Indirect Reciprocity in Japanese

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Abstract. I shall discuss a special usage of the Japanese reciprocal expression *otagai*. In this usage, *otagai* does not occur as the object of a transitive verb and does not induce a reciprocal interpretation. Rather, it seems to modify the nominal in the subject position. I argue that *otagai* in such examples expresses reciprocity only indirectly in that the relation is not expressed overtly in the sentence in question. The relation is a psychological one in that the sentence as a whole says that each participant of the speech context knows that the other participant(s) have the property given by the overt predicate in the sentence. This, then, entails that each of them has this same property since *know* is a factive predicate. Since each participant has to be in a position to assess what the other member(s) are thinking of, the group of people in question must know each other well. This means that the nature of reciprocity is essentially the same in English and Japanese except that *otagai* could introduce a covert psychological relation to satisfy the reciprocity requirement. The article also discusses the similarity between the indirect use of *otagai* and the indirect passive in Japanese.

Keywords. reciprocity; empathy; anaphor; binding; passive; Japanese.

1. Introduction. Reciprocity is a very important topic for both syntactic and semantic theory. Regarding English, *each other* and *one another* are reciprocal anaphors, and they have the following semantic characteristics. Sentences involving a reciprocal expression (such as *each other*) contain a plural subject and a transitive verb. The expression for reciprocity occurs in the object position as in (1).

(1)   Robin and Chris like each other.

(1) shows the strict interpretation of reciprocity (Heim, Lasnik and May 1991). The interpretation of this sentence is explained in (2).

(2)   For the set {Robin, Chris}, each member x of this set is such that for every other member y of {Robin, Chris}, x likes y.

This indicates the strict interpretation of *each other*. A more general description of what *each other* does is described in (3).

(3)   For any set A provided by the subject DP and the relation R given by the verb, every pair <x,y> in A x A where x ≠ y is in R.

The Japanese expression *otagai* is regarded as a reciprocal morpheme, and it indeed has a use that approximates the strict use of *each other*.[1,2]

(4) Robin-to   Jamie-wa   otagai-o   seme-ta.
     Robin-and Jamie-TOP   each.other-ACC blame-PAST
     'Robin and Jamie blamed each other.'

However, many natural uses of the same morpheme *otagai* 'each other' do not require that it be the object of a transitive verb. (5) is one example. Suppose that Saburo and Jiro are old friends and were reunited for the first time in 30 years. Let's assume that they are now in their 60s.

(5) a. Saburo (to Jiro): Otagai(-ni)   tosi-o   tot-ta   nee. (with a smile)[3]
                          each.other(-DAT) age-ACC gain-PAST   ENDING
                          'Each of us grew old. (And we feel for each other.)'
     b. Jiro (to Saburo): Ahaha.   Soo-da   nee. (with a smile)
                          (laughter) so-be.PRES ENDING
                          'Ha ha. That's true/I agree.'

This example contains the predicate *tosi-o toru* 'get old'. The verb *tot-ta* 'gain-PAST' is a transitive verb, but its object position is already filled by *tosi* 'year/age'. The entire predicate behaves like an intransitive verb (of type $\langle e,t \rangle$) that means 'get old'. The point of using this predicate is that getting old cannot be a collective predicate; each person has to get old. In terms of truth conditions, (5a) simply requires that each of them (Saburo and Jiro) got old. However, I contend that there is a covert reciprocal relation holding between the two participants of this conversation, which I believe is a form of empathy between them. Let us tentatively assume that there is a covert relation such as 'feel for' that holds between them, and this makes the sentence felicitous in the context in question. That is, in addition to the requirement that each of them got old, this sentence conveys their mutual sympathy: they feel for each other. Let us see if this hypothesis can account for other similar examples of *otagai*.

2. Weaker readings of *each other* in English. *Each other* in English can receive interpretations less strict than what (3) indicates, and this has been reported in the literature (Dalrymple, Kanazawa, Kim, Mchombo & Peters 1998).

(6) a. As the preposterous horde crowded around, waiting for the likes of Evans and
        Mike Greenwell, five Boston pitchers sat alongside each other. (The New York Times)
     b. Mrs. Smith's third-grade students gave each other measles.

