Tense, VP and Temporal Argument Chains:
The Case of Perception Bare Infinitival Complement Constructions*

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概　要

Tense は動詞句 (VP) が表す「時」をその項とする時間に関する述語であるとする考え方に依ると，動詞句の分布に関する制約は Tense との選択関係において捉えることができる。Tense などの機能範疇の介在が形態的に明示されない知覚動詞の裸不定詞補文は，経済性の点からも VP と分析することが妥当と考えられるが，しかし，この分析では Tense に直接選択されていない VP の分布が許容されることになる。裸不定詞補文を含む知覚構文の共時性や補文述語の特徴などに基づき，本稿では裸不定詞補文の時間項が上位の節の時間項と chain を形成し，この時間項の chain が Tense の項となることを提案し，Tense に直接選択されていない VP が許容されうる新たな分析を提示する。裸不定詞を含む知覚構文に特徴的な主な統語的現象に対し，この構造においては temporal argument chain が必須であるという分析に基づく合理的な説明が与えられることを示す。また，時間項が形成する chain が DP chain とも共通する性質を有することを示し，本稿の分析が時間項が統語的には時を表す DP であるとする Zagona (1990), Stowell (1993) らの提案を支持するものであることを示す。

0. Introduction

The properties of the so-called bare infinitival complements of perception verbs have been long-standing and intriguing problems in syntactic theories. This article argues that bare infinitival complements

of perception verbs are VPs without Tense or aspectual functional projections and that these VP complements satisfy the Tense Criterion, the licensing condition imposed on VPs, by forming a temporal argument chain. The analysis outlined in this article shows that the properties of perception BI structures largely follow from the formation of a temporal argument chain. Temporal argument chains formed by event-time arguments exhibit properties paralleling nominal chains, which provides additional support for the proposals made by Zagona (1990) and Stowell (1993) that temporal arguments are represented in syntax as temporal DP/Zeit Phrase.

Section 1 discusses the distributional restrictions of VPs and the Tense Criterion proposed in Sato (2003) to stipulate the distribution of VPs. Section 2 takes up the problem of apparent violation of the Tense Criterion, i.e., perception bare infinitival (BI) complement structures. It will be proposed that BI complements of perception predicates satisfy the Tense Criterion by forming a chain of event-time arguments. In Section 3 some noted properties of perception BI structures can be derived from the formation of a temporal argument chain. Section 4 states the conclusion.

1. The distributional restriction of VPs and their licensing

It is generally accepted that the distribution of verb phrases must be licensed by Tense in some way or other (cf. Guéron and Hoekstra 1988, Zagona 1990, Giorgi and Pianesi 1997 among others). The following examples taken from Zagona (1990) show that VPs cannot occur as an adjunct or a secondary predicate and their distribution cannot be accounted for on a par with other predicative elements like APs and PPs.

(1) a. They [bought the car [$_{AP}$ old]]
b. They bought the car [$_{PP}$ in good condition]]
c. *They bought the car [$_{VP}$ run]

(2) a. with [$_{PP}$ them [in the house]]
b. with [$_{AP}$ them [so sick]]
c. *with [$_{VP}$ them [sing already]]

VPs are also excluded from small clause complements as the following examples indicate.

(3) a. We consider [George [$_{DP}$ a wimp]]
b. We consider [George [$_{AP}$ weird]]
c. We consider [George [$_{PP}$ above average]]
d. *We consider [George [$_{VP}$ know the answer]]
e. *We consider [George [$_{VP}$ be weird]]

These examples suggest that VPs cannot occur bare without Tense. In other words, VPs require licensing by Tense, but it is not a unilateral requirement on the part of VPs. Tense in turn requires a VP as its complement, i.e., when T(ense) is present, it requires a VP complement.[1]

(4) a. *Bob thought that Marilyn T [$_{AP}$ very shy] (cf. Bob thought that Marilyn was very shy.)
b. *Bob hopes [$_{T}$ to] [$_{DP}$ the governor] (cf. Bob hopes to be the governor.)
c. *Bob advised that Marilyn T [$_{PP}$ in the house] (cf. Bob advised that Marilyn be in the house.)

Following Zagona (1990), I take Tense to have a predicative property that determines the temporal order between its two temporal arguments, with the argument structure as shown in (5).

(5) Tense: [$Temp_1$, $Temp_2$].

The arguments of Tense are temporal entities i.e., 'times' denoted by

time-denoting elements in a clause. One of the Time-denoting elements in a clause is assumed to be VPs, which denote eventualities that need to be temporally evaluated with respect to another time denoted in the clause. The other time-denoting element in a clause is the UT, whose reference is the utterance time of the sentence containing the clause. More specifically, $Temp_2$ in (5) is the time denoted by the complement VP, and $Temp_1$ is the UT in the spec T or the time denoted by the higher VP. Given that Tense has the argument structure as stated above, Sato (2003) proposes the Tense Criterion to stipulate the relation between Tense and its complement VP.

(6) Tense Criterion
   a. T-features are dyadic predicates taking the time denoted by time-denoting elements (VP/vP or the UT) as their arguments.
   b. The time referred to by a time-denoting phrase in a sentence (VP/vP) must be made temporally interpretable by being an argument of T-features selecting the VP/vP.

The Tense Criterion is a temporal analogue of the Theta Criterion for nominal arguments suggesting the nominal properties of temporal arguments, as will be discussed below.

2. Perception BI complements and the Tense Criterion

The Tense Criterion predicts that a VP can be present only when it is selected by Tense. This section will, however, argue that the so-called bare infinitival (BI) complements of perception verbs have the structure of VP lacking outer functional projections of TP or CP. The validity of the Tense Criterion may be challenged if a VP is present in a structure without being the complement of Tense.

