Japanese Relative Clauses and the Parallelogram Law

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This paper presents an analysis of Japanese relative clauses. On the basis of data available in the literature, it is shown that the morpheme *no* can be either a genitive marker, a relative pronoun or a neutral pronoun. In externally-headed relative clauses, *no* moves rightward and adjoins to the right edge of its antecedent. Then, being a vector, it finds itself in a parallelogram of forces, and as a result it is demised by a bypass effect (Desouvrey 2021). In the so-called internally-headed relative clauses, *no* stays in situ in the matrix relative, and being a pronoun, as opposed to an anaphor, it can refer to any argument in the embedded (main) clause, hence the importance of pragmatic considerations for the interpretation of this construction. Furthermore, it is shown that the case alternation that occurs in relative clauses and certain complement clauses is due to the fact that all vectors alternately pair off with one another (pendulum effect). When relative *no* is paired off with a noun, it adjoins to it, which triggers the bypass of its case marker and that of the noun. Normally the accusative marker cannot be bypassed due to the fact that it is made up of a single segment (accusative singularity). However, in Kansai Japanese (Asano and Ura 2010), I show that the resultant of the parallelogram can reach a lower vector, the present tense verb, and as a result the accusative singularity is overridden, allowing the relative pronoun to surface.

Keywords: Syntactic features, coreference, vectors, parallelogram law, bypass effect, pendulum effect, combination, phase, relative pronoun, NGC, AGC, accusative singularity.

1. Introduction

A popular view in current linguistic theories is that there are no relative pronouns in Japanese, which nevertheless possesses at least two types of relative clauses. In externally-headed relative clauses (EHRC), the relativized argument is indeed replaced by a gap, while in the so-called internally-headed relative clauses (IHRC) the morpheme *no*, mostly analyzed as a nominalizer affixed to the embedded clause, is shown up instead. In this paper, which is built on the theory of features and constraint interaction advocated in Desouvrey (2000) and subsequent work, I argue that the morpheme *no* is actually a referring element, hence its use as a relative pronoun, and also a vector. In IHRCs, it satisfies the argument structure of the verb, taking its antecedent in the embedded clause, which is in fact the main clause, just like complement clauses in English. In EHRCs, it is adjoined to its antecedent and is barred from the output by a bypass effect induced by the parallelogram law.

I shall proceed as follows. In the next section, I present the assumptions regarding sentence structure, the representation of coreference, the nature of the case markers, and the vector effects known so far. In sections 3 and 4, I discuss the two types of relative clauses. In section 5, I show that the nominative-genitive conversion and the accusative-genitive conversion in the Kansai dialect, as reported in the literature, are a consequence of the pendulum effect. According to this process, all vectors alternately pair off with one another, which enables the relative pronoun/complementizer to

adjoin to any NP mate, bypassing the case marker of its host. In section 6, I discuss certain facts justifying the hypothesis that the case markers are vectors, the apparent absence of superiority effect, and finally I reinterpret certain pieces of evidence that have been adduced to dismiss the morpheme *no* as a pronoun, showing that in fact they strongly support its status as a referring element. Section 7 briefly concludes this article.

2. Theoretical assumptions and hypotheses

The analysis to be presented is possible under a feature- and constraint-based theory of grammar. The crucial assumption is that grammatical elements vary according to their features, which fall under the realm of a few constraints, some of which are violable. As I will show, the key feature of interest here is omega (ω), which makes its bearer a vector. This feature is pervasive in Japanese syntax, where subject and direct object arguments, as well as the relativization morpheme, are vectors, as I will show.

In this theory, there is neither predetermined structure for a sentence, nor functional heads. The traditional heavy machinery used in current generative theories is replaced by features and their interaction, much like in nonlinear phonology. On this view, a simple sentence is constructed dynamically by the grammar which fetches fully inflected lexical elements and merges them in an assumed order, for instance SOV, SVO, etc., as exemplified in (1). This type of representation translates the fact that the verb is merged with the already-built NP, making up the VP, which is then merged with the subject. Node labels are used descriptively and do not have any theoretical relevance.

(1) [He [hit [the wall]]]

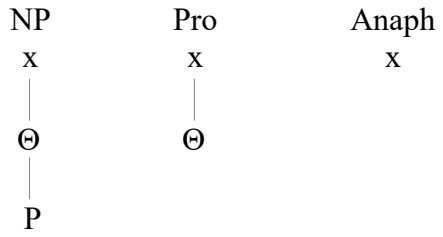
Syntactic elements may move within the structure to another element, or head (head adjunction), or outside the structure by juxtaposition to an edge. Under head adjunction the adjoined element forms a new tier parallel to the original one (see below). Edge movement is limited to elements that bear the feature π, mostly *wh*-elements, which, in general, cannot appear on a secondary timing tier. In a simple sentence like (1), no movement needs to be performed because no constraints are violated, and there is no need to assume an abstract level like LF.

2.1 The representation of coreference

In this theory, coreference is also a feature that can spread to another referring element (cf. Desouvrey 2003, 2006, etc.). Referring elements belong to three types: (a) NPs, which are referentially autonomous in that they are directly linked to a real world entity, which appears in the grammar as a

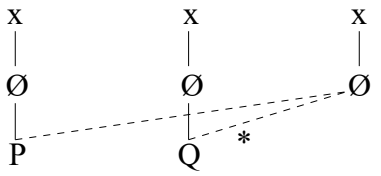
terminal feature, usually referred to with such letters as P, Q, etc.; (b) pronouns, which must get a referential feature from an NP via their bare thematic node in order to be interpretable; and (c) anaphors, whose the bare root node can get a thematic feature either from a pronoun or an NP, as shown in (2) (the value of the root node [x] is set aside for the time being). The thematic node, referred to as R-node in earlier work, can have any value such as agent, theme, dative, ablative, etc.

(2) The referential structure of NPs, pronouns, and anaphors

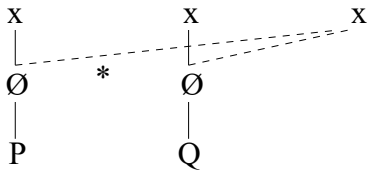


This can be illustrated with the structure in (3). The NPs *Joana* and *Mary* are endowed with the terminal features P and Q respectively, which are the virtualization of the real world individuals in the grammar. The pronoun *her* does not have a direct connection with the real world and therefore freely gets a terminal feature from *Joana*, or any other similar element in the discourse. Different terminal features do not belong to the same plane, hence there is no line crossing in (3). Notice that if *Mary* were the intended antecedent to *her*, the grammar would select a better match in the paradigm, as in (4). This structure further shows that the intermediate node of *Joana*, which is in the same plane as that of *Mary*, cannot be the antecedent of the anaphor, given the ban on line crossing in the representation.

(3) Joana thinks Mary hates her



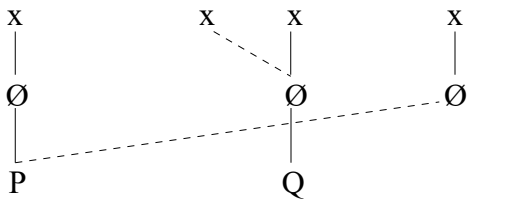
(4) Joana thinks Mary hates herself



To further analyze this sentence, let us put the complementizer, as well as clause boundaries, as in

(5). It is important to note that, contrary to current assumptions, I assume that each clause is an island, meaning they are not merged together. Since the complementizer is in fact a relative pronoun (Desouvrey 1997, etc.), it turns out that the matrix clause is a relative clause whose antecedent is the event described in the independent clause. As I will show, (5) has the same structure as an internally-headed relative clause (see Desouvrey 2010 and below).

(5) [Joana thinks that$_i$] [Mary hates her]$_i$



Regarding the coreference relation descriptively represented in (5) with the indices, the grammar of like-languages shows some limitations. In effect, there is no way to translate it into the nonlinear representation: the embedded clause does not seem to have what could be called an event feature that can be spread to the anaphor. Because of this limitation, the anaphor complementizer takes the subject, or perhaps any argument which has to be normally in the first position of the clause in non-SVO languages, as a default antecedent. In order for the event reading to be warranted, the complementizer must stay in situ, instead of adjoining to the argument, in violation of the Obligatory Contour Principle (OCP), which requires that any case specified element exit the VP (cf. Desouvrey 2000, etc.).

2.2 The vector theory

The vector theory stems from the fact that operators are not commutable. In current generative theory, their commutation is correctly ruled out by the Superiority Condition. However, as observed in Desouvrey (2000) and subsequent work, other grammatical elements in various languages — including certain verbs, personal pronouns (clitics), adverbs, etc. — can have this property as well. Hence, it must be the case that the superiority effect is due to a cross-category feature, referred to as [ω], which makes its bearer a vector. Non-vector elements, referred to as 'scalar', can be either specified for an opposite feature, [φ], or unspecified, [Ø], i.e. neutral.

If there is only one vector in a structure, one may not be able to identify it. Such elements show their special properties when they interact with similar elements, whether or not they are of the same grammatical category. Their known properties so far are listed in (6).