(6a) describes a situation where five Boston pitchers are sitting close together on a bench. Even though the expression *each other* is used in it, it is clearly not the case that for any pair <x, y> in this group, x and y sat alongside each other. Regarding (6b), the point is that all the students in Mrs. Smith's third-grade class (other than the one who brought the virus to the class) ended up

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[1] Japanese has another way to express reciprocity, which is to suffix *-aw* to a transitive verb (Yamada 2010). We will not discuss this morpheme in this paper.

[2] See Nishigauchi (1992), Nakao (2003) and Hoji (2006) (among others) for the syntactic properties of *otagai* and the *-aw* suffix.

[3] In natural conversations, many Japanese sentences end with sentence-ending particles such as *ne*, *nee*, *naa*, etc. They indicate the speaker's feelings toward the content of what is being expressed in the sentence. They have no truth conditional effects but are included to make the example sentences natural. They are glosses as ENDING in this article.

having measles by getting it from someone within this group. It is clearly not the case that for any pair <x,y> from this group of students, x and y gave each other measles. In fact, if y got measles from x, then y could not give measles back to x since x already had it. Regardless of how the intuitive meaning of the sentence should be captured, the requirement is much looser than what (3) requires. However, (6a, b) do require *each other* to be in the object position of a relational predicate. This is very different from the special use of *otagai* exemplified by (5a).

3. The reciprocal morpheme *otagai* in Japanese. As mentioned in Section 1, the Japanese reciprocal morpheme *otagai* can receive a strict interpretation as shown in (4). However, it can also receive a universal-quantifier-like reading that does not involve a reciprocal relation. This was already demonstrated by (5a). Other alleged non-reciprocal uses of *otagai* have been noted in the literature. For example, Imani and Peters (1996) note that (7) can receive a reflexive reading (among other readings). That is, Mary took her children to the park, and John took his children to the park. Note that (7) contains a genitive use of *otagai*.

(7)   Mearii-to   Zyon-ga   otagai-no   kodomo-o   yuuenti-ni   tureteit-ta.
        Mary-and   John-NOM reciprocal-GEN child-ACC   park-to   take-PAST
        [One possible interpretation] 'Mary took her children to the park, and John took his children to the park.'

Hoji (2006) discusses (8), which involves split antecedents and appears to yield a non-reciprocal reading. Hoji does not make clear what reading is available here, but I think it receives either a universal-quantifier-like reading or a collective reading.

(8)   Ieyasu$_1$-wa Nobunaga$_2$-ni [Singen-ga   sin-eba   [pro$_{1+2}$ otagai]-no
        Ieyasu-TOP Nobunaga-DAT [Shingen-NOM die-if   otagai-GEN
        ryoodo-ga   sibaraku-wa   antai-da   to]   tuge-ta
        territory-NOM for.a.while-TOP safe-be   that]   tell-PAST
        'Ieyasu$_1$ told Nobunaga$_2$ that, if Shingen dies, their$_{1+2}$ territories will be safe for a while.'

Given the above examples, it looks as if *otagai* does not have to express reciprocity as we understand it. However, I argue that even when the sentence in question contains no overt relational predicate that *otagai* targets, the sentence in question as a whole does express a covert and psychological reciprocal relation between the individuals under discussion.

    Let us discuss another example that does not involve a relational predicate but expresses an important emotional and personal connection between the two participants of a conversation.

(9)   Hanako says to Jiro: Watasi-tati otagai   ganbat-ta   ne!
                             I-PL   each.other work.hard-PAST ENDING
        'Each of us worked hard. (We congratulate each other.)'

Here is the story that I would like the reader to assume. Hanako and Jiro were high school classmates but had no communication for more than 40 years after graduation. They were reunited at a reunion party and talked to each other. They found that they had successful life despite many challenges. This scenario makes clear that no reciprocal relation or any interaction between them was possible; (9) only requires that each of them worked hard. Following our initial hypothesis that *otagai* 'each other' is licensed by a covert reciprocal relation that holds between the two individuals, I tentatively hypothesize that the sentence suggests covertly that they congratulate each other. The fundamental intuition is that there is some empathy between the two people in question, and this licenses the use of *otagai* in (9).

