

Where *-tati* plurals are not allowed*

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1. Introduction

In some contexts, *-tati* plurals in Japanese are not allowed. For example, they cannot be used as predicates (1), they cannot serve as the internal argument of the relational possession construction (2), they cannot take narrow scope with respect to intensional verbs (3), and they cannot refer to kinds or be used in generic sentences (4).

- (1) Taro-to-Jiro-wa gankai(*-tati)-ni natta.
Taro-and-Jiro-Top ophthalmologist-TATI-Dat became
'Taro and Jiro became ophthalmologists.'
- (2) Taro-ni-wa sinyuu(*-tati)-ga iru.
Taro-Dat-Top best friend-TATI-Nom exist
'Taro has a best friend.'
- (3) a. Sono byooin-wa gankai-o sagasite-iru.
that hospital-Top ophthalmologist-Acc look for-Prog
'That hospital is looking for ophthalmologists.'
b. Sono byooin-wa gankai-tati-o sagasite-iru.
that hospital-Top ophthalmologist-TATI-Acc look for-Prog
'There is a group of ophthalmologists that hospital is looking for.'

* I am grateful to two anonymous reviewers for their helpful comments. All errors and inadequacies are my own.

- (4) Gankai(*-tati)-wa mezasuraku-nai.
 Ophthalmologist-TATI-Top rare-NEG
 ‘Ophthalmologists are not rare.’

There has been some discussion on this in the literature. Kawasaki (1989) argues that *-tati* plurals are definite, Kurafuji (2004) proposes a semantics of *-tati* that encodes plurality and definiteness, Nomoto (2013) argues about their definiteness and specificity, and Nakanishi and Tomioka (2004) analyze *-tati* plurals as associative plurals whose extension can contain exceptions.

This current work is concerned about the contexts rather than the plurals themselves. Specifically, I argue that they require property-denoting NPs. This paper is organized as follows: Section 2 reviews some facts about predicate nominals, which are assumed to denote properties (of type $\langle e, t \rangle$).¹ Sections 3-5 examine the rest of the contexts to determine how NPs occurring in those contexts denote properties. Section 6 presents the conclusion.

2. Predicate nominals

This section reviews some facts about predicate nominals, which are assumed to denote properties (of type $\langle e, t \rangle$). As their name suggests, predicate nominals occur in the predicate position, which is one of the contexts wherein *-tati* plurals are not allowed.

- (5) Taro-to-Jiro wa gankai(*-tati)-ni natta.
 Taro-and-Jiro-Top ophthalmologist(-TATI)-Dat became
 ‘Taro and Jiro became ophthalmologists.’

One interesting fact about predicate nominals is that as Moltmann (1997) notes, they do not support definite anaphora. In (6a), *soitu* “he” can be anaphoric to *gankai* “ophthalmologist” in the preceding sentence, which is used as an argument: however, in (6b), the anaphor cannot be anaphoric to *gankai*, which is used predicatively.

- (6) a. Taro-wa gankai-ni atta. Jiro-mo soitu-ni atta.
Taro-Top ophthalmologist-Dat saw Jiro-also him-Dat saw
'Taro saw an ophthalmologist. Jiro saw him, too.'
- b. *Taro-wa gankai-ni natta. Jiro-mo soitu-ni natta.
Taro-Top ophthalmologist-Dat became Jiro-also him-Dat became

Another important fact about predicate nominals is that as McNally (1997) notes, quantificational NPs can occur in predicative positions if they range over kinds.

- (7) a. Fred has been every kind of doctor. (McNally 1997)
- b. Taro-wa subete-no-syurui-no-isyua-ni natteiru.
Taro-Top every-Gen-kind-Gen-doctor-Dat have become.
'Taro has been every kind of doctor.'

Nouns like *kind* denote properties of properties (see Wilkinson 1991, Zamparelli 2000, Carlson 1977). For example, the NPs *kind of doctor* and *syurui-no-isyua* "kind of doctor" denote a set whose members include a set of ophthalmologists, a set of otolaryngologists, a set of dermatologists, etc. The examples in (7) are comparable to (8b), where a verb requiring an entity-referring NP, such as *Jiro*, takes a quantificational NP over entities, such as *subete-no-gankai* "every ophthalmologist."

