

Japanese Ditransitive Verbs and the Hierarchical Lexicon

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Abstract. In this paper, I will utilize the notion of integrating linking and the hierarchical lexicon (Davis (2001)) in accounting for certain aspects of syntactic and semantic patterning in the ditransitive constructions in Japanese. I will suggest certain classes for the major ditransitive verbs and formulate those feature specifications under the framework of Head-driven Phrase Structure Grammar (Sag et al. (2003)). The major phenomena discussed in this paper include the two alternants of a ditransitive verb, ditransitive and monotransitive with *to*, contrary to the standard analysis (Hoji (1985)). Japanese ditransitive verbs are divided into two groups, depending on whether they encode a motion or a possession of an entity.

Keywords: Japanese ditransitive verbs/constructions, typed feature structure, semantic class, linking, the hierarchical lexicon, Head-driven Phrase Structure Grammar (HPSG)

1 Introduction

Recent years have seen an increasing interest in the role of verb semantics in accounting for the grammatical behaviors of verbs. English ditransitive verbs as in (1) invoking the so-called *to*-dative alternation consist of several distinct classes of verbs having some differences in their lexical semantics, and also have been studied in this area (Gropen et al. (1989), Pinker (1989), Levin (1993)).

- (1) a. Ken sent Anna a package. (Double object construction: DOC)
b. Ken sent a package to Anna. (*to*-dative construction: TDC)

In this paper, I will look at the corresponding construction(s) in Japanese. Unlike English, Japanese appears to have only one structure, the DOC, in which the GOAL is marked with the dative *ni* and the THEME with the accusative *o* case marking, as shown in (2).

- (2) a. Ken-wa Anna-ni nimotu-o okutta.
Ken-TOP Anna-DAT package-ACC sent
'Ken sent Anna a package.'
b. Ken-wa nimotu-o Anna-ni okutta.
Ken-TOP package-ACC Anna-DAT sent
'same as (2a).'

The GOAL-THEME order in (2a) is assumed to be the basic order, and the THEME-GOAL order variant in (2b) is viewed as an instance of scrambling (Hoji (1985)).

I will give arguments that a construction like (2b) may be a *to*-dative counterpart in Japanese and (2a) and (2a) should be distinguished.

2 Some Constraints on *Ni*-marked Argument

2.1 Animacy Requirement

Quantifier Scope Hoji (1985) proposed, based on quantifier scope data and others, that the order in (3a) is basic, and (3b) is derived by optional scrambling.

- (3) a. Ken-wa dareka-ni dono-nimotu-mo okutta.
Ken-TOP someone-DAT every-package sent
'Ken sent someone every package.'
(some > every, *every > some)
- b. Ken-wa dono-nimotu-mo_i dareka-ni *t_i* okutta.
Ken-TOP every-package someone-DAT sent
(some > every, every > some)

He observed that if quantifiers occupy the VP-internal positions in the *ni*-(*m*)o (GOAL-THEME) order in (3a), the *ni*-marked argument asymmetrically c-commands and then takes scope over the (*m*)o-marked argument. In the (*m*)o-*ni* (THEME-GOAL) order in (3b), on the other hand, the scope is ambiguous.

The same structural relation can be seen in the DOC in English. See (4).

- (4) a. John sent no one anything.
b. *John sent anyone nothing.

NPI *any(thing)* must occur in the scope of a negative element *no(thing)*. In (4a) *anything* c-commanded by *no one* while in (4b) *anyone* fails to be licensed by *nothing*. This indicates the GOAL phrase asymmetrically c-commands the THEME phrase (See Barss and Lasnik (1986)).

Hoji's analysis predicts that there is no grammatical operation of dative alternation, which relates indirect objects and *to*-datives. There is only one structure associated with ditransitive verbs. However, this is incorrect. Consider (5).

