The semantics of possessive noun phrases and temporal modifiers

Abstract

This paper examines the semantics of possessive NPs like *Joana's former mansion*. I argue that the scope ambiguity in the interpretation of *former* supports a two-place approach, according to which possessive noun phrases are always formed from relational denotations. This ensures that a possessive relation is available in the syntactic/semantic composition at the point where a temporal modifier is added. In this way, the modifier can take scope over the relation. I derive the difference between *ex-* and syntactic modifiers, with respect to the kinds of possessive relations they can modify, from the distinction between sortal and relational nouns. The prediction is that derivational affixes can only target relations that are lexically encoded, not those arising via type-shifting.

1   Introduction

This paper is concerned with the semantics of possessive NPs and its interaction with temporal modifiers like *former* and *ex-*. I will focus specifically on the so-called Saxon genitive, exemplified in (1).

(1)   John's father

Despite the label "possessive", an indefinite number of relations between entities can be described this construction, such as ownership, control, and part-whole, to name a few. There debate in the literature as to which of these relations are lexically determined and which are contextually derived. Peters and Westerståhl (2013) argue for the extreme view that all relations are pragmatically derived, being present in the semantic composition only as a free variable. On the basis of restrictions on the availability of possessive relations in the context of different modifiers, I argue

for an intermediate position, one in which most relations are contextually derived, but some have to be specified in the lexicon.

Another question tackled by this paper is the scopal properties of temporal modifiers. These can take scope over the noun to which they attach, or over the relation between this noun and its possessor. For example, the noun phrase in (2) can refer to a house where I used to live, but also to an entity that was formerly a house, but may still be mine.

(2)   My former house

One motivation for paying attention to these facts, at least in the case of *ex-*, is the worry that this sort of scope interaction would be a challenge to some versions of the Lexical Integrity Hypothesis, according to which word-level morphological elements should not be able to interact with syntactic elements (Lieber and Scalise, 2006). As we will see later, the strength of this counterexample is largely dependent on the semantic analysis of these constructions.

Another motivation for studying this topic is the need to square this sort of scope ambiguity with non-transformational theories of the syntax-semantics (and morphology-semantics) interface that do not involve the movement of elements for scope-taking. My analysis will be couched in a version of Combinatory Categorial Grammar, although it is largely compatible with other syntactic frameworks.

2   Approaches to the semantics of possessive NPs

As discussed in Löbner (1985), common nouns can have two basic interpretations, sortal or relational. The first are those usually represented by one-place functions, characterizing sets of entities. This is the interpretation given, for example, to the noun *table* in most of its contexts. Relational interpretations, in contrast, denote relations between

entities, and can be represented by two-place functions, e.g. *wife* and *edge*. Nouns can often be used in both interpretations, so, even though *table* is prototypically sortal, the phrase *my table* denotes an object that stands in some relation to me. In this case, we can say that *table* has a relational use by virtue of being in a possessive construction.

Approaches to the semantics of possessives have differed on which of these cases is the most basic. One-place approaches assume that possessors always combine with nominal predicates denoting a set, of type $\langle e, t \rangle$ (hence "one-place"). Approaches of this kind then need some mechanism to allow the formation of possessive noun phrases from relational nouns, under the reasonable assumption that these have a lexical denotation of type $\langle e, \langle e, t \rangle \rangle$. Two-place approaches, on the other hand, assume that possessors always combine with relations of type $\langle e, \langle e, t \rangle \rangle$. The converse is true in this case: two-place approaches need to account for the formation of possessive NPs from nouns that are not lexically relational.

2.1 Arguments for a one-place approach

The most recent example of a one-place approach is the work of Peters and Westerståhl (2013). For them, possessive relations are always introduced by the possessive morpheme in NPs, as a relational variable to be set contextually.

The authors note that even in the case of relational nouns, context must always be invoked to determine the appropriate relation for the interpretation of a possessive NP. This relation may or may not coincide with the one predicted by the lexical specification of the noun.

As the argument goes, since context can always override the lexical preferences of relational nouns, the advantage of having a possessor phrase combine with relational denotations, to directly derive lexical interpretations, would be illusory. Hence, in favor of uniformity, the authors choose an analysis in which possessors always combine with a set and introduce a possessive relation.

Due to lack of space, I will not explore the flaws in this parsimony argument here. Instead, I will focus on another way these approaches can be distinguished. Namely, by the empirical consequences of assuming that possessa acquire a relational denotation only after combining with a possessor, as opposed to assuming that relationality is already present in the semantic composition.