(6) **Vector properties**

a) A vector cannot move past a higher vector (superiority effect), and it cannot spread its feature to any element across another vector.

b) Feature spreading from vectors is directional throughout the derivation, i.e. either from left to right or right to left, not both ways in the course of the derivation. This property presumably accounts for certain cases of cross-over effects.

c) In a structure, the distance between two vectors amounts to a potential difference (PD), which triggers conflicting demands of the vectors; a lower vector wants to move higher to have wider scope, while reducing the PD; a higher vector opposes it in order to maintaining a greater PD.

d) When the PD is null, which happens under adjunction or morphological concatenation, both vectors are disabled, i.e. they lose their vector properties.

e) When three or more vectors are not collinear, basically when an element is adjoined to a head (i.e. an X^0 element), the higher vector aligns with the lower vector, making up a resultant of what appears to be a parallelogram of forces, which is the sum of all the vectors in the structure (Desouvrey 2021). As a result intermediate vectors are bypassed in the output, i.e. they are not spelled out.

f) In a structure with more than two vectors, the vectors alternately pair off with each other, so that the number of combinations can be obtained with the formula of the binomial coefficient.[1] This is referred to as 'the pendulum effect'. When two vectors are in a pair, one can move into the other if need be. In Japanese, as I will show, the requirement for the relative pronoun to adjoin to its intended antecedent is diluted under the pendulum effect, so that it adjoins to any vector NP with which it can pair off. This is the cause of the case alternation in Japanese subordinate clauses.

In Japanese, as I will show, the syntax of relative clauses can be explained thoroughly and elegantly under the vector theory, which requires the hypothesis that case markers and the morpheme *no* — an all-purpose referring element, as I will argue — be all vectors.

1 Given the number of vectors, n, and the size of each combination, k, the total number of combinations is:

$${}_nC_k = n!/k!(n-k)!$$

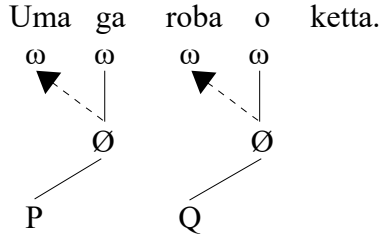
For instance, in a structure with four vectors, $n=4$ and $k=2$; thus ${}_nC_k = 6$. Certain combinations may be either invalid or ir-relevant (see below).

2.3 The case markers are referring elements

Generally in agglutinative languages, each NP is followed by an adjacent (or perhaps affixed) case marker, as in (7). However in Desouvrey (2010), on the basis of Korean data, I take the case markers to be thematic pronouns associated to the grammatical relations of subject, direct object, and indirect object. On this view, there are universally three cases: the subject case (nominative), the direct object case (accusative), and the oblique case, which can be associated with a range of thematic features, including dative, ablative, instrumental, etc. (cf. Desouvrey 2013). The case markers for nominative and accusative, respectively *ga* and *o* in Japanese (7), have a neutral thematic node and are by default interpreted as agent and theme respectively. Thus in (7), the referential features, [P] and [Q], are attached to their respective case-marker via a neutral thematic node, which then spreads to the ω-specified root node of the noun, as shown in (8).

(7) Uma-ga roba-o ketta. (Adapted from Ishizuka 2005)
horse-NOM mule-ACC kicked
'The horse kicked the mule.'

(8)



In this theory, features may not clash. Two elements can merge it their features are compatible, meaning either both bear the same feature or one (normally the complement) is neutral (see below). Also, in an anaphoric dependency, as in (8), the root nodes of the giver and the receiver must be compatible in the same way. Moreover, I assume that the verb assigns an abstract case to each argument, nominative and accusative, which will not be shown throughout, as they are irrelevant to the discussion. Notice that an arrowed line indicates that the element from which it originates is a vector. I assume that Japanese verbs are neutral in general, i.e. they are not vectors.

3. The derivation of externally-headed relative clauses

The following sentences (cf. Ishizuka 2005, ex. 3, 4) illustrate an EHRC with an object gap (9a) and a subject gap (9b). Ishizuka represents the gap with the letter *e* standing for a null pronoun coindexed

with the head noun. On the other hand, (9c) is an IHRC (adapted from Kikuta 1998, ex. 1), where the morpheme *no* appears instead of a gap.

(9) a. [uma-ga e_i ketta] roba$_i$-ga sinda.
horse-NOM kicked mule-NOM died
'The mule that the horse kicked died.'

b. [e_i uma-o ketta] roba$_i$-ga sinda.
horse-ACC kicked mule-NOM died
'The mule that kicked the horse died.'

c. Hanako-wa [inu-ga hasitte-kita] **no**-o tukamaeta.
Hanako-TOP dog-NOM run-come-PAST **NO-**ACC catch-PAST
'Hanako caught the dog which came running.'

I argue that *no*, in this context, is a relative pronoun (RP) which enters the derivation of EHRCs in the place of the gap. The input from which sentence (9a) can be derived consist of two island clauses, as shown in either (10a) or (10b). The best input must be the one that uses less derivational steps. Since Japanese is a head final language, the option in (10b) can be dismissed.[2] Then to realize relativization according to a head, as opposed to an event, only the relative pronoun needs to adjoin to its antecedent, *roba-ga*. If one assumes that adjunction applies uniformly to head initial and head final languages, the leftmost segment of the moved element is linked to the rightmost segment of the host via an association line, resulting in the breaking of the collinearity of the vectors, as shown in (11). As can be seen, I assume that a line parallel to the adjunction line runs from the first segment of case marker *ga*, /g/ (the '+' sign is to be discussed shortly), so that it intercepts the secondary timing tier resulting from the adjunction of the relative pronoun. As a result, a parallelogram of forces obtains. In such a case, a line running from /g/ to /n/, as in (11a), amounts to a resultant of all the vectors. The resultant can run instead from the segment /a/ of the head to the intersection of the *g*-line with the secondary tier, (11b). In any event, the accusative-marked *no* is bypassed, meaning it is not spelled out (cf. Desouvrey 2021). In the linearized structure, which is obtained from the Linearizing Convention in (12), the equal sign between two elements indicates that the right one is temporally adjoined to the left one.[3,4]

2 More generally, the length of a derivation is regulated by the Derivation Equivalence Number (DEN) (cf. Desouvrey 2018, 2019, etc.). In any derivation the number of steps, including the input, may not be greater than 3, hence DEN ≤ 3.

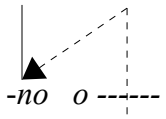
3 Actually, the adjunction line links the rightmost x-slot of the host to the leftmost x-slot of the adjunct. Conveniently, the x-slot skeleton is not shown in this paper; see Desouvrey (2020, 2021) for more details on that matter.

4 It is assumed that the RP and its case marker move together, which conveniently simplifies the drawing, but it is likely that they move separately so that one is adjoined to the other. We will see below in the text that RP *no* and its genitive mark-

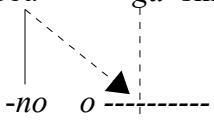
(10) a. [uma-ga no-o ketta] [roba-ga sinda]
horse-NOM RP-ACC kicked mule-NOM died

b. [roba-ga sinda] [uma-ga no-o ketta]

(11) a. [uma-*ga* ketta] [roba +*ga* sinda]



b. [uma-*ga* ketta] [roba +*ga* sinda]



Uma-ga ketta roba = ~~no-o~~ -ga sinda. (= 9a)

(12) **Linearizing Convention**

(a) From the leftmost element process successively each temporal slot according to a continuous flow.

(b) Two temporal slots linked by an association line must be processed successively in the sense of the flow.

In the above derivation, *no-o* has moved to a lower position; it can be said to be a downgraded vector. A vector can also be downgraded if it is outscoped by the movement of a lower vector. I claim that in Japanese, or perhaps universally, a downgraded vector has to be eliminated in the structure. Let us precise how the representation can warrant this outcome. Suppose that each vector has two poles, a positive and a negative, which are its leftmost and its rightmost segment respectively. On the main tier, the parallel to the adjunction line can run through either pole. If the vector is downgraded, the line runs through the negative pole, otherwise it runs through the positive one, as in (11). On the other hand, on the secondary tier, the poles are reversed, so that the adjunction line links two identical poles.[5] The diagonal must link the opposite poles of the two most distant vectors. As a result, intervening vectors or part of vectors on both sides of the resultant are bypassed. I further assume that the bypass of a part of a vector brings about the bypass of the whole vector, as in (11).

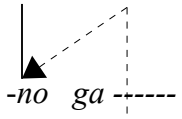
er can each move to a different NP. Anyway, the parallelogram analysis would yield the same result.

5 It is not clear at this point whether the inversion of the poles under adjunction, which allows the host and the adjunct to be linked by their identical pole, is a variable parameter like feature specification or a property of agglutinative languages like Japanese.

Let us turn now to the subject gap relative clause in (9b). In the input for this sentence, given in (13), I assume that the subject RP must be more embedded than the accusative-marked argument in order to be closer to its intended antecedent *roba-ga* 'mule'. The RP moves to adjoin to the head noun, as shown in (14). Under the parallelogram law, the resultant runs from *g(a)* to *n(o)* or vice versa, and as a result the downgraded RP and its case marker are bypassed.

(13) [uma-o no-ga ketta] [roba-ga sinda]
horse-ACC RP-NOM kicked mule-NOM died

(14) [uma- *o* ketta] [roba +*ga* sinda]



uma-o ketta roba = ~~no-ga~~ -ga sinda. (= 9b)

To sum up, whenever it is adjoined, typically in EHRCs, *no*, as a relative pronoun, is doomed to be filtered out in the output, given the bypass effect induced by the parallelogram law. It turns out that the RP in Japanese has the same fate as the complementizer in German, which is bypassed under the same condition when both the matrix verb and the subordinate verb realize V2, as discussed in Desouvrey (2021).

4. More on relative clauses

We have seen that relative *no*, as a verbal argument, must have a thematic node supplied by a case marker and therefore cannot be used as an anaphor, whose thematic node must come from its antecedent. An anaphor normally takes an adjacent antecedent, as it is protected from other possible NPs or pronouns by a locality effect induced by the ban on line crossing, as discussed above. However, I show that the fact that *no* cannot be used as an anaphor in relative clauses allows the derivation of another type of related construction, the so-called IHRC. In such a construction, the RP functions as a complementizer to a matrix verb.

