To appear in *Linguistics and Philosophy*

Adjectival Relatives

Toshiyuki Ogihara

University of Washington

Univ. of Washington, Department of Linguistics

Box 354340

Seattle, WA 98195-4340, U.S.A.

email: ogihara@u.washington.edu

Phone: (206) 685-4282 (direct), (206) 543-2046 (dept.)

fax: (206) 685-7978 (dept.)

---

* Earlier versions of this article were presented at Tohoku University, the University of British Columbia, Kyoto University, and the University of Washington. I thank the audiences at these occasions and, in particular, Yasuaki Abe, Kiyomi Kusumoto, Lisa Matthewson, Henry Davis, Yukinori Takubo, Satoshi Kinsui, Karen Zagona, Yuki Matsuda, Laurel Preston, Stephen Hollister, Beth Levin, and the three anonymous *Linguistics and Philosophy* reviewers. I also thank Ann Gaponoff for her proofreading help. All remaining errors and inadequacies are my own. The proposal advanced here is similar to Kusumoto's (2002) account in many ways. This is mainly because of our interactions. Kusumoto (2002) cites an earlier version of this article, and I now adopt some specific proposals Kusumoto (2002) makes. Kusumoto's paper was not available until the final stage of the revision of this manuscript. Therefore a detailed comparison of the two proposals must await another occasion.

Abstract: This article discusses what may be referred to as “adjectival relatives” in Japanese and related constructions in other languages (such as adjectival passives in English). The most intriguing characteristic of this construction is that the verb contained in it occurs in the past tense form, but its primary role is to describe a state that obtains at the local evaluation time, rather than the past event that produced this state. In fact, in some cases, the putative event that presumably produced the target state is non-existent, and the entire construction receives a purely stative interpretation. In other words, it is possible for an adjectival relative to describe a target state without having its triggering event. The proposal I put forth in the article states that what I refer to as an adjectival relative does not have a clausal structure. It rather has a verbal projection (technically a Tense Phrase). **Mod** (the modifier head) then combined with TP to yield a MP (modifier phrase), which denotes a property of states that appear to have resulted from an event the verb describes. In order to reach this conclusion, I adopt two additional ideas: (i) Kratzer’s (1996) idea that the so-called external argument of a verb is not really its argument at all; (ii) Direct causation does not have to be overtly represented in natural language syntax (Bittner 1999). Having incorporated these two ideas, the proposal explains the relation between the state that the adjectival relative describes and the putative event as a modal one, thereby accounting for the non-existence of putative past events in some examples.

1. Introduction

This paper discusses a type of Japanese adnominal modifier that contains a verb in the past tense (V-*ta*) and is used for an adjectival interpretation. (1) is a typical example.

(1) Taroo-wa [simat-ta tobira]-o mitumete iru.
Taro-TOP [close-PAST door]-ACC look-at-PROG-PRES
‘Taro is looking at the closed door.’

The phrase *simat-ta tobira* 'closed door' simply indicates the *current* state of the door's being closed, and the meaning of *simat-ta* 'close (intransitive verb) PAST' is very much like that of a regular adjective. It is important to note here that the past tense morpheme *-ta* suffixed to the verb does not have the expected preterit meaning. That is, (1) does not entail that there was a past event of the door's closing. Since this construction appears to have a relative clause structure, we will refer to it as an **adjectival relative** construction. Semantically, this construction clearly resembles the adjectival passive construction in English and many other European languages such as German (Kratzer 2000). The Japanese adjectival relative and the English adjectival passive both involve an inflected form of a verb and describe a state that results from the event designated by the verb.

To account for adjectival interpretations associated with adjectival relatives, I will present a proposal that incorporates three major ideas: (i) what I call "adjectival relative" does not have a clausal structure; it is inherently "subjectless"; (ii) Kratzer's idea that the so-called "external argument" of a verb is not an argument of this verb; (iii) the idea that resultative constructions involve direct causation and that no overt linguistic form is required for expressing a direct causation relation. The idea that resultatives involve direct causation is discussed by Goldberg (1995) and is incorporated into a formal semantic framework by Bittner (1999).[1] Put informally, the proposal to be defended in this paper contends that *simat-ta tobira* 'close-PAST door' in (1) refers to a/the door that has a state *s* such that *s* appears to have resulted from a past event of closing (where **V-ta** is an adjectival relative). This accounts for the absence of triggering events associated with some adjectival relatives.

The overall organization of the paper is as follows. Section 2 introduces the reader to all relevant data and some crucial observations. Section 3 discusses Abe's proposal and some related issues.

---

[1] In the rest of this article, I will mainly refer to Bittner's proposal because I will adopt her formal interpretation of the concept of direct causation. Some relevant discussion regarding resultatives and causation is also found in Kaufmann (1995), Wunderlich (1997), and Bierwisch (2002).

Our formal investigation of adjectival relatives starts in Section 4 with the standard formal semantic account of regular tense morphemes in relative clauses, which is followed by some preliminary (but formal) analyses in Section 5 of tense morphemes in adjectival relatives. Section 6 presents the fully formalized account of adjectival relatives, and Section 7 some residual issues.

2. Preliminaries

Let us start our discussion by examining the examples (2a-b), each of which contains the Japanese verb *taore* 'fall over'.

(2) a. Hasira-ga taore-ta.
pole-NOM fall-PAST
'A pole fell over.'

b. Hanako-wa [taore-ta hasira]-o mite iru.
Hanako-TOP fall-PAST pole-ACC look-PROG-PRES
Preferred reading: 'Hanako is looking at a pole which is lying on the ground (and this state was caused by its having fallen over).'

(2a) only receives an eventive interpretation. That is, it asserts that the event of the pole's falling over occurred in the past and does not require that the pole be lying on the ground at the utterance time. By contrast, the relative clause in (2b) is ambiguous between an adjectival interpretation and an eventive interpretation. Its adjectival interpretation indicates the state of the pole's lying on the ground. The natural assumption would be that this state is brought about by the pole's having fallen over. But the native speaker has strong intuition that the relative clause is used to indicate the current state and not the triggering event. When the matrix clause is in the present tense as in (2b) and the relative receives an adjectival interpretation, the state of the pole's lying on the ground is required to

obtain at the utterance time. This is unexpected under the standard analysis of the past tense morpheme *-ta*. If *-ta* is a preterit, then it should only require that a relevant event take place wholly in the past; it should not require that its result persist until the utterance time. For the purpose of this paper, an adnominal modifier that contains a verb in the past tense (*-ta*) and has an adjectival interpretation will be referred to as "adjectival relative."[2] Although this term turns out to be a misnomer for the purpose of my proposal, the reader is asked to regard it as a convenient label for the type of adnominal modifier exemplified by the one in (2b). (2b) can also receive a non-preferred "eventive" interpretation that parallels the one associated with (2a): Hanako is looking at a pole that fell over in the past (but has since been restored in the original upright position). This interpretation is forced upon us when the adnominal modifier is accompanied by an adverb like *kinoo* 'yesterday'. The distinction between "target state" and "resultant state" drawn by Parsons (1990) is important here. We shall see below that the state conveyed by an adjectival relative is a special case of what Parsons (1990) terms "target state". This contrasts with what Parsons calls "resultant state", which is permanent. Parsons (p. 235) notes:

(3) It is important not to identify the Resultant-state of an event with its "target" state. If I throw a ball onto the roof, the target state of this event is the ball's being on the roof, a state that may or may not last for a long time. What I am calling the Resultant-state is different; it is the state of my having thrown the ball onto the roof, and it is a state that cannot cease holding at some later time.

I will use Parsons' terms in what follows.

A brief note on Japanese relative clauses is in order here. The most natural interpretation of a relative clause in Japanese is one in which its temporal interpretation is determined in relation to the

---

[2] Given this definition, a relative clause containing an adjective or stative verb is not covered by the term "adjectival relative."

tense morpheme in the minimal containing clause (i.e., the matrix clause for a simple sentence) (Ogihara 1996). Consider examples in (4).

(4) a. Taroo-wa [uta-o utat-te iru otoko]-o mite iru.
Taro-TOP song-ACC sing-PROG-PRES man-ACC watch-PROG-PRES
'Taro is watching a man who is singing a song.'

b. Taroo-wa [uta-o utat-te iru otoko]-o mite ita.
Taro-TOP song-ACC sing-PROG-PRES man-ACC watch-PROG-PAST
'Taro was watching a man who was singing a song (then).' or
'Taro was watching a man who is now singing a song.'

(4a) and (4b) contain identical relative clauses, which are in the present tense. The matrix clause in (4a) is in the present tense, whereas the matrix clause in (4b) is in the past tense. This difference produces a semantic difference in (4a) and (4b), which contain identical relative clauses: the time of singing must be located at the utterance time in (4a) but can be located at the past time of watching him in (4b). (4a–b) show that each relative can be interpreted in relation to the closest c-commanding tense.[3] The tense morpheme in a relative clause can also be interpreted independently of the tense in the matrix clause, and this produces ambiguity in cases like (4b). To avoid this type of complication, I will restrict my attention to examples in which the matrix clause is in the present tense. This will enable us to concentrate upon the meaning of relative clauses *per se*. A more detailed discussion of tense morphemes in relative clauses is found in Section 4.

The interpretation of Japanese adjectival relatives is analogous, if not identical, to that associated with English past participles used in adjectival passives. Consider the examples in (5).

---

[3] Ogihara (1996) appeals to QR to account for the fact that the relative in (4b) can be interpreted independently of the matrix tense. According to this account, a relative clause is interpreted in relation to the closest (c-)commanding tense at LF.

(5) a. This paper is published.

b. There are some fallen leaves on the street.

(5a) is an instance of adjectival passive. It means that the paper is now in print as a result of having been published at an earlier time. (5b) exemplifies a past participle used as an adnominal modifier. The participle *fallen* describes the state of the leaves being on the ground as a result of their having fallen. Both examples are adjectival in that they primarily indicate a current state associated with the entity in question, and this state is a result state of the event indicated by the verb in question. This is a characteristic shared by Japanese adjectival relatives and English adjectival past participles.

Japanese adjectival relatives and English adjectival past participles share one other important characteristic with regard to the thematic roles associated with the modifiee. In most cases, a Japanese DP containing an adjectival relative denotes an individual whose thematic role is theme or incremental theme in Dowty's (1991) terms in relation to the event described by the verb.[4] To be more precise, in order for the relevant relative to receive an adjectival interpretation, this entity must acquire a clearly identifiable property, typically a locational or physical characteristic, as a result of participating in a relevant event.[5] For example in (2b), the head noun *hasira* 'pole' is the theme, and the entity denoted by this noun acquires the state of lying right after a falling event takes place. Similarly, the English sentence (5b) entails that some leaves are now in a state brought about by their falling. In a typical situation, this means that they are now on the ground. It is also important to note that in many cases adjectival relatives are "purely adjectival" to the degree that the existence of

---

[4] The simplifying assumption made here is that the NP/DP in question behaves like a definite expression. Needless to say, it can receive different (e.g. indefinite or generic) interpretations as well.

[5] Dixon's (1982) cross-linguistic study shows that natural language prefers deverbal forms to indicate physical properties of objects. Adjectival relatives in Japanese conform to this pattern.

a putative triggering event is not entailed (Kindaichi 1950 and many other subsequent works). For example, on its adjectival interpretation (6a) describes the shape of the spoon in question as not being straight. This state could have been caused by someone's bending it at some past time; the spoon could have been created that way. In a case like this, the semantic difference between an adjectival and non-adjectival reading is clear.

(6) a. magat-ta sazi
bend-PAST spoon
'a/the spoon that got bent' or 'a/the spoon that is bent'

b. $\{\langle w, t, x\rangle \mid$ there is a past time t_1 earlier than t such that x gets bent at t_1 in $w\}$

c. $\{\langle w, t, x\rangle \mid x$ is bent at t in $w\}$

Assume that (6b) is the denotation of *magat-ta* 'bend-PAST' in (6a) when it receives a resultant state (or non-adjectival) interpretation. Assume also that (6c) is the denotation of the adjectival reading of *magat-ta* 'bend-PAST'. Then it can be proven that the two readings are distinct in that neither is a subset of the other: (i) there is a triple $\langle w_1, t_1, y\rangle$ such that $\langle w_1, t_1, y\rangle \in$ (6b) and $\langle w_1, t_1, y\rangle \notin$ (6c) (because a thing that got bent at a past time may not be in the same shape now) and (ii) there is a triple $\langle w_2, t_2, z\rangle$ such that $\langle w_2, t_2, z\rangle \notin$ (6b) and $\langle w_2, t_2, z\rangle \in$ (6c) (because an object that is bent now is not necessarily something that underwent a bending event at a past time). Although the adjectival interpretation attributed to *magat-ta* 'bend-PAST' in (6a) must be slightly polished later, we can safely conclude that adjectival readings are independent and genuine interpretations associated with Japanese adjectival relatives.

When the individual described by the head noun does not receive a locational or physically specifiable target state, the relative does not yield an adjectival interpretation. Consider the examples in (7).[6]

(7) a. Otoko-wa CD-o kat-ta.
man-TOP CD-ACC buy-PAST
'The man bought a/the CD'

b. [$_{DP}$ CD-o kat-ta otoko]-wa Hanako-no koibito-da.
CD-ACC buy-PAST man-TOP Hanako-GEN boyfriend-BE
'The man who bought a/the CD is Hanako's boyfriend.'

c. [$_{DP}$ otoko-ga kat-ta CD]-wa ninki-ga aru.
man-NOM buy-PAST CD-TOP popularity-NOM exist-PRES
'The CD that the man bought is popular.'

d. ? a bought CD

e. ? This CD is (already) bought.

The head noun of the relativized DP in (7b) is the agent (*otoko* 'man') associated with the event, and no adjectival interpretation is available. In (7c), the head noun *CD* 'CD' is a patient and does not receive any easily identifiable state as a result. Therefore, no adjectival interpretation is found with (7c). This parallels the fact that no adjectival reading can be attributed to the English examples (7d) and (7e), if they are acceptable at all. The CD and the man do obtain new properties after participating in the relevant event. The CD obtains the property of having been purchased by the

---

[6] Ackerman and Goldberg (1996) claim that a putative adjectival passives such as (4d–e) are acceptable only if they describe **informative states**. For example, *fed child* is unacceptable, but *well-fed child* is. Since children are expected to be fed, the former is uninformative unlike the latter. This gives us a partial characterization of adjectival relatives/passives but not the whole picture.

man, and the man the property of having purchased the CD. However, there are no *lexically specified* properties that these two entities come to possess that are distinct from these properties.[7]

This point can be made clearer by paraphrasing adjectival relatives. The meaning associated with an adjectival relative can be made explicit by suffixing the expression *zyootai no* 'in the state (of)' without any appreciable change in meaning as exemplified by (8a–b). On the other hand, a "regular relative" cannot be paraphrased this way as shown in (8c–d).

