Alternating conj/disjunctions: the case of Japanese *-toka* and *-tari*[1]

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Abstract. This paper investigates the interpretation of Japanese *-toka* and *-tari*, two non-exhaustive particles that receive conjunctive interpretations in upward-entailing environments, but disjunctive interpretations in downward-entailing and question contexts. We analyze *-toka* and *-tari* as items that introduce unstructured sets of alternatives in a Hamblin-style alternative semantics (Hamblin, 1973; Kratzer and Shimoyama, 2002), and derive their conjunctive and disjunctive readings via an interaction between these sets and the semantics of the environment containing them.

Keywords: *-toka*, *-tari*, Japanese, alternative semantics, conjunction, disjunction

1. *-toka* and *-tari*

-toka and *-tari* are used in unembedded declarative contexts to introduce non-exhaustive conjunctions of similar individuals and predicates, respectively. For example, (1a) is true if at least Taro and Hanako come, as well as if someone else, say, Jiro, comes, and is false if none or only one of those individuals comes. Likewise, (1b) is true if Taro cleaned his room, did the laundry, and did at least one other thing, such as some other household chore.

(1) a. Taro -toka Hanako-toka -ga ki -ta
Taro -TOKA Hanako-TOKA -NOM come -PST
'Taro, Hanako, and someone else came.'
b. Taro-wa heya-o sooji si -tari sentaku-o si -tari si -ta
Taro-TOP room-ACC clean do -TARI laundry-ACC do -TARI do -PST
'Taro cleaned his room, did the laundry, and did other such things.'

Although often encountered in coordinating constructions, both *-toka* and *-tari* may be used as stand-alone particles non-coordinatively, while still retaining their conjunctive and non-exhaustive interpretation, as demonstrated in (2).

(2) a. Taro -toka -ga ki -ta
Taro -TOKA -NOM come -PST
'Taro and someone else came.'
b. Taro-wa heya-o sooji si -tari si -ta
Taro-TOP room-ACC clean do -TARI do -PST
'Taro cleaned his room and did other such things.'

[1] We would like to thank Heidi Harley, Robert Henderson, Massimo Piattelli-Palmarini, and Jianrong Yu for questions and comments on the material presented here. We also thank audiences at Sinn und Bedeutung 22, especially Maribel Romero, Uli Sauerland, and Katsuhiko Yabushita, for helpful comments, questions, and suggestions, as well as audiences at ConSOLE XXV and GLOW in Asia XI for their comments on earlier versions of this material and related work. The second author was supported by Grant-in-Aid for JSPS Fellows #16J00637.

 In: Uli Sauerland and Stephanie Solt (eds.),
Proceedings of Sinn und Bedeutung 22, vol. 2, ZASPiL 61, pp. 393–406. ZAS, Berlin.

These particles's ability to be used non-coordinatively distinguishes them from the nominal coordinator *-ya*, which also behaves as a non-exhaustive conjunction in upward-entailing contexts but requires two conjuncts (Hayashishita and Bekki, 2012; Sudo, 2014).

(3) a. Taro ya Hanako -ga ki -ta
Taro YA Hanako -NOM come -PST
'Taro, Hanako, and someone else came.'
b. *Taro ya (-ga) ki -ta
Taro YA -NOM come -PST

Although these conjunctive readings are robust in (1) and (2), in the next section we show that this interpretation is not constant across environments.

2. Disjunctive readings of *-toka* and *-tari*

-toka and *-tari* do not display the conjunctive reading of (1) and (2) in all environments; in fact, they receive *disjunctive* interpretations in several semantic contexts. These environments are generally non-veridical or implicature-cancelling, and include negation, the antecedent of a conditional, imperatives, and polar questions. What is more, the disjunction is also non-exhaustive: it includes individuals/predicates that are not overtly mentioned, regardless of whether *-toka* and *-tari* are used coordinatively or not. As such, in the examples below, we include the second conjunct in parentheses to note that the disjunctive effect is observed in coordinative and non-coordinative uses. We discuss each of the environments in detail below.

