

Against licensing in Sequence of Tense

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1 Introduction

Many (though not all) Indo-European languages exhibit so-called *sequence of tense* (SOT) effects, in which a present tense utterance such as (1a) must be reported using past tense when it is embedded under a past tense main clause, as in (1b).

- (1) a. SARAH SAID: “Allison is sick.”
b. Sarah said that Allison was sick.

The standard view of SOT has been that the embedded past tense in (1b) is morphologically dependent on the tense of the matrix clause, and is not semantically interpreted (Abusch 1994, 1997; Heim 1994; Schlenker 2003; Stowell 2007; Grønn and von Stechow 2010; Zeijlstra 2012).

In this paper I argue, however, that the dependent analysis of SOT is largely incompatible with current theories of morphosyntactic feature dependencies. After a brief overview of SOT phenomena in section 2, section 3 reviews problems for analysis of SOT in which embedded tense is dependent on tense features in the main clause. Section 4 sketches an alternative approach based on potential variation in the syntactic implementation of tense semantics.

2 A brief summary of SOT effects

Examples like (1b), where an embedded past clause is interpreted as simultaneous with the embedding predicate, have been treated as the core case of SOT. Embedded tense in such cases has been treated as semantically vacuous, because it does not shift the time of the embedded event. This is not a simple requirement for surface morphological identity, however: in SOT languages embedded past tense can also be used to report on an event or state that concluded prior to the time of the matrix event, as in (2b) (which can also be expressed using an embedded past perfect). Furthermore, the simultaneous interpretation in (1) is only available with embedded statives or imperfectives; the mechanism underlying it must thus be sensitive to properties of the embedded predicate, not only to the presence of formal tense features.

- (2) a. SARAH SAID: “Allison was sick.”
b. Sarah said that Allison was sick. *or* Sarah said that Allison had been sick.

In languages without SOT effects, by contrast, equivalent reports preserve the present tense of the original utterance: compare the Inuktitut examples in (3) with their English counterparts in (1b) and (2b).

- (3) a. jaan uqa-lauq-tuq miali singai- \emptyset -ngmat
 Jaan say-PAST-PTCP.3SG Mary pregnant-PRES-CAUS.3SG
 “John said that Mary was pregnant.”
- b. jaan uqa-lauq-tuq miali singai-lau-ngmat
 Jaan say-PAST-PTCP.3SG Mary pregnant-PAST-CAUS.3SG
 “John said that Mary was / had been pregnant.” [S. Baffin Inuktitut: Hayashi, 2011]

Matching is moreover not obligatory even in SOT languages; a present tense clause can be embedded below a past tense matrix, as in (4), but unlike in the Inuktitut example in (3a), (4) requires a *double access* reading so that the embedded predicate holds both at the time of the matrix event and at the matrix time of evaluation.

- (4) Sarah said Allison is sick. (*requires that Allison is still sick now*)

A final complication arises in modal contexts. Abusch (1994) observes that in examples like (5) the furthest embedded clause describes a future event, despite being morphologically past.

- (5) Yesterday I predicted that the next time I got a phone call, the caller would claim that they **were** from Microsoft. (*I'm still waiting to see if I was right.*)

Examples like (5) have been taken as decisive evidence that embedded tense is sometimes semantically uninterpreted in SOT languages, and is thus dependent in some way on the matrix clause.