(8) a. ai-ta mado
open-PAST window
'window that is open' (Lit.: 'window that opened')

b. aita zyootai-no mado
open-PAST state-GEN window
'window that is in the state of having opened'

c. hon-o yon-da hito
book-ACC read-PAST person
'person who read/has read a/the book'

d. ?? hon-o yon-da zyootai-no hito
book-ACC read-PAST state-GEN person
'person who is in the state of having read a/the book'

---

[7] Note that the CD does obtain a property distinct from properties like {<*w*, *t*, *x*>| there is a time t_1 earlier than *t* such that the man bought *x* at t_1 in *w*} after it is purchased by the man, namely {<*w*, *t*, *x*>| the man owns *x* at *t* in *w*}. (Similarly for the CD.) The point here, however, is that the relative clause in (7c) can never be used to indicate that the CD has this property now. According to the proposal I defend, this is because the property in question is not physical or locational in nature.

(8a) and (8b) are virtually synonymous. On the other hand, (8d), if meaningful, is not synonymous with (8c). That is, (8d) sounds as if it describes a person who stopped moving as soon as s/he finished reading the book and is still in that state. This is odd not only because it is a very implausible situation but because there is no lexically specified physical state associated with the person when a book reading is complete. This shows that an adjectival relative indeed describes a property of individuals being in a particular state, presumably in a physical state, or being at a location. To sum up, an important requirement for the head noun of an adjectival relative is that it denote an entity that undergoes a change specified by the verb and comes to possess a concrete stative property brought about by the change in question.[8] I should note, though, that this condition is a necessary but not a sufficient condition for a relative clause to receive an adjectival interpretation.

3. Abe's Proposal

Abe (1993) observes that relative clauses in examples like (9) are not adjectival despite the fact that after the boiling of an egg is complete, the egg does have a physically detectable property: being hard-boiled. The relative clause in (9) only receives the preterit interpretation as indicated by the English gloss in that the egg in question is characterized in terms of what happened to it in the past (i.e., undergoing an event of getting boiled), not in terms of what physical or locational property it currently has.

(9) Kore-wa Taroo-ga yude-ta tamago-da.
this-TOP Taro-NOM boil-PAST egg-be
'This is an egg that Taro boiled.'

[8] At this point, the term "stative property" is used in an intuitive and non-technical sense.

This intuition can be confirmed by comparing examples like (10a) and (10b). The relative in (10a) does not have an overt subject and strongly suggests an adjectival interpretation and is not compatible with the meaning of the main predicate. On the other hand, the relative in (10b) has no adjectival interpretation (i.e., receives a preterit interpretation) and is compatible with the meaning of the main predicate.

(10) a. ?Hutatu-ni ot-ta hankati-ga
in-two fold-PAST handkerchief-NOM
ima teeburu-no ue-ni orazuni hirogete aru.
now table-GEN surface-at unfolded -PROG-PRES
'A handkerchief folded in two is on the table unfolded.'

b. Taroo-ga hutatu-ni ot-ta hankati-ga
Taro-NOM in-two fold-PAST handkerchief-NOM
ima teeburu-no ue-ni orazuni hirogete aru.
now table-GEN surface-at unfolded spread-PROG-PRES
'The handkerchief Taro folded in two is now on the table unfolded.'

In the Japanese example (2b) (repeated here as (11)), the sole argument of the verb behaves like an object argument in that it bears a THEME thematic role in relation to the verb and not an AGENT thematic role.

(11) Hanako-wa [taore-ta hasira]-o mite iru.
Hanako-TOP fall-PAST pole-ACC look-PROG-PRES
Preferred reading: 'Hanako is looking at a pole which is lying on the ground (and this state was caused by its having fallen over).'

Borrowing the term introduced by Perlmutter (1978), Tsujimura (1991) refers to verbs like *taore* 'fall over' in (2b) as unaccusative verbs. Most instances of Japanese adjectival relatives conform to this pattern. There are examples of adjectival relatives that involve non-unaccusative verbs, however. Takezawa (1983), Abe (1993) and Kinsui (1994) point out that some agentive transitive verbs can be used in the *-ta* form in relative clauses to yield adjectival interpretations. This happens when the relative clause has no overt subject. Consider examples like (12a–b).

(12) a yude-ta tamago
boil-PAST egg (where 'boil' is a transitive verb)
'[a] boiled egg'

b. e-ni kai-ta moti
picture-DAT draw-PAST rice cake
Lit. 'rice cake that is drawn in a picture'

Here, the head noun (i.e. the modifiee) is associated with a non-agentive thematic role such as theme or patient. As mentioned above, Abe notes that when an overt agentive subject NP is present as in (9), the relative does not receive an adjectival interpretation. Abe also discusses examples like (13a–b) and show that the entity associated with the modifiee must acquire some salient property. When this condition is not satisfied, no adjectival reading results. (13a–b) do not receive adjectival readings presumably because buying an apple gives no physically determinable property to it distinct from the property of having been purchased.

(13) a. kat-ta ringo
buy-PAST apple
'[an] apple that [someone] bought'

b. mituke-ta tamago
find-PAST egg

'[an] egg that [someone] found'

In Romance languages, unaccusative verbs can be characterized in terms of their syntactic properties such as the behavior of clitics and co-occurring auxiliary verbs. Thus, Burzio (1986) characterizes unaccusative verbs as those that require their sole arguments to be located in the "internal argument position" (i.e., the same syntactic position occupied by the direct object DP of an agentive transitive verb). By contrast, so-called unergative verbs, which are also intransitive verbs (i.e., verbs that only require one nominal argument), require their sole arguments to occupy an "external argument position," the same position that the agentive subject of an agentive transitive verb occupies. This enables us to distinguish between two types of intransitive verbs in syntactic terms and is called **the Unaccusative Hypothesis**. I will adopt this hypothesis for Japanese as well.

There are some intriguing parallels between Japanese and English concerning adjectival interpretations of verb forms. Typical examples of adjectival past participles in English involve an agentive transitive verb and the modifiee that bears a non-agentive thematic role associated with the object NP/DP of the verb as in (5a). This is similar to (12a–b). In addition, there are some unaccusative verbs that yield adjectival interpretations in their past participle forms as shown in (5b). Note here that no explicit reference can be made to the agent in that when the agent is mentioned the adjectival reading is unavailable. This is shown in (14).

(14) The door is closed by John.

(14) cannot receive an adjectival interpretation if it is meaningful at all. That is, (14) cannot describe one particular state of the door's being closed brought about by John's closing it at some past time. Recall that the Japanese examples given in (12) must not contain an NP that bears an agentive thematic role.

Given the foregoing discussion, Abe (1993) proposes an account of the above Japanese data. Abe's account is based upon the generalization that a relative clause containing an agentive

transitive verb can receive an adjectival interpretation when the agentive subject DP does not occur overtly in the relative clause nor is it co-indexed with the empty category in the subject position (i.e. does not bear an agentive thematic role). For example, the relative clause in (15a) contains an overt agentive subject and therefore cannot receive an adjectival reading. The one in (15b) contains an empty category that is coindexed with the head noun that has an agentive thematic role. Thus, it cannot receive an adjectival reading, either. By contrast, (15c) can be an adjectival relative since the empty subject position is not associated with an agentive thematic role.[9]

(15) a. [Taroo-ga e_i yude-ta] $tamago_i$
Taro-NOM boil-PAST egg
'an/the egg that Taro boiled'

b. [e_j tamago-o yude-ta] $hito_j$
egg-ACC boil-PAST person
'the person who boiled an/the egg'

c. [e e_i yude-ta] $tamago_i$
boil-PAST egg
'a/the boiled egg'

In Abe's terms, the empty subject position not coindexed with an agentive head noun is a dethematized position. In this case, the empty subject position comes to bear a "resultative" role,

---

[9] The indexing is that of Abe. For the purpose of semantic interpretation, we can assume the following:

(i) $[\![[_{DP}\ S\ NP_n]]\!]^g = [\iota\ x\ .\ [\![[_{DP}\ S\ NP_n]]\!]^{g[x/n]} = 1 \text{ and } [\![NP]\!]^g(x) = 1]$
[Note: ι x reads 'the unique x'.]

which is a three-place relation involving two eventualities (corresponding to the "event" and the "result state") and an individual. Abe characterizes a dethematizable position in terms of the Spec(IP) position. Abe's generalization can be stated as in (16).

(16) **Abe's Generalization**

A relative clause can convey an adjectival interpretation when the Spec(IP) position of this relative clause is not associated with an agentive thematic role, i.e. is a dethematized position.

Based upon this generalization, Abe contends that when the subject position is not associated with any expression that bears an AGENT thematic role, it can bear a result role. Abe argues that this is the source of adjectival interpretations of Japanese adjectival relatives.

To defend Abe's position, one needs to adopt the Unaccusative Hypothesis (Perlmutter 1978, Burzio 1986) and to assume that the "internal argument position" is VP-internal, whereas the "external argument position" is VP-external, the position Spec(IP) to be more specific. Consider examples in (17).

(17) a. Taroo-wa [kabe-ni kizu-ga tui-ta] ie-o mite iru.
Taro-TOP wall-DAT scratch-NOM stick-PAST house-ACC see-PROG-PRES
'Taro is looking at a house whose wall has scratches'

b. Taroo-wa [ana-ga ai-ta] kabe-o mite-iru.
Taro-TOP hole-NOM open-PAST wall-ACC see-PROG-PRES
'Taro is looking at a wall that has a hole.'

c. Taroo-wa [yuki-ga tumot-ta] miti-o aruite iru.
Taro-TOP snow-NOM accumulate-PAST road-ACC walk-PROG-PRES
'Taro is walking on a road covered by snow.'

The relative clause in (17a) contains a nominative-case-marked (i.e., *ga*-marked) noun but receives an adjectival interpretation and indicates that the wall has scratches now. Similarly for (17b–c). If a *ga*-marked expression were always a subject, Abe's generalization would not hold. Note, however, that the *ga*-marked nominals in (17) do not bear an agent role. Thus, each *ga*-marked nominal in (17) is an internal argument and is therefore VP-internal. In this way, I can defend Abe's generalization about adjectival relatives.

4. The Standard Analysis of Tense Morphemes in Relative Clauses

Our investigation starts with a formal syntactic and semantic analysis of relative clauses. Throughout this article, I adopt the notation of Heim and Kratzer (1998) for representing semantic entities. The types of basic semantic entities assumed in this article are given in (18).

(18) D_e = the set of (normal) individuals
D_{ev} = the set of events
D_{st} = the set of states
D_i = the set of intervals
D_s = the set of worlds
D_t = the set of truth values = {0, 1}

In general, for any types *a* and *b*, $D_{<a,b>}$ indicates the set of all functions from D_a into D_b. The proposal to be defended in this article will use a small subset of complex semantic entities obtained from the above primitives.

It is assumed in the syntactic literature that a relative clause in English is a clause with a gap (i.e., an open sentence) that is co-indexed with a *wh*-expression located in the Comp (Ross (1967), Chomsky (1977), and many others) as in (19a) and is interpreted in formal semantics as a property

abstracting over this gap as in (19b) (e.g., Montague (1973), Rodman (1976), see also Heim and Kratzer (1998)).

(19) a. $[_{CP}$ who/which$_n$ $[_{IP}$ ... e_n ...]] (Note: n is any natural number.)

b. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. x ... at t in w]]

The internal structure of the DP that contains a relative clause is controversial, but for the purpose of semantic interpretation, what is standardly assumed (based upon the DP hypothesis proposed by Abney (1987)) for (20a) is (20b).

(20) a. the man who is happy

b. $[_{DP}$ $[_{Det}$ the]$[_{NP}$ $[_{NP}$ man]$[_{CP}$ who$_1$ e_1 is happy]]]

This means that the NP *man* is a sister of the relative clause CP. The denotation of the NP *man who I met* is obtained by intersecting the extensions of the two immediate constituents. To be precise, the semantic rule is (21a), and the denotation of the larger NP is what is given in (21b).

(21) a. Predicate Modification (à la Heim and Kratzer (1998))

$[\![[_{NP}$ $[_{\mathbf{NP}}$ ...]$[_{\mathbf{CP}}$ ...]]$]\!]$ = $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $[\![[_{\mathbf{NP}}$ ...]$]\!](x)(t)(w)$ = 1 and $[\![[_{\mathbf{CP}}$ ...]$]\!]$ $(x)(t)(w)$ = 1]]

b. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. x is a man at t in w and x is happy at t in w]]

A determiner denotes a function that applies to the NP denotation (i.e., a set of individuals) and yields a generalized quantifier (i.e., a set of sets of individuals).

Let us assume, for the sake of argument, that the above analysis of English relative clauses carries over to Japanese. Note that this analysis is by no means uncontroversial because Japanese has no overt relative pronouns or expressions that resemble *wh*-expressions in English. Thus, in

order to adopt the above proposal for Japanese, I must posit covert *wh*-operators. (22a) is then syntactically represented as in (22b), where e_1 indicates the position of the subject.[10] Assuming that (22b) contains no overt or covert determiner, it is interpreted as in (22c).

(22) a. nai-te iru otoko
cry-TE IRU-PRES man
'(a/the) man who is crying'

b. $[_{NP}[_{CP}[_{IP}\ e_1$ nai-te iru$]\ wh_1][_{NP}$ otoko$]]$

c. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. *x* is a man at *t* in *w* and *x* is crying at *t* in *w*]]

The verb in (22a) is in the "present progressive" (*-te iru*) form and the entire verbal form behaves like a stative verb. Thus the time of the man's crying is co-temporal with the "evaluation time" for the entire DP.

Let us now turn to the examples (23a–b) (presented earlier as (2a–b)) to see what truth conditions are predicted for them on the basis of this standard analysis of the morpheme *-ta*.