- (5) a. Ken-ga dokoka-ni dono-nimotu-mo okutta.
Ken-NOM some.place-to every-package sent
'Ken sent every package to some place.'
(some > every, every > some)
- b. Ken-ga dono-nimotu-mo dokoka-ni okutta.
Ken-NOM every-package some.place-to sent
(some > every, every > some)

(Miyagawa and Tsujioka (2004))

Ambiguity obtains if we slightly change the quantifier as in (5). The only difference between (3a) and (5a) is in the animacy of the *ni*-marked GOAL argument.

Note that this ambiguity difference leads Miyagawa and Tsujioka (2004) to the conclusion that there are two underlying positions for GOAL argument.

- (6) [VP ... GOAL/animate) ... [... { GOAL(inanimate) THEME
THEME GOAL(inanimate) } V]]

As shown in (6), the animate GOAL is always higher than the inanimate one, and the THEME may occur before or after the lower one.

Verb Types Bresnan (1978) noted that the DOC does not usually tolerate an inanimate GOAL because the GOAL must be interpretable as the ultimate possessor of the referent of the THEME, except in metaphor or in personification, but no such restriction occurs in the TDC. See (7).

- (7) a. Ken sent Anna/*Wuhan a package.
 b. Ken sent a package to Anna/Wuhan.

At first blush, there seems to be no contrast in the Japanese counterpart of (7).

- (8) a. Ken-wa Anna-ni/Wuhan-ni nimotu-o okutta.
 Ken-TOP Anna-DAT/Wuhan-DAT package-ACC sent
 ‘Ken sent Anna/*Wuhan a package.’
 b. Ken-wa nimotu-o Anna-ni/Wuhan-ni okutta.
 Ken-TOP package-ACC Anna-DAT/Wuhan-DAT sent

However, the *ni*-marked argument of verbs such as *ataeru* ‘give’ and *(te)watasu* ‘hand’ is subject to the animacy restriction, regardless of whether it count as an argument of DOC or TDC.

- (9) a. Ken-wa Anna-ni/*Wuhan-ni nimotu-o ataeta/(te)watasita.
 Ken-TOP Anna-DAT/Wuhan-DAT package-ACC gave/handed
 ‘Ken gave/handed Anna/*Wuhan packages.’
 b. Ken-wa nimotu-o Anna-ni/*Wuhan-ni ataeta/(te)watasita.
 Ken-TOP package-ACC Anna-DAT/Wuhan-DAT gave/handed

The contrast between (8) and (9) consists of distinct classes of verbs having some difference in their lexical meaning. I will take up the semantic issue later in section 3.2 and give evidence that the two classes should be distinguished.

2.2 Quantifier Float

A numeral quantifier may float off its host only if the host is an NP, while it cannot float if the host is a PP (Shibatani (1978)). This is a way to test for the categorical status of *ni*-marked arguments. Compare (10) with (11).

- (10) a. Keesatu-wa yoogisya-ni futa-ri syuttoomeeree-o okutta.
 Police-TOP suspects-DAT 2-CL summons-ACC sent
 ‘The police sent two suspects summons.’
 b. Keesatu-wa futa-ri-no yoogisya-ni syuttoomeeree-o okutta.
 Police-TOP 2-CL-GEN suspects-DAT summons-ACC sent
- (11) a. *Keesatu-wa kenmon-ni futa-tu zoin-o okutta.
 Police-TOP checkpoint-to 2-CL reinforcements-ACC sent
 (Lit.) ‘The Police sent two checkpoints reinforcements.’
 b. Keesatu-wa futa-tu-no kenmon-ni zoin-o okutta.
 Police-TOP 2-CL-GEN checkpoint-to reinforcements-ACC sent
 ‘The Police sent reinforcements to two checkpoints.’

The quantifier float facts harmonize with the proposal that the ditransitive verbs in Japanese have both the DOC and the TDC, contrary to the standard analysis (Hoji (1985)). If the *ni*-marked GOAL is animate as in (10), it should be in a DOC since it is a NP, which allows quantifier float. If the GOAL is inanimate as in (11), it should be in a TDC since it is a PP, which blocks quantifier float.