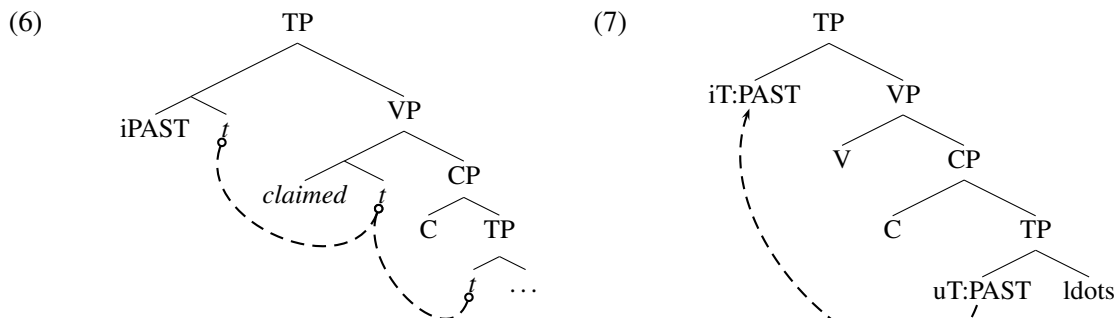
3 Against the licensing analysis of SOT

The view of SOT as a morphological dependency is a longstanding one in generative syntax and semantics. Ross (1967) proposed that embedded tense is inserted by a rule; in a similar spirit, Ogihara (1995) proposed that embedded tense is deleted at LF. More recently, SOT has been analyzed in terms of feature licensing, with many proposing that SOT effects arise when embedded tense features are checked or valued by matrix [PAST] (Abusch 1994, 1997, Heim 1994, Kusumoto 1999, Schlenker 2003, Stowell 2007, Grønn and von Stechow 2010, and Zeijlstra 2012, a.o.).

The licensing relationship required to account for SOT is at odds with the restrictions on syntactic licensing operations identified in other domains, however. In this section I discuss these issues in relation to two representative feature licensing accounts of SOT.

Grønn and von Stechow (2010) analyze SOT in terms of Feature Transmission (Heim, 1994, 2008), within a pronominal approach to tense (Partee 1973, et seq.). In SOT configurations the embedded clause's time pronoun is bound by the matrix verb, and a morphosyntactic [PAST] feature is then syntactically transmitted via the two binding relations illustrated in (6). Zeijlstra (2012) develops a similar analysis of SOT, but in terms of Upwards Agree, consistent with other work that

has proposed Agree as the mechanism that values the inflectional features of verbs (Wurmbrand, 2012; Bjorkman, 2011; Bjorkman and Zeijlstra, 2019). On this proposal, the unvalued and uninterpretable tense feature on embedded T Agrees directly with the valued and interpretable tense of matrix T, as illustrated in (7).



These licensing-based accounts of SOT face at least two problems: they require a licensing relationship that is non-local, extending across both finite clause boundaries and typical intervenors for tense valuation; and they require licensing in some cases in the absence of any potential licenser. Taken together, these challenge the viability of a licensing approach to SOT overall.

3.1 SOT requires non-local licensing

The first challenge faced by licensing-based accounts of SOT is that they require a morphosyntactic dependency to extend across a finite clause boundary, the canonical boundary across which syntactic dependencies are blocked.¹ Licensing accounts might propose in response to mediate SOT licensing via a head in the left periphery of the embedded clause, at the edge of the embedded domain. After all, on independent grounds Chomsky (2005) has suggested a relation of “feature inheritance” between C and T; while the mechanism underlying feature inheritance is not entirely clear, inheritance could enable long-distance SOT licensing via two more local dependencies.

While this solution could resolve the locality issue in simple configurations such as (6) and (7), it would not resolve the same issue in more complex configurations, where SOT effects are attested across two CP clause boundaries, or across an auxiliary-participle construction in the matrix clause.

In the first case, recall the examples of future-oriented SOT past from ??, which involve a past tense clause embedded under the past tense modal *would*. Strikingly, the furthest embedded morphological past in such examples remains licensed even if *would* in the intermediate clause is replaced by the (arguably) non-past modal *might* as in (8a),² or by a non-finite clause as in (8b).

¹Even if such a licensing relationship is not excluded, if we assume a phase-based approach to Spell-Out (i.e. morphological realization), valuation across a phase boundary should not be morphologically reflected, as the embedded clause would be morphologically realized before the matrix licensing T was merged.

²Though *might* is historically the preterit counterpart of *may*, in many varieties of contemporary English there is little evidence that it is still morphologically past tense: it does not replace *may* in sequence of tense contexts, and cannot be used in matrix clauses to express past possibilities.