(23) a. Hasira-ga taore-ta.
pole-NOM fall-PAST
'A pole fell over.'

b. Hanako-wa [taore-ta hasira]-o mite iru.
Hanako-TOP fall-PAST pole-ACC look-PROG-PRES
Preferred reading: 'Hanako is looking at a pole which is lying on the ground (and this state was caused by its having fallen over).'

---

[10] For the purpose of this article, I simply assume without argument that Japanese has covert determiners and, therefore, have DPs.

Although (23a–b) do not contain overt determiners, I assume for the purpose of this article that they contain covert determiners because they receive an interpretation analogous to a definite description in English. I assume also that *-ta* is used in both (23a) and (23b) for a preterit interpretation. The truth condition of (23a) is described as in (24a), and that of (23b) as in (24b). Here, the past tense morpheme *-ta* is understood to involve existential quantification over past times. Under a referential analysis of tense such as Enç (1987), there would be no existential quantifier for times, but choice between these two analyses would not change the main point of our discussion here.

(24) a. There is a t_2 such that $t_2 <$ *now* and there is a pole *x* at t_2 and *x* falls at t_2.

b. There is a t_2 such that $t_2 <$ *now* and there is a pole *x* at t_2 and *x* falls at t_2 and Hanako is looking at *x now*.

Note: *now* indicates the utterance time.

According to (24a–b), both (23a) and (23b) require that there be a past time at which a pole fell over. Crucially, (24b) does not require that a pole be lying down at the utterance time. Thus, the past tense morpheme *-ta* produces exactly the same semantic effect in (23a) and (23b) according to the above analysis of relative clauses and the morpheme *-ta*.[11] However, the relative clause in (23b) can actually receive an adjectival interpretation as observed above. Since the standard account of the morpheme *-ta* predicts the right result in non-relative clauses, an explanation must be found as to why the same morpheme can produce adjectival interpretations in relative clauses (and nowhere else).

---

[11] It is important to note here that the entire clause in (2b) is in the present tense, and this makes sure that no scoping (if the above theory is correct) changes the semantic contribution of the morpheme *-ta* in the relative clause.

5. What do Adjectival Relatives Mean?

Let us now attempt to semantically characterize adjectival relatives. According to our pretheoretical intuitions, Japanese adjectival relatives and English adjectival past participles denote "stative properties" — properties typically associated with adjectives and stative verbs. Extending the standard assumption regarding stative sentences (Bennett and Partee (1972), Dowty (1979, 1986) and many other related works), I shall define stative property in terms of the **subinterval property** (renamed here as **subinterval character** to avoid ambiguity in the expression *property*) as in (25a) and define stative predicate as in (25b) in terms of it.

(25) a. A property $P \in D_{<e,<i,<s,t>>>}$ has **subinterval character** iff for any individual *a*, interval of time *t*, and world *w* such that $P(a)(t)(w) = 1$, $P(a)(t_2)(w) = 1$ for any subinterval t_2 of *t*.

b. A predicate (VP, relative clause, etc.) α is a **stative predicate** iff α has subinterval character.

Consider now the examples in (26). (26a) is a lexical adjective and its denotation in (26b) clearly has the subinterval character. (25c) is an adjectival relative, and I tentatively assume that its denotation is the function given in (26d). This would mean that the meaning of an adjectival relative is like that of a perfect aspect characterized in terms of a past event and its target state.[12] (This

---

[12] I follow the standard literature such as Comrie (1976) and Smith (1991) in that I use the term "perfect" to refer to the aspectual meaning associated with the current relevance or resultant state arising from a past event. The term "perfective" is used in the literature to refer to a concept analogous to what I call "relative past" (Ogihara 1996). In order to avoid confusion, I simply avoid the use of the term "perfective" and instead use the term "preterit" to refer to "perfective aspect" or "relative past".

assumption will be revised below.) (26d) has subinterval character as desired.[13] (26e) is not an adjectival relative in that it can only receives a preterit reading; its denotation is assumed to be the function in (26f), which also has the subinterval property.

(26) a. utukusii
beautiful-PRES
'beautiful' [adjective]

b. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. x is beautiful at t in w]]

c. taore-ta
fall-PAST
'lying flat (after having fallen over)' [adjectival]

d. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists t_2 < t$. x falls over at t_2 & for all t_3 such that $t_2 < t_3 \leq t$, x is lying flat at t_3]]

e. CD-o kat-ta
CD-ACC buy-PAST
'who bought a CD' [preterit]

f. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists t_2 < t$ such that x buys a CD at t_2 in w]]

---

[13] Suppose that John fell over at t_1 and has been lying flat until now (call it t_0) in w_0. Then $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists t_2 < t$. x falls over at t_2 & for all t_3 such that $t_2 < t_3 \leq t$, x is lying flat at t_3]]($John$)(t_0)(w_0) = 1. This property has the subinterval character defined in (25a) because for any subinterval t_1 of t_0, $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists t_2 < t$. x falls over at t_2 & for all t_3 such that $t_2 < t_3 \leq t$, x is lying flat at t_3]]($Taro$)(t_1)(w_0) = 1. If the utterance time t_0 is an instant (i.e., a singleton set), then the condition is trivially satisfied because t_0 itself is the only subinterval for t_0.

It seems reasonable to assume that (26d) and (26f) describe what Parsons (1990) calls **target state** and **resultant state**, respectively. (26d) describes a target state in that it is reversible; (26f) describes a resultant state in that it is a property that never goes away once acquired.[14] This means that (25a–b) are not sufficient to distinguish between these two classes of states; we need additional criteria.

We need the notion of **temporary property** defined in (27) in order to make the required distinction.

(27) A property $P \in D_{<e,<i,<s,t>>>}$ is **temporary** iff for any individual a (i) there is some possible world w and intervals t_1, t_2 such that $t_1 < t_2$, $P(a)(t_1)(w) = 1$ and $P(a)(t_2)(w) = 0$, and (ii) there is some world w_3 and intervals t_3 and t_4 such that $t_3 < t_4$, $P(a)(t_4)(w_3) = 1$ and $P(a)(t_3)(w_3) = 0$.

Put simply, (27) says that a temporary property is such that one and the same individual can have it only for a limited amount of time *at least in principle*. It is a very weak condition but is sufficient to distinguish between target states on the one hand and resultant states on the other. (26d) is a temporary property according to (27). For example, if John has the property (26d) in w_0 at t_0, then it is perfectly possible for John not to have this property at some time later than t_0. For instance, there is a possible world in which John is no longer lying down at some future time. Similarly, given that John has the property (26d) in w_0 at t_0, it is possible (and in fact necessary if he in fact fell) that at some time earlier than t_0 he does not have this property in w_0 . Thus, (26d) is a temporary property. On the other hand, relative clauses with a preterit or a future tense fail to satisfy

---

[14] Note that (25d) describes not just a target state but an event that produces this state as well. This point is discussed in more detail below.

(27). In other words, (26f) is a non-temporary property.[15] We can summarize the findings as in (28).[16]

---

[15] Note that (i) merely talks about the set of possible worlds without restricting it in any way. This is intended. This ensures that adjectival relatives which denote so-called inalienable properties (e.g. (i-a)) are not problematic.

i) a. sin-da hito
die-PAST person
'a/the dead person' (Lit., person who died) [adjectival/preterit]

b. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. x is dead at t & $\exists t_2 < t$. x dies at t_2]]

c. Asoko-ni sin-da hito-ga iru.
there-at die-PAST person-NOM be-PRES
'There is a dead person over there.' [adjectival]
(Lit., There is a person who died over there.)

Intuitively, the relative (i-a) can be used for an adjectival interpretation (i-b) in examples like (i-c). But it is arguable that (i-b) is not temporary because death is irreversible. However, in a fictitious world where resurrection is possible, a person can have the property (i-b) at some time t_0 *and* not have this property at time t_1 later than t_0 in the same world. Thus, (i-a) denotes a temporary property. By contrast, properties like (26f) cannot be lost once acquired even in fictitious worlds since the permanency of the property is built into the semantics of a preterit. The adjectival relative *sinda* 'die-PAST' can also be used metaphorically. Note that (ii) can be used to describe eyes that look lifeless or lethargic.

ii) sin-da me
die-PAST eye

(28) a. Target state properties are temporary properties.

b. Resultant state properties are non-temporary properties.

We now turn to those adjectival relatives such as (29a–b) which describe a state that appears to be a target state of an event described by the verb but actually is not in that no relevant triggering event exists. This point was touched upon briefly in Section 2.

(29) a. [magat-ta] miti
bend-PAST road
'a/the curved/winding road'

b. [tooku hanare-ta] mati
far move-away-PAST town
'a/the town far away (from here)'

(29a) (due to Kindaichi 1950) makes the following point: even if the road in question has been a curved road throughout its lifetime (which is the most natural assumption that could be made about roads), it still can be described by the relative clause. The entire adjectival relative *magat-ta* 'bend-PAST' simply indicates the state of being curved. (29b) is similar in that *hanare-ta* 'move-away PAST' indicates the state of being far away (from something), not the target state of having moved

---

'eyes that look lifeless/dispirited/lethargic'

Even if Taro's eyes have this property now, this does not guarantee that they will continue to have it in the future. Thus, (i) also shows that *sin-da* 'die-PAST' does denote a temporary property.

[16] The generalization reached here differs somewhat from the one that Kratzer (2000) reaches based on the distribution of *immer noch* 'still' in German.

away (from something). Intuitively, these examples are not exceptional in that they have an ordinary adjectival character associated with them. They suggest that as a rule the existence of a triggering event is not entailed by an adjectival relative. On the other hand, the state described by an adjectival relative can only be characterized in terms of a relevant triggering event in that it is a state that typically results from this type of event. Thus, this phenomenon necessitates a very careful treatment. What seems clear is that Parsons' concept of "target state" is not specific enough to narrow down the special type of state associated with adjectival relatives.

I propose to characterize adjectival relatives as those that describe a locational or physical property that *appears* to have resulted from a past event (based upon evidence obtained through our senses). In other words, their meaning has a modal character. (26c) (repeated here as (30a)) is now claimed to denote (30b) rather than (30c) (= (26d)). The modal character of adjectival relatives indicated informally at this point in (30b) will be formalized in Section 6.

(30) a. taore-ta
fall-PAST
'lying flat (after having fallen over)' [adjectival]

b. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. x is lying flat at t & it appears in w that there is a time $t_2 < t$ such that x falls over at t_2]]

c. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists t_2 < t$. x falls over at t_2 & for all t_3 such that $t_2 < t_3 \leq t$, x is lying flat at t_3]]

One can easily verify that both (30b) and (30c) are temporary properties. Assuming that (30b) is an adjectival property but (30c) is not, we need an additional criterion that tells them apart.

The crucial difference between a perfect aspect relative (i.e., a relative that indicates both a triggering event and its target state) and an adjectival relative is that the former is required in the actual world to have a starting point of the state in question but not the latter. This is formalized in (31).

(31) A property $P \in D_{<e,<i,<s,t>>>}$ has an **obligatory starting point** iff for any individual *a*, interval *t*, and world *w* such that $P(a)(t)(w) = 1$, there is a time $t_2 < t$ such that $P(a)(t_2)(w) = 0$.

According to (31), a relative clause with a preterit and one with a perfect must denote a property *P* such that whenever an individual *a* has *P* at *t*, there is a time t_2 earlier than *t* and *a* does not have *P* at t_2.[17] (30c) clearly has an obligatory starting point, whereas (30b) does not because of its modal character. I assume that the English adjectival passive receives the same interpretation. For example, the past participle *fallen* used as an adnominal modifier as in (32a) receives the interpretation in (32b).

(32) a. fallen leaves

b. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. *x* is lying down in *w* at *t* & it appears in *w* at *t* that there is a time $t_2 < t$ such that *x* falls to the ground at t_2 in *w*]]

Lastly, adjectival relatives can only describe physical or locational properties that appear to have been caused by relevant past events. For example, (33a) satisfies all the conditions discussed up to this point, but (33b) cannot denote this property. Under normal circumstances, there is no overt physical indication of high blood pressure. That is, (33c) cannot describe a person who has high blood pressure. Thus, it is virtually impossible for an external observer to detect a relevant state that appears to be brought about by a relevant past event such as a sudden upsurge of blood pressure.

---

[17] A relative clause with a future tense is already taken care of by the concept of "temporary property."

(33) a. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. *x* has high blood pressure in *w* at *t* & it appears in *w* at *t* that there is a time $t_2 < t$ such that the blood pressure of *x* rises to an above normal level in *w* at t_2]]

b. ketuatu-ga agat-ta
blood pressure-NOM rise-PAST

c. [ketuatu-ga agat-ta] hito
blood pressure-NOM rise-PAST person
[intended meaning] 'person whose blood pressure is high'

The judgments given here are influenced by pragmatic factors. For example, (33b) might be able to receive an adjectival reading if blood pressure could be read off some readily available visible signs. This is indeed what the proposal to be presented expects since the semantics of adjectival relatives relies on whether a physical or locational state is available now which allows us to hypothesize that it might have been caused by a relevant event. If pragmatic factors change, the availability of adjectival readings changes with them.

Adjectival relatives are now characterized semantically as in (34).

(34) Adjectival relatives in Japanese and adjectival past participles in English (i) **are state predicates** (= have the subinterval character), (ii) **are target state predicates** (= denote temporary properties), and (iii) **are not perfect properties** (= do not have an obligatory starting point), (iv) describe **physically or locationally identifiable stative properties**.

The requirement (iv) is given in an informal fashion in (34). In Section 6, I will present a fully formalized proposal that systematically obtains interpretations of adjectival and other types of relatives in Japanese in a compositional manner.

6. Proposal

In the previous section, we observed that the type of interpretation associated with adjectival relatives is different from that associated with preterit and perfect aspect relatives (i.e., relative clauses with *-ta* used for preterit interpretations) and showed that this semantic difference can be captured formally. The crucial difference has to do with event implication. With adjectival relatives, the existence of a triggering event is not entailed. Thus, assuming that the morpheme *-ta* in Japanese has a perfect aspect interpretation (i.e., an event and its target state) is not necessary or sufficient to assign the right interpretation to adjectival relatives. In what follows, I will pursue the idea that an adnominal modifier constitutes a modifier phrase (MP) and is composed of a TP (Tense Phrase) and a phonetically unrealized morpheme **Mod** (the head of Modifier Phrase (Rubin 1996)), where TP is simply a VP plus a tense morpheme and does not signify a clausal status of the structure.[18] A Modifier Phrase receives an adjectival interpretation and has no event implication. This section explains how the proposal works.