2.1. The categorial status of perception BI complements

One salient property of perception BI complements is that they do

not show any overt evidence for T or C features, i.e., the infinitival particle *to*, overt Tense morphology, or an overt complementizer.[2] Hence the term 'bare' infinitives.

(7) Marilyn watched Bob sign the check.

(8) a. *Marilyn watched for Bob (to) sign the check.
b. *Marilyn watched Bob to sign the check.
c. *Marilyn watched Bob signed the check.

It should be pointed out that some of the typical perception verbs have homophonous epistemic counterparts, and it is important to distinguish between these two varieties. The focus of the present study is the complement of verbs of physical perception, and the complement of the homophonous epistemic verbs is excluded. Notice that the predicates taking a *to*-infinitive complement in the following examples are used in the epistemic sense, and they should be distinguished from perception predicates (cf. Jespersen 1940, Palmer 1987).

(9) a. Marilyn saw Bob to be a smart boy.
b. Marilyn heard Bob to be very stupid.
c. Marilyn felt Bob to be an incorrigible liar.

One might be tempted to suggest that perception BI complements are TPs as given in (10), and the *to*-infinitive complements in (9) and the BI complements differ minimally in whether the infinitive particle is phonetically spelled out or not.[3] However, besides the complication brought about by the overt-covert alternations of the infinitival particle, the assumption of T in perception BI complements turns out to be problematic in terms of feature specification of T.

(10) Marilyn watched [$_{TP}$ Bob T sign the check]

Given that nonfinite Tense consists of either [−finite, +Tense] or

[−finite, −Tense] as Stowell (1982) proposes, the feature composition of the phonetically unrealized T in (10) should be either of the following two.

(11) a. [−finite, +Tense]
b. [−finite, −Tense]

Martin (1992) proposes that of the two feature specifications given in (11), only the T specified as in (11.a) can assign/check null Case of PRO. The feature specification given in (11.b), on the other hand, has no Case property, and thus, it leads to ECM structures. Assuming these previous analyses, I will show that neither of the above feature specifications is possible for perception BI complements.

Since the subject of a perception BI complement cannot be PRO, the feature specification in (11.a) is ruled out due to a Case feature conflict. Now, concerning the specification given in (11.b), let us compare some typical examples of ECM and perception BI complement structures.

(12) a. We believed Bobby to have a baby sister.
b. *We believed Bobby to crash his Mercedes.
(13) a. *We watched Bobby to have a baby sister.
b. We watched Bobby crash his Mercedes.

(12.a) and (13.a) contain an individual-level predicate while (12.b) and (13.b) contain an eventive (stage-level) predicate in the embedded infinitives. The contrasts observed in (12) and (13) show that while eventive predicates are not acceptable in ECM complements, perception BI complements are possible only with an eventive predicate. The intolerance of eventive predicates in ECM complements is accountable if, as Enç (1991) suggests, eventive predicates need to be licensed by [+Tense]. Since the predicate in perception BI complements is required to be eventive, it also follows that these

complements could not have T with the same feature specification as ECM complements. It turns out then that neither of the T specifications in (11) is possible for perception BI complements. If no T feature specification is possible, and if there is no overt evidence suggesting the presence of T, it naturally follows that T is not present at all in these structures. In other words, perception BI complements are VPs, not TPs. Since there is no empirical evidence for T or C and VP is the minimally required structure in perception BI complements, the VP analysis should be preferred over TP or CP analyses in view of the economy of structural representation as well (cf. Law 1991, Bošković 1997).[4]

Having concluded that perception BI complements have the categorial status of VP, as shown in (14) below, we are faced with the issue of how a VP complement can satisfy the Tense Criterion and be licensed without being selected by T.

(14) Marilyn T [$_{VP}$ watched [$_{VP}$ Bobby sign the check]]

The temporal argument denoted by the matrix VP is taken as an argument of the matrix T, but the sentence contains no other T feature that takes the embedded BI complement as its argument. This apparently induces a violation of the Tense Criterion (Clause B).

In the proposal to be presented below, the temporal argument denoted by the perception VP and the one denoted by the BI complement VP form a chain due to simultaneity of the denoted events, and it is the chain of the temporal arguments that is taken as an argument of Tense and satisfies the Tense Criterion.

2.2 The temporal argument chain in perception BI complements

An important property of perception BI complement structures is that the event described by a perception predicate and the one described by its BI complement must be construed as simultaneous. This requirement is not fulfilled in example (15): the matrix perception

predicate and the embedded predicate are each modified by a time adverbial referring to a different time point from the other.

(15) *This morning I heard John leave the house last night.

The required simultaneity can be stated in terms of co-reference between the time referred to by a perception VP and the time referred to by the embedded BI complement. Assimilated to co-referential nominal arguments, the two temporally co-referential VPs can be tentatively assumed to have the same temporal index (Ti) as indicated in (16).

(16) We watched John type the letter.
We $[_{VP(Ti)}$ watched $[_{VP(Ti)}$ John type the letter]

If temporal co-reference as observed in (16) is a requirement for perception BI structures, the preclusion of individual-level predicates from the BI complements can be attributed to this requirement. Compare the sentences in (16) and (17).

(17) *We watched John be tall.

The difference in temporal reference of stage-level predicates and that of individual-level predicates can be assimilated to the difference in reference between count nouns and mass nouns; whereas stage-level predicates denote a delimited moment in time, individual-level predicates do not. Since an individual-level predicate *be tall* in (17) cannot locate its temporal reference as a point in time, its reference cannot be taken as co-referential with that of the matrix perception event. This contrasts with the temporal co-reference obtained between a perception event and the event described by its BI complement headed by a stage-level predicate as in (16) above.