2.1. Negation

Beginning with negation, we observe that (4a) is true if Taro studied neither English nor Spanish, nor anything else like that. Similarly, (4b) is true if Taro failed to clean his room, do the laundry, or any of his chores.

(4) a. Taro-wa eigo -toka (supeingo-toka)-o benkyoo si -nakat -ta
Taro-TOP English-TOKA Spanish -TOKA -ACC study do-NEG -PST
'Taro didn't study English (or Spanish) or anything like that.'
b. Taro-wa heya -o sooji si -tari (sentaku-o si -tari) si -nakat-ta
Taro-TOP room -ACC clean do-TARI laundry-ACC do-TARI do-NEG -PST
'Taro didn't clean his room (or do the laundry) or do anything like that.'

This interpretation is unexpected on an analysis of *-toka* and *-tari* as typical conjunctions; if they were conjunctive in this environment, we would expect (4a) to have the weaker meaning that Taro simply didn't study every language, i.e. he only studied English, but not Spanish, rather than the actual interpretation of (4a), in which Taro has studied none of the languages at all.

2.2. Antecedent of conditionals

In the conditional in (5a), Yosuke will serve tea if Taro, Hanako, or someone else like them, such as their friend Jiro, comes. Likewise, in (5b), Taro's mom will be happy if he engages in any healthy activity, such as drinking milk, eating an apple, or something similar to that.

(5) a. Taro-toka (Hanako-toka) -ga ki -tara Yosuke-wa ocha-o das -u
Taro-TOKA Hanako-TOKA -NOM come-if Yosuke-TOP tea -ACC serve-PRS
'If Taro (or Hanako) or someone like that comes, Yosuke will serve tea.'
b. Taro-ga gyuunyuu-o non-dari (ringo-o tabe-tari) si-tara mama-wa yorokob-u
Taro-NOM milk -ACC drink-TARI apple-ACC eat-TARI do-if mom-TOP be.happy-PRS
'If Taro drinks milk (or eats an apple) or something like that, his mom will be happy'

Here again, the interpretation of *-toka* and *-tari* is unexpected if they are interpreted conjunctively in these environments; in (5a), for instance, it is not necessary for Taro, Hanako, and someone else to come for Yosuke to serve tea.

2.3. Possibility modals

The disjunctive interpretation of *-toka* and *-tari* is attested in the scope of possibility modals as well, as (6) shows. In (6a), the lucky individual may receive a promotion or an overseas assignment, but not necessarily both. Likewise, Godzilla may engage in either action, or some other destructive act, but not necessarily both possible plans of attack.

(6) a. shoosin -toka (kaigaikimmu -toka) -ga ari-e -ru
promotion-TOKA overseas.assignment -TOKA-NOM be-POSS-PRS
'There is a possibility of promotion (or working abroad), among other things.'
b. Gojira -wa machi-o hakai si-tari (teki -o taosi -tari) si -e -ru
Godzilla-TOP town -ACC destruction do-TARI enemy-ACC defeat-TARI do-POSS-PRS
'Godzilla may destroy the town (or defeat his enemies) or do other such things.'

At this point it is worth pointing out potential objections to the claim that *-toka* and *-tari* receive an interpretation in the environments we have discussed here that is distinct from their interpretation in upward-entailing contexts. For one, one could argue that the apparent disjunctive interpretation of *-toka* and *-tari* under negation is simply due to their taking wide scope with respect to negation. Moreover, one might point out that conjunctions can be weakened in the antecedent of a conditional;[2] (7), for example, is felicitous in English.

(7) If John and Mary come, I'll serve tea. In fact, I'll serve tea if John comes alone.

Finally, English *and* also permits the same kind of interpretation under a possibility modal that *-toka* and *-tari* do, as the modal can distribute over each conjunct. (8), for instance, does not require that John eat shrimp and crab in the same world, but simply that eating shrimp and eating crab are both possibilties for him.

[2] We thank Rajesh Bhatt for bringing this objection to our attention.

(8) John may eat shrimp and crab.