3 Causal Affect and an End Point of Motion

The syntactic analysis in section 2 is supported by examinations of lexical meanings of ditransitive verbs. In this section, I argue essentials of the verb semantics.

3.1 Entailment of Causer

Causative Meaning In English, the DOC as in (12a) may have a causative meaning but not the TDC counterpart as in (12b) (Oehrle (1976)).

- (12) a. The article gave me a headache.
b. *The article gave a headache to me.

(12a) is interpreted as my having read the article was responsible for causing my headache. (12b), on the other hand, cannot have such a causative meaning, so the sentence is odd.

In Japanese, there are several verbs of 'give' and the kind of distinction as in (12) cannot be found. The verb *ataeru* 'give', for example, may have the ostensible causative interpretation as in (13) (Miyagawa and Tsujioka (2004)).

- (13) a. Sono ronbun-ga boku-ni zutuu-o ataeta.
the article-NOM me-DAT headache-ACC gave
'The article gave me a headache.'
b. ?Sono ronbun-ga zutuu-o boku-ni ataeta.
the article-NOM headache-ACC me-DAT gave

(13b) is not as good, but it is still grammatical. Note that this means both the DOC and the TDC in Japanese may be associated with a causative meaning.

Ditransitive Lexical Causatives Some of the ditransitive verbs are ditransitive lexical causatives, causative version of transitive verbs (Matsumoto (2000)). The verb *kabuseru* 'put x on someone else's head' in (14a), for example, is a causative version of transitive verb *kaburu* 'put x on one's own head' in (14b) representing processes in which the subject is affected as a RECIPIENT.

- (14) a. Ken-wa Anna-ni sono herumetto-o kabuseta.
Ken-TOP Anna-DAT the helmet-ACC put.on
'Ken put the helmet on the head of Ann.'
b. Anna-wa sono herumetto-o kabutta.
Anna-TOP the helmet-ACC put.on
'Anna put the helmet on her head.'

In the ditransitive lexical causatives, the CAUSER acts on the PATIENT of the related transitive verb to cause the result, as in lexical *(s)ase* causative in (15).

- (15) Ken-wa Anna-ni sono sukeeto-gutu-o hak-ase-ta.
Ken-TOP Anna-DAT the skate-shoes-ACC put.on-CAUS-PAST
'Ken put the skates on the feet of Anna.'

The causative meaning and ditransitive lexical causatives facts converge to suggest that CAUSER is entailed within the ditransitive verbs in Japanese.

3.2 Motion and an End Point

Pinker (1989) and among others have argued that there is a semantic difference between the two alternants of a verb like ‘throw’, which the theta-grids implicitly do. The verbs of DOC has the semantics of causing to possess, while the verbs of TDC has the semantics of caused motion.

Those entailments have been observed in the DOC and the TDC in Japanese.

Entailment of Motion and Possession One important difference between *okuru* ‘send’ in (16a) and *watasu* ‘hand’ in (16b) is the entailment they express.

- (16) a. Ken-wa Anna-ni nimotu-o okutta-ga,
Ken-TOP Anna-DAT package-ACC sent-but
Anna-wa mada uketot-te i-nai.
Anna-TOP yet receive-INFL be-NEG
‘Ken sent Anna a package, but Anna has not received it yet.’
- b. #Ken-wa Anna-ni nimotu-o watasita-ga,
Ken-TOP Anna-DAT package-ACC handed-but
Anna-wa mada uketot-te i-nai.
Anna-TOP yet receive-INFL be-NEG
‘Ken handed Anna a package, but Anna has not received it yet.’

The former specifies movement of an entity, but it is neutral with respect to whether or not the moved entity reaches the GOAL. However, the latter includes specification as to whether the RECIPIENT or POSSESSOR actually received the entity or not, so the statement in (16b) is contradictory.