- (8) Yesterday I **decided** ...
- a. ... I **might** tell the caller I **was** busy, the next time I got a phone call.
 - b. ... **to** tell the caller I **was** busy, the next time I got a phone call.

In both of these cases, the future-oriented interpretation of the most deeply embedded clause persists. But here the proposed licensing relationship must skip the intermediate clause, which shows no evidence of morphological past, SOT or otherwise. Mediation via C will thus not repair the locality issue in these cases; a licensing account of SOT in (8) requires a non-local morphosyntactic dependency, schematized in (9).

- (9) *decided*_{PAST} ... [CP ... *might*_{PRES/TOINF} ... [CP ... *were*_{PAST}]]

SOT also arises in configurations of *relative* non-locality, where licensing-based accounts require a dependency between matrix and embedded T even when a more local dependency between matrix T and its clausemate verb is impossible. In English, for example, the progressive auxiliary in (10) blocks morphological past from appearing on the immediately lower V, but yet does not block SOT for the embedded clause. If both of these relationships involve licensing of [PAST] on a lower verb, the fact that progressive intervenes in one case but not the other is difficult to explain.

- (10) Sarah was walking. (*walked / *walkinged)
- (11) My friend **was** *saying* that she **liked** this book.

This issue of relative locality arises is particularly acute for the Feature Transmission account in Grønn and von Stechow (2010), where embedded T is bound not by matrix T, but by the embedding verb: in cases like (11), the embedding verb *saying* does not itself bear a [PAST] feature, and so could not transmit such a feature to any lower variable.

A related issue is raised by experimental evidence presented by Grano and Lasnik (2018), showing that for several phenomena that are usually not possible across a finite clause boundary—including comparative deletion, illustrated in (12a-b)—ungrammatical cross-clausal dependencies improve when the subject of the embedded finite clause is a pronoun bound by an antecedent in the higher clause, as in (12c):

- (12) a. More teachers gave the students pencils than [~~gave the students pens~~].
- b. *More teachers claimed that the principal gave the students pencils than [~~claimed that the principal gave the students pens~~].
- c. ?More teachers₁ claimed that they₁ gave the students pencils than [~~claimed that they₁ gave the students pens~~].

If the interpretation of embedded tense also involves binding across a finite clause boundary (as it does in Feature Transmission approaches), we might expect SOT to similarly ameliorate ungrammatical cross-clausal dependencies. Grano and Lasnik (2018) do not directly test potential effects of SOT, but the contrast between (12b-c) suggests that SOT at least does not have as strong an

effect as subject binding.

3.2 SOT is possible without any syntactic licenser

The issue facing licensing-based accounts of SOT is the fact that SOT-like effects that arise in the absence of any potential syntactic valuer. Ogiwara (1989) describes SOT effects in relative clauses as in (13), where the past tense *resembled* refers to a future time, not to a resemblance holding at the past time of Kira's childhood.³

- (13) *Context: Kira was an odd child, with fixed opinions about her future. When she was six she decided that she would one day own a cat that looked like her. She's now changed her mind, but...*

Kira's childhood desire to own a cat who **resembled** her remains bizarre.

The past tense on *resembled* appears to be licensed by the pastness of Kira's desire—but this pastness is not plausibly syntactically represented via a [PAST] feature. Though nouns in some languages can bear tense or aspect marking (see, e.g., Nordlinger and Sadler 2004), nouns in English are not morphologically marked with past tense, nor are non-finite clauses.⁴ The presence of SOT effects in the absence of any potential syntactic licenser for embedded past tense in contexts like (13) presents a second significant challenge for a licensing based account of SOT.

4 Temporal anchoring in SOT and non-SOT languages

If SOT effects cannot be attributed to morphosyntactic licensing, then the alternative is to derive them from the ordinary composition of past tense in embedded clauses. This section sketches a possible avenue for a new approach to variation in embedded tense interpretation, based on potential differences in the syntactic position in which tense is *anchored*.