Notice that the relevant distinction on the type of permissible

predicates in the BI complement is stage-level vs. individual-level, which does not necessarily coincide with the distinction between stative vs. non-stative. Stative predicates may occur in these complements as long as they are construed in a stage-level sense.

(18) They watched John be generous.

Sentence (18) cannot mean that what they observed was that John is an individual of generous nature. The sentence is felicitous only if its BI complement is interpreted as describing John's generous behavior at a certain point in time, which is contemporaneous with the time of the perception event.

Kratzer (1989) proposes to derive the difference between stage-level and individual-level predicates from a difference in argument structure; stage-level predicates have an abstract "Davidsonian" spacio-temporal external argument in [spec, VP], whereas individual-level predicates lack this argument. Partly adopting Kratzer's proposal, I suggest that the simultaneity is satisfied in perception BI structures only when the VP headed by a perception verb and its complement VP contain abstract eventive arguments with the same temporal reference. However, the present proposal departs from Kartzer's in assuming that individual-level predicates also have an abstract temporal argument in [spec, VP], but this argument cannot refer to a delimited moment in time, and thus it is distinct from the eventive temporal argument in referential property. The difference between eventive and non-eventive temporal arguments is analogous to the difference between count and mass nouns as suggested above. Assuming this difference, co-reference cannot hold between the temporal arguments of these two different types of predicates. I will henceforth refer to the abstract spacio-temporal argument of eventive predicates as an event-time argument, *E*. Then, the notation given in (16) is revised as shown in (19) in which the simultaneity required between the perception event and the perceived event is represented with co-indexing of the

relevant event-time arguments.

(19) We [$_{VP}$ E_i watched [$_{VP}$ E_i John type the letter]

A question remains as to how the Tense Criterion is satisfied in the complement VP in perception BI structures like (19) where the complement VP is not selected by Tense. According to the Tense Criterion given in (6) above, a VP must be selected by Tense so that its time reference is made temporally interpretable. In (19), although the embedded VP is not selected by Tense, by being co-referential with the matrix event-time argument, the embedded event-time argument can in effect be ordered with respect to the other temporal argument, the UT, by the matrix Tense. The relation between the event-time arguments in a perception BI structure can be compared with the relation holding between a DP and its trace (or copy) in the following examples.

(20) a. Mary$_i$ seems [t_i to be the favorite to win]
b. The report$_i$ was repudiated t_i by the authority

The raised DP and its trace/copy in each of these examples form a chain. Since each chain is assigned only one theta role, the whole chain is interpreted as an argument of a predicate. The relation between the matrix Tense and the two co-referential event-time arguments parallels the relation between the DPs and their traces/copies.

On the basis of these observations, I propose that co-referential event-time arguments form a chain and the chain can serve as an argument of Tense. In example (21), though the embedded VP is not selected by Tense, its event-time argument E_2 is construed as an argument of the matrix Tense by being in a chain headed by E_1, the event-time argument of the VP selected by the matrix Tense. Hence, the Tense Criterion is satisfied in perception BI structures by a chain of

co-referential event-time arguments.

(21) We watched John leave the house.
[$_{TP}$ We [$_{T}$ +past] [$_{VP}$ E_{1i} watched [$_{VP}$ E_{2i} John leave the house]]]

A chain formed by event-time arguments will be henceforth referred to as a temporal argument chain. Adopting a temporal argument chain as a possible argument of Tense, the Tense Criterion is revised as follows.

(22) Tense Criterion (Revised)
a. T-features are dyadic predicates taking the time denoted by time-denoting elements (VP/vP or the UT) as their arguments.
b. The time referred to by a time-denoting phrase in a sentence (VP/vP) must be made temporally interpretable by being an argument of T-features selecting the VP/vP, or by forming a temporal argument chain with an argument of T-features.

In BI perception structures the Tense Criterion is satisfied only if a temporal argument chain is formed and is construed as an argument of Tense. Thus, the two properties of these constructions discussed above, namely the intolerance of individual-level predicates in BI complements and the required simultaneity between the perception event and the perceived event can be accounted for on the basis of the Tense Criterion. Since individual-level predicates are not associated with an event-time argument, a BI complement VP headed by an individual-level predicate cannot be a part of a temporal argument chain to be made temporally interpretable. Thus, Clause B of the Tense Criterion is violated in such structures. Also, when the event-time argument of a BI complement and that of the higher VP are not co-referential, a temporal argument chain cannot be formed, leading to a violation of the Tense Criterion.

The relevance of temporal argument chains in perception BI complement structures can also be found in the cases of adverbial modification. Consider the examples in (23).

(23) a. John saw Mary leave the house three times.
b. We watched him repair the car for an hour.

In interpreting sentence (23.a), there are three separate instances of perception, each of which is about a separate occurrence of Mary's leaving the house. This interpretation can easily be obtained if the frequency adverb *three times* modifies the temporal argument chain as a unit that consists of the event-time argument of the perception predicate and that of the BI complement. Likewise, the interpretation of sentence (23.b) suggests that the durational adverb *for an hour* modifies the temporal argument chain. The sentence denotes an event of perception that lasted for an hour and the event of repairing the car that is contemporaneous with the perception event. Thus, these examples provide support for the relevance of temporal argument chains in perception BI complement structures.

2.3 The properties of temporal argument chains

This subsection demonstrates that the proposed temporal argument chains exhibit typical chain properties paralleling chains created by DP movement. First, as chains created by movement do not limit the number of links, temporal argument chains can consist of more than two links. In a dual perception construction (24), the event-time denoted by VP1, VP2 and VP3 are all contemporaneous.