- (8) a. Taro-wa Jiro-ni atta.
Taro-Top Jiro-Dat saw
'Taro saw Jiro.'
- b. Taro-wa subete-no-gankai-ni atta.
Taro-Top every-Gen-ophthalmologist-Dat saw
'Taro saw every ophthalmologist.'

One fact about predicate nominals that is rarely explored in the literature is their inability to be relativized.² Consider the object in (9a), which is schema-

tized in (9b).

- (9) a. *Hanako-wa Taroo-ga natta gankai-ni atta.
Hanako-Topic Taro-Nom became ophthalmologist-Dat saw
b. $[_{NP} [_{CP} Op_i [_{IP} \text{Taroo-ga } t_i \text{ natta}]] [_{NP} \text{gankai}]]$

Let us assume that relativization in Japanese involves movement of a null operator to the Spec CP of the relative clause (see Ishii 1991 for discussion). In the case of (9b), this movement maps onto a property trace ranging over type $\langle e, t \rangle$. The variable introduced by this trace is abstracted over, thereby producing an open sentence that denotes a set of sets of entities (of type $\langle \langle e, t \rangle \rangle$).

- (10) $[[\text{Taroo-ga natta}]] = \lambda X[\text{BECAME}(\text{Taro}, X)]$

Relative clauses are combined with their heads through a rule such as Heim and Kratzer's (1998) predicate modification, which amounts to set intersection. This rule combines two functions of the same type. In (6b), however, the relative clause and its head *gankai* "ophthalmologist" are not of the same type: whereas the former denotes a set of sets of entities, and the latter denotes a set of entities (of type $\langle e, t \rangle$).

- (11) $[[\text{gankai}]] = \lambda x[\text{OPHTHALMOLOGIST}(x)]$

The unacceptability of (9a) can be attributed to this semantic type mismatch. This speculation can be confirmed by the fact that (10) can be combined with an expression denoting $\langle \langle e, t \rangle \rangle$. Consider the subject in (12a), which is schematized in (12b).

- (12) a. Taroo-ga natta shurui-no-isyawa mezasuraku-nai.
Taro-Nom became kind-Gen-doctor-Top rare-Neg
'The kind of doctor Taro became is not rare.'
b. $[_{NP} [_{CP} Op_i [_{IP} \text{Taroo-ga } t_i \text{ natta}]] [_{NP} \text{shurui-no isyawa}]]$

As noted above, *syurui-no-isya* “kind of doctor” denotes a set of sets of individual doctors (of type $\langle\langle e, t \rangle t \rangle$), as in (13).

$$(13) \quad [[\text{syurui-no-isya}]] = \lambda X[\text{DOCTOR}(X)]$$

As (10) and (13) are of the same type, they can be combined through predicate modification.

$$(14) \quad [[\text{Taro-ga-natta syurui-no-isya}]] \\ = \lambda X[\text{DOCTOR}(X) \ \& \ \text{BECAME}(\text{Taro}, X)]$$

The iota-operator applies to (14) and returns a term referring to the kind (of doctors) ophthalmologist, which can be taken by *Mezurasi* “rare,” a kind-level predicate in the sense of Carlson (1977). (12) is interpreted as in (15).

$$(15) \quad [[(12)]] = \text{common}(\iota X[\text{DOCTOR}(X) \ \& \ \text{BECAME}(\text{Taro}, X)])$$

Now that we have examined predicate nominals, which are supposed to denote properties, we are ready to explore the other contexts.

3. Relational possession construction

This section examines the relational possession construction, another context in which *-tati* plurals are not allowed, to determine how the internal argument of this construction denotes properties.

$$(16) \quad \text{Taro-ni-wa} \quad \text{sinyuu}(*\text{-tati})\text{-ga} \quad \text{iru.} \\ \text{Taro-Dat-Top} \quad \text{best friend}(\text{-TATI})\text{-Nom} \quad \text{exist} \\ \text{'Taro has a best friend.'}$$

Evidence reveals that this construction requires a property-denoting NP: the internal argument of the relational possession construction cannot readily be

relativized. Consider the object in (17a), which is schematized in (17b).