Consider the sentence in (15) in which the main clause is transitive. The input structure for such a clause is normally ambiguous, as the RP can refer to either noun in the main clause, as shown in (16) (underlining indicates coreference). In addition, since all the referring elements are vectors, the coreference relation cannot be set between the RP and its intended antecedent (*Hanako*) across the vector subject, given the pendulum effect (see below). Therefore, the topic-marked subject must clear

the way by moving to the opposite edge of the relative clause, as in (17a). Then, the nominative-marked RP is adjoined to the head noun and is bypassed, as can be seen in (17b).

(15) Taroo-wa hasittekita Hanako-o tukamaeta. EHRC, Ohara's (2)
Taroo-TOP came-running Hanako-ACC caught
'Taro caught Hanako who came running.'

(16) a. [no-ga hasittekita] [Taroo-wa Hanako-o tukamaeta]
RP-NOM came-running Taroo-TOP Hanako-ACC caught
b. [no-ga hasittekita] [Taroo-wa Hanako-o tukamaeta]

(17) a. Taroo-wa [no-ga hasittekita] [Hanako-o tukamaeta]
b. Taroo-wa [hasittekita] [Hanako= ~~no-ga~~ -o tukamaeta]

Since *no* is an argument with its own case-marker, an equivalent input structure to (16a) can be derived by swapping it with its intended antecedent, as seen in (18a). Just like the EHRC, this structure is further improved by the movement of *Taroo-wa* to the front of the structure, so that *no* can get the referential feature of its antecedent, as shown in (18b). This movement is presumably possible because Japanese is a pro-drop language, and the noun bears a case marker (topic) that makes it easily recoverable. The *no*-clause functions as a matrix clause, just as in ordinary complementation structures. Since there is no secondary timing tier created by adjunction, the relative pronoun cannot be bypassed, and it normally shows up in the output. Thus, it turns out that the so-called IHRC is an embedded main clause.

(18) a. [Hanako-ga hasittekita] [Taroo-wa no-o tukamaeta]
b. Taroo-wa [Hanako-ga hasittekita] [no-o tukamaeta] (= Ohara's (4a))

This construction owes its existence to the very nature of *no* which must be case-marked as any argument and therefore cannot be used as an anaphor — an element receiving its thematic node from its antecedent instead of its own case marker. Since it is not an anaphor, it need not be adjacent to its antecedent. It differs from ordinary complement clauses in that it can refer to any argument in the embedded clause, just like in the input for an EHRC (cf. 16), as shown in (19). Ohara points out, "In these cases, pragmatic contexts play a role in narrowing the range of possible targets." (p.103) This ambiguity of IHRCs is expected under the present theory.

(19) Taroo-wa [neko-ga nezumi-o oikaketeiru] [no-o tukamaeta] IHRC, Ohara's (9a)
Taroo-TOP cat-NOM mouse-ACC chase-PRO-RU RP-ACC caught
'Taroo caught the cat that was chasing the mouse.' (preferred reading)
'Taroo caught the mouse that the cast was chasing.'

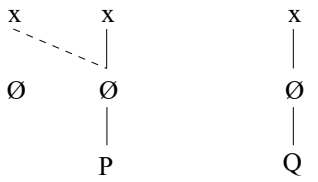
In addition, as Ohara points out, the IHRC reading is not available when the matrix verb selects an event as complement. In such a case, the event reading takes precedence, as shown in (20) (an adaptation of Ohara's 11). Thus in this sentence *no* is a complementizer referring to a complement clause, just like in English-like languages.

(20) Taroo-wa [Hanako-ga hasittekita] no-o sitteita.
Taroo-TOP Hanako-NOM came-running no-ACC knew
'Taroo knew that Hanako came running.'
(not 'Taroo knew Hanako who came running.')

If this analysis is correct, one can tackle the question as to why there is no IHRCs in English and suchlike languages. In fact, as seen above, English matrix clauses have the same structure as an IHRC. The complementizer *that* must stay in situ, instead of adjoining to an embedded argument, because the whole embedded clause is intended to be its antecedent. This construction carries a cost: relative *that* may not exit the VP, yielding a violation of the OCP. Why is the same structure impossible with non-event verbs? I show that the operations that occur in Japanese IHRCs cannot take place in English for a number of reasons. For instance, let us simulate the derivation of an IHRC from the sentence in (21a), setting relative *that* in situ despite the OCP. One can posit an input like (21b), where the relative clause precedes the main clause, just like a matrix clause. If one assumes that the complementizer, *that*, is an anaphor with a floating thematic node, it can only refer to the adjacent NP, the subject of the embedded clause, which provides it with a thematic feature. Under the natural assumption that anaphors override pronouns, the floating node is dismissed. Thus any link between the relative and its intended antecedent is precluded by the ban on line crossing. Hence, this construction yields an unwanted result.

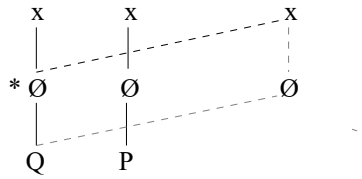
(21) a. The cat killed the bird that John caught.

b. *[John caught <u>that</u>] [the cat killed <u>the bird</u>]



Now let us try with the input (22a). The relation of coreference exists between the relative element and its antecedent, thanks to its floating intermediate node. Assuming that if a structure can be improved, it must be improved, the relative pronoun has to surface as an anaphor. If *that* is kept in situ despite the OCP effect, this structure can be improved only by moving the intervening subject to the front of the main clause.[6] Such a messy movement, shown in (22b), is impossible since the NP has no overt case-marker, and English is not even a pro-drop language. Thus relative *that* can stay in situ only in matrix clauses since in this context its antecedent is intended to be the complement clause event. This is expected under the assumption that a semantic constraint can override a structural constraint like the OCP (cf. Desouvrey 2000, etc.).

(22) a. [the cat killed <u>the bird</u>] [John caught <u>that</u>]



b. *John [the cat killed the bird] [caught that]

To conclude, this test shows that IHRCs are possible under all or part of the following parameters: the relative morpheme must be a relative pronoun, as opposed to an anaphor, (ii) the OCP is not active, i.e. the relative pronoun may not be case-specified,[7] (iii) NPs must be marked with over thematic pronouns, and/or (iv) the language must be of the type *pro*-drop.

6 In this theory, coreference is generally not derivable, meaning it must exist between two elements from the very beginning of the derivation, in the input. But it can be improved to avoid ambiguity. Thus, if an element with dual nature enters the derivation as a pronoun, it must surface as an anaphor whenever this is possible to avoid the ambiguity inherent to pronouns. If coreference fails in the natural (normal) input, an alternative input has to be generated.

7 In an SOV language, the OCP may be permanently violated since a case-specified argument (inherent case) may not exit the VP, given the ban on string vacuous movement (cf. Desouvrey 2000, etc.). Thus an [S [V O]] input with an accusative specified object yields an S=O V output, as in Romance; but an [S [O V]] input will not give a different output (*S=O V), and therefore movement need not take place.

5. Case alternation in subordinate clauses

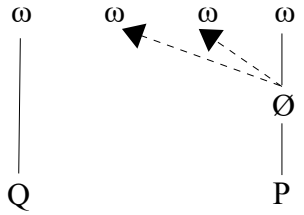
The nominative-genitive conversion (NGC), i.e. the optional replacement of the nominative by the genitive case, basically occurs in relative clauses, a fact well-discussed in the literature since Harada (1971). As I will show, NGC is concomitant with the relativization/complementation process. Under the pendulum effect, the RP instead of targeting its intended head noun, adjoin to any vector NP it can pair off with. The accusative-genitive conversion arises from the same process, except it can surface only in the Kansai dialect, as I will show. Both alternations will be discussed in turn.

5.1 The nominative-genitive conversion

Before proceeding, it is necessary to take a closer look at genitive. In the present theory, the case markers hold the thematic node, which is assigned to the noun by spreading. Unlike other case markers, I assume that genitive does not have any thematic feature, meaning it is intrinsically an anaphor. Therefore, it must be the case that it gets a thematic feature from the case marker of the head noun, while it is in a structural dependency with the modifying noun, as shown by the representation of (23a) in (23b). As can be seen, the referential feature (P) passes through the thematic node which spreads to both the head noun and the genitive marker. The modifying noun may not have a thematic feature since it is not an argument of a verb. If this view is correct, genitive is an anaphor linking its structure to an external head noun, much like a relative pronoun.

(23) a. Hanako no imooto wa...
Hanako GEN sister TOP...
Hanako's sister...

b. [Hanako no] imooto wa



With this representation of genitive in mind, one can account for NGC as well as the absence (or the presence) of accusative-genitive conversion (*o/no*) or dative-genitive conversion (*no/ni*) in a principled way. As I will show, in every case of NGC up to three instances of *no* may be present in the input either as a genitive marker, a relative pronoun or a neutral pronoun. The simplest cases of NGC

are illustrated in (24) (cf. Akaso and Haraguchi 2010, ex. 10a,b).

(24) a. Taro-ga/no nonda kusuri
Taro-NOM/GEN took medicine
'the medicine that Taro took'

b. Gakusei-ga/no katta hon
students-NOM/GEN bought book
'The book that students bought'

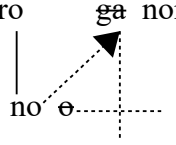
It is obvious that NGC takes place in contexts where the relative pronoun has gone missing under the parallelogram law. Therefore, I am lead to claim that in (24) the morpheme *no* is the missing relative pronoun. If so, the question now is why and how it may end up there, replacing the nominative marker.