(24) Mary [+past] [$_{VP1}$ E_{1i} saw [$_{VP2}$ E_{2i} John watch [$_{VP3}$ E_{3i} Kate unlock the safe]]]

The relation observed among E_1, E_2 and E_3 forming a temporal argument chain parallels the relation among the links of the chain

($Mary_i$, t_{2i}, t_{1i}) observed in (25) formed by successive DP movement.

(25) $Mary_i$ is likely [t_{2i} to be recommended t_{1i} for the job]

Another property shared by both temporal argument chains and movement chains is that the relation between any two links of a chain must be local. In (26) *Mary*$_i$ and t_i do not form a well-formed chain since they are intervened by the expletive *there* in a potential landing site for the moved DP.

(26) *$Mary_i$ is likely [there to be recommended t_i for the job]

Similarly, temporal argument chains must respect the minimal link condition and a chain cannot be formed when two event-time arguments are not in a local relation. For instance, the temporal indexing shown in (27) below leads to an unacceptable result and this can be attributed to the failure to form a temporal argument chain among E_1, E_2 and E_3.

(27) *Mary [+past] [$_{VP1}$ E_{1i} saw [$_{VP2}$ E_{2j} John watch [$_{VP3}$ E_{3j} Kate unlock the safe]]]

Since VP2 and VP3 in the above sentence are not selected by Tense, their event-time arguments E_2 and E_3 can be made temporally interpretable only if they form a temporal argument chain with another co-referential event-time argument of a VP selected by Tense. Although co-referential E_2 and E_3 can form a temporal argument chain, the chain cannot include E_1 since it is counter-referential from the other two. Consequently, Tense can only relate E_1 with respect to UT, but E_2 and E_3 are left temporally uninterpretable.

The unacceptable interpretations as given in (28) can be ruled out on the same ground.

(28) a. *Mary [+past, +tns] [$_{VP1}$ E_{1i} saw [$_{VP2}$ E_{2j} John watch [$_{VP3}$ E_{3i} Kate unlock the safe]]]
b. *Mary [+past, +tns] [$_{VP1}$ E_{1i} saw [$_{VP2}$ E_{2i} John watch [$_{VP3}$ E_{3j} Kate unlock the safe]]]

In (28.a) the intervening E_2 with a different temporal index from the other event-time arguments prevents temporal argument chain formation between E_1 and E_3. Hence, E_2 and E_3 are left temporally uninterpretable. In (28.b) E_3 cannot be included in the temporal argument chain formed by the other two temporal arguments in the sentence because it does not share the temporal reference with E_1 or E_2. Thus, the sentences in (27) and (28) all show that some event-time arguments are left temporally uninterpretable since a temporal argument chain fails to include them due to the minimal link condition.

3. Deriving the properties of perception BI structures

This section shows that some of the well-known characteristics of perception BI structures are predictable consequences of the proposed analysis based on the formation of a temporal argument chain and the Tense Criterion. I will first discuss restrictions against aspectual auxiliary verbs, and then restrictions against the passivization in these structures.

3.1 Restrictions against aspectual auxiliaries

As observed in the contrast among the sentences (29) and (30) below, perfective auxiliary *have* and progressive auxiliary *be* are not allowed in perception BI complements.

(29) a. We saw John eat the cake.
b. *We saw John have eaten the cake.
(30) a. We heard John laugh.
b. We heard John laughing.

c. *We heard John be laughing.

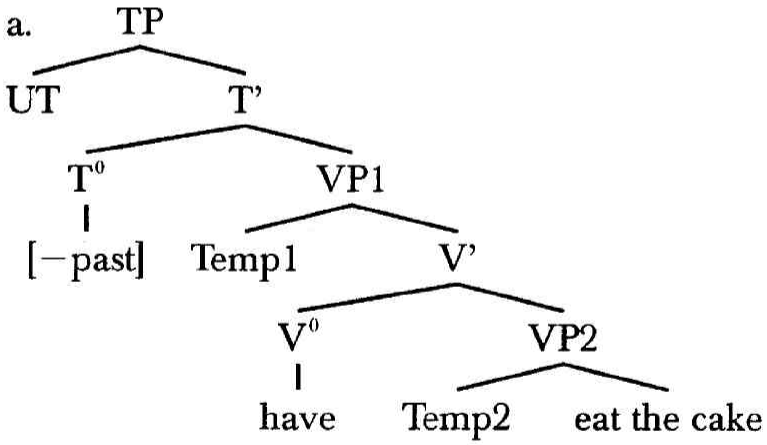
I assume that perfective *have* functions as a quasi-temporal predicate with the temporal argument structure shown in (31).

(31) $have_{perfective}$ [Temp1, Temp2]

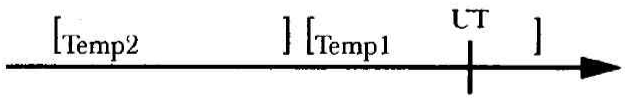
Perfective *have* takes its own temporal argument, Temp1, in its specifier position, and it takes the temporal argument of the complement VP as its internal argument, Temp2. The predicative function of perfective *have* is that of ordering Temp1 subsequent to Temp2. Then, the structural alignment of temporal arguments in the present perfect sentence in (32) can be represented as in (33.a), and the relation among these temporal arguments is described as in (33.b).

(32) John has eaten the cake.

(33) a.



b.