One can therefore question the claim that *-toka* and *-tari* alternate between a conjunctive and a disjunctive reading depending on their environment. Because of this, we consider the behavior of *-toka* and *-tari* in two more environments, imperatives and polar questions, arguing that their behavior in these contexts demonstrates more convincingly the variation in their interpretation.

2.4. Imperatives

In imperatives, disjunctive interpretations of *-toka* and *-tari* are readily available. In (9a), the addressee may satisfy the speaker's request by bringing either food, drink, or some form of sustenance. Likewise, the speaker in (9b) is requesting some form of entertainment, and will be satisfied if the addressee performs at least one of the actions; they need not perform all of them.

(9) a. Tabemono -toka (nomimono -toka) motteko -i!
food -TOKA drink -TOKA bring -IMP
'Bring me food (or drink) or something like that!'
b. Tsumaranai. Odot -tari (utat -tari) si-ro!
boring dance-TARI sing-TARI do-IMP
'I'm bored. Dance (or sing) or something!

It is harder to argue for a conjunctive interpretation of *-toka/-tari* here; if they were interpreted conjunctively, we would expect (9a), for instance, to only be satisfiable if both food and drink are brought to the speaker, but this is not the case. This context, therefore, provides a stronger case for the claim that *-toka* and *-tari* receive disjunctive interpretations in this environment.

2.5. Polar questions

Finally, disjunctive interpretations are also observed in polar questions. An affirmative response is felicitous in (10a) if only one of the people comes, and in (10b) even if only one of the actions is done.

(10) a. Taro-toka (Hanako-toka) -ga ki -ta no?
Taro-TOKA Hanako-TOKA -NOM come -PST Q
'Did Taro (or Hanako) or someone like that come?'
b. Taro-wa heya -o sooji si -tari (sentaku-o si -tari) si -nakat-ta no?
Taro-TOP room-ACC clean do-TARI laundry -ACC do-TARI do-NEG -PST Q
'Did Taro clean his room (or do the laundry) or something like that?'

Here again we find an interpretation that is consistent with a disjunctive treatment, but difficult to account for if *-toka* and *-tari* are in fact conjunctive. In particular, the felicity of an

affirmative response even if only one of the overtly mentioned conjuncts comes is unexpected if these particles receive a conjunctive interpretation.

Polar questions are especially useful for demonstrating the non-exhaustive nature of this disjunctive interpretation, and can be used to distinguish *-toka/-tari* questions from disjunctive polar questions using *-ka* 'or'. (11), for instance, may be answered in the affirmative even if none of the overtly mentioned individuals came.

(11) Context: Taro, Ryo, and Jiro are all good friends, and everyone associates them with one another. There was a big party last night, and Hanako wants to know if any of them came. She asks:
a. Taro-toka Ryo-toka-ga ki -ta no?
b. Un, Jiro-ga ki -ta yo.
Yes Jiro-NOM come -PST PRT
'Yes, Jiro came.'

This differs markedly from a question using *-ka*, which may not be felicitously answered affirmatively if neither of the disjuncts came.

(12) a. Taro-ka Ryo-ga ki -ta no?
b. #Un, Jiro-ga ki -ta yo.
Yes, Jiro-NOM come -PST PRT
'Yes, Jiro came.'

This thus shows that the interpretation of *-toka/-tari* in these environments is crucially different from both conjunction and ordinary disjunction.

2.6. Interim summary

In this section, we have shown that *-toka* and *-tari*, though interpreted as non-exhaustive conjunctions in unembedded declarative contexts, receive a non-exhaustive disjunctive interpretation in a range of environments. In the next section, we develop an analysis of *-toka/-tari* that accounts for this alternation.

3. Analysis

Couching our analysis within a Hamblin-style Alternative Semantics framework (Hamblin, 1973; Kratzer and Shimoyama, 2002), we propose that *-toka* and *-tari* are both *similarity-based alternative generators.* More specifically, *-toka* and *-tari* denote sets of individuals and predicates, respectively, that are similar in the context to the overtly mentioned argument of *-toka/-tari*. By virtue of being self-similar, this set will always include the overtly mentioned argument itself. Denotations for *-toka* and *-tari* are given in (13a-b), and we additionally provide example sets of individual and predicate alternatives in (13c-d) to illustrate these denotations.

