

CPs: Copies and Compositionality*

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Abstract *Finite clausal arguments differ from other arguments—and other CPs—in two fundamental ways: (i) they do not move leftward (Koster 1978, Alrenga 2005, Takahashi 2010, Moulton 2013) and (ii) they may combine with nouns that do not accept arguments (Stowell 1981, Grimshaw 1990). I argue that finite clausal arguments are predicates of propositional content (type $\langle e, \langle s, t \rangle \rangle$) following Kratzer 2006, Moulton 2009. They combine with nouns by predicate modification, explaining (ii). In order to complement verbs, CPs trigger two type-driven leftward movements (CP movement and remnant AspP fronting). I argue that the resulting configuration prevents further leftward movement of clausal arguments, explaining (i). Also derived are the right-peripheral position of CPs relative to arguments and the verbal complex in Germanic, freezing effects in the VP, extraction and binding into CPs, and the similarities and differences among CP argument extraposition, heavy NP shift, and relative clause extraposition. More broadly, the proposal demonstrates that copies can denote restricted variables, but need not be DPs (cf. Fox 2002, Takahashi 2010, Johnson 2012).*

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1 *That*-clauses vs. CP proforms

According to a standard picture, the distribution of arguments is determined by syntactic requirements (like Case licensing) and semantic requirements (such as selection). These two requirements often compete, forcing arguments to appear in positions in which they are not semantically selected. It is movement, particularly as it is understood by the copy theory (Chomsky 1995, Sauerland 1998, Fox

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1999 among others), that mediates these requirements. Copies are diagnosed by connectivity:

- (1) a. Who impersonating him_i should no one_i see ~~who impersonating him_i~~
b. *Who impersonating John_i should he_i not see ~~who impersonating John_i~~

In addition to capturing connectivity effects, lowest copies fulfil the Projection Principle. In (1), for instance, the low copies saturate the internal argument of *see*.

This standard picture, however, is designed for nominal arguments. How other categories fit—in particular CPs—is currently unknown. In fact, it is not clear that many CPs even move. When finite CPs appear left-dislocated, they may only associate with gaps in positions where DPs are otherwise licensed. This is true of sentential subjects¹ and it is equally true of topicalized CPs. This DP-Requirement is well-documented (Williams 1981, Grimshaw 1982, Postal 1986, Webelhuth 1992, Alrenga 2005).

- (2) a. Most baseball fans believed/knew/expected that the Giants would win.
b. Most baseball fans believe/knew/expected that/it.
c. That the Giants would win, most baseball fans believed/knew/expected.
- (3) a. Albert {boasted/commented/complained} that the results were fantastic.
b. *Albert {boasted/commented/complained} that/it/a belief that the results were fantastic.
c. *That the result were fantastic, Albert boasted/commented/complained.

Movement-based frameworks offer two ways to address the DP Requirement. One line is that a DP in the form of a null operator is recruited, and CPs are high, base-generated satellites (Koster 1978, Alrenga 2005). The other line is that CPs that move are in fact embedded in null DPs (Davies and Dubinsky 2010, Takahashi 2010). Now both these solutions have the following corollary. In order to capture the fact that CPs *must* rely on one of these DP strategies, the grammar must prevent CPs from themselves moving alone. And here's the interesting thing: there is no general ban on things of category CP moving. The CP proform *so* is such an item (Stowell 1987). Distribution tests confirm that *so* is a CP: it complements verbs like *seem*, which allow only CP arguments (4b). Crucially, *so* may be displaced (4c).²

- (4) a. It seems so/that John left.
b. *That (it) seems./*It seems that.
c. So it seems.

¹Debate persists about whether CPs can be subjects (Koster 1978, Delahunty 1983, Davies and Dubinsky 2010). The issues in this paper are orthogonal to this debate.

²In fact, as a reviewer points out, *so* has an operator-like status elsewhere (e.g. *so tall a man*).

As-parentheticals provide another case of CP movement. Postal (1994, 72) shows that the gaps in *as*-clauses can be complements to verbs like *boast* and *comment*. As (3) shows, these select CP but not DP complements.

(5) The results were fantastic, as Albert {boasted/commented/complained}.

Ross (1984) and Postal (1994) provide examples of island sensitivity, establishing a movement dependency here.³

With this larger class of CPs taken into account, we can see that there is no general ban on moving CPs—just a particular ban on moving *that*-clauses leftward. What, then, is the difference between *so/as* and *that*-clauses that determines their movement options? There is another difference that is revealing: *so* may not complement nouns, but *that*-clauses can.

- (6) a. I believe/claim/am afraid so.
b. my belief/claim/fear that pigs fly
c. *my belief/claim/fear so

This is a very systematic pattern. No clause-taking nouns take *so* (Hallman 2006). Now, not all clause-taking verbs select *so*, either. Let me pause to address this issue. Recent literature claims there is a division among clause-taking verbs that is tracked by *so*. de Cuba and Ürögdi (2009) and Haegeman and Ürögdi (2010) suggest that *so* cannot combine with the class of verbs that select what they call ‘referential CPs’ (7). Referential CP complements include factive complements (*know, regret*). But as Bhatt (2010, 177–178(5,6)) notes, there are naturally occurring examples of *know* selecting *so* (8).