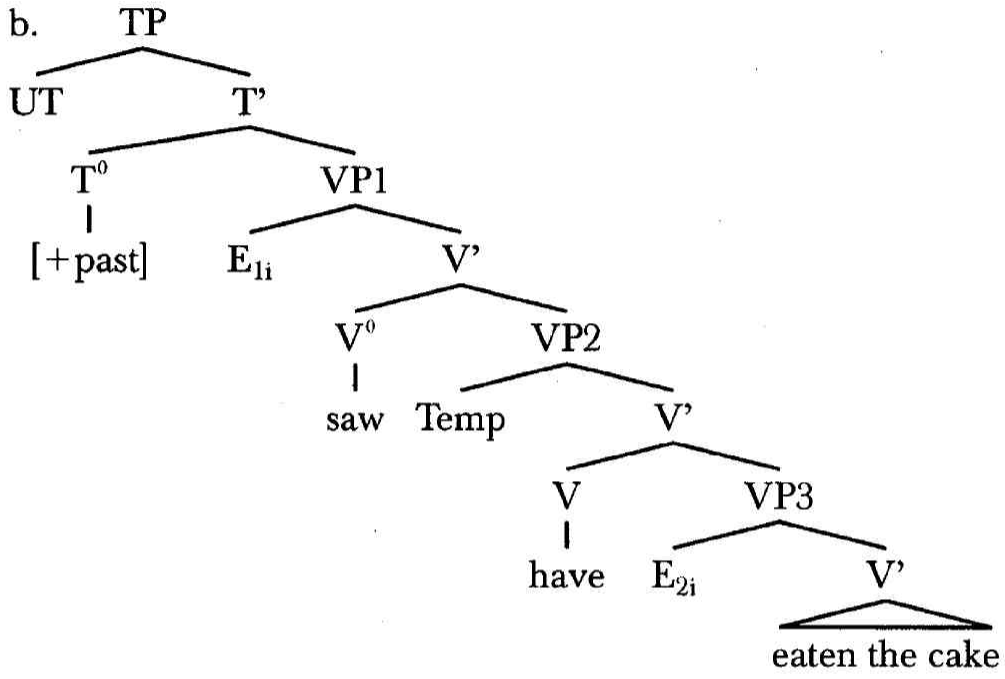
As shown in (33.b) the temporal argument of VP2, Temp2, is ordered in precedence to Temp1, which contains the utterance time (UT).

With the temporal argument structure of perfective *have* given

above, the temporal argument structure of sentence (34.a) with perfective *have* in the BI complement will be represented as (34.b).

(34) a. *We saw John have eaten the cake.

b.

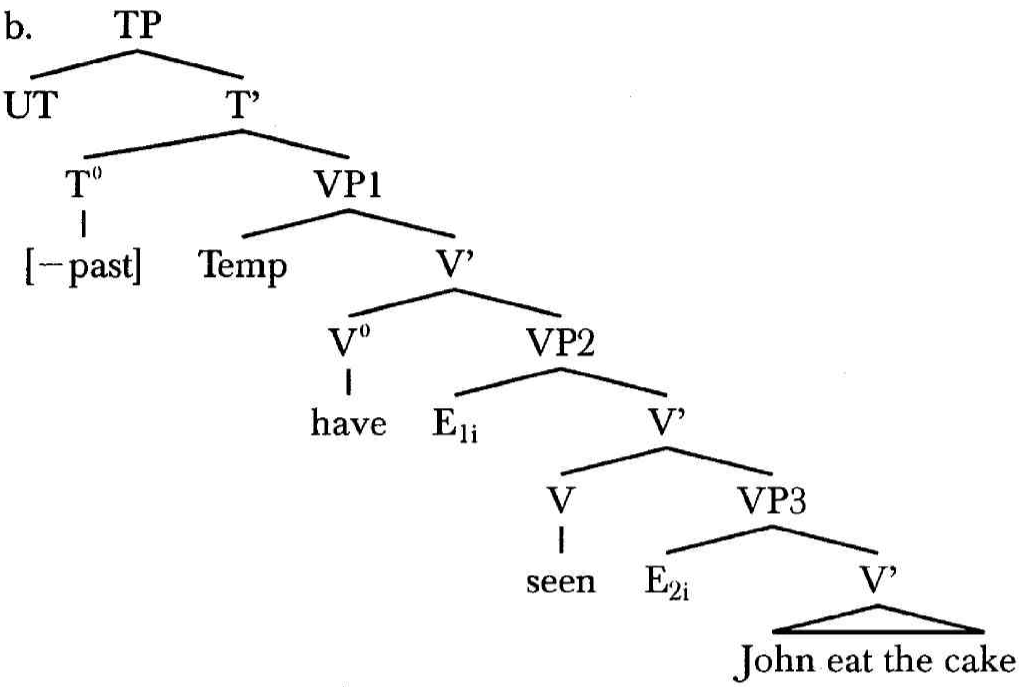


In (34.b) E_1 and E_2 cannot form a temporal argument chain because there is an intervening temporal argument due to perfective *have*. The temporal argument of VP2 cannot be an argument of Tense, for it is not selected by Tense. It cannot form a temporal argument chain with the matrix E_1 either since it is not an event-time argument. Thus, the presence of perfective *have* intervenes in the formation of a temporal argument chain and eventually leaves its temporal argument uninterpretable.

In contrast to sentence (34.a), (35.a) shows that perfective *have* is possible in perception BI sentences when it is in the complement of Tense so that its temporal argument is predicated of by Tense.

(35) a. We have seen John eat the cake.

b.