- (17) a. *Jiro-wa Taro-ni iru sinyuu-o tataita.
 Jiro-Top Taro-Dat exist best-friend-Acc hit
 b. $[_{NP} [_{CP} Op_i [Taro-ni t_i iru]] [_{NP} sinyuu]]$

The unacceptability of (17a) can be accounted for if we assume that the internal argument of the relational possession construction denotes a (two-place) property (of type $\langle\langle e, e, t \rangle\rangle$). *Sinyuu* “best friend” is a relational noun and is of type $\langle e, e, t \rangle$.

$$(18) \quad [[sinyuu]] = \lambda x \lambda y [BEST-FRIEND(x, y)]$$

As the trace in (17b) corresponds to *sinyuu* in (16), it is of type $\langle e, e, t \rangle$. The variable introduced by it is abstracted over, thereby producing an open sentence that denotes a set of (two-place) properties (of type $\langle\langle e, e, t \rangle\rangle t$).

$$(19) \quad [[Taro-ni iru]] = \lambda X \exists y [X(Taro, y)]$$

In (17b), the relative clause is of type $\langle\langle e, e, t \rangle\rangle t$: however, the head *sinyuu* is of type $\langle e, e, t \rangle$. As they are not of the same type, they cannot be combined through predicate modification.

However, relational nouns are not categorically prohibited from being relativized. Consider the object in (20a), which is schematized in (20b).

- (20) a. Jiro-wa Hanako-ga atta Taro-no-sinyuu-o tataita.
 Jiro-Top Hanako-Nom saw Taro-Gen-best friend-Acc hit
 ‘Jiro hit Taro’s best friend Hanako saw.’
 b. $[_{NP} [_{CP} Op_i [Hanako-ga t_i atta]] [_{NP} Taro-no-sinyuu]]$

In the case of (20b), the trace is of type *e* since the predicate *atta* ‘saw’ requires an entity-referring NP instead of a property-denoting NP. The relative clause is,

therefore, of type $\langle e, t \rangle$.

$$(21) \quad [[\text{Hanako-ga atta}]] = \lambda x[\text{SAW}(\text{Hanako}, x)]$$

Following Partee (1983/1997), let us assume that genitives are combined with a relational noun to make an NP of type $\langle e, t \rangle$. In the case of (20b), *Taro-no* is translated as in (22), and the resulting head *Taro-no-sinyuu* denotes a set of entities (of type $\langle e, t \rangle$).

$$(22) \quad [[\text{Taro-no}]] = \lambda X \lambda x[X(\text{Taro}, x)]$$

$$(23) \quad [[\text{Taro-no-sinyuu}]] = \lambda x[\text{BEST-FRIEND}(\text{Taro}, x)]$$

In (20b), the head and the relative clause are both of type $\langle e, t \rangle$ and can be combined to form (24), to which the ι -operator is applied before it is taken by the matrix verb *tataita* ‘hit.’

$$(24) \quad [[\text{Hanako-ga atta Taro-no-sinyuu}]] \\ = \lambda x[\text{BEST-FRIEND}(\text{Taro}, x) \ \& \ \text{SAW}(\text{Hanako}, x)]$$

Relational nouns can be relativized in the relational possessive construction if the head is modified by *syurui* ‘kind.’ Consider the object in (25a), which is schematized in (25b).

- (25) a. Jiro-ni-wa Taro-ni i-nai syurui-no-tomodati-ga iru.
 Jiro-Dat-Top Taro-Dat exist-Neg kind-Gen-friend-Nom exist
 ‘Jiro has a kind of friend that Taro does not have.’
 b. $[_{NP} [_{CP} Op_i [\text{Taro-ni } t_i \text{ inai}]]][\text{syurui-no-tomodati}]$

In (25b), the relative clause is of type $\langle \langle e, t \rangle, t \rangle$, as shown in (26).

$$(26) \quad [[\text{Taro-ni inai}]] = \lambda X \neg \exists y[X(\text{Taro}, y)]$$