Before going further, let me show that some alternative interpretations are not viable here. They did not have any communication at all since they graduated high school. Thus, a collective reading or semi-reciprocal reading of (9) concerning 'working hard' is precluded. They did not work hard together. Moreover, there was no semi-reciprocity between them regarding the event of working hard, either; they did not help each other when they worked hard.

4. Indirect Reciprocity. I contend that the reciprocity involved in sentences such as (5a) and (9) is what we might call "indirect reciprocity." Here's a tentative proposal for the lexical semantics of *otagai* 'each other' when it is used in an indirect way. In (10), P and Q are variables for type $<e,t>$, and R is a variable for type $<e,<e,t>>$.[4]

(10) ⟦otagai 'each other (indirect)'⟧ =
      $\lambda P . \lambda Q . \lambda R . \forall x[P(x) \rightarrow [Q(x) \ \& \ \forall y[[P(y) \ \& \ y \neq x] \rightarrow R(y)(x)]]]$

In (10), P corresponds to the group provided by a plural expression such as *watasi-tati* 'we', and Q is matched with the overt predicate such as *ganbaru* 'work hard'. We then need a covert relation that corresponds to R. Let us assume tentatively that for (4) and (9), the covert relations are 'feel for' and 'congratulate', respectively. With the lexical meaning of *otagai* given in (10), (9) is interpreted with the compositional structure given in (11).

(11) **Indirect Reciprocity (Version 1): Semantic composition of (9)**

P	otagai	Q	R
'we'	reciprocal	'work.hard'	(covert: 'congratulate')
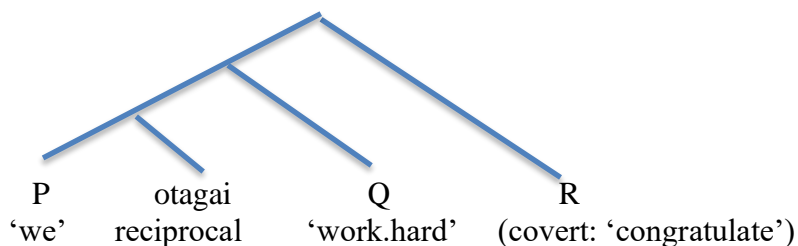
(12) shows how the computation of the entire sentence proceeds.

(12) ⟦watasi-tati 'we'⟧ = $\lambda x[x = \text{Hanako} \vee x = \text{Jiro}]$
      ⟦ganbat-ta 'worked.hard'⟧ = $\lambda x[x \text{ worked hard}]$
      ⟦watasi-tati otagai ganbat-ta 'we each other worked hard'⟧ =
      $\lambda P . \lambda Q . \lambda R . \forall x[P(x) \rightarrow [Q(x) \ \& \ \forall y[[P(y) \ \& \ y \neq x] \rightarrow R(y)(x)]]]$
      (⟦watasi-tati 'we'⟧)(⟦ganbat-ta 'worked.hard'⟧)(⟦'congratulate'⟧) = 1 iff
      $\forall x[[x = H \vee x = J] \rightarrow [\text{worked\_hard}(x) \ \& \ \forall y[[[y = H \vee y = J] \ \& \ y \neq x] \rightarrow$
      $\text{congratulate}(x, y)]]]$[5]

The last line in (12) says that Hanako worked hard and congratulates Jiro, and Jiro worked hard and congratulates Hanako. This appears to be what we mean when we say (9). The covert reciprocal relation is very much like what we call empathy. The concept of empathy involves your ability to understand the feelings of someone else, and if we are correct in assuming that

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[4] For the purpose of this article, I adopt a higher order logical language analogous to Montague's (1973) Intensional Logic as our semantic meta-language, assuming that the semantic interpretation of each expression is clear.

[5] Throughout this article, I adopt Montague's (1973) relational notation for readability. For example, **congratulate(x, y)** reads 'x congratulates y', just as in Predicate Logic, but *congratulate* is technically an expression of type $<e,<e,t>>$. Therefore, its functional structure is **congratulate(y)(x)**.

(12) involves Hanako and Jiro congratulating each other, then Hanako is talking as if she knows what Jiro has in mind. This is exactly what we want in the situation at hand.