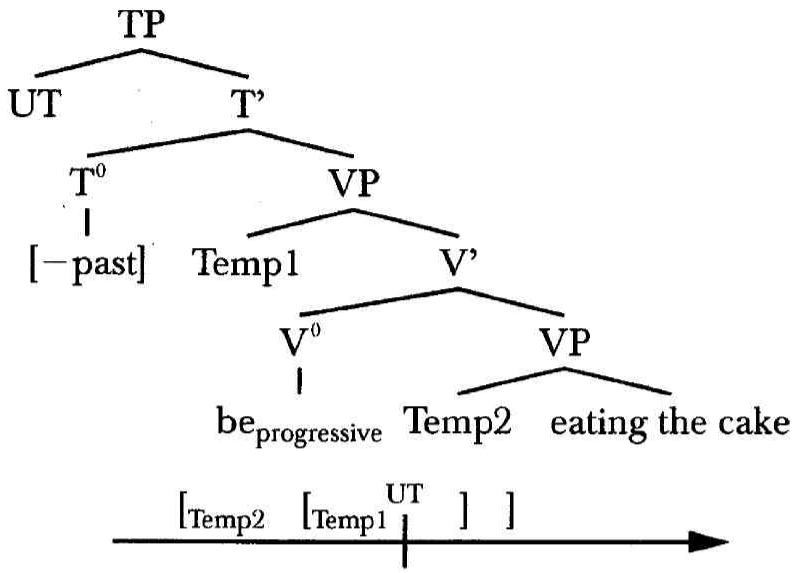
In (35.b) above, E_1 and E_2 form a temporal argument chain, and the chain is taken as the internal argument of perfective auxiliary *have*. The matrix Tense takes Temp of VP_1 as its argument. Thus, all the temporal arguments in the sentence are predicated of and the Tense Criterion is satisfied.

The restriction against progressive auxiliary can be accounted for in a similar manner. Following Demirdache and Uribe-Etxebarria (1997), I will assume that progressive auxiliary *be* is a temporal predicate which orders its external argument within its internal argument. Thus, progressive *be*, with the argument structure as shown in (36), is interpreted such that Temp1 is contained within Temp2.

(36) $be_{progressive}$ [Temp1, Temp2]

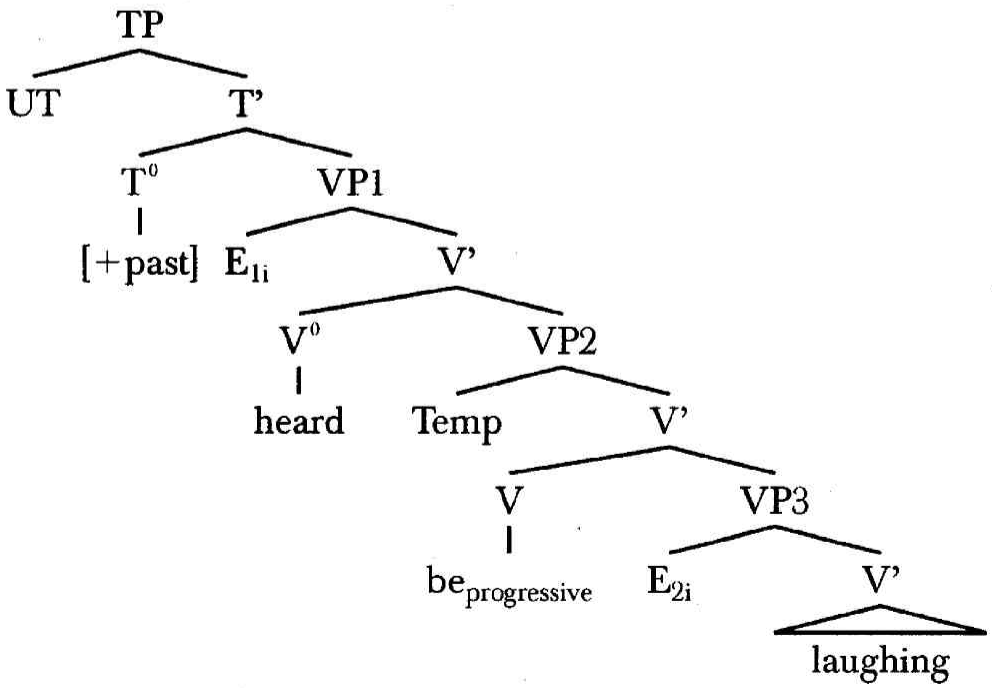
With these assumptions, the temporal arguments of a progressive sentence *John is eating the cake* can be represented as in (37).

(37)



The external argument of progressive *be*, Temp1, is a time within the interval denoted by the complement event time, and thus Temp1 is not an event time, but is part of an event time. Then the unacceptability of progressive *be* in perception BI complements as in (37) above can be given an account paralleling the analysis involving the perfective auxiliary. Consider that the sentence is now assumed to have the structure as follows.

(38)