2.2 The case for a two-place approach

Peters and Westerståhl (2013) discuss and reject the main argument given by Partee and Borschev (2003) for a two-place approach, which is based on the semantics of *former*. Consider (3).

(3) Mary's former mansion was destroyed by fire.

A one-place account will not readily get the wide-scope reading of *former*, in which the subject NP refers to something that is still a mansion, but is not owned by Mary anymore. The reason is that the possessive relation between these two entities is not available in the semantic composition at the point at which the temporal modifier combines with the possessed noun, since the relation is introduced by the possessive morpheme.[1]

In a two-place approach, possessor phrases combine with relational denotations, saturating an argument role that is already present in the denotation of the possessed noun. The question, then, is how a possessive relation is introduced for nouns that are lexically sortal. The route taken in much of the literature, including this paper, is the postulation of a type-shifting operation that turns one-place nominal predicates into two-place relations. A crucial advantage of this assumption is that a possessive relation can already be present in the semantic composition by the time *former* combines with the possessed noun; hence the temporal adjective can scope over this relation.

Peters and Westerståhl (2013) recognize that a one-place account will not get the wide-scope reading of *former* in (3), but they argue that a two-place account also does not give the right result in this case. The reason, they argue, is that is that applying *former* to a relational denotation such as (4), derived via type-shifting, would result in a representation like (5), under the assumption that an operation applying to a conjunction commonly applies to both conjuncts.

(4) $\mathrm{mansion}(x) \land \mathrm{own}(y, x)$

(5) $\mathrm{former}(\mathrm{mansion}(x)) \land \mathrm{formerly}(\mathrm{own}(y, x))$

In discussing this case, the authors argue against Partee and Borschev (2003, 95)'s suggestion that

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[1] This problem also applies to mixed-approaches in which possessors can combine both with relational and with sortal nouns. Note that (3) exemplifies the case of a sortal noun. In a mixed-approach, *mansion* would be a one-place predicate throughout the derivation; relationality would be introduced in the construction by the possessive morpheme, hence outside the scope of *former*.

former could "in principle target either part [of the conjunction], depending on what was presupposed and what was focussed in the given context". Although there is a technical problem in assuming, and ensuring that, *former* targets only one part of the conjunction, I believe the spirit of Partee and Borschev (2003)'s approach is correct, in that the operation performed by *former* can be relevant to one or the other of the constituents, depending on what is relevant in a context. It can also be the case that *former* operates over both conjuncts. Under these assumptions, a first approximation of the meaning of this modified possessive NP is in (6).

(6) $former(mansion(x) \land own(y, x))$

The relevant aspect of (6) here is that it requires that the conjunction does not hold at the reference time. Note, however, that there are different ways a conjunction can be said not to hold. Accordingly, all the contexts in (7) would be compatible with an utterance of (3), showing that *former* can indeed be relevant to either or both of the conjuncts.

(7) a. Mary used to own a mansion, which she turned into a bed and breakfast. She still owns the property, but it was recently destroyed.

b. Mary used to own a mansion, which she sold. The mansion was recently destroyed.

c. Mary used to own a mansion, which she turned into a bed and breakfast and sold. The property was recently destroyed.

Once we properly define the semantic contribution of *former*, the semantic argument of Peters and Westerståhl (2013)'s against Partee and Borschev (2003)'s two-place approach disappears.

3   The limits of freedom

Freedom of the possessive relation is a characteristic property of possessive NPs in English and other languages. However, as observed at least since Barker (1995), freedom is not absolute in this domain. For the purposes of this paper, I focus on the availability of possessive relations under modification. The relevant contrast is between syntactic and morphological modifiers, exemplified in (8).

There is a sharp contrast between relations that are inherent in the meaning of the head noun, as in (8a–b), and those that are contextually determined,

as in at least (8c–e). In the first case, *ex-* prefixation is perfectly acceptable, but not in the latter.

(8) a. My (former/ex-)girlfriend

b. Our (former/ex-)boss

c. Since we sold it, I've seen our (former/?ex-)car every single day.

d. The waiter moved us back to our (former/*ex-)table.

e. He has only the memory of his (former/*ex-)injury.

f. "A carved wooden peg with a brass tip replaced his (former/*ex-)leg."[2]

The generalization, I suggest, is that *ex-* can only modify relations that are lexically specified. (8f) is a problematic case for this generalization, for although *leg* is usually taken to be a relational noun, it cannot be modified by *ex-*. The same seems to be true of terms referring to other body parts. I take this to be a principled exception, suggesting that part-whole relations at the lexical level are treated as inalienable in English, and furthermore, that *ex-* is incompatible with inalienability.