To convince the reader that the covert relation has to be personal and mutual, let me present an example that is minimally different from (9) in that the speaker knows the other person unilaterally. Here's the story. The speaker of (13) is a teenager and has just watched a movie featuring a boy growing up to become a teenager. (13) is anomalous on this scenario.

(13)　# Jiro: Boku-tati otagai　　ookiku nat-ta　　　naa.
　　　　　　I-PL　　each.other big　　become-PAST INTERJECTION
　　　　　[Intended] 'We both grew up.'

The problem with (13) is that Jiro got to know the boy that appeared in the movie, but the boy in the movie does not know Jiro, and there is no room for empathy between them.

5. *Otagai* 'each other' involving more than two individuals. The examples discussed above involve groups with only two individuals. This may be more common than examples involving larger groups. However, I think *otagai* could deal with larger groups if we carefully set up the context. Since *otagai* (especially in the usage under discussion) requires empathy, we need to set up a situation where people in the group can feel for each other. Consider the example in (14).

(14)　[Jiro, who is the leader in a graduating class, says the following to the group of graduating
　　　seniors.] Minna, kore-kara otagai　　ganbarima-syoo.
　　　　　　　　all　　this-from each.other work.hard-let's
　　　'All of us, from now on, will work hard (individually). (And we encourage each other.)'

It is hard to pinpoint what the relevant covert relation is, but the basic idea is that they share the same feeling and they are aware of this. I represent this by using the verb *encourage* here. The point of this example is that the group could include more than two individuals as long as they are located in the same speech situation and share the required personal and mutual relationship.

6. General characterization of the covert reciprocal relation. We now turn to the question of whether we could make a more general characterization of the covert reciprocal relation holding between the relevant individuals when *otagai* is used in an indirect fashion. We start with the discussion of an example in which a covert relation that acts like the source of empathy between or among the individuals under discussion is not easy to find.[6] Assume that A and B are names of the soccer teams.

(15)　A-mo　B-mo otagai-ni　　ten-o　　tore-masen.
　　　A-also B-also each.other-DAT point-ACC get-NEG.PRES
　　　'Neither Team-A nor Team-B has scored.'

(15) could be uttered by the sports broadcaster reporting live from a soccer game. It is not clear whether there is a relation that emotionally unites the two teams that are playing a soccer game with each other.[7] (15) is also different from (4) and (9) in that it is uttered by someone who is not a member of the group under discussion. Examples like this one have caused me to look for an account of the reciprocity associated with *otagai* that is more general than (10).

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[6] I thank David Y. Oshima (personal communication) for suggesting this example.

[7] Perhaps, the covert relation is 'playing a soccer game with'. It is true that the two teams are playing a soccer game with each other, but this is very different from the relations that I posited for (4) and (9), which invoke the idea of empathy.

I revise my initial hypothesis and suggest the following as a general account of the indirect use of *otagai*: the participants are related in a reciprocal fashion via the relation in (16).

(16) $\lambda x . \lambda y$. x knows that that y has the property P, where P is the property provided by the predicate in the sentence.

(16) allows us to formalize the concept of empathy in a general fashion. Based on the idea that this relation is targeted by otagai, we can propose a new lexical meaning of *otagai* in (17). Here, P is a variable of type <e,t>, and Q is a variable of type <s,<e,t>>, where s marks intensionality and indicates functions from the set of worlds. Unlike (10), (17) does not assert that every relevant individual has the property provided by the overt predicate; this is entailed by the fact that every relevant individual knows that everyone else has the property in question.

(17)   ⟦otagai 'each other'⟧ =
       $\lambda P . \lambda Q . \forall x[P(x) \rightarrow \forall y[[P(y) \ \& \ y \neq x] \rightarrow know(x, \lambda w[Q(w)(y)])]]$

(18) is the compositional structure for the semantic calculation for (15).

(18)   **Indirect Reciprocity (Version 2): Semantic composition of (15)**

P	otagai	Q
'A and B'	reciprocal	'has not scored'
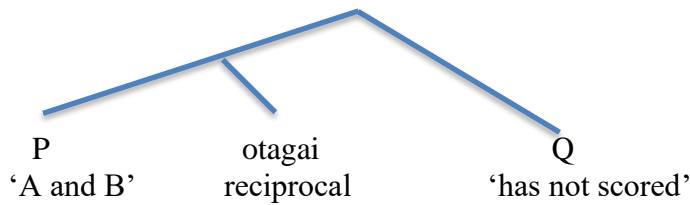
(15) is then interpreted as shown in (19).