Consider for instance the input for (24a), as shown in (25a). The RP must normally link up with the head noun (which may or may not be a vector; see fn. 9), where it is always eliminated, (25b). Such a fatal movement is required in order to remove any ambiguity. However, since in the relative clause both arguments are vectors, they must pair off under the pendulum effect. Since movement to its head results in its elimination, it does not matter to which NP it actually adjoins. I claim that this state of affairs allows the RP to move to any NP with which it can pair off under the pendulum effect. Thus, when the RP pairs off with the clausemate subject, it moves into it, bypassing the nominative marker. As can be seen in (25c), the nominative marker of *Taro* being downgraded, the parallel to the adjunction line runs from its negative pole, *(g)a*, to the temporal line of the RP. Then the resultant runs from the positive pole of *no* to the negative pole of the case-marker, resulting in the bypass of both case markers, *o* and *ga*. The gap still exists, but the RP ends up being a thematic pronoun to the subject instead of being deleted. Structure (25c) mimics the genitive structure in (23) since *no* refers intentionally to the head noun while in a structural dependency with the subject of the modifying clause. By this transformation which is restricted to subordinate clauses, the grammar provides a strong hint that *no* is a general unspecified pronoun.

(25) a. [Taro-ga no-o nonda] kusuri...

b. Taro-ga nonda kusuri = ~~no-o~~...

c. Taro ~~ga~~ nonda kusuri

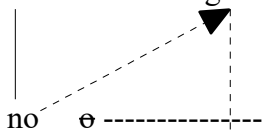


Taro=no nonda kusuri...

Akaso and Haraguchi (2010) report that NGC is not possible if the subject includes a focus particle. As can be seen in (26a) (their 11a), the presence of the focus morpheme, *dake* 'only' blocks the conversion. This restriction on NGC can be explained if one assumes that such particles are vectors, just like the case markers. Thus adjunction of the RP to the subject is impossible under the assumption that lexical elements cannot be in a position to be bypassed. In other terms, if adjunction to *Taro* were possible, *dake* (and other similar particles) would be barred from the output by a bypass effect, as shown in (26b), and there would be no way for the sentence to convey the intended meaning.[8]

(26) a. Taro-dake-ga/*no nonda kusuri
Taro-only-NOM/GEN took medicine
'the medicine that only Taro took'

b. *Taro ~~dake~~ ~~ga~~ nonda kusuri



* Taro = no nonda kusuri (not the desired meaning)

In addition, NGC is not possible when the relative clause includes an overt accusative-marked complement. This is referred to in the literature as the 'transitivity restriction'. As can be seen in (27) (adapted from Ahn 2006, ex. 7), a dative argument has no effect on NGC (27a), while an overt accusative argument blocks it (27b). If the offending argument is ellipsized, NGC is fine, (27c).

(27) a. John-no/ga tomodati-ni kasita hon...
John-GEN friend-DAT lend.PERF book
'The book that John lent to a friend...'

b. John-ga/*no hon-o kasita tomodati.
'The friend that John lent a book...'

c. John-no kasita tomodati.
'The friend that John lent [something]...'

First, consider the input for (27a), as shown in (28a). The accusative-marked RP can normally

8 This is akin to the fact that in German V2 may not take place in a complement clause if the matrix verb is negated. As shown in Desouvrey (2021), a bypass effect would barred the negative morpheme from the output, resulting in a loss of crucial information.

move rightward to the head noun, *hon* 'book' (28b), where it must be bypassed, as discussed above. Alternatively, *no-o* can move leftward, attracted by the nominative subject since they can pair off, as shown in (28c). I assume that the dative argument is a neutral element, not a vector, as will be discussed below, and therefore it does not take part in the combination process. Thus NGC normally occurs.

(28) a. [John-ga tomodati-ni **no-o** kasita] hon...

b. [John-ga tomodati-ni kasi.ta] hon = ~~no~~ -~~o~~...

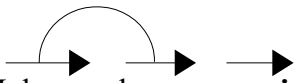
c. [John = no -~~o~~ -~~ga~~ tomodati-ni kasita] hon...

As for (27b), it can be derived from input (29a). I assume that the relative pronoun is generated in the most embedded position so as to be closer to the head noun. Here it must be assumed that both *no* and *ni* are vectors for reasons to be discussed below. If the relative pronoun moves rightward to the head noun, it must be eliminated either by a bypass effect or a deletion rule, yielding an acceptable output, (29b).[9]

(29) a. [John-ga hon-o **no-ni** kasita] tomodati

b. [John-ga hon-o kasi.ta] tomodati = ~~no~~ -~~ni~~...

In the relative clause, all elements but the past tense verb are vectors. Under the pendulum process, they alternately pair off with one another, as shown in (30), which illustrates all possible elementary pairs in three layouts, or phases.[10] Let us assume that the pattern in the phase (30c), where a pair has a leftover in between, is ill-formed by virtue of a well-formedness condition on pairs, as stated in (31a).[11] Under this condition, the relative cannot adjoin to the subject independently of the object, hence the unacceptability of NGC in (27b).

(30) a. 
[John-ga hon-o **no-ni** kasita] tomodati

9 An independent rule of deletion of RP *no* may be needed in certain context. If an accusative-marked *no* is adjoined to a dative-marked head noun, which is not a vector, the result would be for instance **tomodati = no-o ni*. Since a noun cannot presumably bear two thematic features, relative *no* has to be eliminated by brute force: *tomodati= ~~no-o~~ -ni*.

10 The number of phases can be obtained by dividing the number of combinations (cf. fn. 1) by the number of pairs of vectors in the structure. So for a structure with 4 vectors, one has 6/2 phases. The result is the same for a structure with 3 vectors, namely 3/1 phases.

11 I assume that the combination of two vectors is due to the alignment of their ω-nodes so that they make up a plane. Thus (31a) is analogous to the gemination effect in nonlinear phonology, which can be seen as another manifestation of the OCP (Desouvrey 2000, 2018, etc.). Conveniently, an arc is used to indicate the combination of two vectors, but it might be that they make up a binary tree by the fusion of their ω-node.

b. 
[John-ga hon-o **no-ni** kasita] tomodati

c. 
*[John-ga hon-o **no-ni** kasita] tomodati

(31) a. **Well-formedness condition on pairs**

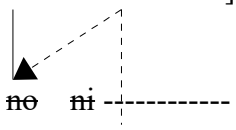
Two vectors cannot pair off across a leftover vector.

b. **Pair uniformity**

If two NPs (or arguments) are in an elementary pair, they must behave identically.

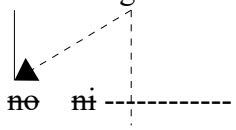
Consider now (30b). The relative pronoun correctly pairs off with the accusative-marked object, and thus it can adjoin to it, even though the subject is left over. In this case, I assume that the accusative marker has a peculiarity (to be discussed shortly) by virtue of which it takes precedence over the relative pronoun, which is then bypassed, as shown in (32a). On the other hand, in (30a) both NPs are paired off, while the relative pronoun is left over. In such a pattern, the leftover relative pronoun has to be integrated into a new pattern with the pair, meaning this elementary pair must merge with the relative pronoun, so that it can move to any element of it. Suppose that when two NPs are paired off, they must behave uniformly with respect to adjunction (or perhaps any process), as stated in (31b). That is, in a pair <A B> one element must emulate the other, so that the adjunction of a third element C to A must return the same result as the adjunction of C to B. Given the peculiarity of the accusative marker (see below), it must be the case that the nominative argument emulates the accusative argument. Thus, if the RP adjoins to the subject, it must be bypassed, as shown in (32b). In a further alternative, the relative pronoun and its case marker split off under movement, so that each adjoins to an argument in the pair; again, the result is the same for both *no* and *ni* which are bypassed, (32c). If this is correct, *no* and its case-marker, *ni*, must move to the arguments taken individually and as a pair, resulting in each being adjoined three times, as if there were three arguments (cf. fn. 4). At the end of the process, I assume that any phase appears randomly as the output.

(32) a. [John-ga hon o kasita] tomodati



John-ga hon-o kasita tomodati

b. [John ga hon-o kasita] tomodati



John-ga hon-o kasita tomodati.

c. John = ~~no~~ -ga hon = ~~ni~~ -o kasita tomodati.

The singularity of the accusative case marker, I conjecture, is due to the fact that it is underlyingly a single-segment morpheme, [o], which may apparently surface as /wo/ in certain phonological environment. It must be the case that a single-segment vector only has one pole, which is positive in (32). Therefore, it can only align with a negative pole to make the resultant, which results in the demise of both *no* and its case marker. For ease of reference, the phenomenon that takes place in (32a) will be referred to as '(Japanese) accusative singularity'. However, it is likely a universal property of vectors that can be stated as in (33). Under this analysis, if the nominative argument is not in a pair with the accusative argument, there is no emulation, and hence NGC is possible, as in (27c). We now know why there is no *o/no* conversion in this variety and by the same token the impossibility of NGC when an accusative argument is present.

(33) **Vector Deficiency Conjecture (Accusative Singularity)**
A single-pole vector along a resultant cannot be bypassed.

There is a number of evidence that supports this analysis. For instance in (34a) the complex predicate normally takes two nominative-marked arguments. Either argument, or both at the same time, can be marked with *no,* so that the alternation in (34b-d) obtains (cf. Shimamura 2019, ex. 14, referring to Hiraiwa 2005).

(34) a. [Totemo yoku John-ga nihongo-ga hanas-er-u] riyuu
very well John-NOM Japanese-NOM speak-can-NONPAST.ADN reason
'The reason why John can speak Japanese very well'

b. [Totemo yoku John-no nihongo-ga hanas-er-u] riyuu

c. [Totemo yoku John-ga nihongo-no hanas-er-u] riyuu

d. [Totemo yoku John-no nihongo-no hanas-er-u] riyuu

The obvious question that arises here is why both arguments can be marked with the same case. If both arguments can be marked with genitive, it must the case that there are two instances of *no* in the

input. In effect, the sentential complement must be mediated by a complementizer argument to the head noun. Since the complement of a noun normally takes genitive case (cf. 23), one can posit the input in (35), which shows a genitive-marked complementizer. If the complementizer were the complement of a matrix verb, it would instead take accusative case, as seen above in the discussion of IHRCs.