Most current approaches to temporal semantics follow Klein's (1994) development of Reichenbach (1947), in which temporal relations involve (at least) three times. These times are referred to by various names; here I adopt the labels Anchoring Time (AT, often called the Utterance Time), Topic Time (TT), and Event Time (ET). Different approaches to the semantics of tense have consequences for how and whether these three times are syntactically represented in clause structure. ET, for example, is sometimes treated as a temporal argument of the verb, but in Neo-Davidsonian event-based approaches to the semantics of predicates and their arguments the verb does not take a temporal argument but instead an event argument, and so ET would not be directly represented in syntax. Viewpoint aspect semantically relates the runtime of the predicate event (=ET) to TT, the time under discussion, but on most treatments it does not syntactically introduce TT as a time variable.

³This example is slightly altered from Ogiwara (1989), who attributes the original to Irene Heim (p.c.).

⁴SOT in relative clauses has a different typological profile than SOT in complement clauses (Kusumoto, 1999), but the two contexts have nonetheless been viewed as requiring the same mechanism of feature licensing.

Tense, syntactically associated with the head T, in turn relates TT to AT. There are at least two distinct traditions in the semantics of tense for how this relationship is expressed, and they differ partly in the relationship between T and TT or AT.

On a *pronominal* theory of tense, as in Partee (1973) and much subsequent work, the syntactic head T is interpreted as a temporal variable. The denotation of this variable is TT, and it saturates the temporal argument of AspP directly. The relationship of TT to AT arises as a presupposition imposed by tense features, i.e. a temporal pronoun bearing [PAST] refers to a time t iff t is prior to AT (=NOW). On a *quantificational* theory of tense, by contrast, tense is interpreted as a function from one predicate of times ($[[AspP]]$) to another; TT is not represented as a variable in the syntax, but introduced indirectly as part of the semantics of tense features. On a quantificational approach, anchoring to AT can be accomplished in several ways: indirectly (i.e. also as part of the semantics of tense features), or via a syntactically represented temporal pronoun that denotes AT. This pronoun can be located either on T itself (Grønn and von Stechow, 2010) or on a higher head.

These differences in how AT is introduced make potentially different predictions for how tense would be expected to behave in embedded clauses.

If tense is pronominal, and tense anchoring is a semantic presupposition triggered by the presence of features such as [PAST] or [PRES]. Then we should expect its interpretation to typically be indexical, much as φ -features on pronouns are. In other words, we would predict that the interpretation of embedded tense would always be relative to NOW (=matrix AT), rather than to matrix ET. This appears to be the wrong prediction for non-SOT languages, where embedded tense is in fact typically interpreted relative to matrix ET.⁵

Treating tense as pronominal while still accounting for non-SOT languages is possible if we analyze embedded tense in such languages as a Kaplanian monster, that is as an indexical pronoun whose context of evaluation has been shifted.⁶ But while pronominal monsters have been described for a variety of languages, they are comparatively rare. Non-SOT languages, by contrast, are extremely common. It is instead SOT that is typologically unusual: SOT effects appear to have been described only for a subset of Indo-European languages, primarily in the Germanic and Romance branches. Dependent interpretations for embedded tense, by contrast, have been described for Russian (Comrie, 1985), South-Baffin Inuktitut (Hayashi, 2011), Japanese (Ogihara, 1995), Hebrew (Sharvit, 2003), Finnish, and Hungarian, among others. We should thus hesitate to attribute the absence of SOT effects to mechanisms that are unusual in other semantic domains, such as indexical shifting.

A quantificational approach to tense, by contrast, offers a more direct handle on dependent tense in complement clauses, because it is not TT that is syntactically represented, but instead AT. In approaches such as Grønn and von Stechow (2010), in embedded clauses this pronoun can

⁵The same prediction would be made by a quantificational approach to tense in which AT is introduced contextually: if anchoring to NOW is part of the interpretation of [PAST] or [PRES], we incorrectly predict an indexical semantics for tense.