Before explaining the details of the proposal to be defended, let me briefly discuss and refute an alternative analysis of adjectival relatives presented in the previous literature. It is often assumed (e.g. Teramura 1978) that the verb in an adjectival relative (referred to as *keijyoo doosi* 'adjectival-stative verb' by Teramura) is inherently stative in that the verb itself describes a state and the morpheme *-ta* is simply an indicator of the adnominal form of the verb in question. On the basis of Teramura's observation, Kinsui (1994) proposes that such stative verbs are derived lexically from event verbs. On this analysis, the morpheme *-ta* is required for a morpho-syntactic reason alone and has no semantic content. This would mean that the morpheme *-ta* that occurs in an adjectival relative is semantically distinct from the preterit morpheme *-ta*. Kinsui's analysis does not account for the

---

[18] I assume that the morpheme *-ta* is a past tense and is a functional head T. I reject the contention, however, that a tense morpheme is a hallmark of a finite clause in Japanese. This is because the presence of a tense does not correlate with the presence of an overt subject.

obvious semantic relation between the preterit interpretation of *-ta* and the state that an adjectival relative describes: an adjectival relative can only describe a state that has resulted (or appears to have resulted) from a previous event described by the verb. Moreover, this analysis does not explain why a stative variant rather than, say, an inchoative variant is derived from an achievement-type verb. In fact, by attaching different morphemes to the same verb stem, one can obtain adnominal forms with distinct aspectual meanings as in (35a–c). (35a–c) present different adnominal forms of the same verb *taore* 'fall over'. The *-ta* form in (35a) indicates (what appears to be) a target state of a falling event; the *-tutu aru* form in (35b) indicates that a falling event in progress; the *-soo na* form in (35c) indicates a falling event likely to happen in the near future. It seems natural to assume that the verb *taore* has a constant meaning describing a falling event and each suffix contributes a different aspectual meaning associated with it. If *-ta* in (35a) were merely an adnominal form indicator, the fact that it describes a target state rather than an on-going process as in (35b) or an imminent event as in (35c) is merely an accident. In theory, these three readings (or perhaps others) should be equally available to *-ta*, but in reality only one of them is. There is good reason to believe that this is not an accident.

(35) a. [taore-ta] ki
fall-PAST tree
'[a] tree that is lying (as a result of having fallen over)'

b. [taore-tutu aru] ki
fall-process-be tree
'[a] tree that is falling/is in the process of falling over'

c. [taore-soona] ki
fall-imminent tree
'[a] tree that is likely to fall over'

Intuitively, the reason is clear. If the tree has already fallen, then it cannot possibly be in the process of falling or be in a position to fall very soon, but could be in the state that results from that event, namely the state of lying (on the ground). Thus, the preterit meaning associated with *-ta* is visible.

There is a clear pattern here; a large class of verbs with a cluster of shared characteristics are capable of expressing stativity with *-ta*. And this is possible only when *-ta* is part of an adnominal modifier. Positing stative verbs separately from "homophonous eventive verbs" to account for adjectival relatives would be extremely uneconomical and leave the obvious semantic relation unaccounted for. Thus, I pursue the null hypothesis that the morpheme *-ta* found in a relative clause contributes a preterit-like meaning just like in any other place. But this assumption alone does not account for the semantics of adjectival relatives completely. On the other hand, as shown in Section 5, assuming that *-ta* has a perfect aspect interpretation (i.e., the one that describes an event and its target state) does not account for the interpretation of an adjectival relative, either, because adjectival relatives have no event implication. The situation is a challenge for a compositional theory of semantics, but I shall show in this section that a solution is found that abides by the principle of compositionality.

Let me digress briefly to discuss the categorial status of adjectival relatives. I employ the term Modifier Phrase rather than Adjective or Adjectival Phrase because in Japanese adjectival relatives do not have the same distributional properties as adjectives (what Nishiyama (1999) calls Canonical Adjectives). Adjectival relatives can only be used as adnominal modifiers, but Canonical Adjectives in Japanese can be used as either attributively or predicatively (without a copula) as shown in (36).

(36) a. Hanako-wa utukusii.
Hanako-TOP beautiful-PRES
'Hanako is beautiful.'

b. utukusii hito
beautiful person
'beautiful person'

Therefore, in order not to suggest a faulty generalization, I adopt Rubin's terminology and refer to the derived adnominal modifier as Modifier Phrase (MP). This accomplishes the syntactic effect that this category does not occur as a main predicate of a clause.

I shall show in what follows that by incorporating and integrating three leading ideas I can account for the semantic properties of Japanese adjectival relatives. The first is the idea that adjectival relatives do not have a clausal internal structure. In other words, they are not genuine relative clauses. They are adnominal modifiers (what will be referred to as Modifier Phrases) that are obtained from a TP (Tense Phrase) containing a verb in the past tense and a phonetically null Modifier head. The resulting phrase (Modifier Phrase) yields an adjectival interpretation distinct from a preterit interpretation obtained from a regular gapped relative clause, which I assume Japanese also has. The second idea is due to Kratzer (1996), who proposes that the so-called "external argument" of a verb is not its argument at all. The presence of this nominal is licensed by the Voice head. The third idea is that direct causation can be expressed covertly in natural language. Bittner (1999) incorporates this idea into her formal semantic account of resultative constructions in a variety of languages. I shall discuss these three ingredients of my proposal one by one.

The first leading idea is that what is referred to as "adjectival relative" is a modifier "derived" from a verbal projection (technically a TP) and is not a genuine relative clause.[19] One desideratum for any successful account of adjectival relatives is that it explains why the *-ta* form of a verb can receive an adjectival interpretation only in an adnominal position. If an adjectival relative does not contain a clause, then this can be the syntactic source of a semantic difference between adjectival "relatives" and those structures that clearly involve clauses (such as simple sentences). According to this account, Abe's generalization (16) follows from the proposal that only TPs (which are non-clausal in my proposal) can be turned into MPs. By contrast, a "regular" relative clause with a

---

[19] Yamakido (2000) proposes this type of analysis for attributive (i.e., adnominal) adjectives in Japanese.

preterit, perfect aspect, present or future interpretation has a conventional gapped relative clause structure where the gap is bound by a *wh*-operator. This proposal gives us a way of accounting for the fact that an adjectival interpretation of a verb in the *-ta* form always occurs as an adnominal modifier. One can reason that since adjectival relatives must not have an internal clausal structure, full-fledged clauses never receive adjectival interpretations.

Despite its initial plausibility, this proposal immediately encounters a problem since the standard formal semantic analysis of such structures produces no semantic difference between them. For instance, the structures (37a) and (37b) (where the two VPs are identical) receive exactly the same semantic interpretation.

(37) a. [who$_1$ [$_{IP}$ e$_1$ [$_{VP}$ met John]]]

b. [$_{VP}$ met John]

This can be shown in detail if desired, but (38) should suffice for our purposes.

(38) 1. $[\![\text{met}]\!] = \lambda y \in D_e \,.\, [\lambda z \in D_e \,.\, z \text{ met } y]$

2. $[\![[\text{who}_1\ [_{IP}\ e_1\ [_{VP}\ \text{met John }]]]]\!] = \lambda x \in D_e.\ [[\lambda y \in D_e \,.\, [\lambda z \in D_e.\ z \text{ met } y]](\textit{John})(x)] = \lambda x \in D_e.\ x \text{ met John}$

3. $[\![[_{VP}\ \text{met John}]]\!] = [\lambda y \in D_e.\ [\lambda z \in D_e.\ z \text{ met } y]]\ (\textit{John}) = \lambda z \in D_e.\ z \text{ met John}$

4. From 2. and 3., we can conclude that (37a) and (37b) are semantically equivalent.

(38) shows that the relevant semantic difference cannot be attributed to the syntactic difference between a relative clause and a VP. Needless to say, the same result is obtained with Japanese adjectival relatives. Compare (39a) and (39b).

(39) a. [Op$_1$ [e$_1$-ga taore-ta]] hasira

fall-PAST pole

b. [taore-ta] hasira

fall-PAST pole

'a/the pole lying on the ground (presumably because it tipped over)'

Note: Op indicates a covert lambda operator.

The adnominal modifier in (39a) has a gapped clausal structure standardly associated with relative clauses, whereas the one in (39b) exemplifies a subjectless structure I am proposing for the adjectival relative *taore-ta* 'fall-PAST'. The structures in (39a–b) are analyzed semantically as in (40a) and (40b), respectively.[20]

(40) a. $[\![[\text{Op}_1\ [\text{e}_1\text{-ga taore-ta}]]\ \text{hasira}]\!] = \lambda x_1 \in D_e\ .\ [\lambda t \in D_i\ .\ [\lambda w \in D_s\ .\ \exists t_2 \in D_i\ .\ t_2 < t\ \&$ x_1 falls over at t_2 in w & x is a pole at t in w]]

b. $[\![[\text{taore-ta}]\ \text{hasira}]\!] = \lambda x_1 \in D_e\ .\ [\lambda t \in D_i\ .\ [\lambda w \in D_s\ .\ \exists t_2 \in D_i\ .\ t_2 < t\ \&\ x_1$ falls over at t_2 in w & x is a pole at t in w]]

(40a) and (40b) yield exactly the same meaning despite their syntactic difference. In both cases, it is required that a falling event take place at a past time. Despite the apparent failure, I argue that assigning a non-clausal structure to adjectival relatives will help us to obtain the right interpretation. I will introduce two additional leading ideas (a theory of argument structure and a theory of concealed causatives) which enable us to produce different semantic results for adjectival relatives.

As a preliminary to the second leading idea, I wish to introduce a system in which events and states are primitive entities and are referred to explicitly. This is what I adopt for the purpose of my proposal. Given this system, I can assume that an adjectival relative denotes a property (which might

---

[20] It is assumed throughout this article that an empty category indicated by e_n (of type *e*) (where n is any natural number) is turned into a meta-language variable x_n. For example, e_1 in the syntactic (i.e., object language) representation corresponds to x_1 in the meta-language representation.

be referred to as stative property) that involves existential quantification over states obtaining at the "evaluation time." The idea is that such properties satisfy all four conditions in (41) (= (34)).

(41) Adjectival relatives in Japanese and adjectival past participles in English (i) **are state predicates** (= have subinterval character), (ii) **are target state predicates** (= denote temporary properties), and (iii) **are not perfect properties** (= do not have an obligatory starting point), (iv) describe **physically or locationally identifiable stative properties**.

For example, the adjectival relative in (42a) is interpreted as in (42b) (with some simplification). In (42b), *s* covers *t* iff the denotation of *t* is "in the middle" of the temporal trace of *s*.[21]

(42) a. taore-ta
fall-PAST

b. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists s \in D_{st}$. *s* covers *t* & *x* is in *s* & s is a state of *x*'s lying]]

It is clear that (42b) meets all four requirements in (41). First, (i) is satisfied because if *s* covers *t*, then *s* also covers any subinterval of *t*. Second, (ii) is satisfied because the state in question does not have to extend infinitely into the past or future. Third, (iii) holds because the state extends indefinitely into the past in the actual world. And fourth, (iv) holds since lying flat is a physically identifiable property. The four conditions given in (41) can be regarded as the essential semantic ingredients of adjectival relatives. Thus, I contend that letting an adjectival relative denote a property like (42b) is fully justified. Adopting an eventuality-based system also allows us to talk about the

---

[21] Formally, *s* is said to cover *t* iff there are non-empty intervals t_1 and t_2 such that $t_1 < t < t_2$ and $t_1 \cap t \cap t_2$ = the temporal trace of *s*.

relations between events and their target states without overly complicating our formalism. Since providing evidence for the existence of events or states and/or arguing for absolute necessity of such semantic entities is well beyond the scope of this article, I will not commit myself to such a position. I merely contend that "adjectival properties" that satisfy the four conditions given in (41) corresponds to our intuitions about the semantics of adjectival relatives in Japanese. Introduction of events and (especially) states is, therefore, understood as a convenient way of talking about adjectival properties, rather than a theoretical necessity. I will adopt a variant of Davidson's (1967) proposal about events. For readability, I will continue to use the Heim-Kratzer notation to represent set-theoretic entities. In the original Davidsonian system, the truth condition of (43a) is given as in (43b).

(43) a. John hit Bill.

b. $\exists e$[*e* is located before now & *e* is John's hitting Bill]

By extending Davidson's original idea to include stative entities as Parsons (1990) suggests, I have all necessary tools for my proposal.

The second leading idea to be adopted in my account is due to Kratzer (1996), who proposes that the so-called external argument of a verb is not a true argument of the verb and is licensed by a projection called Voice. According to Kratzer, a prototypical agentive transitive verb like *hit* has a so-called "internal argument" as its only nominal argument. Consider the example given in (44).

(44) a. hits Bill

b. $\lambda e \in D_{ev}$. *e* is hitting & Bill is the theme of *e*

c. $\lambda e \in D_{ev}$. *e* is Bill's getting hit

(44a) can be analyzed in two ways: as in (44b) (in a neo-Davidsonian system such as the one adopted by Parsons (1990)) or as in (44c) (in the original Davidsonian system). Taken as a whole,

both (44b) and (44c) denote sets (or properties) of events. Adopting Kratzer's analysis means that a transitive verb *hit* asks for only one nominal argument. In other words, the denotation of the verb *hit* is given as either (45a) or (45b), which I assume are set-theoretically equivalent.

(45) a. $\lambda x \in D_e$. [$\lambda e \in D_{\text{ev}}$. *e* is hitting & *x* is the theme of *e*]

b. $\lambda x \in D_{\text{e}}$. [$\lambda e \in D_{\text{ev}}$. *e* is *x*'s getting hit]

Similarly, verbs like *boil* would denote (46a) or (46b).