4   Temporal modification of possessive relations

I take noun denotations to be relativized to times, as in Tonhauser (2002), such that every nominal predicate has a temporal index whose value is identified with the verbal predication time, as a default, in the absence of other contextual pressures.

Besides context, the temporal interpretation of a noun can also be manipulated through the introduction of temporal modifiers, such as *former*, *future* or *present*. Following Tonhauser (2002), I take *former* to introduce a time variable, with the requirement that its value be a time following the time at which the nominal predicate holds.

(9) $\llbracket former \rrbracket = \lambda P.\lambda t.\lambda x.\neg P(t)(x) \land \exists t'[t' \prec t].P(t')(x)$

I propose that *ex-* has essentially the same semantic effect as *former*. In order to account for the fact that the prefix is more restricted, as we saw in the previous section, I follow the spirit of Dowty (1979)'s proposal on the distinction between lexical and syntactic rules. The difference between lexicon and syntax would be primarily one of function, not of form. While lexical rules

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[2]From Bryce Courtenay's novel "Sylvia".

serve to extend the basic set of expressions available to the grammar, syntactic rules serve to combine these expressions.

The consequence of this view for *ex-* prefixation is that, if we take this prefix to be added by a lexical rule, then it serves the role of extending the set of basic expressions of the grammar. This task, however, is rarely necessary, especially when there is some syntactic rule having the same effect (in this case, *former* modification). Thus, one reason why *ex-* prefixation is more restricted than *former* modification is to be found in a theory of morphological productivity.

More interestingly, I hypothesize that items of open lexical classes are never lexicalized with free variables. Hence, no sortal noun could be lexicalized with a free relational variable π. From this hypothesis, we derive the result that morphological elements like *ex-* cannot modify extrinsic relations. The reason is that extrinsic relations can only be introduced via type-shifting, when this is required to resolve a type mismatch arising from the combination of a sortal noun with a possessor that crucially requires a relational noun.

Hence, since a relational variable π is guaranteed not to be available at the point in the derivation in which *ex-* is attached, we account for the fact that *ex-* is more restricted than *former*, in not modifying extrinsic relations.

If, however, we had reason to reject the assumption that type-shifting only occurs under coercion, and instead take such operations to apply freely, as suggested by Barker (2011), the same restrictions on *ex-* could be derived from the same basic hypothesis. Namely, since *ex-* is introduced by a lexical rule, serving to extend the set of basic expressions, its introduction has to result in a valid basic expression of the corresponding lexical category. By hypothesis, a basic expression containing a free relational variable would not be a valid result of the application of a lexical rule.

A crosslinguistic prediction stemming from this idea is that whenever we find derivational affixes able to modify possessive relations, we should also find that these elements cannot modify relations that are not lexically specified.

5 Grammar fragment

This section presents a fragment of the grammar of possessive noun phrases in English, building on the discussion developed in the previous sections. The syntax is couched in a version of Combinatorial Categorial Grammar (Steedman and Baldridge, 2011).

The lexical entry I propose for the possessive clitic *'s* closely follows Coppock and Beaver (2015)'s treatment, in which this morpheme has no particular semantic effect, being just an identity function operating on the possessive relation present in the denotation of the noun.

(10)   's $=_{def} (NP/(N/NP))\backslash NP :$
$\lambda y.\lambda R_{\langle e \langle et \rangle \rangle}.\lambda x.R(y)(x)$

To account for relational uses of lexically sortal nouns I propose the type-shifter in (11). It is essentially the same type shifting operation proposed in other accounts, such as Barker (2011) and Coppock and Beaver (2015).

(11) $\Uparrow\pi := N \Rightarrow N/NP;$
$\lambda\phi.\lambda y.\lambda x.\phi(x) \wedge \pi(x)(y)$

Exemplifying my treatment of temporal modifiers, I take *former* to have the lexical entry in (12).

(12)   *former* $:= N/N :$
$\lambda P.\lambda t.\lambda x.\neg P(t)(x) \wedge \exists t'[t' < t].P(t')(x)$

(12) can directly combine with a noun like *mansion*. The resulting phrase, *former mansion*, can then be shifted into a relational denotation, as shown in (13), in order to combine with a possessor. However, as this example shows, a relation introduced at this point of the derivation is outside the scope of the temporal modifier. The result is a possible reading of *former mansion*, as predicted, but not the most salient one.