(19) $\lambda P . \lambda Q . \forall x[P(x) \rightarrow \forall y[[P(y) \ \& \ y \neq x] \rightarrow know(x, \lambda w[Q(w)(y)])]]$
       $(\lambda z[z = A \vee z = B])(\lambda v. \lambda w_1 . has.not.scored(v, w_1))$ = 1 iff
       $\forall x[[x = A \vee x = B] \rightarrow \forall y[[[y = A \vee y = B] \wedge y \neq x] \rightarrow$
       $know(x, \lambda w[has.not.scored(y, w)])]]$

(19) says that A knows that B hasn't scored, and B knows that A hasn't scored. Since *know* is a factive predicate, it follows that A has not scored and B has not scored. This is indeed what (15) says. By saying that each team knows what is happening to the other team, we can formalize the concept of empathy successfully. In this example, *otagai* conveys pragmatically the feelings of frustration as well as hope on the part of each team, which seems appropriate.

Let us apply the same idea to the examples discussed earlier. For example, (9), which is reproduced here as (20), is analyzed as in (21).

(20)   Hanako says to Jiro: Watasi-tati   otagai   ganbat-ta   ne!
                              I-PL   each.other work.hard-PAST ENDING
       'Each of us worked hard. (We congratulate each other.)'
(21) $\forall x[[x = H \vee x = J] \rightarrow \forall y[[[y = H \vee y = J] \wedge y \neq x] \rightarrow knows(x, \lambda w. worked.hard(y, w)]]]$

In the notation I adopt here, **worked.hard(y, w)** means that y worked hard in w. By asserting that each participant knows that all other participants have the property in question, we can say that the interpretation invokes the concept of empathy. Moreover, the truth of the complement is entailed since *know* is a factive predicate. Therefore, it does not have to be asserted.

(7), reproduced here as (22), can also be dealt with in the same way. The interpretation under discussion is given in (23). I think this interpretation is exactly what we want. If Mary and John are total strangers and simultaneously brought their children to the same park by accident, then the sentence is unacceptable. The intended interpretation suggests that Mary and John brought their children together so that they could play together, for example. By saying that each of them knew that the other brought their children, we can conclude that they knew each other.

(22) Mearii-to Zyon-ga   otagai-no   kodomo-o yuuenti-ni tureteit-ta.
      Mary-and John-NOM reciprocal-GEN child-ACC park-to   take-PAST
      [One possible interpretation] 'Mary took her children to the park, and John took his children to the park.'

(23) ∀x[[x = Mary ∨ x = John] → ∀y[[[y = Mary ∨ y = John] ∧ y ≠ x] →
      knows(x, λw. y took the children of y to the park in w)]]]

(8) is a conditional and has a very complicated structure, but we can extract the content of Ieyasu's statement, which is given here as (24).

(24) Ieyasu to Nobunaga: otagai-no   ryoodo-ga   antai-da.
                           each.other-GEN territory-NOM safe-be.PRES

Our analysis renders (24) as in (25). This accurately captures what this statement conveys.

(25) ∀x[[x = Ieyasu ∨ x = Nobunaga] → ∀y[[[y = Ieyasu ∨ y = Nobunaga] ∧ y ≠ x] →
      knows(x, λw. the territory of y is safe in w)]]]

(25) says, essentially, that Ieyasu and Nobunaga can assure each other that their respective territories are safe (if Shigen dies). This is the right interpretation.

The above discussion shows that (17) is a superior account of the covert reciprocity under discussion. The specific relations such as 'congratulate', 'encourage', 'feel for' posited earlier as targets of reciprocity can be explained through pragmatic effects of the general reciprocal relation holding among the relevant individuals.

7. Negative examples involving *otagai*. Most occurrences of *otagai* that do not involve overt reciprocal relations talk about good or neutral covert reciprocal relations. However, there are instances of *otagai* that have very negative overtones. These examples express the speaker's resentment or frustration toward the conversation partner. Let us see if we can account for the negative connotations associated with them using the general relation proposed in (16). B's utterance consists of the expression *otagai* with the suffix *-sama* 'HONORIFIC' and the evidential morpheme *-desyoo* 'probably'. The morpheme *-sama* is used sarcastically, and it has no true honorific meaning.