(35) [Totemo yoku John-ga nihongo-ga hanas-er-u] **no-no** riyuu
very well John-NOM Japanese-NOM speak-can-NONPAST.ADN **RP**-GEN reason

In this structure the genitive-marked RP gets a thematic feature from the case-marker that spreads through the head noun *riyuu*. This state of affairs, I claim, triggers its reanalysis as a dependent of the head noun, just like a relative pronoun in EHRCs. Thus, the genitive-marked *no* depends on different heads: the matrix head noun and the most prominent argument in the embedded clause, namely the subject, just like a sentential complement to a matrix verb. However, since there is no matrix verb to force the event reading, which precludes head adjunction, the RP can move into any head in the embedded clause as long as both can correctly pair off. Assuming that no other elements, in particular the verb, are vectors, (34) can be derived from the following phase.

(36) 

In (36) the leftover complementizer must combine with the pair in order to adjoin to either argument. Whether it adjoins to the subject or the object, its genitive marker and the nominative marker of its host are bypassed, as shown in (37b) and (37c). Alternatively, the complementizer and its case marker split, so that each can adjoin to an argument in the pair, yielding (37d). The relative can also adjoin to the head noun, as shown in (37a). Remarkably, in this transitive structure, the transitivity restriction does not hold, since there is no accusative singularity.

(37) a. [Totemo yoku John-ga nihongo-ga hanas-er-u] riyuu = ~~no-no~~ (=34a)
b. [Totemo yoku John = no -~~no~~ -~~ga~~ nihongo-ga hanas-er-u] riyuu (=34b)
c. [Totemo yoku John-ga nihongo = no -~~no~~ -~~ga~~ hanas-er-u] riyuu (=34c)
d. [Totemo yoku John = no -~~ga~~ nihongo = no -~~ga~~ hanas-er-u] riyuu (=34d)

Consider now the sentences in (38) (cf. Shimamura 2019, ex. 2), which is translated into the paradigm in (39) for the sake of clarity. As can be seen, a complex NP complement headed by either

Koto or *no* is used as a complement to the matrix verb. Shimamura analyses both the head noun *koto* and its replacement *no* as a formal noun (FN) affixed to the verb, whereas the accusative marker is affixed to the whole clause. Shimamura provides no reason as to why *koto/no* must be affixed to the verb. Instead, I take *koto* as the head of a complex NP complement to the matrix verb, and the instance of *no* with which it alternates is a neutral pronoun (perhaps the pronoun of itself). Thus, (38) can be derived from two different inputs, reflecting the *koto/no* alternation, as shown in (40). As can be seen in (40b), it turns out that *no* has three different functions: complementizer (RP), genitive marker, and neutral pronoun (PRO).

(38) Boku-wa [kinoo Taroo-{ga/no} Kyooto-ni tui-ta-{koto/no}]-o sira-nakat-ta.
I-SC TOP yesterday Taro-NOM/GEN Kyoto-at arrive-PAST-FN ACC know-NEG-PAST
'I didn't know that Taro arrived at Kyoto yesterday.'

(39) a. Boku-wa [kinoo Taroo-ga Kyooto-ni tuita-koto]-o siranakatta.
b. Boku-wa [kinoo Taroo-ga Kyooto-ni tuita-no]-o siranakatta.
c. Boku-wa [kinoo Taroo-no Kyooto-ni tui-ta-koto]-o siranakatta.
d. Boku-wa [kinoo Taroo-no Kyooto-ni tui-ta-no]-o siranakatta.

(40) a. Boku-wa [[kinoo Taroo-ga Kyooto-ni tuita] [no-no koto]]-o sira-nakat-ta
I.SC -TOP yesterday Taro-NOM Kyoto-at arrived RP-GEN fact-ACC know-NEG-PAST
b. Boku-wa [[kinoo Taroo-ga Kyooto-ni tuita] [no-no no]]-o sira-nakat-ta
I.SC -TOP yesterday Taro-NOM Kyoto-at arrived RP-GEN PRO-ACC know-NEG-PAST

In (40), the genitive-marked *no* can pair off with either *koto/no* or the subject of the embedded clause. In the first case, it moves into *koto/no* and is bypassed, as shown in (41a,b). In the second alternative, it moves to *Taroo*, and it surfaces while the outscoped nominative marker, *ga,* and its genitive marker, *no*, are bypassed, (41c,d).

(41) a. Boku-wa [[kinoo Taroo-ga Kyooto-ni tuita] [koto = ~~no~~ -~~no~~]]-o sira-nakat-ta (= 39a)
b. Boku-wa [[kinoo Taroo-ga Kyooto-ni tuita] [no = ~~no~~ -~~no~~]]-o sira-nakat-ta (= 39b)
c. Boku-wa [[kinoo Taroo = no -~~no~~ -~~ga~~ Kyooto-ni tuita] koto]-o sira-nakat-ta (= 39c)
d. Boku-wa [[kinoo Taroo = no -~~no~~ -~~ga~~ Kyooto-ni tuita] no]-o sira-nakat-ta (= 39d)

Finally, I discuss a further piece of data that supports this analysis of NGC. It is reported in the literature that NGC is not possible with the *no-da* construction, as exemplified in (42) (Shimamura

2019, ex. 48), where *no* is taken to be a formal noun (FN). I claim that the copula takes a sentential complement mediated by a complementizer (i.e. a relative pronoun), *no*, as shown in input (43). I assume that the copula does not assign a thematic role to its complement, which explains the fact that *no* does not take a thematic pronoun. Just as in ordinary complementation structures, *no* stands for the complement clause, but refers by default to the subject *Taro.* Since *no* is a complement of a matrix verb, as opposed to a noun, the event reading is enforced. Therefore, it cannot move to the embedded head *Taro-ga*.

(42) Taro-ga/*no ki-ta no-da.
Taro-NOM /GEN come.PAST FN-COP.NONPAST
'It is that Taro came.'

(43) [Taro-ga ki-ta] [no da]
Taro-NOM come.PAST RP COP.NONPAST
'It is that Taro came.'

Summing up, a single morpheme, *no,* is used either as a neutral pronoun, a case-marker (genitive), or a relative pronoun. I have shown that the instance of *no* that supplants the nominative marker actually enters the derivation as a relative pronoun/complementizer, which must move to an NP. The fact that NGC is absent in root clauses, complement clauses, and IHRCs, where there is no movement, supports this analysis.[12] The absence of *ni/no* conversion follows from the assumption that the dative-marked NP is not a vector (see below). As for the impossibility of *o/no* conversion, it is due to a singularity that prevents the accusative marker from being bypassed. However, in Kansai Japanese, to which I turn in the next section, this singularity can be overridden in certain contexts.[13]

12 I leave aside NGC in the adnominal form (or *rentai-kei*) for lack of well-described data.

13 Miyagawa (2013) reports a number of facts that are not addressed in this paper. Firstly, no elements (basically sentential adverbs) can intervene between a genitive subject and the verb, (ia) (Harada 1971). Second, scrambling is not possible across a genitive subject (ib) (Dubinsky 1993). These facts can be accounted if it is assumed that sentential adverbs are vectors, unlike VP adverbs which are neutral. If the reader wants to try, she/he must keep in mind that lexical elements (here the sentential adverbs) may not be in a configuration to be bypassed; if so, the derivation must be rejected. Also, another parallelogram could run from the adjunction line to any higher vector.

(i) a. kodomotati-ga minna-de ikioi-yoku kake-nobotta kaidan
children-Nom together vigorously run-climb up stairway
'the stairway which those children ran up together vigorously'
b. geki-dei musume-ga/*-no ti odotta koto
play-in daughter-Nom/-Gen danced fact
'the fact that my daughter danced in the play'

5.2 The Accusative-genitive conversion in Kansai

Asano and Ura (2010) (henceforth A&U) report that in addition to NGC Kansai Japanese allows the conversion of the accusative case into genitive case (AGC). A&U identify the following necessary conditions for AGC to occur:

(44) **Necessary conditions for AGC (A&U p.45)**

a) The subject must be *pro* in the clause where AGC occurs. (Condition α)

b) The clause where AGC occurs is in irrealis mood. (Condition β)

c) The clause where AGC occurs is immediately subordinate to a noun. (Condition γ)

d) There must be no strong phase boundary intervening structurally between the head noun and the genitive-marked object of AGC. (Condition δ)

Condition γ, in other words, means that a relativization/complementation process must take place, just as in NGC, as discussed above.[14] As for condition δ, it states that case alternation resulting from the relativization must be a local process, meaning the relative pronoun can only move to the clause it relates to the head noun, consistent with the present analysis of NGC. The other conditions are the key to understand this phenomenon. Condition α is parallel to the transitivity restriction on NGC. Indeed, AGC is impossible if there is an overt subject, whereas NGC is disallowed if there is an overt accusative argument. Thus the analysis of the transitivity restriction on NGC must be related to the subject restriction on AGC, as I will show. Finally condition β, which requires that the subordinate verb be in irrealis mood, is specific to AGC and is thus the crucial condition.

The question arises as to why the present marker (irrealis according to A&U) allows AGC in Kansai dialect but not elsewhere. Given our assumptions, it must be the case that this tense bears some

14 However, in a subordinate clause like (i), there is no head noun (Shimamura 2019, Miyagawa 2013, Takahashi 2010). It is likely that the genitive subject is derived from a different input in which *made* 'until' takes as complement a bare complementizer (*no*) referring to the embedded clause. Also, according to Shimamura (fn. 2), Maki and Uchibori (2008) claim that *made* has a covert complement, *oki* 'time'. If this is correct, this sentence can accounted for under the present analysis.

