nothing other than a trace. This poses a problem since a predicate in the nuclear scope is necessary. Thus, we assume that only the alternative choices move, and the predicate is left behind. The apparent coordination of IPs is the result of insertion of a *pro*-verb, which is the repetition of the verb in Mandarin Chinese.

$$\begin{aligned}
 (45) \text{ Zhangsan lai haishi Lisi lai?} &= (7) \\
 &= [_{CP} [\text{Zhangsan} \oplus \text{Lisi}]_i [_{IP} t_i \text{ lai}]] \\
 &= \lambda y \exists X [X=\{\text{Zhangsan, Lisi}\} \& y \text{ comes} \& y \in X]
 \end{aligned}$$

In Egyptian Arabic, it seems that the disjunctive phrase does not define the restrictive domain, but it simply moves into it. This is the reason why the *wallaa*-phrase implies other choices, whereas, the *aw*-phrase does not.

$$\begin{aligned}
 (46) \text{ iftakart ?inn-u baa? il-?arabiyya wallaa ?ahan il-beet.} &= (27a) \\
 &= [_{CP} [\text{baa? il-?arabiyya} \oplus \text{?ahan il-beet}]_i [_{IP} \text{iftakart } t_i [_{CP} \text{?inn-u } t_i]]] \\
 &= \lambda y [\exists X [\exists x \in X [x \in \text{sell-the-car} \vee x \in \text{mortgage-the-house} \vee \dots] \& [\text{I thought [that he does } y \& y=x]]]]
 \end{aligned}$$

This analysis also explains the data that the *wh*-movement analysis fails to account for. As the movement is driven by presupposition accommodation, it does not matter whether the clause includes a *yes-no* question marker. What differs between Mandarin Chinese and Finnish is the function of interrogative particle.

The alternation of interrogative and declarative disjunctive connectives is also explained. Note that the interrogative disjunction is formed with the sum operator (\oplus), while the declarative disjunction is formed with the Boolean conjunction ($\&$). When they are embedded, both are interpreted as a disjunction of propositions since the disjunctive phrase ($a \oplus b$) must be placed in the predicate by point-wise application (Rooth 1985) in order to be selected by the main verb.

$$\begin{aligned}
 (47) \text{ Wulun ni qu haishi ta qu dou keyi.} &= (17) \\
 &= [_{CP} [\text{ni} \oplus \text{ta}]_i [t_i \text{ qu}]] \text{ dou keyi} \\
 &= \lambda P \forall p [p \in P \rightarrow p \text{ doesn't matter}] (\lambda y \exists X [X=\{\text{you, he}\} \& y \text{ goes} \& y \in X]) \\
 &= \lambda P \forall p [p \in P \rightarrow p \text{ doesn't matter}] (\lambda q [q=\text{you go} \vee q=\text{he goes}]) \\
 &= \forall p [p \in \lambda q [q=\text{you go} \vee q=\text{he goes}] \rightarrow p \text{ is OK}]
 \end{aligned}$$

5. JAPANESE DATA

Japanese includes no alternative questions. In order to express the meaning of alternative questions, it either conjoins two interrogatives or attaches a set of choices before a *wh*-question.

- (48) a. Taro-ga ki masu-ka, (soretomo) Hanako-ga ki-masu-ka?

Taro-NOM come-HON.PRES-Q (or) Hanako-NOM come-HON.PRES-Q

“Is Taro coming? Or is Hanako coming?”

- b. Taro-to Hanako-no docchi-ga ki-masu-ka?

Taro-and Hanako-GEN which-NOM come-HON.PRES-Q

“Which is coming: Taro or Hanako?”

In Uegaki (2012), he argues that Japanese alternative questions include the reduction of two disjointed interrogatives. This is a misanalysis from the viewpoint of the restriction on disjoining speech acts. Instead, the present author proposes that the coordination of interrogatives is an instance of a canceling device, since the covert connectives conjoining the interrogatives are assumed to be *soretomo* (*otherwise*). On the other hand, attaching a set of choices before a *wh*-question is simply the logical structure presented in (41). Therefore, it can be concluded that we have a new parameter to distinguish languages. In English, Mandarin Chinese, Finnish, and Egyptian Arabic, disjunctive phrases are in situ; whereas, Japanese allows for their overt movements.

6. CONCLUSION

This paper has shown that the *wh*-movement analysis regarding the SI of disjunctive phrases cannot account for the data from various languages. It also proposed a new logical structure for alternative questions in which disjunctive phrases move into the restrictive domain with a trace left in the nuclear scope. Finally, our paper showed that this analysis also explains the data from languages that include no alternative questions.

〈Abbreviation〉

CL: classifier COMP: complementizer COP: copular verb FOC: focus marker GEN: genitive case
HON: honorification ILL: illative case INST: instrumental case LOC: locative marker NEG: negation
PAR: partitive case PERF: perfective PROG: progressive Q: question particle REL: relative clause
marker SI: scope indicator SG(F): singular (feminine) SG(M): singular (masculine)

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(注)

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- 1 According to Han & Romero (2004), the term is *Q*.
- 2 Actually, *huozhe* sometimes sounds awkward with the *yes-no* question particle *ma*. The low acceptability might be derived by the collision between the interrogative mood and the indeterminacy, which the disjunctive phrase inherently includes. “Zhangsan chi miantiao huozhe mifan ma? (Does Zhangsan eat any of these, noodles or rice?)” is only acceptable in the context of asking whether *Zhangsan* eats the main staple or not. In this case, the context of choosing noodles or rice is irrelevant.
- 3 One of the native speakers that the author consulted pointed out that, in this sentence, the interrogative complementizer *-ko* should be replaced by the declarative complementizer *ettā* (that).
- 4 This sentence is ambiguous between the alternative reading and the *yes-no* reading.