(26) A to B: Kimi uta-ga   heta-da   ne.
                you   singing-NOM bad-be.PRES   ENDING
                'You are bad at singing.'
      B to A: Otagai-sama   desyoo.
                each.other-HONORIFIC EVIDENTIAL
                'You are bad at singing, too.'
                [Literal] 'Honorable each other.'

The semantic analysis of (26) is again straightforward given the characterization of the covert relation given in (16). Here's what happens to the interpretation of (26).

(27) $\forall x[[x = A \lor x = B] \rightarrow \forall y[[[y = A \lor y = B] \land y \neq x] \rightarrow \text{knows}(x, \lambda w. \text{be.bad.at.singing}(y, w)]]]$

(27) says that A knows that B is bad at singing, and B knows that A is bad at singing. What comes out of the truth conditions given here is not really empathy but is some type of mutual knowledge; the idea that A and B are in the same boat in that they are both bad at singing is accurately conveyed.

8. Theoretical implications of the above analysis of indirect reciprocity in Japanese. In the account given in this article, when the overt predicate is not suitable for expressing a reciprocal relation, a covert relation that is suitable for expressing reciprocity is created. That is, the overt <e,t>-type predicate is changed to a relational predicate of type <e,<e,t>>, which is suitable for expressing reciprocity. Taking (20) as an example, (28) shows this conversation process.

(28) Before: λx . x worked hard
        After: λx . λy . x knows that y worked hard

This means that Japanese has a covert operation that turns a simple <e,t>-type property to a complex psychological relation, which enables the reciprocal morpheme to be interpreted in the standard way.

     Note that this operation is much more complex than the well-known and common operation of turning an intransitive verb to a transitive verb by adding a causer argument. One example of this operation is given in (29).

(29) a. John walked.
        b. Mary walked the dog.

If the analysis of indirect reciprocity is correct, we wonder if there is anything similar elsewhere in Japanese grammar. This question is answered positively in next section.

9. Indirect passives in Japanese. I shall show in this section that the so-called indirect (or adversative) passive in Japanese is very similar to the indirect reciprocal.[8] First of all, if my claim is correct, the reciprocal morpheme *otagai* forces a reciprocal relation to be created covertly. This is very similar to the way the indirect passive is used in Japanese.

     Let us go over what happens with indirect passives in Japanese. (30) is an example of a regular passive sentence.

(30) Jiroo-ga Hanako-ni   homer-are-ta.
        Jiro-NOM Hanako-by   praise-PASS-PAST
        'Jiro was praised by Hanako.'

This sentence contains a relational predicate *homeru* 'praise' and its patient expression is promoted to the subject in this passive sentence. This is exactly like the English passive.

     In an indirect passive sentence such as (31b), the predicate is an intransitive verb, *sinu* 'die', but (31a) can be passivized by introducing a new subject and demoting the agentive nominal to a dative-case-marked adjunct as shown in (31b).

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[8] See Oshima (2006) and Aoyagi (2021) for some recent findings about the indirect passive in Japanese.

(31) a. Jiroo-ga   sin-da.
         Jiro-NOM die-PAST
         'Jiro died.'
      b. Hanako-wa Jiroo-ni sin-are-ta. [9]
         Hanako-TOP Jiro-DAT die-PASS-PAST
         'Hanako suffered from Jiro's death.' [Literal: 'Hanako was died by Jiro.']

What happens in (30b) is to allow a sufferer to be introduced as a new argument of the passivized predicate. This corresponds to the change from (32a) to (32b).

(32) a. ⟦sin-da 'died'⟧: $\lambda x.$ x died
      b. ⟦sin-are-ta 'die-PASS-PAST'⟧: $\lambda x. \lambda y.$ y suffered from x's death

(32a) is a function of type $<e,t>$, whereas (32b) is a function of type $<e,<e,t>>$. This allows (30b) to be interpreted in a straightforward fashion. The semantic composition is given in the form of a tree in (33).

