

Syntactic and Semantic considerations for a Property theory of Control
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I want to explore some consequences for semantic composition that arise from recent syntactic proposals for control structures. Wurmbrand (2001) argues that certain obligatory controlled (OC) infinitives—the restructuring cases—involve only a syntactic VP, providing novel arguments for Chierchia's (1984) property-level approach to infinitives. The interaction between the syntactic VP and its interpretation as a property is not, however, so straightforward. In particular, the following three complications arise, each of which can be accommodated as long as changes are made to Wurmbrand's analysis or to the semantic composition of the verb and infinitive.

(i) Wurmbrand shows that although restructuring infinitives can be directly mapped to property-level meanings, not all cases of obligatory control can. I will demonstrate, though, that this isn't a problem for semantic composition, since there is more than one way to achieve a property-level denotation, allowing the semantics to give a uniform analysis of different syntactic parses. The flexibility of the semantic composition has real uses.

(ii) I will also argue that Wurmbrand's syntactic structures for restructuring infinitives won't directly give us a property-level denotations, since her Kratzerian-approach to verbal projections eliminates the external argument from the VP. Several solutions will be sketched, one of them using Kratzer's Event Identification to compose an OC predicate with its infinitival complement. This section requires much more work.

(iii) Lastly, I will show that one piece of evidence for the property-level denotations for control, namely the sloppy interpretation of *it*-anaphors, does not crucially rely on property-level antecedents. We will see that a sloppily interpreted *it* anaphor can refer to a property contained *within* a proposition-level antecedent.

The following gives more detail for each section:

i. How to get the same meaning from 2 syntaxes

There are two semantic mechanisms that can return a property-level denotation for infinitives, and while identical in their result, they arise through different compositional strategies. Adopting evidence from Wurmbrand, we will see that indeed both these routes to property-level denotations are needed: the same predicate can appear with a syntactically saturated complement and an unsaturated VP-level complement. Nevertheless, these complements are interpreted exactly alike.

Chierchia (1984) proposes that infinitival and gerundive complements of obligatory control verbs are interpreted as properties rather than propositions, the embedded subject being construed through semantic entailment rather than semantic composition.¹ Deriving a property-denotation for an infinitival complement is quite easy,

¹ Chierchia's (1984) account involves nominalization of the property (as well as case of nominalizations of propositions) which provides individual correlates for these complex objects. This is part of a larger project on the model-theoretic status of these objects. I think the property-level/individual correlate distinction is orthogonal to the issues discussed here. But I keep them in mind.

when we assume that the external argument in the infinitival is not saturated. The following translations demonstrate the status of a complement to an obligatory control verb *try*:

(1) John tried *to fix the car*

(2) a. [[(to) fix the car]] $\lambda x.\lambda s.\mathbf{fix}(\mathbf{the\ car})(x)(s) : \langle e, \langle s, t \rangle \rangle$
 $\lambda y\lambda x.\lambda s.\mathbf{fix}(y)(x)(s) : \langle e, \langle e, \langle s, t \rangle \rangle \rangle$ $\mathbf{the\ car} : e$

This account of control does not require a null element such as PRO; the verb in the infinitival is not fully saturated, but simply is a property (a function from an individual *x* to a proposition in which *x* fixes the car, in this example). Nothing like the stipulations of, say, Chomsky 1981 are required to characterize OC (i.e. no blocking categories needed, no considerations of government required).

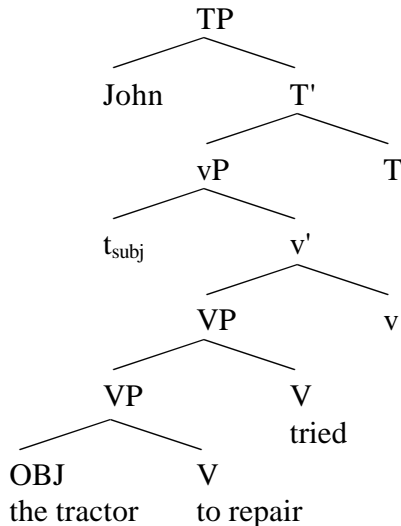
Similarly, Wurmbrand (2001) argues that a robust set of facts supports a similar syntactic parse for certain infinitivals: restructuring infinitives. Restructuring infinitives are known in German and Romance, displaying properties that suggest less (functional) structure intervenes between the matrix verb and the infinitive. These are based mostly on extraction facts: passive-movement and scrambling (German) and clitic climbing (Romance) can operate from the embedded to matrix clause in restructuring cases. These are clause-bounded processes that are unexpected under a clausal view of these infinitives. Wurmbrand takes the radical step and proposes that restructuring infinitives do not contain any functional material above the VP (such as complementizers, tense, or even aspect).