End Point Made The same type of difference can also be discerned by looking at the distribution of *made* ‘to’, which can designate the ‘the limit of motion’ as one of its uses (Kishimoto (2001)).

- (17) a. Ken-wa Anna-no uti-made nimotu-o okutta
Ken-TOP Anna-GEN home-to package-ACC sent-but
‘Ken sent package to Anna’s home.’
- b. *Ken-wa Anna-no uti-made nimotu-o ataeta.
Ken-TOP Anna-GEN home-to package-ACC gave
‘Ken gave package to Anna’s home.’

The *ni*-marked arguments of Japanese ditransitive verbs are allowed to occur in the DOC when they encode possession of an entity with no denotation of movement of the entity, and in the TDC when movement of an entity is specified in their lexical meanings, irrespective of whether they express possession of an entity or not.

4 Feature Structure for the Japanese Ditransitive Verbs

Head-driven Phrase Structure Grammar (Sag et al. (2003)) is a feature-based integrated theory of syntax and semantics. This section sketches the typed feature structure for formalizing grammatical information of some Japanese ditransitive verbs under the framework of HPSG.

4.1 Essentials of Semantics

Gropen et al. (1989) noted that English ditransitive verbs which display the *to*-dative alternation are classified by the semantic class of the verbs: (i) giving (*give, sell, hand, etc.*), (ii) communication (*tell, show, read, etc.*), (iii) accompanied motion: *bring, take*. (iv) sending (*send, ship, mail, etc.*), (v) ballistic motion (*throw, kick, toss, etc.*), and (vi) future having (*promise, assign, offer, etc.*).

Japanese ditransitive verbs also have lexical meanings similar to English ones.

Type Hierarchy Building on the work by Davis (2001), the type hierarchy in Fig. 1 summarizes the main semantic relation types I have discussed.

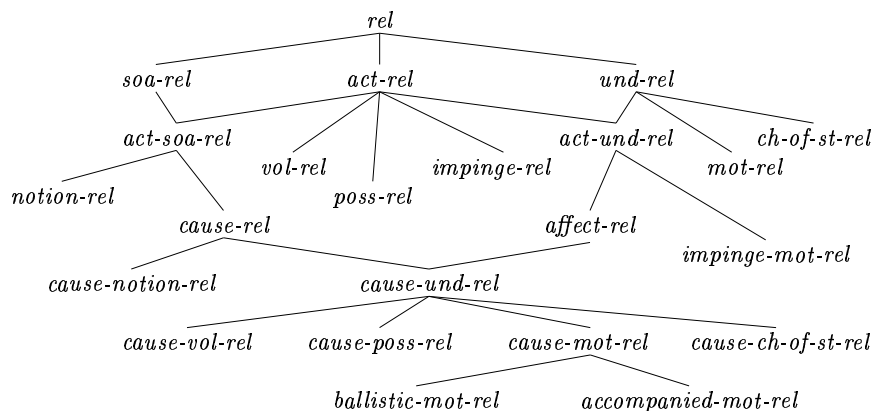


Fig. 1. Type Hierarchy

How does the typed feature-based theory account for some properties of Japanese ditransitive verbs which have been observed in the previous sections? The theory provides some answers to the questions regarding semantic commonalities among verb classes, while maintaining syntactic distinctiveness.

Causal Affect Semantic predicative relation *cause-und(ergoer)-rel(ation)* in Fig. 2 is of sorts both *cause-rel*, a subsort of *act(or)-soa-rel*, and *affect-rel*, a subsort of *act-und-rel*.

$$\left[\begin{array}{l} \textit{cause-und-rel} \\ \text{ACT} \quad i \text{ (causer)} \\ \text{UND} \quad j \text{ (causee)} \\ \text{SOA} \quad k \text{ (effect)} \end{array} \right]$$

Fig. 2. Feature Structure of *cause-und-rel*

The relevant attributes and their characteristic entailments together with the most general relations which introduce them are listed in Table 1.