(46) a. $\lambda x \in D_e$. [$\lambda e \in D_{\text{ev}}$. *e* is boiling & *x* is the theme of *e*]

b. $\lambda x \in D_e$. [$\lambda e \in D_{\text{ev}}$. *e* is *x*'s getting boiled]

Kratzer does not discuss intransitive verbs. But I think adopting the Unaccusative Hypothesis is fully in line with her proposal because "external argument" is characterized in terms of agentivity in Kratzer's proposal. Since an unaccusative verb requires a non-agentive argument, this argument is an internal argument; an unergative verb, on the other hand, occurs with an agentive argument, which is understood to be an "external argument". The Unaccusative Hypothesis and Kratzer's analysis allows me to say that the non-agentive nominal associated with an unaccusative verb is its argument whereas the agentive nominal associated with an agentive transitive verb is not. The schematic syntactic configurations are given in (47). The categorial labels used here are the standard ones and will be modified below.[22]

(47) agentive transitive verb: $[_{\text{IP}}$ DP $[_{\text{VP}}$ DP V $]]$

---

[22] The relationship between unaccusativity and agentivity represented here glosses over many complicated issues, but (47) is sufficient for the purpose of this article. The reader is referred to Levin and Rappaport Hovav (1995) for an in-depth survey on such issues.

unergative verb: $[_{IP}$ DP $[_{VP}$ V $]]$[23]

unaccusative verb: $[_{IP}$ __ $[_{VP}$ DP V$]]$

Assuming the Unaccusative Hypothesis, Kratzer's proposal enables us to say that an unaccusative verb and an agentive transitive verb have something in common: they are both one-place predicates in that they need an individual in order to be saturated. On the other hand, a VP composed of an agentive transitive verb and its patient argument such as *tamago-o yude-ta* 'boiled an egg' is not a "one-place predicate" in that its sole argument position has already been filled. It is already saturated as far as individual arguments are concerned. Given this syntactic assumption and Abe's generalization given earlier in (16), Japanese adjectival relatives can be characterized as follows: they are adnominal modifiers (Modifier Phrases) made up of a verbal phrase in the past tense (to be called Tense Phrase or TP for short) and a phonetically null "adjectivizer" (**Mod**), and denote properties of individuals involving states. Consider (48a–b).

(48) a. taore-ta hasira
fall-PAST pole
'fallen pole' or 'pole lying after having fallen over'

b. yude-ta tamago
boil-PAST egg
'boiled egg'

(48a) and (48b) involve an unaccusative verb *taore* 'fall over' and an agentive transitive verb *yude* 'boil', respectively. Note that the adjectival relative in (48b) contains no agentive subject. By

[23] In the case of unergative verbs, we can assume that they do not require a nominal argument to be saturated.

adopting Kratzer's hypothesis with some modification, I posit the denotations of the two verbs as in (49).

(49) a. $[\![[_V \text{ taore}]]\!] = \lambda x \in D_e.\ [\lambda e \in D_{ev}.\ e \text{ is } x\text{'s falling over}]$

b. $[\![[_V \text{ yude}]]\!] = \lambda x \in D_e.\ [\lambda e \in D_{ev}.\ e \text{ is } x\text{'s getting boiled}]$

In both cases, the sole individual argument bears the role THEME (or INCREMENTAL THEME). Note in particular that (49b) has no information about the agent, i.e., the one who does the boiling.

At this juncture, I need to make clear my background assumptions before discussing the details of the compositional semantics I propose. First, the morpheme *-ta* (belonging to a functional category T) is assumed to have a preterit interpretation, which is given in (50).

(50) $[\![_T \text{ -ta}]\!] = \lambda f \in D_{<ev,t>}.\ [\lambda e \in D_{ev}\ .\ [\lambda t \in D_i.\ [\lambda w \in D_s\ .\ e \text{ precedes } t \text{ in } w \ \&\ f(e) = 1]]]$

I assume that a past tense morpheme *-ta* combines with a VP to form a TP (Tense Phrase) and that the phonetically null expression **Mod** combines with a TP to yield an adnominal modifier, which I will refer to as Modifier Phrase (Rubin 1996).[24] What justifies positing a phonetically null expression? This is where the third leading idea comes in which says that direct causation does not need to be expressed overtly in natural language.

Bittner discusses examples like (51a) and contends that the causative relationship between the event indicated by the verb *shoot* and the state indicated by the adjective *dead* is that of **direct causation**. According to Bittner, an event e_2 is the direct cause of e_1 iff e_2 causes e_1 and every event e_3 distinct from e_1 that causes e_1 causes e_2 as well. This intuitively corresponds to the notion of the most immediate cause. I adopt this proposal for the purpose of this article. For example, when (51b) is true, (51a) is false. In other words, (51a) is true when John's shooting Bill that took

[24] For technical details of how this works, see below.

place in the past is the direct and immediate cause of Bill's death. Note that unlike (51b) the causal link between John's shooting and Bill's dying is not explicitly represented in (51a).

(51) a. John shot Bill dead.

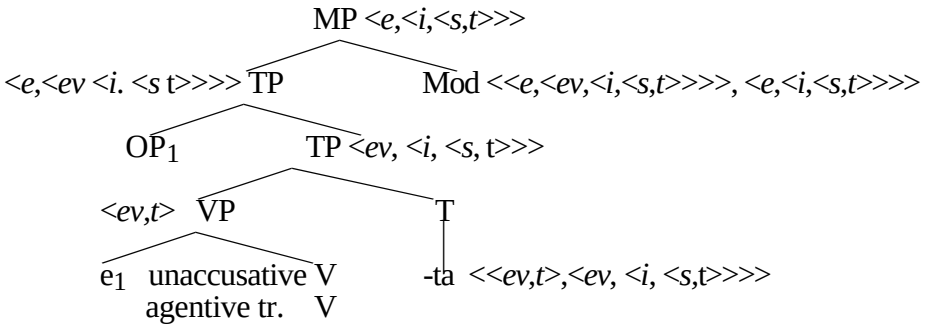
b. John's shooting Bill caused him to die a year later.

Bittner examines many typologically distinct languages and concludes that when expressing direct causation, natural language can resort to non-overt means. Bittner refers to this type of causative construction as **concealed causative**. I contend that the semantics of adjectival relatives in Japanese and adjectival passives in English can be accounted for by adopting Bittner's proposal. The important common issue here is how to account for various sorts of (apparent) syntax-semantics mismatches. In the case of the English concealed causative construction, it is necessary to explain why the causative meaning can be expressed even though there is no overt expression that indicates the causal relation. Bittner herself adopts a type-shifting operation that in effect introduces the desired causative meaning. I will not adopt this proposal since the theoretical status of type-shifting operations in the syntactic component of grammar is unclear.

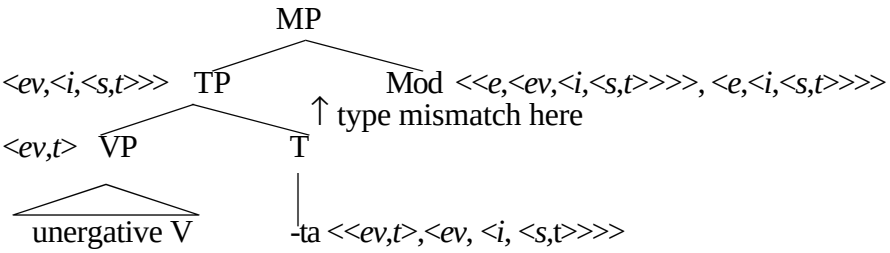
Instead I posit a null operator **Mod** which combines with TP to yield an adnominal modifier MP. But there is a difference between English resultatives and Japanese adjectival relatives. In the case of the resultative/causative construction that Bittner is concerned with, the target state is overtly represented. The only information covertly expressed is the causal link. On the other hand, Japanese adjectival relatives can be thought of as a construction in which both the target state and the causal link are covertly expressed. This is presumably because the target state is concrete and uniquely determinable given the event in question (unlike the case of resultative constructions) and the relationship between the event and the target state is indeed a direct one (i.e., the target state immediately results from the event in question). In order to account for the data, I adopt the idea that a TP (and no other projection) can combine with a null operator **Mod** to yield an adnominal modifier MP.

Schematically, an MP (Modifier Phrase) that is used as an adjectival relative has the structure in (52a). By contrast, (52b) is filtered out by the semantic component because of a type mismatch.

(52) a.



b. #



In (52a), the empty position in the VP is bound by the covert operator adjoined to the TP. This allows the tense morpheme *-ta* to combine with the TP. On the other hand, this is impossible in (52b). The unergative verb has no nominal argument. So **Mod** cannot combine with an unergative verb semantically. The morpheme *-ta* is assumed to be a tense morpheme and a functional head T of TP. As in Ogihara (1996), TP is not an indicator of finite clauses. It is also assumed here that lambda (or "*wh*-") operators can be adjoined to TP. Then the covert MP head (Mod) combines with the VP to yield an adnominal modifier. I assume that the categorial shift from a TP into an MP also triggers a subtle but important semantic shift as well. The resulting adnominal modifier describes a state that results directly from the type of event associated with the verb stem. Following Bittner, I assume that when the causative relation is direct and immediate, no overt linguistic material is needed which indicates causation. To this, I also add the assumption that when the resulting state is predictable, this can also be expressed covertly.

One quirky fact about the resulting adnominal modifier is that the triggering event in question is rendered as a probable event rather than an actual one. I take this to mean that the relation between the event that the verb describes and the state that the modifier as a whole describes is a modal one. As a prerequisite for defining Mod semantically, I introduce in (53) the function APPEARS-AS-IF, which mimics the meaning of the English expression *appear as if*. The technical tools used here are the same as those assumed for *de re* attitudes (Cresswell and von Stechow 1982, Ogihara 1996).

(53) APPEARS-AS-IF is that function $L \in D_{<<e,<st,<i,<s,t>>>>,<e,<st,<i,<s,t>>>>>}$ such that for any $R \in D_{<e,<st,<i,<s,t>>>>}$ (a relation among), $e \in D_e$, $s \in D_{st}$, $t \in D_i$ and $w \in D_s$, $L(R)(e)(s)(t)(w) = 1$ iff for **Epistemic Conversational Background** $f \in D_s \times D_i \times Pow(Pow(D_s))$ and **the ordering source based upon human senses** $g \in D_s \times D_i \times Pow(Pow(D_s))$ (Kratzer 1981) the following conditions are satisfied: for all $u \in \cap f(w, t)$ there is a $v \in \cap f(w, t)$ such that (i) $v \leq_{g(w,t)} u$ and (ii) for all $z \in \cap f(w,t)$: if $z \leq_{g(w,t)} v$, then $R(x)(s)(t)(z) = 1$.

[Note: f determines for any world w_0 and interval t_0 **the modal base** $\cap f(w_0, t_0)$**,** which is the set of worlds that are accessible from w_0 at t_0. For any worlds w_1 and w_2, $w_1 \leq_A w_2$ reads 'w_1 is at least as close to the ideal A as w_2 is'. More formally, for all w_1 and $w_2 \in D_s$, $w_1 \leq w_2$ iff $\{p \mid p \in A \text{ and } w_2 \in p\} \subseteq \{p \mid p \in A \text{ and } w_1 \in p\}$. (Kratzer 1981:47-48)]

To understand the intuitive content of the function APPEARS-AS-IF in (53), the quasi-English paraphrase (54) may be useful.

(54) $R \in D_{<e,<st,<i,<s,t>>>>}$, $a \in D_e$, $s \in D_{st}$,, $t \in D_i$, $w \in D_s$, APPEARS-AS-IF$(R)(a)(s)(t)(w)$ reads "in w at t, it appears as if a and s have the relational property R."

The adjectival relative describes a stative property some entity currently has, which is characterized in terms of a current state that appears to have been directly caused by a past event that the verb describes. (53) is based upon Kratzer's (1981) proposal about modal expressions but is different from her original in that it is time-sensitive. Her proposal has two important ingredients: the modal base and the ordering source. The modal base determines the accessible worlds for any given world *w*. For example, in the present case, we can assume that the accessible worlds for any world *w* at any time *t* are determined in terms of what is known in *w* at *t*. When our knowledge about what happened in the past is absent or insufficient to determine what produced a state that obtains now, we rely on information available through our senses. That is, I contend that the information obtained through our senses determines how the ordering source is determined in this particular case. Among those worlds that are consistent with what is known, those that are consistent with what is observed through our senses are more valued than those that are inconsistent with it. When we know what actually happened, that takes precedence over what appears to have happened. On the other hand, when we do not know what actually happened, our best guess based upon information obtained through our senses is accepted for the purpose of evaluating adjectival relatives.

Given (53), **Mod** is semantically characterized as in (55). I adopt the direct causation relation $\propto$ between events and states and its semantics adopted by Bittner (1999, p. 70). It suffices for our purposes to understand $e \propto s$ to mean that *e* directly causes *s*.

(55) $[\![\text{Mod}]\!] = \lambda P \in D_{<e,<ev,<i,<s,t>>>>} . [\lambda x \in D_e . [\lambda t \in D_i . [\lambda w \in D_s . [\exists s \in D_{st} . s \text{ covers } t \ \& \ x \text{ is in } s \ \& \ \text{APPEARS-AS-IF}(\lambda x_2 \in D_e . [\lambda s_2 \in D_{st} . [\lambda t_2 \in D_i . [\lambda w_2 \in D_s . \exists e_2 \in D_{ev} . P(x_2)(e_2)(t_2)(w_2) = 1 \ \& \ e_2 \propto s_2 \text{ in } w_2]]]])(x)(s)(t)(w) = 1]]]]$

Mod is phonetically null and combines with a TP, which by definition is tensed. When the TP is in the past tense (i.e., *-ta* is suffixed to the verb), the resulting MP (with the same pronunciation as the tensed verb itself) means "there is a current state that appears to have been caused directly by a past event of such-and-such type." If the TP is in the future tense, **Mod** can be combined with it

to yield an MP.[25] But in that case the semantic requirement can never be satisfied since the MP says that there is a state that is a direct result of a probable future event. (21a) is now replaced by (56), which specifies the denotation of an adjectival relative (i.e., MP) in conjunction with its modifiee (i.e., the head noun).