(13) Denotation and example alternatives for *-toka* and *-tari*

a. $[\![\alpha_{<e>}\text{-toka}]\!] = \{ x \mid x \sim_C \alpha\}$

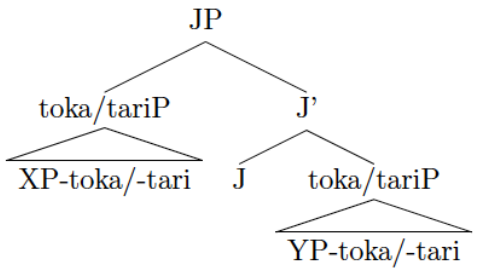
b. $[\![\alpha_{<e,t>}\text{-tari}]\!] = \{ P \mid P \sim_C \alpha\}$

c. [[Taro-toka]] = {Taro, Jiro, Ryo}

d. [[heya-o sooji si-tari]] = {λx.λw.x clean the room in w, λx.λw.x study English in w, …}

Because we analyze *-toka* and *-tari* as stand-alone alternative generating expressions, we follow Mitrović and Sauerland (2014) in making use of a silent coordinating Junction head, or simply J. This results in the syntactic structure in (14) for coordinative uses of *-toka* and *-tari*.

(14) *-toka* and *-tari* in a coordinate structure.



Semantically, we depart from Mitrović and Sauerland's analysis of J in terms of set intersection, and propose instead that it denotes the *union* of the two sets of alternatives introduced by each coordinand. Essentially, J on this analysis behaves the same way *or* does according to Alonso-Ovalle (2006), collecting up the alternatives into a single set, and a similar, disjunctive J head has been proposed for Japanese *-ka* disjunctions by Uegaki (2018).[3]

(15) Where $[\![XP]\!]$ and $[\![YP]\!] \subseteq D_\tau$, $[\![[[XP]\ [J\ [YP]]]]\!] \subseteq D_\tau = [\![XP]\!] \cup [\![YP]\!]$

The alternatives compose with other elements of the sentence through Pointwise Functional Application (Hamblin, 1973), as defined in (16). This allows members of, say, a singleton set to compose with members of a non-singleton set by applying the member of the former to each member of the latter.

(16) If $[\![\alpha]\!] \subseteq D_{<\sigma,\tau>}$ and $[\![\beta]\!] \subseteq D_\sigma$, then $[\![\alpha(\beta)]\!] = \{c \in D_\tau \mid \exists a \in [\![\alpha]\!]\ \exists b \in [\![\beta]\!]\ (c = a(b))\}$

[3] It may be necessary to place an additional restriction on J here, in order to capture the fact that the two phrases need to be similar to one another. This seems to be warranted anyway, as the null coordinator in Japanese has a similar effect to *ya* in expressing a non-exhaustive alternating conjunction/disjunction (Sudo 2014).

i) Taro, Hanako-ga ki -ta
Taro Hanako-nom come-pst
'Taro, Hanako, and someone else came.'

This could be analyzed as forming a set of alternatives that is restricted to being similar to both coordinands, as well as any alternatives introduced within those coordinands. We leave investigation of this possibility to future research.

Pointwise Functional Application involving sets of alternatives generated by *-toka* and *-tari* ultimately yields a set of propositional alternatives, as in (17).

(17) a. ⟦Taro-toka ga kita⟧ = {λw.Taro came in w, λw.Ryoichiro came in w, …}
b. ⟦Taro wa heya-o soojisi-tari sita⟧= {λw.Taro cleaned the room in w, λw.Taro did laundry in w, …}

What happens after the alternatives reach propositional status depends on the semantics of the environment in which they appear. Having developed the core of our analysis above, we turn now to each of these environments in turn.