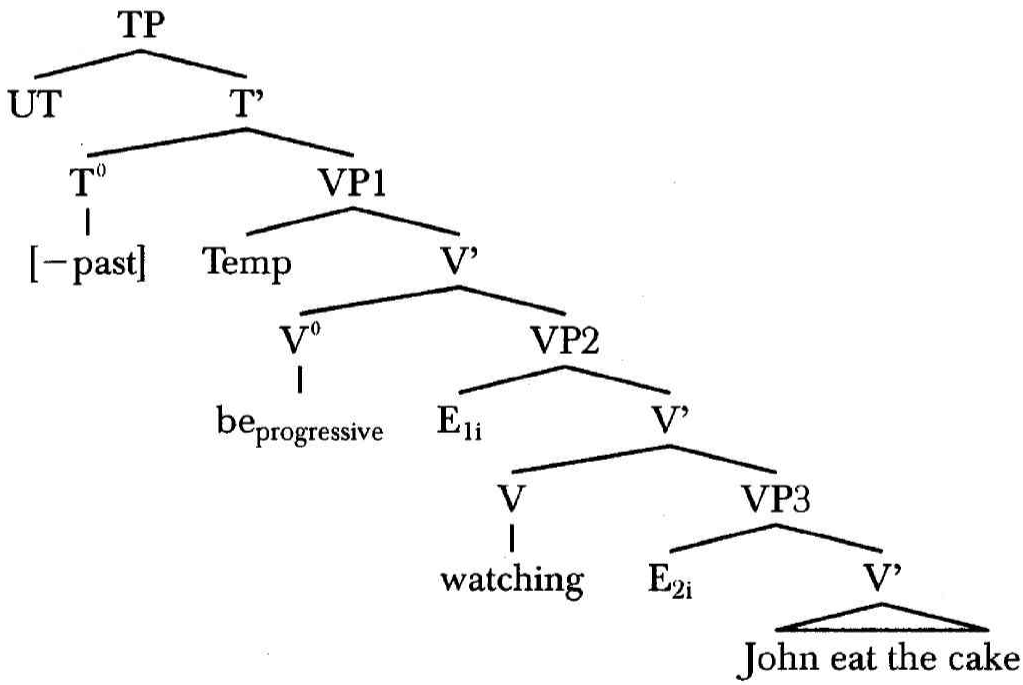
In (38) E_1 and E_2 cannot form a temporal argument chain because there is an intervening temporal argument Temp due to progressive *be*. Then, neither Temp nor E_2 can be made temporally interpretable since either of them can become an argument of Tense.

Notice again that the presence of progressive *be* in the matrix clause as in (39) does not cause perception BI structures to be ungrammatical.

(39) We are watching John eat the cake.

Within the current framework the structure of this sentence will be represented as in (40).

(40)



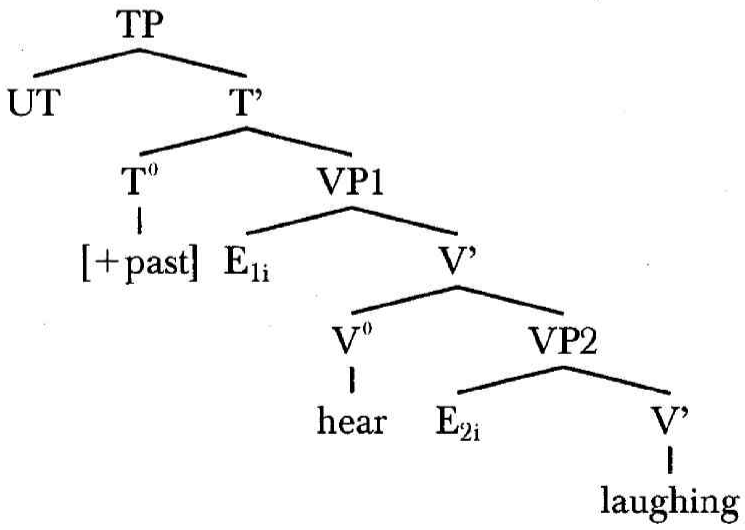
In this structure E_1 and E_2 can form a temporal argument chain, and the chain is taken as an argument of progressive *be*. The temporal argument chain is related to Temp by the progressive auxiliary, and Temp is related to UT by means of Tense. Thus, every temporal argument in this sentence is made temporally interpretable and the Tense Criterion is satisfied.

A remaining problem is to account for the difference in grammaticality between BI complements with progressive *be* and infinitival complements with a present participle as in (30.b) above, repeated here as (41).[5]

(41) We heard John laughing.

I will suggest that the progressive interpretation observed in perception sentences with a participial complement is due to progressive suffix *-ing*, but the presence of the suffix does not affect the temporal argument chain formation. The function of the suffix is assumed to be that of modifying an event-time argument by adding the sense of progress. Since the progressive auxiliary is not present in (41), no non-event-time argument due to the auxiliary is present. Then, participial VP complements have only an event-time argument as in the case of BI complements. Therefore, as shown in (42), a temporal argument chain is formed in sentence (41) between the event-time argument of the matrix perception verb phrase and that of the complement VP.

(42)



3.2 The restriction against passivization

The restriction against the passivization of the BI complement subject also follows from the proposed analysis based on temporal

argument chain.[6] It will be shown that the passivization of the subject DP out of a BI complement as in (43.b) can also be attributed to the failure to form a temporal argument chain leading to a violation of the Tense Criterion.

(43) a. We watched him cross the street.
b. *He was watched cross the street.

Let us assume that the passive morphology suppresses the event-time argument of eventive verbs, and as a result of this, passive predicates have only non-eventive argument due to passive auxiliary *be*. Assuming this, sentence (43.b) can be shown to have the following structure.

(44) *He_i [$_T$ +past] [$_{VP1}$ Temp was [$_{VP2}$ (E_1) watched [$_{VP3}$ E_2 t_i cross the street]]]

The parenthesized event-time argument, (E_1), in (44) indicates that its eventive status is suppressed by the passive morphology, and Temp refers to the non-eventive temporal argument due to passive *be*. Thus, in structure (44) the event-time argument of the matrix perception verb is no longer available to form a chain with the embedded E_2. Without a co-referential event-time argument there is no way for E_2 to be related to Tense and made temporally interpretable. Hence, sentence (43.b) is ruled out on account of a violation of the Tense Criterion.

Note that the complement internal pasivization as observed in the following examples exhibits more acceptable results than the matrix passivization.

(45) a. We saw the car get repaired.
b. We saw the car being repaired.
c. ?We saw the car be repaired.[7]

The proposed analysis can also predict the acceptability of the sentences in (45). In these sentences the BI complements can only be interpreted with an eventive sense. The eventive interpretation in (45.a) can be attributed to the verb *get*, which may be assumed to be inherently non-stative. As for (45.b), given that progressive suffix *-ing* is compatible only with an eventive predicate, *be* should be taken as an eventive predicate in this sentence. For speakers who find sentence (45.c) acceptable, it may be the case that the use of eventive *be* as in (45.b) extends in this sentence as well. Then, even if the event-time argument of the passive participle is suppressed, if the auxiliaries *be* and *get* in these examples function as eventive predicates in their own right, a temporal argument chain can be formed between the matrix perception verb and the passive predicate.