(56) Predicate Modification (à la Heim and Kratzer (1998))

$[\![[_{\mathbf{NP}}[_{\text{MP}} \ldots][_{\text{NP}} \ldots]]]\!] = \lambda x \in D_e \,.\, [\lambda t \in D_i \,.\, [\lambda w \in D_s \,.\, [\![[_{\text{MP}} \ldots]]\!](x)(t)(w) =$
$[\![[_{\text{NP}} \ldots]]\!](x)(t)(w) = 1]]$

---

[25] Japanese has no morphological marker for future time, and the morpheme *-ru* (or the absence of *-ta*) indicates either present time or future time. An anonymous referee points out that a relative clause in the non-past tense morpheme (*-ru*) can be used as adjectival relatives in examples like (i-a). This is an instance of what Kinsui (1994) refers to as "the fifth verb class" and cannot be dealt with by my proposal. However, I do not believe that this is a problem since this is restricted to a small class of verbs. For example, *taore-ru* 'fall over' cannot be used in the *-ru* form to indicate an adjectival reading. (i-b) can only mean 'a/the pole that is going to fall over' — a future event reading or 'a/the pole that falls over' — a generic reading.

(i) a. mon-no yoko-ni tat-ta/-tu doozoo
gate-GEN side-LOC stand-PAST/-PRES statue
'a/the statue that stands at the side of the gate' (adjectival reading possible)

b. taore-ru hasira
fall-over-PRES pole
[intended] 'a/the pole that is lying on the ground/floor (after falling over)'
(adjectival reading impossible)

I contend that the concept of "locational or physically detectable property" discussed in Section 2 is captured in terms of the semantics for **Mod** proposed here. An adjectival relative is required to denote a stative property *P* such that it appears as if *P* resulted from a previous event of a relevant sort. To recapitulate some examples discussed earlier, the relative clause in (2b) (repeated here as (57a)) can receive an adjectival reading because the pole in question obtains the locational and physical property of being lying flat on the ground, whereas the one in (7c) (repeated here as (57b)) cannot be an adjectival relative because the CD does not obtain a locational or physical property that enables us to say that there is a current state of the CD that appears to have resulted directly from the man's buying the CD.

(57) a. Hanako-wa [taore-ta hasira]-o mi-te i-ru.
Hanako-TOP fall-PAST pole-ACC look-TE IRU-PRES
Preferred reading: 'Hanako is looking at a pole which is lying on the ground (and this state was caused by its having fallen over).'

b. [$_{DP}$ otoko-ga kat-ta CD]-wa ninki-ga aru.
man-NOM buy-PAST CD-TOP popularity-NOM exist-PRES
'The CD that the man bought is popular.'

To be more specific, I interpret the semantics of APPEAR-AS-IF to involve human judgments made on the basis of information obtained through our senses. In most cases, the information is vision-based. But in some cases, the information may be obtained through other types of sensory inputs. For example, it is nearly impossible to judge whether an egg is raw or boiled by just looking at it. Therefore, to account for examples like (12a) (*yude-ta tamago* 'boiled egg') we need to allow for the possibility that non-visual sensory stimuli are involved in making the relevant judgments.

Given the above discussion, (48a–b) are analyzed as in (58) and (59), respectively.

(58) [$_{NP}$ [$_{MP}$[$_{TP}$ Op$_1$ [$_{TP}$[$_{VP}$ e$_1$-ga taore]-ta]] Mod] hasira]

-NOM fall -PAST pole

'fallen pole' or 'pole lying after having fallen over'

1. $[\![[_{TP}\ Op_1\ [_{TP}[_{VP}\ e_1\text{-ga taore}]\text{-ta}]]]\!] = \lambda x \in D_e\ .\ [\lambda e \in D_{ev}\ .\ [\lambda t \in D_i .\ [\lambda w \in D_s\ .\ e$ precedes t in w & e is x's falling over]]]

2. $[\![[_{MP}[_{TP}\ Op_1\ [_{TP}[_{VP}\ e_1\text{-ga taore}]\text{-ta}]]\ Mod]]\!] = \lambda x \in D_e\ .\ [\lambda t \in D_i\ .\ [\lambda w \in D_s\ .$ $\exists s \in D_{st}\ .\ s$ covers t & x is in s & APPEARS-AS-IF$(\lambda x_2 \in D_e\ .\ [\lambda s_2 \in D_{st}\ .\ [\lambda t_2 \in D_i\ .$ $[\lambda w_2 \in D_s\ .\ \exists\ e_2 \in D_{ev}\ .\ e_2$ precedes t_2 in w_2 & e_2 is x_2's falling over & $e_2 \propto s_2$ in $w_2]]]])(x)(s)(t)(w) = 1]]$

3. $[\![[_{NP}[_{MP}[_{TP}\ Op_1\ [_{TP}[_{VP}\ e_1\text{-ga taore}]\text{-ta}]]\ Mod]\ hasira]]\!] = \lambda x \in D_e\ .\ [\lambda t \in D_i\ .$ $[\lambda w \in D_s\ .\ \exists s \in D_{st}\ .\ s$ covers t & x is in s & APPEARS-AS-IF$(\lambda x_2 \in D_e\ .\ [\lambda s_2 \in D_{st}\ .$ $[\lambda t_2 \in D_i\ .\ [\lambda w_2 \in D_s\ .\ \exists\ e_2 \in D_{ev}\ .\ e_2$ precedes t_2 in w_2 & e_2 is x_2's falling over & $e_2 \propto s_2$ in $w_2]]])\ (x)(s)(t)(w) = 1$ & x is a pole in w at $t]]$

(59) $[_{NP}\ [_{MP}[_{TP}\ Op_1\ [_{TP}[_{VP}\ e_1\text{-o yude}]\text{-ta}]]\ Mod]\ tamago]$

-ACC boil -PAST egg

'boiled egg'

1. $[\![[_{TP}\ Op_1\ [_{TP}[_{VP}\ e_1\text{-o yude}]\text{-ta}]]]\!] = \lambda x \in D_e\ .\ [\lambda e \in D_{ev}\ .\ [\lambda t \in D_i .\ [\lambda w \in D_s\ .\ e$ precedes t in w & e is x's getting boiled]]]

2. $[\![[_{MP}[_{TP}\ Op_1\ [_{TP}[_{VP}\ e_1\text{-o yude}]\text{-ta}]]\ Mod]]\!] = \lambda x \in D_e\ .\ [\lambda t \in D_i\ .\ [\lambda w \in D_s\ .\ \exists s \in D_{st}$ $.\ s$ covers t & x is in s & APPEARS-AS-IF$(\lambda x_2 \in D_e\ .\ [\lambda s_2 \in D_{st}\ .\ [\lambda t_2 \in D_i\ .$ $[\lambda w_2 \in D_s\ .\ \exists\ e_2 \in D_{ev}\ .\ s$ covers t_2 in w_2 & $e_2 \propto s_2$ in w_2 & e_2 is x_2's being boiled]]])$(x)(s)(t)(w) = 1]]$

3. $[\![[_{NP}\ [_{MP}[_{TP}\ Op_1\ [_{TP}[_{VP}\ e_1\text{-o yude}]\text{-ta}]]\ Mod]\ tamago]]\!] = \lambda x \in D_e\ .\ [\lambda t \in D_i\ .$ $[\lambda w \in D_s\ .\ \exists s \in D_{st}\ .\ s$ covers t & x is in s & APPEARS-AS-IF$(\lambda x_2 \in D_e\ .\ [\lambda s_2 \in D_{st}\ .$ $[\lambda t_2 \in D_i\ .\ [\lambda w_2 \in D_s\ .\ \exists\ e_2 \in D_{ev}\ .\ s$ covers t_2 in w_2 & $e_2 \propto s_2$ in w_2 & e_2 is x_2's being boiled]]])\ $(x)(s)(t)(w) = 1$ & x is an egg in w at $t]]$

The above computations show that the adjectival relatives in (48a–b) receive the desired interpretations.[26]

For my proposal to be complete, I must also discuss the syntax-semantics interface conditions for non-adjectival relative clauses and regular clauses. For the purpose of this paper, I will adopt Kratzer's (1996, 2000) proposal that an inflectional category head Voice is responsible for introducing the "external argument". My implementation closely follows Kusumoto's (2001) rendition of Kratzer's proposal for Japanese. In (60), Agent is assumed to occupy the head position of Voice Phrase. Note that the event variable is existentially closed here.

(60) $[\![\text{Agent}]\!] = \lambda P \in D_{<ev,<i,<s,t>>>}. [\lambda x \in D_e . [\lambda t \in D_i . [\lambda w \in D_s . [\exists e \in D_{ev} . x \text{ is the agent of } e \ \& \ P(e)(t)(w) = 1]]]]$

Let us see how the simple sentence in (61) is analyzed in this account.

(61) Taroo-ga tamago-o yude-ta.
Taro-NOM egg-ACC boil-PAST
'Taro boiled an egg/eggs/the egg(s).'

The semantics of (61) is given as in (62), assuming that *-ta* has a preterit interpretation. I assume for simplicity that *tamago* 'egg' receives an indefinite interpretation here and translates as 'an egg'.

---

[26] Verbs like *naguru* 'hit' (e.g. (44)) do not give rise to adjectival interpretations in relative clauses because of its inherent semantic properties. When a person is hit, this may leave a scar or bruise that is observable, but this is not a required by the semantics of *naguru* 'hit'. Note that verbs like *kizutukeru* 'injure' or 'deface' do produce adjectival interpretations. Fillmore (1970) makes a similar observation about *hit* and *break*.

(62) [$_{\text{VoiceP}}$ Taroo-ga [$_{\text{V}'}$ Agent [$_{\text{TP}}$[$_{\text{VP}}$ tamago-o yude]-ta]]]

Taro-NOM egg-ACC boil -PAST

'Taro boiled an egg/eggs/the egg(s).'

1. ⟦tamago-o yude-ta⟧ =

   $\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists x \in D_e$. x is an egg in w at t & e precedes t in w & e is boiling of x]]

2. ⟦Agent tamago-o yude-ta⟧ = $\lambda P \in D_{<ev,<i,<s,t>>>}$. [$\lambda y \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists e \in D_{ev}$. y is the agent of e & $P(e)(t)(w) = 1$]]]]

   ($\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists x \in D_e$. x is an egg in w at t & e precedes t in w & e is boiling of x]])

3. $\lambda y \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists e \in D_{ev}$. y is the agent of e & $\exists x \in D_e$. x is an egg in w at t & e precedes t in w & e is boiling of x]]]

4. ⟦Taroo-ga Agent tamago-o yude-ta⟧ = $\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists e \in D_{ev}$. Taro is the agent of e & $\exists x \in D_e$. x is an egg in w at t & e precedes t in w & e is boiling of x]]

If this is a matrix clause, its truth condition is given as in (63).

(63) A matrix sentence [$_{\text{VoiceP}}$ ...] is true in w_0 at t_0 iff ⟦[$_{\text{VoiceP}}$ ...]⟧(t_0)(w_0) = 1.

The truth condition of (61) is then given as in (64), which accurately reflects our intuitions.

(64) There is an event e such that Taro is the agent of e & e precedes the utterance time & e is a boiling of an egg.

The fact that **Mod** can combine only with a TP receives a semantic account. That is, since the Voice head introduces an existential quantifier over event variables, the denotation of a complete clause cannot combine with that of **Mod**.

7. Potential Problems and Further Issues

This section will discuss some controversial or less straightforward instances of adjectival relatives. We start with (65). The relative clause in (65) has an overt subject DP *dareka-ga* 'someone'. Nevertheless (65) clearly indicates that the flag is in a raised position now.

(65) Dareka-ga takaku kakage-ta hata (-ga hatamei-te i-ru.)
someone-NOM high raise-PAST flag-NOM flap-TE IRU-PRES
'the flag that someone has raised [up the pole] (is flapping.)'

I contend that this is a normal preterit or perfect aspect interpretation of a regular (i.e., clausal and gapped) relative clause. This is reasonable because (65) clearly entails that someone hoisted the flag, which should not be the case with true adjectival relatives. (65) is analyzed as in (66).

(66) syntax: $[_{NP}[_{CP}\ Op_1\ [_{VoiceP}$ dareka-ga Agent $[_{TP}\ e_1$-o takaku kakage-ta]]] $[_{NP}$ hata]]
semantics:

1. $[\![[e_1\text{-o takaku kakage-ta}]]\!] = \lambda e \in D_{ev}\ .\ [\lambda t \in D_i .\ [\lambda w \in D_s\ .\ e$ precedes t in w & e is hoisting of $x_1]]$
2. $[\![$dareka-ga Agent e_1-o takaku kakage-ta$]\!] = \lambda t \in D_i\ .\ [\lambda w \in D_s\ .\ [\exists e \in\ D_{ev}\ .\ [\exists y \in D_e\ .$ y is a person & y is the agent of e & e precedes t & e is hoisting of $x_1]]]$
3. $[\![[_{CP}\ Op_1\ [_{VoiceP}$ dareka-ga e_1-o takaku kakage-ta$]]]\!] = \lambda x_1 \in D_e\ .\ [\lambda t \in D_i\ .\ [\lambda w \in D_s\ .\ [\exists e \in\ D_{ev}\ .\ [\exists y \in D_e\ .\ y$ is a person & y is the agent of e & e precedes t & e is hoisting of $x_1]]]]$
4. $[\![[_{NP}[_{CP}\ Op_1\ [_{VoiceP}$ dareka-ga e_1 takaku kakage-ta$]]\ [_{NP}$ hata$]]]\!] =$
$\lambda x_1 \in\ D_e .\ [\lambda t \in D_i\ .\ [\lambda w \in D_s\ .\ [\exists e \in\ D_{ev}\ .\ \exists y \in D_e\ .\ y$ is a person & y is the agent of e & e precedes t & e is hoisting of x_1 & x_1 is a flag in w at $t]]]$

(66) does not guarantee that at the evaluation time (indicated by the variable *t*) the target state of flag hoisting obtains. Thus, the impression that the flag is still up there is a pragmatic effect of what (65) asserts: the flag is flapping now. The truth of the sentence merely requires that hoisting of a flag obtained in the past. Thus, (65) turns out to be a preterit interpretation of a regular relative clause with a gap, not an adjectival relative. My proposal also allows for a perfect interpretation of *-ta* as well. In this case, the target state is required to obtain at the utterance time. But the existence of a triggering event is also required. This is consistent with our intuitions.

We now turn to (67), in which the phrase *ana-ga ai-ta* 'hole open-PAST' receives an adjectival interpretation.