3.1. Declaratives

Recall that in unembedded declarative contexts *-toka* and *-tari* are interpreted as non-exhaustive conjunctions, as in (1), repeated below as (18).

(18) a. Taro -toka Hanako-toka -ga ki -ta
Taro -TOKA Hanako-TOKA -NOM come -PST
'Taro, Hanako, and someone else came.'
b. Taro-wa heya-o sooji si -tari sentaku-o si -tari si -ta
Taro-TOP room-ACC clean do -TARI laundry-ACC do -TARI do -PST
'Taro cleaned his room, did the laundry, and did other such things.'

We model this as the insertion of a universal quantifier over propositional alternatives, defined as in (19) following Kratzer and Shimoyama (2002).

(19) ⟦∀⟧ (A) = {λw'. ∀p[p ∈ A → p(w')]}

Following previous work (Menéndez-Benito, 2005; Rawlins, 2008, 2013), we treat the universal propositional quantifier as inserted by default in order to reduce the set of alternatives to a singleton set, due to the presence of an assertion operator in the syntactic structure that requires a singleton set as an argument in order to be defined. Applying this quantifier to the set of alternatives in (17), for instance, results in the singleton set in (20).[4]

(20) {λw'. ∀p[p ∈ {Taro came, Hanako came, Jiro came,…} → p(w')]}

(20) states that sentence (18a) is true if each proposition in the alternative set holds in the world of evaluation.[5] This is equivalent to asserting the conjunction of all of the alternatives

[4] For reasons of space we will restrict our analysis to either a sentence with *-toka* or one with *-tari.* The analysis is valid for both examples, regardless of which example we choose to illustrate the formal treatment.

[5] One might worry here that the derived interpretation is too strong; it asserts that *all* the propositions in the set of alternatives are true, whereas the interpretation of sentences with *-toka* and *-tari* seems to be more accurately paraphrased as asserting that at least one alternative is true, in addition to the overtly mentioned alternatives. Given that the alternatives are constrained both by the similarity relationship and by the context, it is not clear that this would necessarily result in a significant increase in the number of alternatives relative to other possible analyses.

in the alternative set, and, therefore, this derives the conjunctive interpretation of unembedded declaratives with *-toka* and *-tari.*

3.2. Negation

The disjunctive interpretation of *-toka* and *-tari* can be straightforwardly derived by simply applying negation pointwise to each alternative, and then inserting the default universal propositional quantifier, just like in the analysis of non-negated declaratives. This results in (21).

(21) $\{\lambda w'.\ \forall p[p \in \{\neg$Taro studied English, $\neg$Taro studied Spanish, …$\} \rightarrow p(w')]\}$

This ensures that the negation of each alternative holds in the world of evaluation, and is equivalent to an analysis where conjunction takes wide scope over negation, thereby generating the reading by which Taro studied none of the languages in the set.

3.3. The antecedent of conditionals

For the analysis of conditionals, we follow the treatment of *if* conditionals in Alternative Semantics due to Alonso-Ovalle (2006) in analyzing the antecedent of a conditional as a universal quantifier over propositional alternatives that takes an argument a property of propositions, notated as *f*. This is displayed in (22) below.

(22) $[\![$Taro-toka Hanako-toka ga kitara$]\!] = \{\lambda f.\lambda w.\ \forall p[p \in \{$Taro comes in w, Hanako comes in w, …$\} \rightarrow f(p(w'))]\}$

The consequent of a conditional is then treated as the property of propositions, or a function from propositions into propositions. Assuming an implicit universal quantification over possible worlds in bare conditionals (Kratzer, 1986; Lewis, 1975), the consequent receives the following translation in (23).

(23) $[\![$Yosuke-wa o-cha-o dasu$]\!] = \{\lambda p.\lambda w.\ \forall w'[f_{\leq w}(p(w')) \rightarrow$ Yosuke serves tea in w'$]\}$

The antecedent then applies to the consequent, resulting in (24).