(i) John-wa [ame-ga/no yam-u made] ofisu-ni ita.
John-TOP rain-NOM/GEN stop-PRES until office-AT be-PAST
'John was at his office until the rain stopped.'

Moreover, this sentence is discussed in the literature with respect to the fact that NGC is possible with unaccusative verbs (i) but not with unergative verbs (ii). This contrast can be accounted for under the hypothesis that in Japanese the derivation of intransitive verbs includes an empty argument, which must be a vector. If so, in the relevant input, the complementizer pairs off with the argument of the unaccusative verb, while the empty vector, which is higher, is left over. On the other hand with unergative verbs, the complementizer and the argument pair off across the null vector, and therefore the structure is ruled out by virtue of (31a). Of course, such an hypothesis needs to be tested with further data.

(ii) John-wa [oogoede Mary-ga/-*no sakeb-u made] odotta.
John-Top loudly Mary-Nom/Gen shout-Pres until danced
'John danced until Mary shouted loudly.'

feature in one variety but not in the other. Consistent with the above analysis of NGC in which all interacting elements are vectors, I am lead to hypothesize that the present tense marker in Kansai Japanese is a vector (i.e. ω-specified), whereas in other dialects it is neutral, just like the past tense marker.[15] If it is assumed that the bare verb is Ø-specified (neutral), it must be enhanced with the ω-feature in order to be merged with the tense morpheme. As a result, the complex made up with the verb and the present tense affix is a vector, and it is expected to interact with its arguments and the genitive-marked *no* (relative pronoun) under the pendulum effect.

Consider the following paradigm (adapted from A&U, ex. 28a, 30a, and i-a in their fn. 14), where both the nominative marker (*ga*) and the accusative marker (*o*) can alternate with the genitive marker (*no*). A&U point out that (45a-c), unlike (45d), are perfectly grammatical for Kansai speakers.

(45) a. [[Taro-ga Biwako-o oyo-gu] hi]
Taro-NOM Biwa-lake-ACC swim-PRES day
‘ The day when Taro has a swim in Lake Biwa.’

b. [[Taro-no Biwako-o oyo-gu] hi] (ex. 28a)

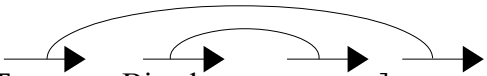
c. [[Taro-no Biwako-no oyo-gu] hi] (ex. 30a)

d. *[[Taro-ga Biwako-no oyo-gu] hi] (ex. ia fn. 14)

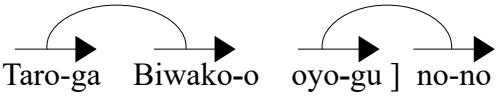
In the present analysis, the input for these structures must consist of a noun *hi* that takes a sentential complement mediated by a genitive-marked complementizer, as shown in (46). All of the elements in this structure are vectors, and they must pair off alternately with one another. Given that the head noun can always host the relative pronoun, which is inexorably bypassed from there, one can set it aside, focusing instead on the complement clause. All combinations (6 in all) can be represented with three phases, as shown in (47a-c). In the phase (47a), the complementizer can move to the subject, since both make up an elementary pair. As a result, the outscoped nominative marker, as well as its genitive marker, is bypassed, as shown in (48a). Similarly in (47b), the complementizer can only move to the accusative-marked object, where it is bypassed, given the accusative singularity (33), as shown in (48b). If *oyo-gu* was not a vector, as in the main dialect, the phase would be arranged differently, as discussed above (cf. the transitivity restriction). Notably, *no-no* and *Taro-ga* could not pair off across *Biwako-o*, given (31a). Consequently, *no-no* would have to be integrated in a pattern with the pair made up by the arguments, and the accusative singularity would oppose any conversion.

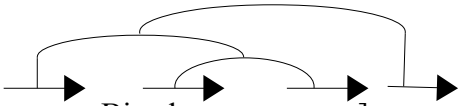
15 The present tense marker seems to have several phonological variants. The following ones are seen in A&U: *u*, *ru*. *suru*, *gu*.

(46) [[Taro-ga Biwako-o oyo-gu] no-no hi]
Taro-NOM Biwako-ACC swim-PRES RP-GEN day

(47) a. 
[[Taro-ga Biwako-o oyo-gu] no-no (hi)]

b. 
[[Taro-ga Biwako-o oyo-gu] no-no (hi)]

c. 
[[Taro-ga Biwako-o oyo-gu] no-no (hi)]

d. 
[[Taro-ga Biwako-o oyo-gu] no-no (hi)]

(48) a. [[Taro ga Biwako-o oyo-gu] (hi)]
no no ----------
Taro=no Biwako-o oyo-gu hi (=45b)

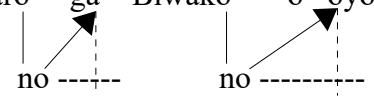
b. [[Taro-ga Biwako o oyo-gu] (hi)]
no no ----------
Taro-ga Biwako-o oyo-gu hi (=45a)

Consider now (47c). It contains two pairs: the arguments on one hand, and the verb and the complementizer on the other. The two pairs must combine to make up a single pattern, so that the complementizer can move into the arguments. However, it cannot move across its mate without inducing a superiority effect. This phase must therefore be rearranged in a novel pattern, where both the complementizer and the subject are left over, while the object and the verb are paired off. Under this condition, the subject combines with the pair to form a new pattern which then combines with the complementizer, as shown in (47d). Since movement has already taken place to each argument in an elementary pair, the relative must split with its case marker, so that each adjoins to a different NP, as shown in (49).[16] Thus, one instance of *no* adjoins to *Biwako*, and since it is in a pair with the verb, the

16 The alignment and the fusion of two pairs may not take place in (47a,b), where both planes overlap. To make this clear, one can imagine that all planes, as defined by pairs, pivot around the morpheme tier, just like the pages of a notebook.

resultant can reach the negative pole of the latter, overriding the accusative singularity. The other instance of *no* adjoins to *Taro*, bypassing the nominative case since it need not mimic the accusative singularity. By the end of this process, either (48a), (48b) or (49) randomly makes it as the output.

(49) [[Taro ga Biwako o oyo -gu] (hi)]



Taro-no Biwako-no oyo-gu hi

It is clear that AGC in Kansai Japanese is possible because the present tense verb is a vector and can end up in the same pair as the accusative-marked object. This analysis is confirmed by the simplest cases of AGC, as illustrated in (50). If A&U are correct, the subject of the embedded clause is dropped (condition α), which makes AGC possible.

(50) a. Kare-ni-mo [[pro akuzi-kara [$_{DP}$ asi]-o/no ara-u] hi] -ga tuini yatteki-ta.
he-DAT-also villainies-from foot-ACC/GEN wash-PRES day-NOM finally come-PST
'A day has finally come when he also gets out of villainies.'

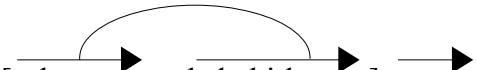
b. [[pro [$_{DP}$ zabuton]-o/no hakobi-kom-u] heya]-o osie-te kudasai
cushion -ACC/GEN carry-in-PRES room-ACC tell please
'Please tell me which room to carry cushions into.' (A&U, ex. 2b and 2e)

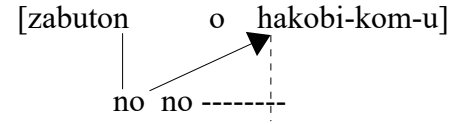
Consider for instance (50b). Under the present analysis, it can be derived from the input shown in (51). Setting aside the head noun and the matrix verb, the embedded verb and its argument can pair off, while the genitive-marked complementizer is left over, as shown in (52a). Other combinations are either impossible or irrelevant.[17] In order to move, the leftover complementizer must combine with the pair, so that it can adjoin to the accusative object. Just as in (49), the diagonal can run from the positive pole of the complementizer to the negative pole of the verb, bypassing both the accusative case and the genitive case, as shown in (52b).

(51) [[zabuton-o hakobi-kom-u] [**no-no** heya]]-o osie-te kudasai
cushion-ACC carry-in-PRES RP-GEN room-ACC tell please

The angle between two planes may become null, but a point of a plane A can never align with a point in a plane B. In (47c) on the other hand, both planes can align so that a straight line parallel to their pivot can pass through a point of each.

17 I assume that in (52) *hakobi-kom-u* 'carry-in-PRES' is a single vector, taking *kakobi-kom* to be a lexical compound. However, this is not crucial. If it is split up into two vectors *kakobi* and *kom-u*, the same result can be obtained with an arrangement like that in (47d).

(52) a. 

b. 

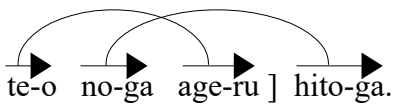
Zabuton = no hakobi-kom-u heya-o...

A&U acknowledge (cf. their fn. 3) that AGC is still possible with an overt subject when the verb is in the predicate adnominal form (*rentai-kei*); as shown in (53b) vs. (53a). According to A&U, the peculiarity is due to the affixes added to the verb stem. Under the present assumptions, one can hypothesize that these affixes are vectors, and therefore allow further combinations to occur. Thus, in (53b), *age sou na* must be split into two independent vectors, *age* and *sou-na* or perhaps *age-sou* and *na*. Then, AGC must be possible whenever the accusative-marked argument is in a pattern with the verb.

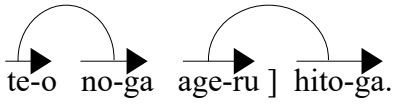
(53) a. Asoko-ni [t_i te-o/*no age-ru] hito$_i$]-ga i-ru.
there-LOC hand-ACC/*GEN raise-PRES man-NOM be-PRES
'There is a man over there who (is going to) raise his hand.'