The head *shurui-no-tomodati* “kind of friend” denotes a set of (two-place) properties (of type $\langle\langle e, t \rangle t \rangle$), or a set of kinds of friends, whose members include best friends, friends in need, friends indeed, etc.

$$(27) \quad [[\text{syurui-no-tomodati}]] = \lambda X[\text{FR IEND}(X)]$$

In (26b), the head and the relative clause are both of type $\langle\langle e, t \rangle t \rangle$ and can be combined to form (28). (I will argue below that *iru* takes a property-denoting NP as its internal argument, and as (28) denotes a property, it does not have to be type-shifted before being taken by *iru*.)

$$(28) \quad [[\text{Taro-ni inai syurui-no-tomodati}]] \\ = \lambda X \neg \exists y [X(\text{Taro}, y) \ \& \ \text{FR IEND}(X)]$$

Unlike predicate nominals, the internal argument of the relational possession construction can support definite anaphora. In (29), *soitu* can be anaphoric to *sinyuu* in the preceding sentence.

(29) Taro-ni-wa sinyuu-ga iru. Soitu-wa yasakii.
 Taro-Dat-Top best-friend-Nom exist he-Top kind
 ‘Taro has a best friend. He is kind.’

This may seem to be at odds with the idea that the internal argument of the relational possession construction denotes a property. However, evidence suggests that the existential force is not contributed by *sinyuu*: the internal argument of the relational possession construction does not scopally interact with other operators. In (30a), *subete-no-hon* “every book” can take either wide or narrow scope with respect to the negation. In (30b), on the other hand, *3-nin-no-sinyuu* “three best friends,” which serves as the internal argument, can only take narrow scope.

- (30) a. Taro-wa subete-no-hon-o yoma-nakatta.
 Taro-Top every-Gen-book-Acc read-Neg
 ‘Taro didn’t read every book.’
- b. Taro-ni-wa 3-nin-no-sinyuu-ga i-nai.
 Taro-Dat-Top 3-CI-Gen-best friend-Nom exist-Neg
 ‘Taro does not have three best friends.’

This fact suggests that unlike *subete-no-hon* in (30a), *3-nin-no-sinyuu* in (30b) is not quantificational.

The relational possession construction in Japanese exhibits a definiteness effect on the internal argument (see, for example, Kishimoto 2000). The unacceptability of (31a-b) seems to be due to the fact that *subetenno-sinyuu* “every friend” is a necessarily quantificational NP, and that *sono-sinyuu* “that best friend” is definite.

- (31) a. *Taro-ni-wa subete-no-sinyuu-ga iru.
 Taro-Dat-Top every-Gen-best friend-Nom exist
- b. *Taro-ni-wa sono-sinyuu-ga iru
 Taro-Dat-Top that-best friend-Nom exist

Nevertheless, necessarily quantificational NPs can serve as the internal argument when their descriptive content ranges over kinds.

- (32) Taro-ni-wa subete-no-syurui-no-tomodati-ga iru.
 Taro-Dat-Top every-Gen-kind-Gen-friend-Nom exist
 ‘Taro has every kind of friends.’

When the internal argument ranges over kinds, it can take wide scope. In (33), *2-syurui-no-tomodati* “two kinds of friends” can take wide scope with respect to the negation.

- (33) Taro-ni-wa 2-syurui-no-tomodati-ga inai.
 Taro-Dat-Top 2-kind-Gen-friend-Nom exist-Neg
 ‘Taro does not have two kinds of friends.’

In fact, the pivot NP in the *there* construction in English (i.e., the NP to the right of the copula) behaves analogously (see McNally 1998). Necessarily quantificational NPs can serve as the pivot when they range over kinds.

- (34) a. *There was every doctor.
 b. There was every kind of doctor. (McNally 1998)

The pivot can take wide scope if it is headed by a noun like *kind*. In (35), *many pictures* cannot take wide scope with respect to the negation, but *some type of wine* can.

