

Backshift and Tense Decomposition*

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Summary. Backshift is a phenomenon affecting verb tense that causes a mismatch between some specific embedded contexts and other environments. For instance, the indirect speech equivalent of a sentence like *Kim likes reading*, with a present tense verb, may show the same verb in a past tense form, as in *Sandy said Kim liked reading*.

In this paper we present a general analysis of backshift, pooling data from English and Romance languages. Our contribution is a novel combination of what has been said in the literature about this phenomenon: our analysis acknowledges that tense morphology is ambiguous between different temporal meanings, explicitly models the role of the speech time and the event times involved and takes the aspectual constraints of tenses into consideration.

Keywords: Tense, sequence of tense, backshift, English, Romance

1 Introduction

The following sentences, adapted from Michaelis (2006), illustrate the phenomenon of backshift, which is visible in indirect speech. The sentences in parentheses after each example are the direct speech counterparts of each embedded clause:

- (1) a. Debra said she **liked** wine. (“I like wine”)
- b. Debra said she **likes** wine. (“I like wine”)
- c. Debra said she **brought** a bottle of wine. (“I brought a bottle of wine”)
- d. Debra said she **had brought** a bottle of wine. (“I brought a bottle of wine”)
- e. Debra said she **would bring** some wine. (“I will bring some wine”)

When the matrix verb is a past tense form, the verb tenses found in the embedded clauses are sometimes different from the tenses used in direct speech (1a, 1d, 1e), but not always (1b, 1c). For instance, in this context we sometimes find the simple past instead of the simple present in English (1a). In this respect English is in sharp contrast with Russian, where present tense can be used in similar embedded contexts with the same meanings as the English sentences using the simple past (example from Schlenker (2004)):

- (2) Petya skazal, čto on plačet.
 Petya said that he is crying
 Petya said that he was crying

An initial observation is thus that English uses tense in an absolute way (the embedded past tense in (1a) is used to locate a situation in the past), whereas Russian uses it in a relative way (the embedded present tense in (2) marks a situation that was present at the time that the situation in

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the matrix clause held). Based on similar data, Comrie (1986) argues that English exclusively uses tense in an absolute way. However, the example in (3), from Rodríguez (2004), shows that in some cases English also uses tense in a relative way. In this example, the past tense is associated with a situation that may hold in the future with respect to the speech time. The past tense here signals anteriority to the time of the event in the higher clause (which is in the future). The phenomenon is thus more complicated than a simple separation between languages that use tense in a relative fashion and languages that use it in an absolute manner.

(3) María will tell us after the party tomorrow that she drank too much.

Several verbs trigger tense shifts in their complement. Reporting verbs are often identified with this group, but other verbs, like belief verbs or verbs like *decide*, create similar contexts.

The phenomenon is also known as sequence of tenses or *consecutio temporum*, although some authors use these expressions in a broader sense, encompassing constraints on the co-occurrence of tenses in the same sentence. We reserve the term backshift to refer to the more specific case of the complements of the class of verbs just mentioned. In this paper, we focus on backshift, in this narrow sense. This is because backshift is more constrained than the general co-occurrence of different tenses in the same sentence. For instance, Rodríguez (2004) points out that relative clauses are temporally independent, as illustrated by the example in (4).

(4) Felipe spoke last night with a girl that was crying this morning.

Here, two past tenses are found, and the verb of the relative clause refers to a situation that temporally follows the one denoted by the matrix verb. In turn, in backshift contexts involving two past tense forms, the embedded tense never signals a time that temporally follows the time associated with the embedding tense:

(5) *Debra said last night that she brought a bottle of wine this morning.

In this paper we present a novel account of backshift and formalize it in HPSG. We use Minimal Recursion Semantics (MRS; Copestake et al. (2005)), but our account is relatively neutral with respect to the theory or format of semantic representation used.

We treat backshift as the combination of three dimensions. The first one is acknowledging that tense, as it is visible in morphology, is ambiguous. The second one consists in classifying the meanings of the tenses along a number of lines: direction (present vs. past vs. future), aspect (perfective vs. imperfective), relativity (relative vs. absolute). Direction and aspect determine which kinds of temporal relations are involved in the meaning of tenses (inclusion, overlap or precedence relations). Relativity is how the arguments in these relations are chosen: absolute tenses always take the speech time as one of the arguments of one of these relations; relative times look at a perspective point, which can be the speech time or the time of another event, depending on the syntactic context. The third dimension is that some tenses may appear only in restricted contexts: they may occur only in contexts where the perspective point is the utterance time, or in contexts where these two times are different, or in both of these contexts.