Table 1. The Relevant Semantic Roles and Characteristic Entailments

Relation	Attribute	Characteristic Entailments
<i>act-rel</i>	ACTOR	Causally affects or influences other participant(s) or event(s); Volitionally involved in event; Has a notion or perception of other participant(s) in event; Possesses an entity.
<i>und-rel</i>	UNDERGOER	Causally affected or influenced by another participant; Undergoes a change of state; Is an incremental theme; Possessed by entity.
<i>soa-rel</i>	SOA	Resulting state of affairs; Perceived or conceived of by another participant; A circumstance aspectually or temporally delimited by the relation.
<i>grnd-rel</i>	GROUND	Entity with respect to which another entity is located; Trajectory along which another participant moves; Is contained by or part of another participant.

(adapted from (Davis (2001)))

Each characteristic entailment of a semantic role attribute can always be associated with a most general predicative semantic relation of which the semantic relations of specific verbs are subtypes. *Notion-rel* (the predicative semantic relation of which the semantic relations of verbs such as *satoru* ‘realize’, *miru* ‘see’, etc.), for example, specifies the ACTOR attribute on the basis of an entailment that holds of realizers and seers, which have a notion of the referent of their object NP.

Advantages of the Hierarchical Lexicon It is noteworthy that the hierarchy of semantic relations in Fig. 1 provides benefits to the representation of semantic attributes of (ditransitive) verbs. The interpretation of supertypes *cause-rel* and *affect-rel*, which are common to verb classes, ensures that the values of their semantic attributes bear the appropriate identical characteristic entailments, such as, being initiator of the event for the ACTOR, being the effect of a causal situation for the SOA, etc.

But with each verb is associated different subtypes of the common core-meaning supertype. The idiosyncratic properties of the meaning described by each verb follow from the differences in interpretations of these subtypes.

4.2 Lexical Specification for Japanese Ditransitive Verbs

Given the formal devices introduced in Section 4.1, it is unquestionable that ditransitive verbs such as *okuru* ‘send’ and *ataeru* ‘give’ have different syntactic and semantic properties, and their *ni*-marked arguments show some constraints.

Cause-motion-relation Verbs The first type of verbs, referred to as verbs of *cause-mot-rel*, including verbs of *sending* (*okuru* ‘send’, *todokeru* ‘deliver’, etc.), *ballistic motion* (*nageru* ‘throw’, *houru* ‘toss’, etc.) and *accompanied motion* (*hakobu* ‘carry’, *mot-te-yuku* ‘take’, etc.), which all entail a motion of an entity, as in Fig. 3

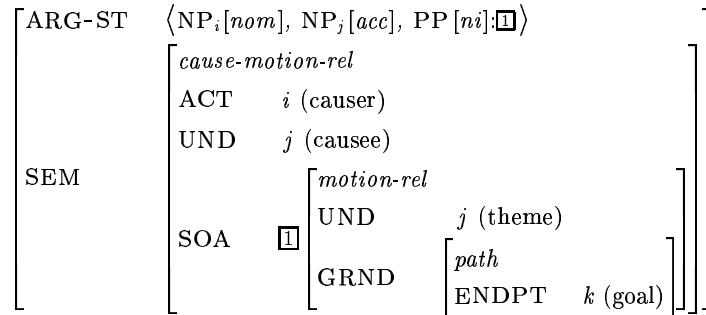


Fig. 3. Feature Structure of Verb of *okuru* ‘send’

These verbs occur in TDCs where the *ni*-marked phrase is realized as PP. No animacy restriction applies to the *ni*-marked GOAL phrase of the verbs, since the GOAL phrase can, in principle, be animate or inanimate entity.

Note that the entailment of GR(OU)ND of *motion-rel* harmonizes with the semantics of *made* ‘to’, which designates the limit of a motion the verb expresses.