⁶One could instead allow embedded pronominal tense, but require that it be bound; this is the foundation of the Feature Transmission approach to SOT, which proposes that embedded tense (=embedded TT) is bound by the higher verb (=matrix ET) in SOT and non-SOT alike, with differences arising from whether Feature Transmission applies.

bound by the matrix ET (with or without language-specific Feature Transmission), which results in a dependent tense interpretation.⁷

The relative interpretation of embedded tense in non-SOT languages (the majority of the world's languages) requires that the embedded clause be anchored not to NOW but to the time of the matrix predicate. This is incompatible with a pronominal theory of tense in which tense is related to an indexical NOW (=AT, introduced contextually rather than semantically). Relative interpretations are better accommodated by a quantificational theory of tense, where AT is represented within the structure, and so can be influenced by its syntactic context.

In SOT languages, by contrast, embedded tense is *independent*. Setting aside the complication of future-oriented interpretations in modal contexts (which in any event are available even without a syntactic licenser), in SOT languages tense is always interpreted in a way that is compatible with AT corresponding to NOW: clauses with [PAST] are always prior to NOW (in both simultaneous and shifted readings), while clauses with [PRES] must overlap with NOW (the double-access reading).

In other words, in the absence of a workable mechanism of feature licensing to account for SOT effects, what distinguishes the typological majority of non-SOT languages from the typological minority of SOT languages is that in the latter languages embedded AT is always interpreted indexically—it not affected by the presence of an embedding predicate—in a way that the AT in non-SOT languages is not.

This difference between SOT and non-SOT languages can be accommodated by the palette of semantic approaches to tense reviewed above in both more and less radical ways. A comparatively radical option would be to propose that while non-SOT languages have quantificational tense, tense in SOT languages is instead pronominal, with AT introduced contextually and thus insulated from syntactic interference.

A more modest proposal could maintain a consistently quantificational semantics for tense across languages, with the difference between SOT and non-SOT languages arising from the position in which AT composes. If AT is introduced immediately above T (e.g. on a finiteness head Fin) in some languages, but higher in the left periphery in other languages, it might be insulated from shifting by a matrix predicate in the former case but susceptible to shifting by the matrix predicate in the latter (or to being prevented from merging at all). This is analogous to the general observation that the properties of C are more commonly affected by matrix / embedded status than the properties of T (as in what are often referred to as *root phenomena*).

Contexts where the distinction between SOT and non-SOT languages collapses are relevant to evaluating the prospects for this type of approach. One such context is relative clauses, where, notably, *both* SOT and non-SOT languages exhibit independent tense interpretations—in other words, in these contexts all languages interpret tense relative to AT of the main clause. Because relative clauses are also a context in which the left periphery is not selected by a propositional verb, the lack of a divide between SOT and non-SOT languages in relative clauses would be easy to explain in an approach where variation in the interpretation of embedded tense arises from whether

⁷As noted above, however, straightforward binding of embedded AT by matrix ET is unavailable if ET is not itself syntactically represented, as it plausibly is not in event-based approaches to the composition of verbs with their arguments.

AT is represented in a position in which it is potentially accessible to embedding predicates.

Another relevant observation is that non-SOT languages do sometimes exhibit simultaneous readings for embedded past tense in some contexts; this is discussed in perhaps the most detail by Altshuler (2008) for Russian, but can also be found in descriptions of other languages. The example in (14) illustrates this for Finnish, otherwise described as lacking SOT effects. Embedded *on* (be.PRES) yields a simultaneous interpretation for the embedded clause, as is typical for non-SOT languages—but *oli* (be.PAST) also allows this interpretation, as in SOT languages.

- (14) Hän sanoi, että vene {**on/oli**} siellä rannassa.
3SG say-IMP that boat {**be.PRES/be.PAST**} there-ADE shore-INE
“They (SG) said that the boat was there on the shore.”
[Finnish: Sulkala and Karjalainen, 1992, P. Koskinen p.c.]