As noted, in German restructuring constructions, an embedded object can undergo long-passive movement when the matrix verb is passivized (3). Wurmbrand argues that this is only possible if restructuring infinitives lack any functional structure, so that matrix passivization triggers the internal argument of the embedded object to raise.

(4) *Long passive (downstairs object gets matrix NOM case)*
 dass der Traktor zu reparieren versucht wurde
 that the tractor-NOM to repair tried was
 'they they tried to repair the tractor.'

Restructuring infinitives (or VP-infinitives) thus receive the syntactic parse in (4b):

(4b) Restructuring syntax



Wurmbrand dubs her approach mono-clausal, as opposed to bi-clausal approaches to restructuring, where the infinitive projects clausal material of its own (and is treated like a proposition cf. Chomsky 1981).

If obligatory control could always be syntactically reduced to the VP analysis, then we would have a nice fit between the syntax of (4b) and the composition in (2). However, the very same verb that selects restructured/VP infinitives can also select for infinitives that involve more than a VP. One piece of evidence for this comes from the behaviour of reflexives in embedded infinitives. In (5), the infinitive verb is inherently reflexive and the reflexive *SICH* needs an antecedent. Since German allows the matrix verb to be passive (*it was tried*), no antecedent can be found in the matrix clause.

(5) Impersonal passive (no restructuring with downstairs object case marked downstairs)

- a. Es wurde versucht PRO_i sich_i den Fisch mit Streifen vorzustellen
 It was tried PRO self the fish with stripes to-imagine

'they tried to imagine what the fish would look like with stripes'

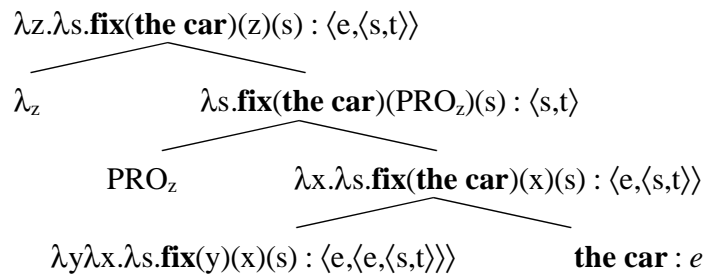
Wurmbrand concludes that *try* in (5), but not (4), selects for an infinitival complement that contains a subject, PRO, which serves to bind the reflexive. She further notes that *SICH* is not possible when long-passive occurs (6)

(6) long passive + *SICH* = bad

- b. *weil (sich) der Fisch (sich) vorzustellen versucht wurde
 since SELF the fish.NOM SELF to-imagine tried was

Thus (6) is a restructuring context, as diagnosed by long passive, and the infinitive is just a VP. Since it does not contain a PRO subject, SICH is not licensed, and the facts bear this out. What is noteworthy in these examples is that the very same verb, *try/versucht*, can have two different types of *syntactic* complements. Now, both are cases of obligatory control, and so we would like their complements to be properties. But this can be achieved even though the syntactic structure in (5) contains a PRO. If we allow free abstraction over PRO, where PRO is construed as a variable, then we can convert an otherwise saturated complement back in to a property (as Partee showed--reference?):

(7) [[to PRO fix the car]]:



The node that the matrix OC verb selects has the same meaning in (7) as it does in (2). Nevertheless, the syntax that (7) interprets has a PRO, which allows for the SICH facts. Here I assume that PRO can serve as an antecedent for SICH in the syntax, even though PRO itself gets abstracted over. That complication aside, a restructuring and a non-restructuring construction will be synonymous, while allowing the syntactic parse to include a subject position when necessary. (7) and (2), then, have real and distinct uses in characterizing the interpretation of OC infinitives.