(24) $[\![(22)((23))]\!] = \{\lambda w.\ \forall p[p \in \{$Taro comes in w, Hanako comes in w, …$\} \rightarrow \forall w'[f_{\leq w}(p(w')) \rightarrow$ Yosuke serves tea in w'$]]\}$

Spelling this out in words, (24) says that for every proposition p, if p is in the set of alternatives, then for every possible world, if p holds in a world close to the world of evaluation (notated $f_{\leq w}$), Yosuke serves tea in that world. This has the effect of distributing the propositions in the alternative set over the set of closest possible worlds, and therefore allows Yosuke to serve tea in worlds where Taro comes alone, in worlds where Hanako comes alone, and so on. In other words, this analysis captures the fact that it need not be the case that every proposition in the alternative set be true for Yosuke to serve tea. This

therefore successfully captures the disjunctive interpretation of *-toka* and *-tari* in the antecedent of a conditional.

3.4. Possibility modals

We provide a standard translation for the possibility modal *-e* as existential quantification over possible worlds, as in (25).

(25) $[\![\text{-e}]\!] = \{\lambda p.\lambda w.\exists w'[wRw' \wedge p(w')]\}$

As with negation in (21), the possibility modal is applied pointwise to each proposition in the alternative set. The default universal propositional quantifier is then inserted to flatten the alternative set into a singleton, resulting in (26).

(26) $\{\lambda w''.\forall p[p \in \{\lambda w.\exists w'[wRw' \wedge$ Godzilla destroys the town in w'], $\lambda w.\exists w'[wRw' \wedge$ Godzilla defeats his enemies in w'], …$\} \rightarrow p(w'')]\}$

According to (26), each of the modalized propositions in (26) holds in the world of evaluation. This results in an interpretation according to which each proposition holds in at least one world accessible from the world of evaluation, effectively distributing the propositions in the alternative set over the worlds accessible from the worlds of evaluation, as with the conditional case in (24). Crucially, this does not require that every proposition in the alternative set end up coming about in the actual world, nor does it require that every proposition hold at every possible world accessible from the world of evaluation. Rather, each proposition is merely an option.

3.5. Imperatives

We can extend the account given of possibility modals above to analyze imperative expressions, adapting ideas from Aloni (2007) into the single-tier alternative semantics framework in which we have couched our analysis. Concretely, we can treat the imperative operator as something akin to universal quantification of the set of alternatives, in combination with existential quantification over a set of worlds that encode the set of desires the imperative aims to satisfy. Applying this to (9a), repeated as (27a) below, we derive (27b) as its interpretation.

(27) a. Tabemono -toka (nomimono -toka) motteko -i!
food -TOKA drink -TOKA bring -IMP
'Bring me food (or drink) or something like that!'

b. $\{\lambda w.\forall p[p \in \{\lambda w'.$ you bring food in w', $\lambda w'.$you bring drink in w',…$\}$
$\rightarrow \exists w'' \in W_{Des}[wRw'' \,\&\, p(w'')]]\}$

Breaking this down, (27) states that each proposition in the alternative set is associated with at least one world, accessible from the world of evaluation, where that proposition holds. Put another way, this can be thought of as meaning that any of the actions done in one of the

desire worlds satisfies the imperative. Just like in the possibility modal case, this does not require every proposition to hold in every world, and therefore we correctly predict a disjunctive-like interpretation for *-toka* and *-tari* with imperatives, where the imperative will be satisfied by any of the actions taken.

3.6. Polar questions

We conclude our analysis with polar questions. A recurrent theme throughout our analysis has been the application of a universal propositional quantifier over the set of alternatives. This, however, will not derive the correct results for polar questions; rather than universal quantification over the set of alternatives, it seems that we need *existential* quantification in order to capture the interpretation of *-toka* and *-tari* in polar questions. Fortunately, we can make use of the existential propositional quantifier defined by Kratzer and Shimoyama (2002), defined as in (28).

(28) $[\![\exists]\!]\,(A) = \{\lambda w'.\ \exists p[p \in A \wedge p(w')]\}$

The insertion of a quantifier to flatten the alternative set into a singleton will be required by the partition operator, which takes a singleton set as argument and generates the bipolar denotation of a polar question.