(67) ana-ga ai-ta kabe
hole-NOM open/arise-PAST wall
'a wall with a hole' (Lit.: 'a wall such that a hole opened [in it]')

(67) contains a *ga*-marked DP, which is presumably the sole argument of the unaccusative verb *aku* 'open'. Since this *ga*-marked DP is not an agentive subject, it does not violate Abe's generalization given earlier in (16). However, my proposal cannot account for its semantics. If *ana-ga* 'hole-NOM' is understood to be a regular nominal argument of the verb *aku* 'open', the entire phrase *ana-ga ai-ta* 'hole open-PAST' does not denote a property of individuals; it denotes a property of eventualities instead. That is not the right input type for an adnominal modifier according to my account. This is shown in (68).

(68) 1. ⟦ai-ta⟧ = $\lambda x \in D_e$. [$\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. *e* is located before *t* & *e* is *x*'s coming into existence]]]

2. ⟦ana-ga⟧ (assuming an indefinite description interpretation) = $\lambda P \in D_{<e,<ev,<i,<s,t>>>>}$. [$\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists x \in D_e$. *x* is a hole in *w* at *t* & $P(x)(e)(t)(w) = 1$]]]

3. ⟦ana-ga ai-ta⟧ = $\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists x \in D_e$. *x* is a hole in *w* at *t* & *e* is located before *t* & *e* is *x*'s coming into existence]]

The interpretation given in (68) is essentially propositional (in that no nominal argument can be fed into it) and cannot be an adnominal modifier unless some special provision is made. There are two possible avenues to resolving the problem. One possibility is to assume that there is a locative gap within the VP because the verb requires it as its argument. This proposal is justified as follows: a hole's coming into existence is semantically incomplete if its location is not specified since a hole cannot exist all by itself.[27] (67) is then analyzed syntactically as in (69) and semantically as in (70) thanks to (55).

(69) [$_{NP}$[$_{MP}$[$_{TP}$ Op$_1$[$_{TP}$ e$_1$-ni ana-ga ai-ta]] Mod][$_{NP}$ kabe]]
at hole-NOM open/arise-PAST wall
'a wall with a hole' (Lit.: 'a wall such that it is in a state that appears to have resulted from a hole that came into existence')

(70) 1. ⟦ai-ta⟧ = $\lambda y \in D_e$. [$\lambda z \in D_e$. [$\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. *e* is located before *t* in *w* & *e* is *z*'s coming into existence & x is located in y]]]]

2. ⟦e$_1$-ni ai-ta⟧ = $\lambda z \in D_e$. [$\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. *e* is located before *t* in *w* & *e* is *z*'s coming into existence & x is located in x_1]]]

3. ⟦ana-ga⟧ (assuming an indefinite description interpretation) = $\lambda P \in D_{<e,<ev,<i,<s,t>>>>}$. [$\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists z \in D_e$. *z* is a hole in *w* at *t* & $P(z)(e)(t)(w) = 1$]]]]

4. ⟦ana-ga e$_1$-ni ai-ta⟧ = $\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists z \in D_e$. *z* is a hole in *w* at *t* & *e* is located before *t* in *w* & *e* is *z*'s coming into existence & *z* is located in x_1]]]

---

[27] For some relevant discussion on obligatory adjuncts, the reader is referred to Goldberg and Ackerman (2001).

5. $[\![[_{TP}\ Op_1\ [_{TP}$ ana-ga e_1-ni ai-ta$]]\!] = \lambda x_1 \in D_e$. [$\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists z \in D_e$. z is a hole in w at t & e is located before t in w & e is z's coming into existence & z is located in x_1]]]]

6. $[\![[_{MP}[_{TP}\ Op_1[_{TP}$ ana-ga e_1-ni ai-ta]]Mod]$]\!] = \lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists s \in D_{st}$. s covers t & x is in s & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. $\lambda x_1 \in D_e$. [$\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists z \in D_e$. z is a hole in w at t & e is located before t in w & e is z's coming into existence & z is located in x_1]]]](x_2)(e_2)(t_2)(w_2) = 1 & $e_2 \propto s_2$ in w_2]]]])(x)(s)(t)(w) = 1]]]

7. $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists s \in D_{st}$. s covers t & x is in s & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. [$\exists e_2 \in D_{ev}$. [$\exists z \in D_e$. z is a hole in w at t & e_2 is located before t_2 in w & e_2 is z's coming into existence & z is located in x_2 & $e_2 \propto s_2$ in w_2]]]]])(x)(s)(t)(w) = 1]]]

8. $[\![[_{NP}[_{MP}[_{TP}\ Op_1[_{TP}$ ana-ga e_1-ni ai-ta]]Mod] kabe$]\!] = \lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. [$\exists s \in D_{st}$. s covers t & x is in s & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. [$\exists e_2 \in D_{ev}$. [$\exists z \in D_e$. z is a hole in w at t & e_2 is located before t_2 in w & e_2 is z's coming into existence & z is located in x_2 & $e_2 \propto s_2$ in w_2]]]]])(x)(s)(t)(w) = 1 & x is a wall at t in w]]] (cf. (56))

(70) provides the right interpretation for (55b).

An alternative would be to assume that there is a mechanism that turns a property of eventualities into a property of individuals. This idea is formalized here in terms of another modifier-creating expression **Mod$_2$** defined in (71).

(71) $[\![\text{Mod}_2]\!] = \lambda P \in D_{<ev,<i,<s,t>>>}$. [$\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists s \in D_{st}$. s covers t in w & x is in s in w & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. $P(e_2)(t_2)(w_2) = 1$ & $e_2 \propto s_2$ & s_2 covers t_2]]])(x)(s)(t)(w) = 1]]]

With (71), (67) is syntactically analyzed as in (72), and its semantic computation is proposed as in (73).

(72) $[_{NP}[_{MP}[_{TP}$ ana-ga ai-ta] $Mod_2][_{NP}$ kabe]]

hole-NOM open/arise-PAST wall

'a wall with a hole' (Lit.: 'a wall such that a hole opened [in it]')

(73) 1. $[\![[_{MP}[_{TP}$ ana-ga ai-ta] $Mod_2]]\!]$ =

$\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists s \in D_{st}$. s covers t in w & x is in s in w & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. $\exists x \in D_e$. x is a hole in w_2 at t_2 & e_2 is located before t & e_2 is x's coming into existence & $e_2 \propto s_2$ & s_2 covers t_2]]])(x)(s)(t)(w) = 1]]

2. $[\![[_{NP}[_{MP}[_{TP}$ ana-ga ai-ta] $Mod_2][_{NP}$ kabe]]$]\!]$ = $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists s \in D_{st}$. s covers t in w & x is in s in w & x is a wall at t in w & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. $\exists x \in D_e$. x is a hole in w_2 at t_2 & e_2 is located before t & e_2 is x's coming into existence & $e_2 \propto s_2$ & s_2 covers t_2]]])(x)(s)(t)(w) = 1]]

Both (70) and (73) provide empirically correct results for (67). However, example (74), which contains an adjectival relative, suggests that the second alternative (the "adjunct approach") should be chosen rather than the first (the "argument approach").

The problem with (74) is the unclear status of the nominal *ningyoo* 'doll'.

(74) boosi-o kabut-ta ningyoo

hat-ACC put-on-PAST doll

'[a] doll that wears a hat'

For all we know, the verb *kaburu* 'put on ... (on the head)' is an agentive transitive verb. This can be shown by examples like (75a). In (75a) Taro is clearly the agent of the event of putting on a hat. Thus, (74) should be able to receive an agentive reading that parallels the one that (75b) receives.

(75) a. Taroo-ga boosi-o kabut-ta.
Taro-NOM hat-ACC put-on-PAST
'Taro put on a hat.'

b. (Sono) ningyoo-ga boosi-o kabut-ta.
that doll-NOM hat-ACC put-on-PAST
'That doll put on a hat.'

(75b) is well-formed and meaningful. However, it suggests that the doll put on the hat on its own, which is impossible unless it is a high-tech self-moving robot.[28] The adnominal modifier in (74) does have this pragmatically implausible and non-preferred reading. However, its preferred reading is a purely adjectival one: (a) doll that has a hat on its head.
It appears then that we need to look for a different source for the adjectival reading of (74).

My proposal requires that the agentive nominal occur outside TP. Since adjectival relatives can only be created from a TP, we know why an agentive NP gap cannot be associated with *ningyoo* 'doll' in (74). But if so, what role does *ningyoo* 'doll' play in (74)? Intuitively, it specifies the

[28] An anonymous reviewer suggests that a "target state" reading for (75b) is available if a doll maker utters it on TV after putting a hat on the doll's head. Even if this reading is available (perhaps due to a metaphorical extension and due to the availability of a perfect aspect reading), (75b) would still differ from its adjectival relative counterpart in that the former entails the existence of a relevant event.

location or holder of the state of wearing a hat. However, this entity cannot be indicated by the dative case marker (or postposition) *-ni* as shown by the ungrammaticality of (76).[29]

(76) *Taroo-wa zibun-ni/Hanako-ni boosi-o kabut-ta
Taro-TOP self-DAT/Hanako-DAT hat-ACC put-on-PAST
Lit. 'Taro put a hat to himself/Hanako.'

This suggests that positing **Mod$_2$** as in (71) would be better than positing a locative PP gap. According to (71), (74) is analyzed as in (77).

(77) 1. [[boosi-o kabut-ta]] = $\lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists x \in D_e$. *x* is a hat in *w* at *t* & *e* precedes *t* in *w* & *e* is an event of putting *x* on]]

---

[29] Note that *-ni* can indicate a more specific location of the hat as shown in (i).

(i) Taroo-wa atama-ni boosi-o kabut-ta
Taro-TOP head-DAT hat-ACC put-on-PAST
Lit. 'Taro put a hat on his head.'

In this connection, note also that (ii-a) is ill-formed whereas (ii-b) is perfectly acceptable.

(ii) a. * Taroo-ni kabut-ta boosi
Taro-at put-on-PAST hat
Intended: 'the hat that Taro wears'
b. atama-ni kabut-ta boosi
head-DAT put-on-PAST hat
'the hat that is on the head (of someone)'

2. ⟦[boosi-o kabut-ta Mod_2]⟧ = $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists s \in D_{st}$. *s* covers *t* in *w* & *x* is in *s* in *w* & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. $\exists x \in D_e$. *x* is a hat in w_2 at t_2 & e_2 precedes t_2 in w_2 & e_2 is an event of putting *x* on & $e_2 \propto s_2$ & s_2 covers t_2]]]])(*x*)(*s*)(*t*)(*w*) = 1]]
3. ⟦[boosi-o kabut-ta Mod_2 ningyoo]⟧ = $\lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists s \in D_{st}$. *s* covers *t* in *w* & *x* is a doll at *t* in *w* & *x* is in *s* in *w* & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. $\exists x \in D_e$. *x* is a hat in w_2 at t_2 & e_2 precedes t_2 in w_2 & e_2 is an event of putting *x* on & $e_2 \propto s_2$ & s_2 covers t_2]]]])(*x*)(*s*)(*t*)(*w*) = 1]]

The doll is understood to be the bearer of the state in question in (77) even though the modifier has no gap. This does justice to our intuitions about (74). The sentence (78a) is the same type of example as (74) and can be explained by the same technique. If acceptable as an adjectival relative, (78b) also favors positing **Mod_2** since the location of someone's falling over is clearly an optional element (i.e., adjunct).

(78) a. ki-ni nobot-ta kuma
tree-DAT climb-PAST bear
'(a/the) bear that is up the tree (as a result of having climbed it).'

b. takusan-no hito-ga taore-ta miti
many person-NOM fall-PAST road
'(a/the) road where a lot of people are lying down (after having fallen over)'

It is worth noting that (71) is type-wise compatible with unergative verbs, which were claimed earlier to have no part in adjectival relatives because (55) is incompatible with unergative verbs.[30] For

[30] I thank an anonymous reviewer for pointing out this potential problem.

example, *hasiru* ‘run’, which is an unergative verb, can be turned into an adjectival modifier in terms of **Mod$_2$**. This is shown in (79) and (80).

(79) [$_{NP}$[$_{MP}$[$_{TP}$ hasit-ta] Mod$_2$][$_{NP}$ hito]]

run PAST person

[intended reading] ‘person who appears to have run’

(80) 1. $[\![[_{TP}\text{ hasiru}]]\!] = \lambda e \in D_{ev}$. e is running

2. $[\![[_{TP}\text{ hasit-ta}]]\!] = \lambda e \in D_{ev}$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. e precedes t in w & e is running]]

3. $[\![[_{MP}[_{TP}\text{ hasit-ta}]\ \text{Mod}_2]]\!] = \lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. $\exists s \in D_{st}$. s covers t in w & x is in s in w & APPEARS-AS-IF ($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. e_2 precedes t_2 in w & e_2 is running & $e_2 \propto s_2$ & s_2 covers t_2]]])(x)(s)(t)(w) = 1]]

4. $[\![[_{\mathbf{NP}}[_{MP}[_{TP}\text{ hasit-ta}]\ \text{Mod}_2][_{NP}\text{ hito}]]]\!] = \lambda x \in D_e$. [$\lambda t \in D_i$. [$\lambda w \in D_s$. x is person in w at t & $\exists s \in D_{st}$. s covers t in w & x is in s in w & APPEARS-AS-IF($\lambda x_2 \in D_e$. [$\lambda s_2 \in D_{st}$. [$\lambda t_2 \in D_i$. [$\lambda w_2 \in D_s$. $\exists e_2 \in D_{ev}$. e_2 precedes t_2 in w & e_2 is running & $e_2 \propto s_2$ & s_2 covers t_2]]])(x)(s)(t)(w) = 1]]

Except in surrealistic circumstances, it is virtually impossible to interpret the adnominal modifier in (79) as having an adjectival reading although (80) assigns a well-defined meaning to it. This is not a problem for my proposal. (80) shows that the entire NP denotes the property of individuals x such that x is a person and there is a state s associated with x and this state appears to have arisen from a previous running activity performed by x. Since there is no clear state that the agent has which indicates a past running activity, we can assume that this property is not satisfied by anyone in the actual world. This is the reason why the adnominal modifier in (79) (and similar examples involving unergative verbs) has no adjectival reading even if **Mod$_2$** is available.