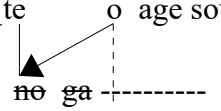
b. Asoko-ni [t_i te-o/no age-sou-na] hito$_i$]-ga i-ru.
there-LOC hand-ACC/GEN raise-likely-PRED man-NOM be-PRES
'There is a man over there who is likely to raise his hand.'

The relevant phases for the relative clause in (53a) are given in (54). In (54a), the RP pairs off with the head noun, while the accusative argument pairs off with the verb. Therefore, *no-ga* can only adjoin to the head noun, where it is bypassed. In (54b), however, *no-ga* pairs off with the accusative argument; as a result, it adjoins to it and is bypassed, given the accusative singularity, as shown in (54c). It is important to note that in this phase the RP being in an elementary pair with an acceptable host, the sequence of pairs need not further combine, and thus the accusative singularity is warranted.

(54) a. 

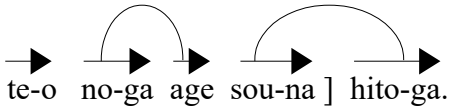
Asoko-ni te-o age-ru hito= ~~no-ga~~ ga....

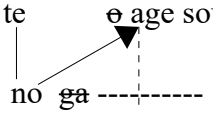
b. 

c. 

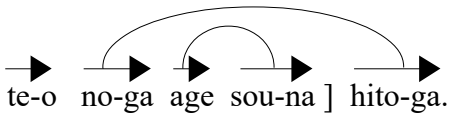
Asoko-ni te-o age-ru hito-ga...

As for the genitive-marked argument in (53b), it can be derived under the phase (55a), which includes two pairs and a leftover. Since the RP is not in a combination with a possible host, its pair must combine with the leftover. In the new pattern that results in, the negative pole of *age* is integrated into the parallelogram, and therefore the accusative case of the head and the nominative case of the RP are bypassed, as shown in (55b). In the phase (55c), the RP moves to the intended head noun and is bypassed. Finally, in the phase (55d), the RP being in an elementary pair with the accusative-marked object, it adjoins to it, and it is bypassed, given the accusative singularity.

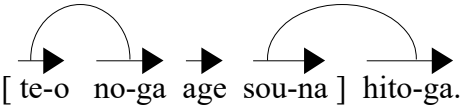
(55) a. 

b. 

Asoko-ni te = no age sou-na hito-ga...

c. 

Asoko-ni te-o age sou-na hito= no - ga ga...

d. 

Asoko-ni te = no – ga o age sou-na hito-ga...

Summing up, the RP cannot stay in situ; it must normally adjoin to the intended head noun. However given the pendulum effect, it adjoins to any noun with which it can pair off, triggering the bypass of its own case-marker and that of the host. Depending on the pattern, the accusative singularity may or may not be overridden.

6. Further justifications for this analysis

6.1 Why the case-markers are vectors

In this theory negation and *wh*-operaotors are universally ω-specified, whereas other elements may or may not have this feature on a language particular basis. Such accidental vectors can be detected by their interaction with the formers. If *wh*-movement is blocked by certain verbs, it is a strong sign that there is a superiority effect in the structure. For instance, the fact that English tensed verbs mess with both negation and object *wh*-operators is a clear indication that they are vectors (Desouvrey 2007, 2008). Pending further information, it seems that the negation test is not available in a verb final language like Japanese in which negation seems to be an agglutinative affix.

The superiority effect, as a test to detect vectors, works in both ways. If it is absent where it is expected, it must be the case that the involved elements are disabled vectors. Vectors are disabled when the PD between them is null, which happens either under affixation or adjunction. Under the present proposal, Japanese nouns and *wh*-words owe their vectorhood to their case markers. Since all of the arguments but the dative one are vectors, one may infer that Japanese vectors are mostly disabled, and therefore scrambling may take place without triggering a superiority effect. Indeed, as shown in (56) and (57) (cf. Law 2010, ex. 5 and 6), this appears to be the case. In these sentences, there is no PD between the case markers and the nouns, and therefore the arguments are inert vectors.

(56) a. Dare-ga nani-o tabeta no?
who-NOM what-ACC ate Q
'Who ate what?'

b. Nani-o dare-ga tabeta no?

(57) a. Dare-ga sakana-o tabeta no?
who-NOM fish-ACC ate Q
'Who ate fish?'

b. Sakana-o dare-ga tabeta no?

As seen above, Japanese nouns are not ω-specified, but they become vectors when they are case-marked. Since features are crucial in the merging process, the question arises as to why there is no feature clash. Let us take a closer look at the features of nouns and case markers. If the noun is the head selecting the case marker, instead of the case marker selecting the noun, the noun must be enhanced

with the relevant feature in order to handle its complement, unless there are other alternatives, as discussed in Desouvrey (2000, and earlier work). Since the case marker is ω-specified, the underspecified noun (Ø) must get this feature in the morphology before entering the syntactic derivation (see also Desouvrey 2020). This enhancement can be realized by doubling the root node, so that one branch is neutral while the other is ω-specified. This insures that verbs, which are neutral, can still merge with their case-marked arguments. Thus one can have the following pairs, (58), where enhanced features are shown in parentheses in order to distinguish them from true lexical features. On the other hand, both elements in (59a) are fully compatible so that they are directly merged in the derivation. (59b-d) show the different scenarios for the neutral dative case marker. Nouns and operators being unspecified, they are perfectly compatible with the dative marker, hence they are merged directly in the syntax, (59d). The configuration in (59c) is possible since the unspecified *ni* does not oppose (hence is compatible with) the head selecting it. However, it seems that Japanese grammar does not favor it; (59b) is used instead, that is, the case marker is enhanced with an ω-feature. This seems to be an effect of the Harmonization Principle (HP) (cf. Desouvrey 2000, 2018, etc.). By virtue of this process, a rule that obligatorily applies to enhance a head (cf. 58a,b) with the feature of its complement comes to apply whenever an element is ω-specified while the other is Ø-specified, eliminating the legitimate (59c). The HP, which presumably needs a long period to go in action, may be a source of variations within languages. Certain speakers may reject it, as well as language regulators.

(58) a. dare ga 'who-NOM'
Ø/(ω) ω

b. sakana o 'fish-ACC'
Ø/(ω) ω

(59) a. no o/ga
ω ω

b. no ni
ω Ø/(ω)

c. no ni (not used)
ω Ø

d. Hanako/dare ni
Ø Ø

Summing up, nouns and operators are vectors. Since there is no PD between a noun and its case-marker, both become inert vectors, and therefore they can commute without triggering a superiority

effect (see Desouvrey 2021, 2020, etc.).

6.2 Additional evidence for *no* as a general referring element

In the literature on Japanese relative clauses, it is common knowledge that the morpheme *no,* which appears in IHRCs, is not a referring element. This element is mostly taken to be either a complementizer (as distinct from relative pronouns) or a nominalizer, that is, a morpheme that has the property to transform a clause into a noun so as to satisfy the argument structure of a matrix verb. In my opinion, these views stem from two unwarranted assumptions that are pervasive in the history of linguistics: (i) the matrix clause must be the main clause, and (ii) the complementizer, which is not a referring element, is a constituent of the embedded clause. These ill assumptions lead to a misinterpretation of the facts.

The data that has been presented to exclude the instance of *no* in IHRCs as a referring element in fact support the idea that it is a pronoun. Important pieces of information on this morpheme can be found in Kikuta (1998). First, Kikuta points out that IHRC *no* is homophonous with another morpheme, the referential pronoun *no.* In his view, they are different since pronominal *no* can be replaced by a content noun, unlike IHRC *no.* Example (60a) indeed shows that pronoun *no* can alternate with a noun, while this is not possible with relative *no*, as shown in (60b) (see also Ohara 1992).

(60) a. Yoko-wa akai kutu-wo katte, Hanako -wa siroi -**no/kuru** -wo katta.
Yoko-TOP red shoe ACC buy Hanako-TOP white NO/shoe ACC buy-PAST
'Yoko bought red shoes, and Hanako bought white ones/shoes.'

b. Hanako-wa [[Kutu -o katta] -**no/*kutu**] -wo kokoni oite-ita.
Hanako-TOP shoe-ACC buy-PAST NO/shoe-ACC here put-PAST
'Hanako left the shoes here which she bought.' (Kikuta 1998, ex. 9)

In fact, (60b) is not conclusive; it does not entail that *no* cannot be a relative pronoun. While a simple pronoun is just a place holder for an NP, a relative pronoun has an additional property: by its very nature it must structurally relate with a noun in another clause, a fact that normally requires strict adjacency with the head noun. This adjacency requirement is normally accomplished by transformation of the input. Thus, a relative pronoun cannot simply be replaced by its referent in the output, or at some intermediate stage of the derivation; compare (61a,b) with (61c):

(61) a. The shoes [that/*shoes Mary bought] are expensive.
b. *The shoes [Mary bought the shoes/them/that] are expensive.
c. The shoes are expensive. Mary bought *that/them/the shoes.

In the present analysis, *no* in (60b) is a relative pronoun referring to *kutu* 'shoe'. If this is correct, *no* can be swapped with its antecedent, so that the embedded clause becomes the relative clause. This is borne out (cf. the discussion of (18) above). The resulting structure, shown in (62a), appears to be an input from which an EHRC can be derived. Thus, RP *no-o* adjoins to the head noun and is bypassed, as shown in (62b), which is presumably a well-formed sentence, since its derivation is similar to that of (18), repeated below as (63). Therefore, one can conclude that in (62a) *no* is used as a RP unspecified for animacy.