(29) $[\![\mathrm{Part}(\{\lambda w'.\ \exists p[p \in A \wedge p(w')]\})]\!] = \{\lambda w'.\ \exists p[p \in A \wedge p(w')],$
$\lambda w'.\neg\exists p[p \in A \wedge p(w')]\}$

This brings about an interpretation for a question like (10a) to which one could answer ‘yes’ if one or more of the alternatives holds, and ‘no’ if none of them do. This delivers the correct disjunctive interpretation of *-toka* and *-tari* in polar questions.

One might ask why the existential propositional quantifier is inserted in this context, rather than the universal propositional quantifier. Empirically, of course, insertion of the universal quantifier delivers the wrong result, but we have not yet provided independent justification for the insertion of a different propositional quantifier. There are two possible ways to implement the selection of the right quantifier. One possibility is that this choice is essentially syntactic: the universal quantifier agrees with a declarative head C_{decl}, while the existential quantifier is inserted to agree with the head responsible for generating polar question interpretations. Another option is that the choice is semantic in nature: the grammar inserts whichever quantifier produces the strongest meaning given the semantic environment. This is the tack taken by Davidson (2013) in her analysis of general use coordination in American Sign Language.[6] In order for this approach to work in the case at hand, however, it would be necessary to guarantee that existential quantification really is stronger in polar questions, which, given the non-monotonic nature of questions, will not necessarily be the case.[7] We leave further exploration of this issue to future research.

[6] We would like to thank Yuko Asada for bringing Davidson (2013) to our attention.

[7] We thank Maribel Romero for discussion on this point.

4. Predictions

The account we have developed here makes additional predictions beyond the data it was designed to explain. We focus on three predictions here: 1) the behavior of *-toka* and *-tari* under necessity modals, 2) the context sensitivity of the non-exhaustive interpretation, and 3) the interpretation of a non-coordinative *-toka/-tari* question.

For the first case, our analysis predicts that *-toka* and *-tari* should possess *conjunctive* interpretations in the scope of necessity modals, just like in ordinary declaratives, but unlike the other contexts we have discussed. This is because the necessity modal, in combination with the default propositional quantifier inserted in declarative clauses, will require that each proposition in the alternative set hold in *every* possible world accessible from the world of evaluation. This predicted interpretation is given in (30) below.

(30) {λw.∀p[p ∈ {λw'.∀w''[w'Rw'' → Godzilla destroys the town in w''], λw'.∀w''[w'Rw'' → Godzilla defeats his enemies in w''], …} → p(w)]}

This prediction is in fact borne out. As the *-tari* sentence in (31) shows, *-tari* does indeed receive a conjunctive interpretation in the scope of the necessity modal expression *hitsuyoo-ga aru.*

(31) insei-wa gakkai-de happyoosi-tari ronbun-o shuppansi-tari su-ru hitsuyoo-ga ar-u
grad-TOP conf -at present -TARI paper-ACC publish -TARI do-PRS need -NOM be-PRS
'It is necessary for graduate students to present at conferences and publish papers, etc.'

Another prediction of our analysis is that the non-exhaustive interpretation may vanish if the set of contextually salient similar alternatives only contains the overtly mentioned individuals or predicates. This is borne out as well: the non-exhaustive inference may in fact be directly cancelled, as (32) shows.

(32) Taro-toka Hanako-toka-ga ki -ta. Jitsuwa, Taro-to Hanako-dake-ga ki -ta.
Taro-TOKA Hanako-TOKA-NOM come-PST in.fact Taro-and Hanako-only-NOM come-PST
'Taro, Hanako, etc. came. In fact, only Taro and Hanako came.'

A final prediction of our analysis is that the non-exhaustive disjunctive inference should be available in non-coordinating uses of *-toka* and *-tari.* That is, we predict that one could felicitously answer 'yes' to the following question, modified from (11), even if the overtly mentioned individual did not come.