4. Conclusion

Since no empirical data exist in support of the presence of Tense or aspectual functional categories, this article analyzed the BI complements of perception verbs as 'bare' VPs. The primary goal of this article was to demonstrate how VPs can be licensed as the BI complements of perception verbs when they are not selected by Tense. In perception BI structures the event-time argument of the complement VP and that of the perception predicate form a temporal argument chain, which is taken as an argument of Tense. Thus, by forming a temporal argument chain BI complements satisfy the Tense Criterion, the licensing conditions imposed on VPs. The requirement for simultaneity to be held between a perception event and the BI complement event follows from the formation of a temporal argument chain. Some well-known properties of perception BI structures were also shown to follow from the chain formation. The analysis proposed above based on temporal argument chains provides supports for the view that Tense is a predicate of temporal arguments and temporal arguments are represented in syntax as temporal DP/Zeit Phrase (cf. Zagona (1990), Stowell (1993)).

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Notes

1 The VP argument of Tense may not be overt as in the cases of VP ellipsis under the recoverability condition.

2 Although they do not show overt evidence for clausal status, the BI complements of perception verbs exhibit properties of clausal constituents. The examples in (ii) through (v) all support the single constituent analysis given in (i.a) rather than the structure given in (i.b). Given a general assumption that only constituents can be pronominalized and conjoined, (ii) and (iii) support the single constituent analysis. In example (iv) the position immediately following the perception verbs is filled by a quasi-argument, 'weather' *it*, which is not allowed to occur in the object position. In example (v) the position is filled by a DP raised out of the embedded infinitive. Thus, (iv) and (v) show the subject status of the post-verbal DP, which provides further support for the (single-) clausal-constituent analysis of BI complements.

(i) a. We heard [George slam the door]
b. We heard [George$_i$] [PRO$_i$ slam the door]

(ii) I saw Mary light a cigarette, and Bill saw it too. (cf. Gee 1977)

(iii) I saw Mary paint the fence and Bill plant the tree.

(iv) I heard it rain cats and dogs last night.

(v) I saw John$_i$ begin t_i to get drunk.

A semantic argument against the structure in (i.b) is that in example (vi) the post-verbal DP *the wind* alone cannot be construed as the object of physical perception. Rather, the adequate interpretation of the sentence suggests that the object of the perception is the event in which the candle was blown out by the wind.

(vi) I saw the wind blow out the candle.

3 The infinitival complements of these epistemic verbs differ from those of the verbs expressing (physical) perception not only in containing the particle 'to', but also in the other characteristic properties with respect to

the aspectual type of predicates, aspectual auxiliaries and the passivization of the embedded subject.

(i) a. We saw the library to own a collection of Monet's paintings.
b. *We saw the library own a collection of Monet's paintings.

(ii) a. We heard Mary to have passed the bar exam.
b. We heard Mary to be leaving for Paris.
c. *We heard Mary have passed the bar exam.
d. *We heard Mary be leaving for Paris.

(iii) a. Mary was seen to be obnoxious.
b. *Mary was seen be obnoxious.

The contrasts observed in the above examples refute the claim that BI complements of perception verbs are alternative to *to*-infinitive complements differing minimally in the phonetic realization of the infinitive particle.

4 Higginbotham (1983) points out that a perception verb construction with a negated BI complement as in (i) cannot be assigned a coherent scope as sentential negation since neither of the logical forms in (ii) would give the correct reading.

(i) John saw Mary not leave the tearoom.

(ii) a. ~[∃ x: leave (Mary, x)]] John saw x
b. [∃ x: ~(leave (Mary, x))] John saw x

Sentence (i) means rather that John saw Mary did the opposite of leaving, e.g. John saw Mary refrained from leaving. Based on these observations, Higginbotham concludes that the negation in a BI complement could only be VP negation. This observation also supports the conclusion advocated here that perception BI complements are VPs, not TPs or CPs.

5 Declerck (1982) argues that participial infinitival complements of perception verbs should be distinguished from (i) NP constituents in which a noun head is followed by a pseudo-modifying clause, and (ii) an NP followed by a participial clause functioning as a predicative adjunct. Participial constructions of type (i), for instance, can undergo NP-movement and trigger number agreement.

(i) a. The moon rising over the mountain appears to have been seen by many people last night.
b. The moon and Venus rising in conjunction have often been observed by the astronomers at Kitt Peak.
(Declerck (ibid.))

6 In contrast to the matrix passivization, perception verbs allow the post-

verbal DP to be followed by a passive participle as in (i).

(i) Mary saw the dogs called back by John.

It has been argued by other researchers that perception sentences with a participial complement like example (i) are not semantically equivalent with their active BI counterparts (cf. Rizzi 1992, Felser 1999, among many others).

(ii) Mary saw John call the dogs back.

Felser (1999), for example, claims that while (i) implies that Mary saw the dogs, but not necessarily John, (ii) means that Mary saw John but it does not necessarily imply that Mary saw the dogs as well. The interpretive differences like this one suggest that passive participial complements of perception verbs are syntactically distinct from BI complements. It has been suggested that they should rather be analyzed as DPs modified by a reduced relative clause.

7 Felser (1999) notes that the degree to which speakers of English accept sentences like (45.c) varies considerably. Whereas speakers of British English tend to reject such sentences, speakers of American English tend to give them better judgments.

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