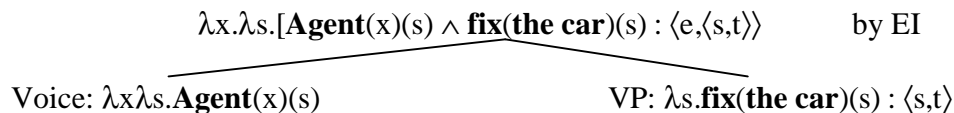
ii. vP vs. VP and its compositional consequences

While Wurmbrand's evidence for VP-infinitives seems to provide new evidence for the Chierchia account, we will see that Wurmbrand's structures, which don't include a vP, won't quite provide a property-level denotation for restructuring infinitives.

I fudged a little in the exposition in the above section. I said the the syntactic parse-tree in (4b) mirrors the semantic composition in (2). This isn't quite right if we take Wurmbrand's account literally. Wurmbrand's claim is that the embedded object receives case not from the any functional head in the infinitival (since there isn't any such head) but from the matrix v^0 --the functional head that introduces the external argument and licenses accusative case (Kratzer 1996). The absence of an embedded v^0 explains, in part, the ability of long-passive movement, and for Wurmbrand, the basic facts concerning obligatory control. Wurmbrand explicitly follows Kratzer in this part of her account. However, for Kratzer (1996), v^0 /Voice not only assigns accusative case but it introduces the external argument. The VP itself is only a two place relation: between events and individuals, i.e. the internal argument. Thus Wurmbrand's VP will be of type $\langle s, t \rangle$, not a property of individuals. The picture Wurmbrand sets up--between her VP (in 4b) and Chierchia's VP (in 2)--is not homomorphic.

In fact, any property-level approach to the infinitive is going to have to wrestle with a Kratzer VP. One simple solution is to include Voice/ v^0 in the restructuring infinitive, but not discharge or saturate its argument. This is demonstrated in (8), using Kratzer's Event Identification (EI) principle to compose v^0 with VP:

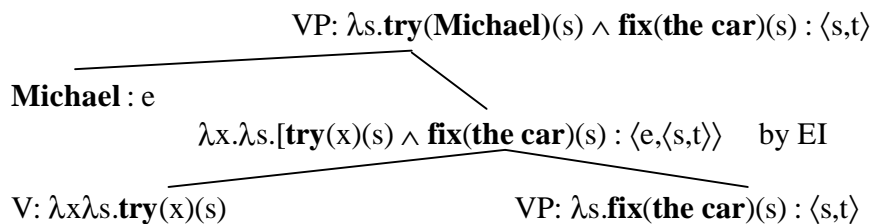
(9) [[v_P to fix the car]]



The cost of this analysis is that we would have to entertain a Voice head that doesn't license accusative case but adds the **Agent** predicate. I will have to see if there is evidence for such a Voice head [sidenote: so-called "defective" v^0 heads appear in a lot of the syntactic literature (e.g. Alexiadou 2001), but I'm skeptical].

Another approach is to maintain, with Wurmbrand, that we are just dealing with a VP complement, but contra Wurmbrand and Chierchia, that restructuring infinitives are of type $\langle s, t \rangle$. The matrix predicate would then compose with this $\langle s, t \rangle$ object in some other way than FA. Kratzer's EI principle is one such candidate. Suppose a verb like *try* and its German counterpart are not relations between individuals and properties. Suppose *try* is more like a lexical version of Kratzer's Voice head. It wouldn't compose with the infinitive through FA, nor could we characterize its semantics as a relation between individuals and properties, but a relation between individuals and events. What we would end up with is (10)

(10) *Michael tried to fix the car*



What would this mean? And does it characterize OC sentences, and in particular the meaning of *try*, which I still haven't given. One point to pursue are claims in the literature that restructuring predicates involve only one event (Napoli 1981). If (10) means $\exists \text{event}$ such that *Michael tried that event and it was an event of fixing the car*, then EI creates one event.

Still, the subject's role as the agent of the *fixing* predicate is left unspecified. Perhaps this is achieved in the same way as in Chierchia--as a meaning postulate whereby "whenever Michael tries to bring about event of car-fixing, then in all the contextually

relevant situations (namely where what Michael tries actually succeeds) Michael is the agent of that event" (adapted from Chierchia 1984).

Do we ever need the subject to compose with the *fixing* predicate? In the case of *try* sentences, it seems to be implicated that the subject doesn't actually complete the event described by the lower VP:

(11) #Michael tried to fix the car, and he eventually did.