Our analysis contains novel aspects. It provides a very clean distinction between absolute and relative tenses, making it depend on the use of two features. It correctly constrains the possible readings of past under past constructions depending on grammatical aspect, which no other theory of backshift explains.

The paper proceeds as follows. In Section 2 we present the semantic representations for some tenses, which we will need in order to treat backshift. The analysis of backshift we propose is explained in Section 3. In Section 4 we compare this analysis with the treatments of backshift found in the literature. We conclude the paper in Section 5 with a summary of our contributions.

2 A Simple Representation of Tense

In this section we present a representation of the meaning of tenses that will be used in the analysis of backshift developed in Section 3.

Ambiguity of Tense Tense presents ambiguity at two levels:

- The same surface form can correspond to more than one grammatical tense. An English example is the verb form *put*, which can, for instance, be present tense or past tense. Some languages show this ambiguity in productive conjugation patterns. For instance, Portuguese *corremos* is both a present and a past form of the regular verb *correr* “run”.
- The same grammatical tense can locate a situation in time in different ways. An English sentence like *I leave tomorrow* shows that present tense can refer to the future. This tense can also locate an event in the present. Other languages show similar cases.

We make a distinction between grammatical tense and semantic tense: we will use the first expression to refer to the morphological category, and the second one to refer to the meaning of tenses, i.e. their semantic representation.

In order to account for this two-fold ambiguity, we assume a two-layer analysis. The first layer consists in a set of rules that map surface form to grammatical tense. The second layer consists in a set of rules that map grammatical tense to semantic representations of tense. Both sets of rules are made of lexical rules, i.e. unary rules that apply to lexical items (verb forms in this case).

Description of the Tenses We assume a Davidsonian (Davidson, 1967) representation of situations which employs event variables as the first argument of the predicates. We model tense via an *at* relation that relates this event variable with a temporal index. A temporal index can be viewed as a free time variable, in the spirit of Partee (1973). The temporal index in this *at* relation is Reichenbach’s event time. Also drawing inspiration from Reichenbach, we describe tense by resorting to various temporal indices and temporal relations between them. Temporal indices have their own type *t*. We represent the speech or utterance time by a subtype *s* of *t*. The *at* relation and the temporal relations holding between the temporal indices are all introduced at the second layer of tense lexical rules (the layer that maps grammatical tense to semantic tense).

For our purposes, we do not need full Reichenbachian representations (relying on the three times: event time E, reference time R and speech or utterance time S) for many of the tenses: in some cases we will represent the temporal relation between the event time and the speech time directly, and say nothing about the reference time. For instance, we assume semantic present to be a temporal relation between S and E, in particular a temporal overlap relation. We follow DRT (Kamp and Reyle, 1993) in further assuming that semantic present is special in that this overlap relation is more specific than just overlap, and it is an inclusion relation: the event time includes the utterance time.

We distinguish between imperfective and perfective tenses as they occur in e.g. Romance and Slavic languages or Greek. The following table shows the sort of temporal representation that we have in mind, using *John smokes* as an example:¹

¹ We leave future tense aside, as it adds nothing new to the discussion. We also leave perfect aspect, as exemplified by the English present perfect, outside the scope of this text, for reasons of space.

Not explicitly shown in these representations are the aspectual (i.e. *Aktionsart*) constraints associated with the different tenses: imperfective tenses (including present tense) constrain the eventuality being temporally located to be a state, whereas perfective ones constrain it to be a telic situation (de Swart, 1998, 2000; Bonami, 2002; Flouraki, 2006). For instance, the semantic representation of *smoke*, which is an activity/process lexically, used in the perfective past could include an operator to convert this activity into a telic situation. In the imperfective tenses a stative operator, like the habitual operator, could be present, in the spirit of de Swart (1998). For our purposes, however, we can ignore these aspectual constraints as they do not affect our analysis.

Semantic (imperfective) present	$smoke'(e, john') \wedge at(e, t) \wedge includes(t, s)$
Semantic imperfective past	$smoke'(e, john') \wedge at(e, t) \wedge overlap(t, t_2) \wedge is-before(t_2, s)$
Semantic perfective past	$smoke'(e, john') \wedge at(e, t) \wedge is-before(t, s)$

We further assume that present cannot be perfective and, similarly to Michaelis (2011) that languages without perfective vs. imperfective distinctions show ambiguity in the other tenses. The examples in (6) are hers and support this last claim. The highlighted verb in the English sentence in (6a) is lexically telic, but the sentence nevertheless has an imperfective reading. In (6b) the highlighted verb is lexically stative, but the clause where it occurs has a perfective reading. Since these are cases of aspectual coercion similar to the ones found with the perfective and imperfective past tenses, the English past tense must be ambiguous between the two.