- (35) a. There weren’t many pictures hanging on the wall.
 b. The food critic was annoyed because there wasn’t some type of wine on the list. (McNally 1998)

Considering these similarities of the internal argument of the relational possession construction to the pivot NP in the *there* construction, I adopt McNally’s (1998) approach to existential sentences, according to which the construction serves as an existential predicate, which takes a property-denoting expression and is interpreted as instantiating the property denoted by it. I assume that the semantics of *iru* is as represented in (36), according to which *iru* denotes a relation between a (relational) property (the *ga*-marked NP) and an entity (the *ni*-marked NP).

- (36) $[[iru]] = \lambda X\lambda y[IS-INSTANTIATED-FOR(X, y)]$

(16) is interpreted as in (37).

(37) $[[[(16)]]] = \text{IS-INSTANTIATED-FOR}(\text{BEST-FRIEND}(x, y), \text{Taro})$

Note that the existential force originates from the lexical entailments of *iru*. This introduces a discourse referent corresponding to the instantiation of the property, which supports definite anaphora in examples like (29).

Since the work of Milsark (1974), weak quantifiers have been recognized as ambiguous between a cardinal reading and a quantificational reading, and Landman (2004) argues that on their cardinal reading, they have adjectival semantics. On its cardinal reading, *3-nin-no-sinyuu* “three best friends” is interpreted as in (38).

(38) $[[[3-nin-no-sinyuu]]] = \lambda x \lambda y [\text{BEST-FRIEND}(x, y) \ \& \ \text{THREE}(y)]$

(38) denotes a property and can serve as the internal argument of the relational possession construction as in (30b). Note that the existential force originates from the lexical entailments of *iru*. Hence, the internal argument does not scopally interact with syntactically introduced operators. Consequently, *3-nin-no-sinyuu* cannot take wide scope in (30b).

The contrast between (31a) and (32) is in accordance with (36). In (32), *subete-no-syurui-no-tomodati* denotes a quantifier over properties, and thus, it is licit as the internal argument of *iru*. (32) is represented as (39).

(39) $[[[(32)]]] = \forall X [[\text{FR} \text{I} \text{E} \text{N} \text{D}(X)] \rightarrow [\text{IS-INSTANTIATED-FOR}(X, \text{Taro})]]$

In (31a), on the other hand, *subete-no-sinyuu* does not have a valid property denotation; that is, it does not have a property-type denotation, and it does not denote a quantifier over properties.

In fact, McNally’s approach is partly semantic and partly pragmatic. The property-type requirement is semantic in nature, and it does not rule out definites, which can shift to well-defined property-type denotations under Partee’s (1986) theory of type-shifting. Under McNally’s approach, definites are pragmatically excluded from existential sentences; following Prince (1981,

1988), Lumsden (1988), and Zucchi (1995), McNally maintains that existential sentences introduce a novel referent into the discourse. Therefore, definites like *sono-sinyuu* in (31b), which are used for referents that have already been mentioned, are excluded from the construction.

4. Intensional verbs

This section examines intensional verbs, with respect to which *-tati* plurals cannot take narrow scope, to witness how their internal arguments denote properties.

- (40) Sono byooin-wa gankai-o sagasite-iru.
 that hospital-Top ophthalmologist-Acc look for-Prog
 “That hospital is looking for ophthalmologists.”

In fact, Zimmermann (1992) proposes an analysis in which intensional verbs take a property-denoting expression as their internal argument. Evidence to that effect exists. As Moltmann (1997) notes, the internal argument of intensional verbs does not support definite anaphora. In (41), *soitu* “he” cannot be anaphoric to *gankai* “ophthalmologist” in the preceding sentence.

- (41) *Sono byooin-wa gankai-o sagasite-iru. Kono byooin-mo
 That hospital-Top ophthalmologist-Acc look for-Prog this hospital-also
 suoitu-o sagasite-iru.
 him-Acc look for-Prog

In addition, when the internal argument of an intensional verb is relativized, the head is modified by *syurui*. Consider the subject in (42a), which is schematized in (42b), where the trace corresponds to *gankai* in (40).