And in cases in the present progressive, the subject's role in the infinitival predicate is left completely open:

(12) Michael is trying to fix the car right now. Who knows whether he'll succeed.

I don't know if these are arguments for dissociating the matrix subject and the infinitival predicate in this way; perhaps they tell us something about *try*'s secondary meanings. But suppose *try* meant something like (13):

(13): **try** is a relation between individuals and events:

a tries b = 1 iff *a* acts in such a way/does something to bring about *b*

So nothing about what the subject does has to involve the relation/action/predicate in the infinitive. Consider (14):

(14) Michael tried to take make a cup of coffee in the new machine in South College.

(14) can be true, of course, if Michael did not make a cup of coffee. But it can't be true if Michael only stared at the coffee machine, bewildered. The *tryer* has to do something, but that 'something' can't be characterized by a formula using (only) the embedded predicate, i.e. the 'something' in (14) can't be *Michael made a cup of coffee*. It seems a contingent fact whether the subject of *try* is also the subject of the infinitive, as Chierchia's denotation states.

Unfortunately, (13) also predicts that (14) is true if Michael, in some unconscious state, accidentally or unknowingly manages to even begin making coffee in the new machine in South College. (14) is surely not true under these circumstances: the *tryer* has to believe that what he is doing will bring about the event/state described by the infinitival VP, whether it is a correct belief or not.

Not only is defining *try* difficult under an EI composition strategy, but *try* isn't the only restructuring verb: Wurmbrand (2001) cites the German equivalents of *dare*, *manage*, *promise*, *forget*, among others, as restructuring predicates.

iii. Sloppy *it* can go searching

The last point I wish to explore has to do with an argument for property-level meanings of infinitival complements. In Chierchia's system, sloppy readings for *it*-anaphors arise when they take properties as their antecedents; strict readings arise if the antecedent is the saturated proposition-level version of the infinitive (which arises through Chierchia's meaning postulate). However, sloppy readings are possible even if the infinitival

antecedent is a proposition in the representation of the semantic composition, i.e. even if the subject is represented as a PRO.

To show this I will use non-obligatory control predicates (NOC). NOC permits the interpretation of the embedded subject to include more than the matrix controlling argument, a phenomenon called split or partial control (Landau and references therein 1999). As such, NOC predicates are compatible with collective predicates in the infinitival clause, since these require more than a singular subject:

- (15) a. John decided to gather in the lounge.
= John_i decided [PRO_{i+j} to gather in the lounge]
- b. Peggy_i liked [PRO_{i+j} gathering in the lounge]

The *gatherers* above include the matrix controller as well as anyone else contextually relevant. Generally, it is assumed that partial control cannot involve a property-level complement (Landau 1999; Wurmbrand 2001), since the property would have to hold of more than just the controller in (15). [I am not sure I am convinced that a property meaning can't handle partial control.]

If cases like (15a,b) must involve a PRO, which saturates the infinitival predicate, then they will always be proposition denoting. But *it* anaphors are licensed in just these contexts (see 16), and they can receive both a strict (expected if the whole proposition is the antecedent) and a sloppy interpretation:

- (16) Peggy likes meeting with students in the lounge, and it seems that Ellen likes it too.
- a. strict (better without 'too')
Peggy_i likes [PRO_{i+j} meeting in the lounge]_k and Ellen likes it_k
- b. sloppy
Peggy_i likes [PRO_{i+j} meeting in the lounge] and Ellen_k likes it too
it = [PRO_{k+l} meeting in the lounge]

In order to achieve the sloppy reading in (16b), we want to get a hold of a property level denotation. Of course, one exists: it's buried in the infinitival.

(16b') Peggy_i likes [[λs.λs.meeting in the lounge]_m(PRO_{i+j})] and Ellen_k likes it_m too

In (16b') an appropriate property-level antecedent is available. The anaphor in the second conjunct, then, will have to be complex (contain a PRO like element to compose with the property) or some silent level of structure exists in the second conjunct, and the anaphor is simply a property applied to PRO.

In either scenario, what the sloppy reading of (16) shows us is that in any case where we find a sloppy reading we could just as easily have a proposition level antecedent, since we will always be able to find a node in the structure that has a property denotation.

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