One other related issue that I would like to discuss here is whether **Mod$_2$** can account for examples like (81b–c).[31]

(81) a. yuka-ni oti-ta kagi
floor-DAT fall-PAST key
'key that is on the floor (as a result of having fallen)' (adjectival reading possible)

b. kagi-ga oti-ta yuka
key-NOM drop-PAST floor
[Intended] 'floor where a key is located, and this key got there by dropping/falling (from a higher location)' (adjectival reading virtually impossible)

c. tenzyoo-ga oti-ta heya
ceiling-NOM drop-PAST room
'room such that its ceiling fell' (adjectival reading possible)

The relative in (81a) is a typical adjectival relative and can mean what it is expected to mean. However, given the same situation, (81b) does not allow for an adjectival reading at least in normal circumstances. (81c) is similar to (81b) in terms of the thematic role associated with the modifiee, but the former can receive an adjectival reading unlike the latter. An anonymous reviewer suggests that the difference is due to the notion of part-whole relation. The key is not part of the floor in (81b), whereas the ceiling is part of the house. The point is well taken, but the data in (81) are readily explained by the proposal defended in this article. **Mod$_2$** can be invoked to produce an adjectival modifier for (81b). However, it is hard to conceive of a state associated with the floor that has been caused by the key's dropping to the floor. The floor does not undergo a change as a result of the key's dropping to the floor. On the other hand, (81c) requires that there be a state *s* such that the room is in this state *s* and *s* appears to have been caused by a falling of the ceiling. Since the

[31] I owe these examples and some relevant observations to an anonymous reviewer.

ceiling is part of the room, this requirement is satisfied. Thus, what the reviewer refers to as the concept of part-whole relation is captured without invoking any special machinery. The main issue is whether there is a current physically determinable state the object in question bears. Sometimes this involves a subtle judgment, but that is exactly what we expect. The reason that in most adjectival relatives the head noun is associated with an incremental theme is that an object denoted by an incremental theme DP necessarily changes its locational or physical state.

An anonymous reviewer points out that not all agentive transitive verbs used as adnominal modifiers produce adjectival relatives even when the subject is missing. Indeed, examples like (82a) and (82b) do not seem to receive adjectival interpretations in normal circumstances.

(82) a. kowasi-ta kuruma
break (v_t) PAST car
'a/the car that (pro) broke'

b. mage-ta kugi
bend (v_t) PAST nail
'a/the nail that (pro) bent'

I contend, however, that both (82a) and (82b) do have adjectival readings. It is just that we do not find natural contexts in which to use them for adjectival readings. In the proposal I defend, I admit no semantic difference between unaccusative verbs and agentive transitive verbs. This would mean that there is no semantic difference between (82a–b) and (83a–b). However, there is a difference between them. I contend that the difference lies in the **agentivity implicature** of (82a–b).

(83) a. koware-ta kuruma
break (v_i) PAST car
'a/the car that is broken'

b. magat-ta kugi

bend (v_i) PAST nail

'a/the nail that is bent'

That is, (82b) can indicate a state that appears to have resulted from a bending event on a par with its unaccusative counterpart (83b). The difference lies in the fact that the former implicates the existence of an agent whereas the latter does not. I defend the implicature thesis because examples like (84a–b) suggest that the existence of an agent is not entailed by an adjectival relative containing an agentive transitive verb.

(84) a. kuzure-ta kami

break (v_i) PAST hair

'(the) hair that is untidy'

b. kuzusi-ta kami

break (v_i)-PAST hair

'(the) hair that is (intentionally) made untidy'

(84a) gives us the impression that the hair is not well maintained. The case in point is a person who does not comb his hair after getting up. (84b) on the other hand, may be used to refer to someone who intentionally wears an untidy hairstyle. The idea is that this hairstyle could be fasionable. Though the relevant judgment is subtle, I believe that (85a) does not entail (85b).

(85) a. Taroo-wa kuzusi-ta kami-o sit-ei-ru.

Taro-TOP break (v_i)-PAST hair-ACC do-PROG-PRES

'Taro wears hair that is untidy'

b. Taroo-wa kami-o kuzusi-ta.

Taro-TOP hair-ACC break-PAST

'Taro made his hair untidy'

For example, (84b) could describe a situation in which the hair in question has not been combed for some time, and the untidy look was brought about "naturally". Thus, it is not easy to pinpoint an agent that caused the untidy look. The only difference is that this result is intended in (84b) but not in (84a). This comes from the implicature that says that there is an agent that caused this result. Since this does not affect the semantics per se, it does not pose a problem for my overall proposal.

Finally, the examples in (86), if interpretable as adjective relatives, are problematic for Abe's generalization (16) as well as for my proposal.

(86) a. [Many people are on the stage wearing different and very peculiar hats.]
Taroo-ga kabut-ta boosi-o mite-goran.
Taro-NOM put-on-PAST hat-ACC look-at-GORAN
[intended] 'Look at the hat that Taro wears'

b. Hanako-ga yubi-ni hame-ta daiya-no yubiwa-ga
Hanako-NOM finger-DAT put-on-PAST diamond-GEN ring-NOM
kirakira hikat-te iru.
brightly shine-TE IRU-PRES
[intended] 'The diamond ring that Hanako wears on her finger is shining brightly.'

c. Hanako-ga minituke-ta burooti-ga hitome-o hii-te iru.
Hanako-NOM put-on-PAST pin-NOM attention-ACC attract-TE IRU-PRES
[intended] 'The pin that Hanako wears is attracting people's attention.'

I believe that (86a–c) are acceptable. But I am not sure if the adnominal modifiers have purely adjectival readings. The relevant readings may be instances of perfect aspect interpretations. Some researchers simply do not accept examples like (86a–c) (e.g., Teramura 1984). Note that these examples all involve "reflexive" predicates where the agentive subject is simultaneously the beneficiary (or theme) of the action in question. Perhaps in these cases *ga*-marked nominals are

reanalyzed as occupying a VP-internal position and are therefore permitted in adjectival relatives marginally. This issue will be left for future research.

8. Conclusion

This paper has discussed the semantics of adjectival relatives in Japanese in conjunction with adjectival passives in English. A proposal is advanced in which adjectival relatives receive a modalized interpretation when a verbal projection (technically a TP) is turned into a Modifier Phrase (MP). In formalizing this idea, I adopted independent proposals made by Kratzer (on so-called external arguments) and Bittner (on direct causation or "concealed causatives"). Reference to target states is very pervasive in natural language, and I hope that this work stimulates further study of related aspectual phenomena in typologically diverse languages.

Bibliography

Abe, Yasuaki: 1993, 'Dethematized Subjects and Property Ascription in Japanese', *Proceedings of the 1992 Asian Conference on Language, Information and Computation*, Seoul, Korea.

Abney, Steven: 1987, *The English Noun Phrase in its Sentential Aspect*, PhD dissertation, MIT.

Ackerman, F. and A. E. Goldberg: 1996, 'Constraints on Adjectival Past Participles', in A. E. Goldberg. (ed.), *Conceptual Structure, Discourse, and Language*, CSLI Publications, Stanford University, Stanford, CA, pp. 17-30.

Bennett, Michael and Barbara Partee: 1972, 'Toward the Logic of Tense and Aspect in English', Distributed by the Indiana University Linguistics Club, Bloomington, Indiana.

Bierwisch, M.: 2002, 'A Case for CAUSE', in Ingrid Kaufmann and B. Stiebels. eds., *More than Words. Festschrift for Dieter Wunderlich*, Berlin, Akademie Verlag, pp. 327–353.

Bittner, Maria: 1999, 'Concealed Causatives', *Natural Language Semantics* **7**, 1–78.

Burzio, Luigi: 1986, *Italian Syntax: A Government-Binding Approach*, Kluwer Academic Publishers, Dordrecht, The Netherlands.

Chomsky, Noam: 1977, 'On WH-movement', in P. Culicover, T. Wasow, and A. Akmajian (eds.), *Formal Syntax*, Academic Press, New York.

Comrie, Bernard: 1976) *Aspect*, Cambridge University Press, Cambridge.

Cresswell, Maxwell J. and Arnim von Stechow: 1982, '*De Re* Belief Generalized', *Linguistics and Philosophy* **5**, 503–535.

Davidson, Donald.: 1967, 'The Logical Form of Action Sentences', in Nicholas Rescher (ed.), *The Logic of Decision and Action*, pp. 81–95, University of Pittsburgh Press, Pittsburgh, Pennsylvania.

Dixon, R. M. W.: 1982, *Where Have All the Adjectives Gone? and Other Essays in Semantics and Syntax*, Mouton, Berlin.

Dowty, David: 1979, *Word Meaning and Montague Grammar: The Semantics of Verbs and Times in Generative Semantics and in Montague's PTQ*, D. Reidel, Dordrecht, The Netherlands.

Dowty David: 1986, 'The Effects of Aspectual Class on the Temporal Structure of Discourse : Semantics or Pragmatics?', *Linguistics and Philosophy* **9**, 37–61.

Dowty, David: 1991, 'Thematic Proto-Roles and Argument Selection', *Language* **67**, 547-619.

Enç, Mürvet: 1987, 'Anchoring Conditions for Tense.' *Linguistic Inquiry* **18**, 633-657.

Fillmore, Charles: 1970, 'The Grammar of Hitting and Breaking', in R. Jacobs and P. Rosenbaum (eds.), *Readings in English Transformational Grammar*, pp. 120–133, Holt, Rinehart and Winston, New York.

Goldberg, Adele E.: *Constructions: A construction Grammar Approach to Argument Structure*, University of Chicago Press, Chicago.

Goldberg, A. E. and F. Ackerman: 2001, 'The Pragmatics of Obligatory Adjuncts', *Language* **77**, 798–813.

Heim, Irene and Angelika Kratzer: 1998, *Semantics in Generative Grammar*, Blackwell, Malden, MA.

Kaufmann, Ingrid: 1995, 'What is an (Im-)possible Verb? Restrictions on Semantic Form and their Consequences for Argument Structure', *Folia Linguistica* **29**, 67–103.

Kindaichi, Haruhiko: 1950, 'Kokugo Dooshi no Ichibunrui [A Proposal for Verb Classification in Japanese]', *Gengo Kenkyuu* **15**, 48-63.

Kinsui, Satoshi: 1994, 'Rentai Shuushoku no *-ta* ni Tsuite [On the Adnominal Modifier *-ta*] ', in Y. Takubo (ed.), *Nihongo-no Meishishuushoku Hyoogen* [Adnominal Modifiers in Japanese], pp. 29–65, Kuroshio Shuppan, Tokyo.

Kratzer, Angelika: 1981, 'The Notional Category of Modality', in H. J. Eikmeyer and H. Rieser (eds.), *Words, Worlds and Contexts*, pp. 38–74, de Gruyter, Berlin.

Kratzer, Angelika: 1996, 'Severing the External Argument from Its Verb', in Johan Rooryck and Laurie Zaring (eds.), *Phrase Structure and the Lexicon*, pp. 109–137, Kluwer, Dordrecht.

Kratzer, Angelika: 2000, 'Building Statives', *Proceedings of the 26th Annual Meeting of the Berkeley Linguistics Society: General Session and Parasession on Aspect*, pp. 385–399.

Kusumoto, Kiyomi: 2001, 'The Semantics of Non-Past *-ta* in Japanese' in María Cristana Cuervo et al. (eds.), *Formal Approaches to Japanese Linguistics 3*, pp. 163–180, MIT Working Papers in Linguistics, MIT, Cambridge.

Levin, Beth and Rappaport Hovav, Malka: 1995, *Unaccusativity: At the Syntax-Lexical Semantics Interface*. The MIT Press, Cambridge.

Montague, Richard: 1973, 'The Proper Treatment of Quantification in Ordinary English', in J. Hintikka, J. Moravcsik, and P. Suppes (eds.), *Approaches to Natural Language*, pp. 221–242, D. Reidel, Dordrecht, The Netherlands.

Nishiyama, Kunio: 1999, 'Adjectives and the Copulas in Japanese, ' *Journal of East Asian Linguistics* **8**, 183–222.

Ogihara, Toshiyuki: 1996, *Tense, Attitudes, and Scope*, Kluwer, Dordrecht.

Parsons, Terence: 1990, *Events in the semantics of English: A Study in Subatomic Semantics*, MIT Press, Cambridge, MA.

Perlmutter, David: 1978, 'Impersonal Passives and the Unaccusative Hypothesis', in J. Jaeger et al. (eds.), *Proceedings of the Fourth Annual Meeting of the Berkeley Linguistics Society*, pp. 157–189, University of California, Berkeley.

Rodman, Rodman: 1976, 'Scope Phenomena, 'Movement Transformations', and Montague Grammar', in Barbara H. Partee (ed.) *Montague Grammar*, pp. 165–176, Academic Press, New York.

Ross, John Robert: 1967, *Constraints on Variables in Syntax*, Ph D dissertation, MIT, Camdridge, MA. [Published in 1986 as *Infinite Syntax!* Ablex Publishing Corporation, Norwood, NJ.]

Rubin, Edward J.: 1996, 'The Transparent Syntax and Semantics of Modifiers', in Brian Agbayani and Sze-Wing Tang (eds.) *WCCFL 15: Proceedings of the Fifteenth West Coast Conference of Formal Linguistics*, pp. 429–439, Stanford Linguistics Association, Stanford, CA.

Smith, Carlota: 1991. *The Parameter of Aspect*, Kluwer, Dordrecht.

Takezawa, Koichi: 1983, 'Aspectual Meanings of Verbs and Two Types of Passive', ms. University of Washington, Seattle, WA.

Teramura, Hideo: 1984, *Nihon-go no Shintakkusu to Imi* [The Syntax and Semantics of Japanese], Kuroshio Shuppan, Tokyo.

Tsujimura, Natsuko: 1991, 'On the Semantic Properties of Unaccusativity', *Journal of Japanese Linguistics* **13**, 91-116.

Wunderlich, Dieter: 1997, 'Cause and the Structure of Verbs', *Linguistic Inquiry* **28**, 27–68.

Yamakido, Hiroko: 2000, 'Japanese Attributive Adjectives Are Not (All) Relative Clauses', in Roger Billerey and Brook Danielle Lillehaugen (eds.), *WCCFL 19: Proceedings of the Nineteenth West Coast Conference of Formal Linguistics*, pp. 588-602, Cascadilla Press, Somerville, MA.