(62) a. Hanako-wa [**no**-o katta] [**kutu**-wo kokoni oite-ita]
b . Hanako-wa [*t* katta] [**kutu = ~~no~~ - ~~o~~** -wo kokoni oite-ita]
Hanako-wa katta kutu-wo kokoni oite-ita.

(63) a. [**no**-**ga** hasittekita] [Taroo-wa **Hanako**-**o** tukamaeta]
b. [Taroo-wa [hasittekita] **Hanako= ~~no~~ -~~ga~~** -o tukamaeta]
Taroo-wa hasittekita Hanako-o tukamaeta.

Kikuta goes on to argue that the instance of *no* in IHRCs cannot be a complementizer (i.e. a free morpheme). The key fact, as he points out, is that *no* needs a case-marker, unlike complementizer *to*, as shown in (64a) vs. (64c) (his 11). Again despite the absence of case marker on *to*, both sentences can be analyzed in the same way, as shown in (64b-d) (*t* indicates the original position of *Hanako* for the sake of clarity). Also, one may note that the sentences have the same translation, which shows that relative *no* is correctly used as a complementizer, which in my view is universally a referring element. The fact that the complementizer *to* is incompatible with case-marking can be explained by its feature structure. Under the present assumptions, it must be the case that *to* is endowed with its own thematic node, while relative *no*, just like NPs, must be supplied with a thematic node by a case marker.

(64) a. Hanako -wa [[inu-ga hasitte-kita] -**no**] -o sira-nakat-ta (Kikuta's analysis)
Hanako-TOP dog-NOM run-come-PAST NO-ACC know-NEG-PAST
b. Hanako -wa [inu-ga hasitte-kita] [*t* **no-o** sira-nakat-ta] (present analysis)
'Hanako didn't know that the dog came running.'

c. Hanako -wa [[inu-ga hasitte-kita] -**to**] sira-nakat-ta (Kikuta's analysis)
Hanako-TOP dog-NOM run-come-PAST COMP know-NEG-PAST
d. Hanako -wa [inu-ga hasitte-kita] [*t* **to** sira-nakat-ta] (present analysis)
'Hanako didn't know that the dog came running.'

If *to* is also a referring element, one must account for the fact that it cannot presumably show up in relative clauses. Pending further data, I suppose that it may be such an element that takes an event as antecedent. This event feature may come from some sentence final particle, overt or covert, which seems to be a common occurrence in Japanese grammar.

In addition, Kikuta points out that referential pronoun *no* cannot refer to human beings, as it takes a degrading connotation, unlike IHRC *no*. Compare the following examples (his 10):

(65) a. Asoko-ni orare-ru senseigata-no uti, itiban se-no-ikui- ***no**/**kata**-wo oturesite-kure.
there loc is (hon) teachers-gen among, first tall no/person acc bring along
'Of the teachers over there, bring along the one who is the shortest (honorific).' (pron)
b. Asoko-ni sensei-ga tatte-orare-ta **no**-wo oturesita. (IHRC)
there-LOC teacher-NOM stand (hon) NO-ACC bring-along
'I brought along the teacher who was standing over there (honorific).'

I argue that these data point to the fact that *no* is a neutral pronoun in (65a). It may not be used to refer to human beings because there are other dedicated pronouns with the relevant specifications (human, honorific, etc.) that block it. In English for instance, the pronoun *it* may not be used in general to refer to human beings, given the blocking effect that rejects it in favor of the best match. On the other hand, in (65b) *no* is used as a relative pronoun and may refer to any NP irrespective of animacy, precisely because there is no other relative pronoun in the language; hence its use as a complementizer as well. In English there are dedicated relative pronouns for human (*who*, *whom*) and non-human (*which*); but interestingly the relative pronoun used in complementation, *that*, is neutral and therefore it can be used to refer to any NP regardless of animacy. Moreover, according to Fujino (2013, citing Kamio 1983), *no* cannot stand as an independent complement of a verb, as in **no-o katta* '(I) bought one'. This fact suggests that *no* is a special pronoun that must be used in certain restricted contexts. Thus, the fact that it cannot normally refer to human in certain contexts does not entail it cannot fill the function of relative pronoun.

A further piece of evidence that supports the analysis of *no* as a general referring element and a

constituent of the matrix clause in IHRCs can be found in Ohara (1992). Ohara observes that an acceptable IHRC cannot be derived if *no* is marked with dative case, as shown in (66b); such a restriction does not exist with the EHRC in (66a). A further well-formed sentence with *no-ni* can be seen in (66c) (adapted from Kitagawa 2019, referring to Kuroda 1999).

(66) a. Taroo-wa [hasittekita] Hanako-**ni** purezento-o watasita. (EHRC, Ohara's 5a)
Taroo-TOP came-running Hanako-DAT present-ACC handed
'Taroo handed a present to Hanako who came running.'

b. *Taroo-wa [Hanako-ga hasittekita] **no-ni** purezento-o watasita. (IHRC, Ohara's 5b)

c. [Keikan-wa otokoi-ga te-o age-te deteki-ta] [**no-ni** taiatari-o-kurawase-ta]
cop-TOP man-NOM hand-ACC raise-and come.out-PAST NO-DAT tackle-PAST
'A policeman tackled a man who had come out with his hands up.'

If (66b) is representative of three-argument verbs in Japanese, it is obvious that the dative argument cannot handle an IHRC. Three-argument verbs such as *to hand*, *to give*, etc., universally possess a dative argument (indirect object) and a theme (direct object). On the other hand, a verb like *tackle* is idiosyncratic in that the case of its internal argument may vary cross-linguistically; such a verb can thus be referred to as a spurious dative, as opposed to genuine dative verbs like *give.* I claim that a complement clause mediated by a complementizer is universally the direct object. This is supported by the fact that in languages which distinguish relative pronouns by case, it is always the direct object relative that is used in complementation. For instance, one has *that* in English as opposed to *(to) whom/ (to) which*, *que* (not *(à) qui*) in French, *dass* (not *die*) in German, etc. Then since IHRCs have the same structure as complement clauses, as shown above, it must be the case that the dative argument cannot stand for the complement clause as long as there is a direct object. Presumably this may not apply to simple transitive verbs with a spurious dative like *taiatari-o-kurawase* ('to tackle') in (66c), which can be a matrix relative for an embedded main clause. In any case, These facts show that *no* is neither a nominalizer nor a constituent of the embedded clause, since its use is sensitive to its function in the matrix clause.

Furthermore, in his attempt to characterize the syntax of IHRCs, Ohara (1992) observes that a sentence with an IHRC can be passivized, suggesting that passivization is a proof that *no* is a nominalizer. In effect, the IHRC in (67a) (discussed above) can be passivized, as shown in (67b).

(67) a. Taroo-wa [Hanako-ga hasittekita] no-o tukamaeta.

b. [Hanako-ga hasittekita] no-ga Taroo-ni tukamaerareta. (Ohara's 6b)
Hanako-NOM came-running-PAST No-NOM Taroo-by caught-PASSIVE-PAST
'Hanako who came running was caught by Taroo.'

This test, however, does not prove the point. On the contrary, it supports the present analysis. In general, there is nothing that prevents a relative clause or any pronominal direct object from being passivized, as can be seen in (68). Thus, one can conclude that *no* is a pronoun and a constituent of the matrix clause.

(68) a. [Taro caught her / she was caught by Taro] [as she came running]
b. The house [*that* Mary bought]... / the house [*that* has been bought by Mary]...

Summing up, a reinterpretation of the evidence presented in the literature supports the view that *no* is a referring element. Actually, it is an unspecified element which can be used either as a case marker (genitive anaphor), a relative pronoun or a neutral pronoun referring to inanimates.[18] These three different uses of *no* are easily distinguishable: genitive *no* must be associated with a modifying NP, while relative *no* must have an antecedent in the structure as well as a case marker. As for its use as a neutral pronoun, *no* may not refer to humans, and it cannot be a standalone argument.

7. Conclusion

I have argued that Japanese realizes relativization with *no*, providing evidence that it is a general referring element which is also used as a genitive marker and a neutral pronoun. Being a vector, relative *no* is barred from the output in EHRCs by the parallelogram law. Its appearance in the so-called IHRCs is due to the fact that it cannot be used as an anaphor in relativization, given that its case marker automatically supplies it with a thematic node. Being a vector, just like nominative- and accusative-marked arguments it may adjoin to either as it can pair off with them under the pendulum effect. By the parallelogram law, it supplants the nominative marker, while the accusative marker is protected by its singularity. In Kansai Japanese, however, the parallelogram can be extended into the first segment of irrealis verbs, and thus the accusative singularity is overridden, allowing AGC to take place.

This analysis brings to light further vector properties, which may or may not be specific to

18 As mentioned above in the text, a relative pronoun must relate to a noun in another clause. At this point, this property is not reflected in their feature structure so that there is no fundamental difference with a personal pronoun. This seems to be the case in Japanese, where *no* has multiple functions. In English and like- languages, I assume that relative pronouns and personal pronouns belong to different paradigms. This insures that, every other things being equal, relative *that* and personal *it*, for instance, may not compete, as in *the car that/*it Mary bought*, since they belong to different paradigms.

Japanese: (i) downgraded vectors must be eliminated in the derivation; (ii) a vector has two poles defined by its first segment (positive) and its last segment (negative), and the resultant must run from a positive pole to a negative pole or vice versa; (iii) a one-segment vector only has one pole and cannot be bypassed if the resultant runs through it; and (iv) the facts discussed here make it possible to state a well-formedness condition which rules out any pairing across a leftover. This analysis strengthens the vector theory and supports the analysis of the German complementizer, which is bypassed under V2, given the parallelogram law. In the light of this theory, whenever an element has gone missing in the output, a bypass effect induced by the parallelogram law must be the prime suspect.

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