- (6) a. At the time of the Second Vatican Council, they *recited* the mass in Latin.
b. He lied to me and I *believed* him.

Similarly, future tense (or future constructions) is ambiguous in English as well as Romance languages with respect to perfectivity.

3 Backshift

For the purpose of handling backshift phenomena, we separate semantic tenses into two groups: relative tenses and absolute tenses. The *absolute tenses* always refer to the utterance time directly: they introduce in the semantic representation a temporal relation with the utterance time as one of its arguments. In turn, the *relative tenses* introduce a relation with a perspective point as one of its arguments. This perspective point is the utterance time if the corresponding verb is the head of the main clause of a sentence. This perspective point is instead the event time of a higher verb, if that higher verb is a verb like *say*, triggering backshift.

For the HPSG implementation of such an analysis, revolving around this distinctive constraint of the perspective point and the utterance time, three features are employed: `UTTERANCE-TIME`,² which represents the utterance time; `PERSPECTIVE-POINT`, for this perspective point; and `EVENT-TIME`, for the event time.³

The utterance time must be accessible at any point in a sentence (as argued above), so this feature must be unified across all *signs* present in a feature structure. Therefore, lexical and syntax rules must unify the `UTTERANCE-TIME` of the mother with that of each of their daughters. In the start symbol, the features `UTTERANCE-TIME` and `PERSPECTIVE-POINT` are unified: the perspective point is thus the utterance time in matrix clauses.

Because some verbs like *say* trigger backshift in their complement, but other elements do not, the relation between an item's perspective point and that of its complement is controlled lexically. For most items (the default case) they are unified, but in the case of backshift triggering elements, the `PERSPECTIVE-POINT` of the complement is the `EVENT-TIME` of the head. This is encoded in the lexical types.

The absolute tenses look at the feature `UTTERANCE-TIME` in order to find one of the arguments for the relevant temporal relation that they introduce in the semantics. The relative tenses look at the attribute `PERSPECTIVE-POINT` instead. As an example, the semantic perfective past tense is a relative tense. Consider:

² E.g. under `SYNSEM|LOCAL|CTXT|C-INDICES`, as suggested by Pollard and Sag (1994).

³ The exact place of these two features in the feature structures is not crucial. The feature `PERSPECTIVE-POINT` must be under `SYNSEM`, since lexical items can constrain the `PERSPECTIVE-POINT` of their complement. We assume the two features are grouped together under a feature `TIMES`, which is under `SYNSEM|LOCAL|CONT|HOOK`, because they are relevant for the composition of semantics. This feature `TIMES` must be percolated in the appropriate places (headed phrases, etc.).

(7) Kim said he lied.

$$at(e_1, t_1) \wedge is-before(t_1, s) \wedge say'(e_1, kim', e_2) \wedge at(e_2, t_2) \wedge is-before(t_2, t_1) \wedge lie(e_2, kim')$$

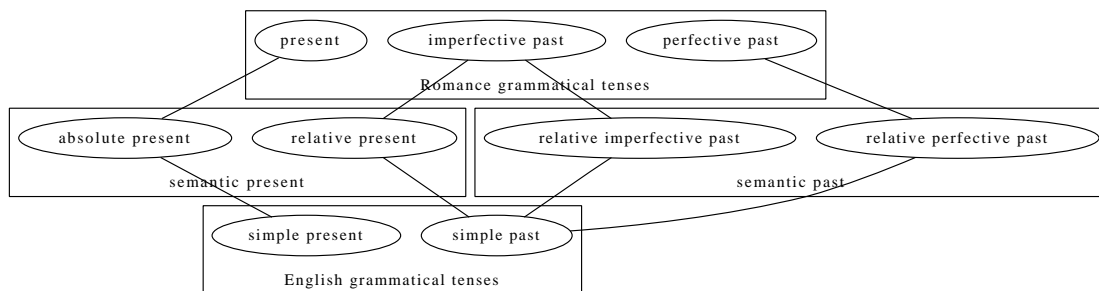
The second argument of the *is-before* relation associated with semantic perfective past is not the utterance time (as has been presented so far) but rather the perspective point, because this tense is a relative tense. In the case of main clauses this perspective point is the utterance time—this is what happens in examples such as (6b), and it is also the case of the matrix verb in (7). In the case of clauses occurring as the complement of verbs that trigger backshift, this perspective point is the event time of the higher verb. The example in (7) is thus correctly analyzed as saying that the event of John lying precedes the saying event, as can be seen from the semantic representation provided in (7). The AVM for the semantic perfective past tense rule thus includes the constraints:

$$\left[\begin{array}{l} \textit{semantic-relative-perfective-past-tense-rule} \\ \text{SYNSEM|LOCAL|CONT} \left[\begin{array}{l} \text{HOOK|TIMES|PERSPECTIVE-POINT } [t_1] t \\ \text{RELS} \left\{ \begin{array}{l} [at \quad [h_1] \quad h] \quad [is-before] \\ \text{LBL} \quad [h_1] \quad h \quad \text{LBL} \quad [h_1] \\ \text{ARG0} \quad e \quad \quad \quad \text{ARG0} \quad [t_2] \\ \text{ARG1} \quad [t_2] \quad t \quad \quad \text{ARG1} \quad [t_1] \end{array} \right\} \cup [A] \end{array} \right] \\ \text{DTR|SYNSEM|LOCAL|CONT|RELS } [A] \end{array} \right]$$

By contrast, the semantic tense given by the English present tense in examples like (1b) is an absolute tense. As presented above, the semantic present carries an inclusion relation between the event time and another time. Because it is an absolute tense, this other time is always the utterance time, regardless of whether it occurs in backshifted contexts or regular ones.

$$\left[\begin{array}{l} \textit{semantic-absolute-present-tense-rule} \\ \text{SYNSEM|LOCAL} \left[\begin{array}{l} \text{CTXT|C-INDICES|UTTERANCE-TIME } [s] s \\ \text{CONT|RELS} \left\{ \begin{array}{l} [at \quad [h_1] \quad h] \quad [includes] \\ \text{LBL} \quad [h_1] \quad h \quad \text{LBL} \quad [h_1] \\ \text{ARG0} \quad e \quad \quad \quad \text{ARG0} \quad [t_1] \\ \text{ARG1} \quad [t_1] \quad t \quad \quad \text{ARG1} \quad [s] \end{array} \right\} \cup [A] \end{array} \right] \\ \text{DTR|SYNSEM|LOCAL|CONT|RELS } [A] \end{array} \right]$$

We use the machinery presented above in Section 2 to allow a grammatical tense to be ambiguous between two or more semantic tenses. The relation between grammatical tense and semantic tense is language dependent, as shown in the following diagram, where this mapping with semantic tense (middle row) is shown for some English grammatical tenses (bottom row) as well as some tenses in some Romance languages (top row):



The following examples illustrate each of the semantic tenses considered in this diagram under the influence of a higher past tense verb: the absolute present, denoting overlap with the utterance

time, and represented by the English simple present in (8a);⁴ the relative present, signaling overlap with the perspective point, and materialized in the English simple past in (8b); the relative imperfective past, marking anteriority to the perspective point, associated with a stative interpretation of the clause and realized by the English simple past in (8c); and the relative perfective past in (8d), similar to the relative imperfective past but associated with telic situations instead of stative ones.

- (8) a. Kim said he is happy. (“I am happy”)
 b. Kim said he was happy. (“I am happy”)
 c. Yesterday Kim said he was happy when he was a child. (“I was happy when I was a child”)
 d. Kim said he already had lunch. (“I already had lunch”)

The Romance grammatical imperfective past is similarly ambiguous between a semantic present (signaling temporal overlap) and a semantic past (marking anteriority). In contexts with no tense shift, it is always a semantic imperfective past. However, in backshifted contexts it can also be a relative present tense. For instance, the Portuguese sentences that are translations of the examples (8b) and (8c) use the grammatical imperfective past. The direct speech equivalents can be the grammatical present or the grammatical imperfective past:

- (9) a. O Kim disse que *era* feliz. (“Sou feliz”)
 b. O Kim disse que *era* feliz quando era pequeno. (“Era feliz quando era pequeno”)

The relative present signals a temporal overlap relation between the time of the event denoted by the verb used in this tense and the perspective point: this is the reading for the examples in (8b) and (9a), where the two events overlap. We give this relative present tense (denoted by grammatical past in backshift contexts) a semantic representation similar to that assumed for the absolute present tense (denoted by grammatical present), the only difference is that the perspective point is used as the second argument of the *includes* relation. These examples are thus analyzed as saying that the event time for the event described in the embedded clause includes the time of the event introduced by the matrix verb.

Because the *imparfait/imperfeito/imperfecto* cannot have a (relative) present reading in contexts with no tense shift, the lexical rule for this semantic tense (relative present) must be constrained so that it only triggers in the appropriate syntactic context, namely in backshift contexts.⁵

Similarly, the English *simple past* is ambiguous between a relative present that only occurs in backshifted contexts, a relative imperfective past, and a relative perfective past. It covers both the Romance grammatical perfective past and the grammatical imperfective past.