- (42) a. Sono byooin-ga sagasite-iru syurui-no-isyawa mezasiku-nai.
 that hospital-Nom look for-Prog kind-Gen-doctor-Top rare-Neg
 ‘The kind of doctor that hospital is looking for is not rare.’
 b. $[_{NP} [_{CP} Op_i [sono\ byooin-ga\ t_i\ sagasiteiru]]] [_{NP}\ syurui-no-isyawa]$

The head *syurui-no-isyawa* “kind of doctor” is of type $\langle\langle e, t \rangle t \rangle$. This means that the relative clause is also of type $\langle\langle e, t \rangle t \rangle$. For the relative clause to be of type $\langle\langle e, t \rangle t \rangle$, the variable introduced by the trace should be of type $\langle e, t \rangle$. (The constituent made up of the head and the relative clause is of type $\langle\langle e, t \rangle t \rangle$, and the ι -operator is applied to it before it is taken by *mezasii* “rare.”)

As well as a property-denoting NP, intensional verbs can take a quantified NP or a definite NP; hence, they need two representations.

- (43) a. Sono byooin-wa subete-no-gankai-o sagasite-iru.
 that hospital-Top every-Gen-ophthalmologist-Acc look for-Prog
 ‘That hospital is looking for every ophthalmologist.’
 b. Sono byooin-wa sono gankai-o sagasite-iru.
 that hospital-Top that ophthalmologist-Acc look for-Prog
 ‘That hospital is looking for that ophthalmologist.’

For example, *sagasu* “look for” should have two representations like (44a) and (44b).

- (44) a. $\lambda Y \lambda x [\text{LOOK-FOR}(x, Y)]$
 b. $\lambda y \lambda x [\text{LOOK-FOR}(x, y)]$

While (44a) takes a property-denoting NP as its internal argument, thereby producing sentences like (40), (44b) takes an entity-referring NP, thereby producing sentences like those in (43). According to this account, examples like (45) are expected to be three-way ambiguous.

- (45) Sono byooin-wa 3-nin-no-gankai-o sagasite-iru.
 that hospital-Top 3-CI-Gen-ophthalmologist-Acc look for-Prog
 ‘That hospital is looking for three ophthalmologists.’

When (44b) takes *3-nin-no-gankai*, it can remain in situ, thus giving rise to an interpretation where it takes narrow scope with respect to the intensional verb; it can also be raised higher than the verb, resulting in an interpretation where it takes wide scope. When (44a) takes *3-nin-no-gankai*, it denotes a property. This interpretation is indistinguishable from that in which *3-nin-no-gankai* takes narrow scope. Meanwhile, (40) is not ambiguous; it only has an interpretation where *gankai* denotes a property. This observation suggests that bare nouns are not existentially quantified.

5. Generic NPs

Let us turn to generic sentences, yet another context in which *-tati* plurals are not allowed.

- (46) Gankai(*-tati)-wa mezasiku-nai.
 Ophthalmologist-TATI-Top rare-NEG
 ‘Ophthalmologists are not rare.’

Generic NPs behave analogously when they are relativized, in which case, the head is modified by *syurui*. *Gankai* in (47a) is interpreted generically. In (48b), the relative clause with a corresponding trace is combined with a head modified by *syurui*.

- (47) Taro-wa gankai-ga kiraida.
 Taro-Top ophthalmologist-Nom hate
 ‘Taro hates ophthalmologists.’

- (48) a. Taro-ga kiraina syurui-no-isya
Taro-Nom hate kind-Gen-doctor
'the kind of doctor that Taro hates'
b. [_{NP} [_{CP} Op_i [_{Taro-ga} t_i kiraina]]][_{NP} syurui-no-isya]

Do generic NPs denote properties? The answer depends crucially on how generic NPs are analyzed. As this topic is beyond the scope of this paper, I leave the matter open for future research.

6. Conclusion

This paper examined some contexts in which *-tati* plurals in Japanese are not allowed. I argued that as well as predicate nominals, NPs occurring in at least two of these contexts denote properties.

Notes

1. For ease of exposition, I will treat properties as sets of entities (of type $\langle e, t \rangle$).
2. In English, predicate nominals can readily be relativized, as in (i). I will not attempt to account for this fact in this paper, but I will note that (i) means (ii).
 - (i) John became the doctor that his father used to be.
 - (ii) John became the kind of doctor that his father used to be.

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