(33) Context: Taro, Ryo, and Jiro are all good friends, and everyone associates them with one another. There was a big party last night, and Hanako wants to know if any of them came. She asks:
a. Taro-toka -ga ki -ta no?
b. Un, Jiro-ga ki -ta yo.
Yes Jiro-NOM come -PST PRT
'Yes, Jiro came.'

The status of this prediction is not entirely clear. While the second author of this paper, a native speaker of Japanese, finds the discourse in (33) to be felicitous, other Japanese speakers find (33) infelicitous if Taro does not come.[8] As such, there seems to be inter-speaker variation on this point. Our current account does not provide an explanation for the judgment of those speakers for whom (33) is infelicitous, and we therefore leave it as a puzzle for future research to address.

5. Conclusion

In this paper, we examined the semantic properties of the Japanese particles *-toka* and *-tari*. We showed that the interpretation of these particles is sensitive to their semantic environment: although they receive non-exhaustive conjunctive interpretations in unembedded declaratives, they receive a non-exhaustive disjunctive interpretation in a variety of other environments. Furthermore, this alternation between a conjunctive and a disjunctive reading remains regardless of whether the particles are used coordinatively or not. In order to explain this variation in interpretation, we developed an analysis in a single-tier Hamblin-style Alternative Semantics, treating *-toka* and *-tari* as introducing sets of similar individual and predicate alternatives, respectively. We then proceeded to derive the conjunctive and disjunctive interpretations through an interaction between the generated sets of alternatives and the semantics of the environment in which the alternatives appear.

Several issues remain to be explored in this line of research. For one, we would like to attempt to relate the work we have done on *-toka* and *-tari* to work that has been done on another Japanese non-exhaustive coordinator, *-ya*, which behaves much like *-toka* in that it takes nominals as arguments and alternates between a conjunctive and disjunctive interpretation in the same environments that *-toka* and *-tari* do (Sauerland et al., 2017; Sudo, 2014). Work on *-ya* primarily adopts an implicature-based approach: *-ya* is analyzed as a simple disjunction, identical in meaning to *-ka* 'or' discussed in example (12) in the current paper. It is then enriched and ultimately receives a conjunctive and non-exhaustive interpretation, through competition with either pragmatically enriched versions of *-to* 'and' and *-ka* 'or', as in Sudo's (2014) higher-order implicature analysis, or with substring alternatives as in Sauerland et al.'s (2017) approach. Although we do not attempt it here, we are interested in reconciling our approach to *-toka* and *-tari* with these analyses of *-ya*.

An avenue of inquiry that may prove fruitful in shaping future work on these particles is an investigation of their interaction with quantificational elements in the sentence. For instance, we note that the sentence in (34) permits a reading in which Taro, Hanako, and anyone else in the context were seen by different children. It is judged true as long as Taro, Hanako, and possibly someone else are seen by at least one of the kids in the set. That is, the individuals in the set denoted by the *-toka* coordination may be distributed across the set of kids.

(34)	subete	-no	ko	-ga	Taro-toka	Hanako-toka	-o	mi -ta
	all	-GEN	child	-NOM	Taro-TOKA	Hanako-TOKA	-ACC	see-PST

[8] We thank Katsuhiko Yabushita and Michael Yoshitake Erlewine for discussion on this point.

'All the kids saw one of Taro, Hanako, etc.'

This is reminiscent of the interpretation of dependent plurals in English (Zweig, 2009); for instance, (35) is true even if each kid only flew one kite, as long as there are at least two kites flown overall.

(35) All the kids flew kites

It is not clear how our approach can handle cases like (34); the insertion of the default universal quantifier will result in too strong of an interpretation, in which every kid sees every one of the individual alternatives, but the insertion of the existential quantifier results in too weak of an interpretation that is satisfied if at least one of the individual alternatives is seen by every kid. However, it is not clear that an implicature-based approach, which would strengthen an underlying disjunctive meaning for *-toka* to a conjunctive one, would fare any better. We leave this interesting issue, as well as interactions with other quantificational elements, to future research.

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