Cause-possession-relation Verbs The second class, which I call verbs of *cause-poss-rel*, includes verbs of *giving* (*ataeru* ‘give’, (*te*)*watasu* ‘hand’, etc.), *communication* (*osieru* ‘teach’, *miseru* ‘show’, etc.) and *future having* (*yakusokusuru* ‘promise’, *wariateru* ‘assign’, etc.) which necessarily encode a POSSESSOR as in Fig. 4.

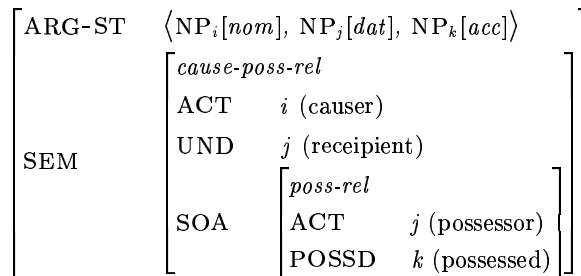


Fig. 4. Feature Structure of Verb of *ataeru* ‘give’

These verbs occur in the DOCs where the *ni*-marked phrase is a dative NP construed as an indirect object. Another different constraint from verbs of *cause-mot-rel* is that *ni*-marked phrases of *cause-poss-rel* verbs must be restricted to animate entities which serve as a possessor or a recipient.

The hierarchy in Fig. 1 is not complete. There are many combinations of the types shown there, intermediate between the general ones depicted in the hierarchy and those in individual predicates. Some semantic relations which I have only mentioned here are specific (sub)types of such types.

5 Categorical Status of *Ni*-marked Arguments

If Japanese has the DOCs and the TDCs, as suggested by the quantifier fact in Section 2 and the semantic entailment in Section 3, and accounted for by the typed features structure in Section 4, we would expect this difference in categorical status, NP vs. PP. This section provides more evidences to defend the distinct underlying structure analysis of the ditransitive constructions.

5.1 Case Alternation

There is another difference in the status of *ni*-marked phrases between the verbs of *cause-mot-rel* and *cause-poss-rel*.

To be concrete, with a verb of *sending* like *okuru* ‘send’, the *ni* is allowed to be replaced with the postposition *e* ‘to’, which designates an intended destination.

- (18) a. Ken-wa Anna-e nimotu-o okutta
 Ken-TOP Anna-to package-ACC sent
 ‘Ken sent packages to Anna.’
 b.??Ken-wa Anna-e nimotu-o ataeta.
 Ken-TOP Anna-to package-ACC gave
 ‘Ken gave Anna packages.’

This is a true postposition, hence it can only occur where a PP occurs. Note that in (18a) and (18b), only the former can take this postposition.

5.2 Passivization

The availability of direct passive clause in which the *ni*-marked phrase is realized as the subject also shows the categorical status, since PP cannot be the candidate of such a passivization. Compare (19a) and (19b).

- (19) a. Anna-wa Ken-ni sono hon-o atae-rare-ta.
 Anna-TOP Ken-by the book-ACC give-PASS -PAST
 ‘Anna was given the book by Ken.’
 b. Anna-wa Ken-ni tegami-o okur-are-ta.
 Anna-TOP Ken-by letter-ACC send-PASS -PAST
 ‘Anna was adversely affected by Ken’s sending the book.’

Note that (19b) is interpreted only as adversative passive reading. Thus, the predictions are borne out here.

The case alternation and passivization facts also converge to suggest that the ditransitive verbs in Japanese have both the DOCs and the TDCs.

6 Conclusion

Japanese ditransitive verbs are divided into two groups, depending on whether they encode a motion or a possession of an entity. Verbs encoding a possession consistently appear in the DOCs, whereas verbs expressing a motion of an entity appears in TDCs, irrespective of whether they denote a possession or not.

Although this paper sketches a strict formalization of Japanese ditransitive verbs based on the typed feature system of HPSG, the actual analysis proposed here leave much room for improvement.

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