(33) **Indirect Passives: Semantic composition of (31b)**

Hanako-TOP   Jiro-DAT   P   -(r)are
                          die   -pass_indirect
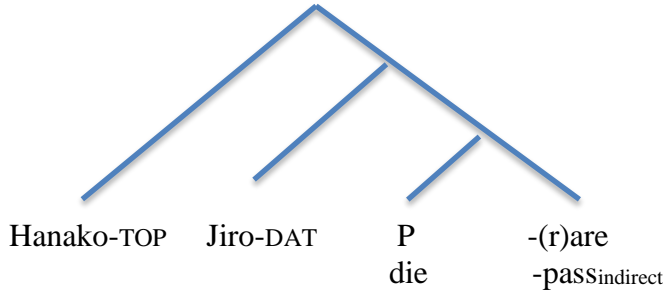
The actual computation proceeds as in (34).

(34) 1. ⟦sinu 'die'⟧ $= \lambda z.$ Die(z)
      2. ⟦-are 'indirect passive'⟧ =
         $\lambda P . \lambda x. \lambda y . \exists e$ [P(x, e) & personally.close.to(y, x) $\wedge$ suffers.from (y, e)]
      3. ⟦sin-are-ta 'die-PASS-PAST'⟧ =
         $\lambda x. \lambda y . \exists e$ [die(x, e) & personally.close.to(y, x) $\wedge$ suffers.from (y, e)][10]
      4. ⟦Hanako-ga Jiro-ni sin-are-ta 'Hanako suffered from Jiro's death'⟧ =
         $\exists e$ [die(Jiro, e) & personally.close.to(Hanako, Jiro) $\wedge$ suffers.from (Hanako, e)]

The last line says that Jiro died and Hanako, who is personally close to Jiro, suffered from it. The major point I wish to make here is that the indirect passive construction forces an intransitive verb to be reinterpreted as a transitive verb with a new argument that is personally related to the sole argument of the intransitive verb. This is a very complex way of adding a new argument to an existing predicate.

10. Some generalizations about Japanese. It appears that we can draw important parallels between the indirect passive and the indirect reciprocity in Japanese. First, they derive a

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[9] The suffix -ni in (30) is glosses as 'by' because it can be elided. By contrast, the suffix -ni in indirect passive sentences cannot be dropped, and this motivates me to propose that the indirect passive -are converts an $<e,t>$-type expression to an $<e, <e,t>>$-type expression. Thus, this occurrence of -ni in (31b) is glosses as a dative case marker (-DAT).

[10] I ignore tense here.

relational predicate from a simple <e,t>-type predicate. As noted above, the operation needed for *otagai* 'each other' is unlike the standard operation of transitivizing an intransitive verb by adding a causer argument. If correct, the proposed analysis introduces a new argument that is the subject of a propositional attitude verb *know*, and the "original" argument of the overt predicate is the subject of the complement clause. This is a very complex and abstract relation.

We have just seen that the case of indirect passives is very similar to the case of indirect reciprocity. The subject of an indirect passive sentence is personally very close to the sole argument of the overt predicate. This is also a complex and abstract relation. I believe what is presented in this article is a novel observation and analysis and reveals an interesting pattern in Japanese hitherto unreported in the literature.

From an even broader perspective, what we have observed in this article is in line with Kuno and Kaburaki's (1977) work on empathy. The syntactic (and semantic) operations in Japanese are strongly influenced by the empathy among the participants, even though similar considerations apply to a lesser degree to other languages as well. We may be able to formalize the concept of empathy in a semantic system, and this work could be the first step toward this goal.

11. Conclusion. I have shown that when *otagai* 'each other' in Japanese is used with a non-relational <e,t>-type predicate, a covert reciprocal relation is established which unites the two (or more) relevant individuals in an emotional or psychological way. Technically, this is based on an operation of creating a complex relational (i.e., <e,<e,t>>-type) predicate, and the indirect passive requires a similar procedure. From the viewpoint of overall characterization of Japanese, it is sensitive to interpersonal relations between the relevant individuals to the extent that they affect the ways in which various constructions such as the passive and the reciprocal are used. Regarding the semantics of reciprocity itself, the proposed analysis allows the standard semantic analysis to be used for Japanese examples, including indirect ones.

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