(13) $\lambda y.\lambda x.\mathbf{former}(\mathbf{mansion}(x)) \wedge \pi(y)(x)$

There is a difficulty in deriving the wide-scope interpretation of the modifier, given the assumption that type-shifting can only occur to solve a local type mismatch. A mismatch only arises with the introduction of the possessor; in this case, after the modifier has already combined with the noun. This problem disappears once we allow for more flexibility in the typing of modifiers. Assuming that a version of the 'Geach Rule' is available, as in (14), from Benthem (1990, p. 117), noun modifiers can be mapped to the type $N/NP/(N/NP)$, corresponding to modifiers of relational nouns.

(14)   Geach rule: an expression occurring in any type (a, b) may also occur in type $((c, a), (c, b))$ (for any c).

In a left-to-right derivation of (15), we have a possessor phrase that requires a relational argument, followed by a noun modifier of type N/N. Given the availability of the rule in (14), this modifier can shift into a modifier of relational nouns, $N/NP/(N/NP)$, as in (16). The derivation can then proceed by composition of the possessor phrase with the modifier, as in (17).

(15)   Mary's former mansion

(16)

$$\frac{\dfrac{\text{former}}{N/N : \lambda P_{\langle e,t\rangle}.\textbf{former}(P)}}{N/NP/(N/NP) : \dfrac{\lambda R_{\langle e,\langle e,t\rangle\rangle}.\lambda y.[\lambda P.\textbf{former}(P)](R(y))}{\lambda R_{\langle e,\langle e,t\rangle\rangle}.\lambda y.\textbf{former}(R(y))}}\text{ GR}$$

(17)

$$\frac{\dfrac{\text{Mary's}}{NP/(N/NP) : \lambda R\lambda x.R(m)(x)} \quad N/NP/(N/NP) : \lambda R\lambda y.\textbf{former}(R(y))}{NP/(N/NP) : \lambda R.\textbf{mary's}(\textbf{former}(R))}\text{ >B}$$

(18)

$$\frac{N/NP/(N/NP) : \lambda R\lambda y.\textbf{former}(R(y)) \quad \dfrac{\dfrac{\textbf{mansion}}{N : \lambda x.\textbf{mansion}(x)}}{N/NP : \lambda y\lambda x.\textbf{mansion}(x) \wedge \pi(y)(x)}\Uparrow\pi}{N/NP : \lambda y\lambda x.\textbf{former}(\textbf{mansion}(x) \wedge \pi(y)(x))}\text{ >}$$

(18) shows an alternative derivation, in which the modifier first combines with a relational noun denotation, forming a complex possessum. The latter can then combine with a possessor. The availability of these alternative derivations captures different coordination possibilities. In (19a), we have a coordination of the non-canonical constituents formed by the possessor phrase and the temporal modifier. In (19b–c), we have a coordination of modified possessum phrases.

(19)   a.   *Maria's former* and *Joana's current* mansion.

   b.   Maria's *former mansion* and *current bed and breakfast* is being restored.

   c.   Maria's *former mansion* and *current bed and breakfast* are being restored.

6   Conclusions

In this paper, I argued for a two-place approach to the semantics of possessive noun phrases, along the lines of Vikner and Jensen (2002) and Partee and Borschev (2003). In this approach, possessive NPs are uniformly headed by a relational denotation. In particular I showed how a two-place approach can account for the interaction between possessive noun phrases and temporal modifiers.

This analysis, coupled with a flexible syntactic framework, is also able to derive cases of non-constituent coordination in possessive NPs.

Perhaps the most important contribution of this paper lies in its exploration of the difference between syntactic modifiers, like *former*, and morphological ones, like *ex-*. In this particular case, both modifiers have a similar semantics, and both can be interpreted as having scope over the relation between the possessor and the possessee. The main difference between them is that *ex-* is not compatible with the whole range of possible possessive relations. In particular, I claim that *ex-* cannot modify relations that are not present in the lexical entry of the noun to which it attaches. This result was derived in this paper from the lexical status of the rule introducing *ex-*, under the assumption that free variables are not present in lexical entries, and its corollary, that lexical rules cannot have free variables in their output, since these have to be valid lexical entries.

In closing this paper, I leave open the urgent task of embedding these results in an explicit theory of the interface between morphology and syntax, and between morphology and semantics, in a categorial grammar framework.

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