The availability of SOT interpretations for past tense in complement clauses even in languages reported to lack SOT effects may point to a further axis of variation, either in the selectional properties of embedding verbs, or in interactions in the left periphery with the interpretation of embedded AT.

5 Outlook: a distributed approach to the puzzles of SOT

It remains to ask whether an independent tense analysis can account for the puzzles presented by SOT at least as well as licensing approaches. Recall the profile of SOT from section 2: (i) past embedded under past allows, but does not require, a simultaneous-with-matrix interpretation (for imperfective or stative clauses only); (ii) present under past results in the double access reading; and (iii) past tense in some modal contexts can receive a later-than-NOW interpretation.

Regarding the first property, the question for an independent analysis of embedded tense is why, if all that embedded past tense requires is that the embedded event occur prior to NOW (prior to matrix AT), can the embedded ET not be later than matrix ET. In other words, why can (15b) not be used to report the utterance in (15a), given that the predicted bad weather is prior to NOW?

- (15) a. Last week, Sarah said: “It will be cold tomorrow.”
b. #Last week, Sarah said it was cold the next day.

A notable feature of examples like (15b), however, is that they report a modal attitude using a non-modal clause. As discussed in a different context by von Stechow and Gillies (2010), modal utterances are epistemically weaker than their non-modal counterparts, and the latter can thus not be felicitously used in contexts that call for the former. This explanation can be extended to account for the infelicity of examples like (15b): using an embedded simple past to report an originally modal utterance attributes a stronger proposition to Sarah than she originally expressed, and so cannot be used to felicitously report her utterance.⁸

⁸Cowper (1996)’s account of SOT effects in terms of semantic binding includes a similar proposal regarding the absence of later-than-matrix interpretations, without explicit reference to modal strength.

The second property, the availability of double access readings, does not present a significant challenge for an independent analysis of embedded tense in SOT languages: while licensing-based accounts must explain why feature licensing does not apply in this specific configuration, the indexical interpretation of embedded [PRES] is predicted if embedded tense is semantically independent.

What the independent analysis of embedded tense does not predict is any instance of embedded [PAST] that results in an interpretation where the embedded clause holds (exclusively) now or into the future, and thus the third property of SOT languages, the existence of future-referring [PAST] in modal contexts, is often cited as strong evidence in favour of licensing approaches. It is precisely this use of past morphology with future reference, however, that arises in the absence of any plausible syntactic licenser, as discussed in section 3.2. The licensing account thus fares no better in accounting for future referring uses of [PAST], because it does not easily extend to these cases. The modal use of [PAST] thus remains one of the most significant empirical obstacles for any account of tense in SOT languages. A promising avenue to account for these data might be to treat the modal use of [PAST] in examples like (13) on analogy to the use of past tense to mark counterfactuals. While potentially promising, this faces the further empirical challenge that the modal use of [PAST] does not exhibit the conditional or subjunctive morphology characteristic of counterfactual [PAST]; in English, for example, past subjunctive *were* cannot be used in place of *was* in these contexts.

In summary, this squib has reviewed several issues facing standard licensing approaches to SOT. To the extent that existing semantic accounts have been given concrete syntactic implementations, they require a licensing or valuation mechanism that is quite unlike other types of morphosyntactic dependencies, both in allowing licensing across locality domains and potential intervenors, and in allowing licensing in the absence of any plausible syntactic licenser.

This motivates a fresh attempt to develop an analysis of SOT effects in which embedded tense is not dependent on the matrix tense, but is instead semantically interpreted. A promising avenue for such an analysis is to consider the syntactic consequences of different approaches to the semantics of tense, specifically regarding how and whether AT is represented in syntax. If AT is a pronoun that is present on a head in the left periphery of a clause, then the height at which this pronoun occurs could influence whether embedded tense is subject to shifting by an embedding verb. And more generally, future accounts of SOT should engage seriously with its skewed typological distribution, engaging with the fact that SOT effects have been robustly described only for Indo-European languages.

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