4 Related Work

Many analyses of backshift and sequence of tense can be found in the literature, some of which we describe briefly. Reichenbach (1947), in his famous analysis of tense as involving temporal constraints between the speech time *S* and a reference time *R* on the one hand and between that reference point *R* and the event time *E* on the other, mentions the *permanence of the R-point*: a sentence like **I had mailed the letter when John has come* is ungrammatical because the temporal constraints between *R* and *S* are incompatible in the two tenses involved (the past perfect constrains *R* to precede *S* while the present perfect constrains them to be simultaneous).

⁴ The meaning of the “present under past” is not trivial (Manning, 1992), and we opt for a simplified view of it here.

⁵ For instance, constraining the feature *TIMES* mentioned in footnote 3 with different types in the appropriate places achieves this effect. We acknowledge that our analysis requires this *ad-hoc* stipulation to keep it from overgenerating (i.e. assigning present readings to this grammatical tense in temporally independent clauses). Note that the other relative tenses can appear in temporally independent clauses, with an absolute interpretation.

However, Reichenbach did not develop a full account of backshift. A Reichenbachian analysis of this phenomenon is that of Hornstein (1991), that posits a sequence of tense rule which associates the speech time S of an embedded clause with the event time E of the higher clause. In this analysis a conditional form of a verb is considered to be, underlyingly, a future form, which is transformed into a conditional form in backshift contexts. As pointed out by Gutiérrez and Fernández (1994), this fails to explain why the two tenses combine differently with adverbs like *yesterday*. If the conditional form in (10b) is a future form in deep structure, (10b) should be ungrammatical just like (10a) is:

- (10) a. *Juan asegura que Pilar asistirá ayer a la fiesta.
Juan affirms that Pilar will attend the party yesterday.
- b. Juan aseguró que Pilar asistiría ayer a la fiesta.
Juan affirmed that Pilar would attend the party yesterday.

The work of Comrie (1986) suffers from the same problem, as it also consists in a sequence of tense rule that transforms the tenses found in direct speech into the ones found in reported speech.

According to Declerck (1990), when two situations are located in time, there are two possibilities: either both of them are represented as related to the time of speech (absolute use of the tenses), or one situation is related to the time of speech while the second is related to the first (relative use, in the second case). In the second case, the simple past simply denotes overlap with a previous situation. This is very similar to our proposal, but we classify the different tenses as to whether they are relative or absolute, whereas Declerck (1990) assumes both possibilities for all tenses and lets pragmatics disambiguate, but these pragmatic conditions are never made explicit.

For Stowell (1993), past morphology is like a “past polarity” item that needs to be licensed by a Past operator (that in English is covert) outscoping it. The Past operator is what conveys the temporal precedence constraints present in the semantics. Past morphology can be bound by Past operators in different (higher) clauses, which explains sentences like (8b). The analysis of Abusch (1994) is similar in spirit, but it resorts to semantic rather than syntactic constraints.

Like us, Michaelis (2011) also assumes that the English simple past is ambiguous between two tenses (a perfective/eventive one and an imperfective/stative one). Because of this, and similarly to us, she is in a position where it is possible to account for the interplay between aspect and tense—i.e. perfective past clauses in backshift contexts are always anterior to the main clause event—, which the rest of the literature on backshift cannot explain.

However, the author fails to notice that and instead analyzes examples like (11), which is hers, as an example of an embedded imperfective/stative tense (when its translation to other languages shows that it should be viewed as an instance of a perfective tense). She then tries to obtain anteriority effects from constraints coming from this imperfective tense, by deriving from it a semantic content similar to that of the English present perfect, which the grammatical imperfective past never has in languages like the Romance ones mentioned.

- (11) He said that he paid \$2000 for his property in 1933.

5 Conclusions

In this paper we presented a cross-linguistic account of backshift. We illustrated the problem with data from English and some Romance languages. Our approach relies on two levels of tense representation: the morphological one and the semantic one. The relation between these two levels is language dependent.

In this scenario, backshift is the result of the interaction of three key properties of tense: (i) grammatical tense can be ambiguous, (ii) the meaning of tense is the combination of three characteristics (direction, aspect, how the arguments of the temporal relations are chosen), and (iii) some of these combinations occur only in restricted contexts.

One strong point of our analysis is the very clean distinction between the tenses that constrain the utterance time directly and the tenses that refer to an abstract perspective point, that needs to be resolved (as the utterance time or alternatively as the event time of a higher event). Another contribution is the correlation between perfectivity distinctions and the availability of temporal overlap readings in past under past backshift constructions, which the remaining literature on the topic fails to explain.

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