(7) John regretted that Bill had done it, and Mary regretted [it/*so] too.
(Kiparsky and Kiparsky 1970: 362)

- (8) a. I knew you would be angry enough about that, madam, or I should have told you before; and he knew so too... (from ‘Mysteries of Udolpho’, p.554, Ann Radcliffe, 1794)
b. Rooney knew he was special from a young age. And those who nurtured a talent that comes along rarely in any sport knew so, too.
(www.dailymail.co.uk/sport/article-389647/Walking-miracle.html, 2006)

Kastner (2013) has argued for the importance of Cattell 1978’s three classes of clause-taking predicates:

- (9) a. Volunteered-stance: *allege, assert, believe, deem, say, tell, think, feel*
b. Response-stance: *accept, admit, agree, deny, confirm*

³What moves in *as*-parentheticals may actually be a null operator (Stowell 1987, Potts 2002). Even so, it’s a CP null operator.

- c. Non-stance: (*be*) aware, (*be*) certain, comment, convince, doubt, mention, notice, realize, recall, regret, remember, remind

Cattell's classes have been shown to be linguistically relevant for extraction (Szabolcsi 2006) and embedded root phenomena (Kastner 2013). However, the distribution of *so* and *that*-clauses does not correlate.⁴ Response stance and non-stance verbs (as well as factives), can take the trace left by *as*-extraction, which is a CP:

- (10) a. The results were not fantastic. . .as Albert admitted/agree/mentioned/realized/regretted/knows/reminded me.
b. Fred is, as no one denies/doubts, a wonderful nurse.

And even some response- and non-stance verbs can select *so*, as the following naturally-occurring examples with *admit* and *convince* demonstrate:

- (11) a. She did pay the woman who cared for her daughter with drugs because that is what the woman asked for. She would not admit so to DYFS because she feared the consequences.
(Ryan, Edward S. *Journal of Instructional Psychology* 2000: 27. p3)
b. Gebara further asserted that politically "advanced" priests and nuns favor decriminalization, but admit so only in "very restricted circles."
(Serbin, Ken. "Simmering Abortion debate goes public in Brazil" *Christian Century* 1995, 112:8, p2666)
c. Each of the stories is about a "real" person; we are convinced so because their presence is faithfully recorded in photographs.
(Ramamurthy, Priti. "Why is Buying a "Madras" Cotton Shirt is a Political Act. A Feminist Commodity Chain Analysis." *Feminist Studies* 30:3. 2004.)

There are interesting restrictions on which verbs appear with *so*, which deserve the attention of future work (see Sailor 2012). But those restrictions appear to be orthogonal to the questions of category and movement which we're investigating. Importantly, there is no such lexical variation when it comes to nouns. I have taken the list of clause-embedding nouns in Higgins 1972's appendix (list 3, p.242) and found none that take *so*:

⁴Kastner (2013) argues that response- and non-stance verbs select DPs, and that their apparent CP complements are headed by a null D. This line faces obstacles from those response-stance and non-stance verbs do not select for overt DPs.

- (i) a. I agree *(to/with) something. (American English)
b. I convinced/reminded him *(of) something. (cf. *I told him *(of) something*)
c. I commented/remarked *(on) something. (Cattell 1978, p.63–64)
d. I was aware/certain *(of) that.

See also Haegeman and Ürögdi 2010, p.136.

- (12) *the/her {admission, announcement, answer, assertion, assumption, claim, comment, complaint, conclusion, expectation, guess, hope, inference, indication, judgment, knowledge, objection, prediction, presumption, pretence, promise, prophecy, proposal, reasoning, report, ruling, sense, speculation, statement, stipulation, supposition, suspicion, teaching, thought, theory threaten, understanding, worry} so.

To recap, all clause-embedding verbs which can select *that*-clauses can take the CP traces of *as*-extraction, and many take *so*, but nouns cannot select *so*.⁵ Neither these nor the movement contrasts between *so/as* and *that*-clauses can stem from a difference in category (all are CPs) or grammatical function (none need Case). This second point is important: since Stowell 1981 the unique distribution of CPs has been tied to the fact that they do not participate in the case system (the Case Resistance Principle, CRP). But the CRP won't explain why *so* can't combine with nouns. And there's another surprising thing about CP-taking nouns that confirms that case and category are irrelevant: clause-taking nouns don't even allow PP arguments which substitute for propositional meanings.⁶

- (13) a. He claimed that./*his claim of that
 b. I believe the story./*the belief of the story (Zucchi 1989, 14 (28c))
 c. *the idea of that
 d. *the fact of that

The simple fact is that clause-taking nouns do not take propositional arguments—even when housed in case-assigning PPs. I will provide more robust evidence for this conclusion in §2.1 with facts uncovered by Grimshaw (1990) showing that clause-taking predicates do not form complex event nominalizations that take internal arguments. This means that something more fundamental separates *that*-clauses from DPs, PPs, and even CP proforms. The more fundamental difference, I claim, lies in the way *that*-clauses *semantically* combine with predicates: CP proforms combine as arguments, while *that*-clauses do not; they merely modify an argument slot.

The idea that *that*-clauses are not normal arguments is not a new one (Stowell 1981). There's arisen a recent industry in exploiting their likeness to relative clauses (Arsenijevic 2009, Kayne 2009, Caponigro and Polinsky 2011). In this paper, I propose a related but different idea: following Kratzer (2006) and Moulton (2009, 2013), I will argue that *that*-clauses are predicates of propositional content.

⁵Constraints on extraction prevent testing whether nouns combine with the traces of *as*.

⁶To the extent that speakers allow such PPs, they do not correspond to the propositional argument but to what the myth/idea/idea is about:

- (i) The myth/claim/idea of that/his birth/that event is that it was a hoax.

See Moulton 2013 for the role of so-called *res* arguments (Kaplan 1968) in nouns. Tellingly, *about* can successfully replace *of* in these examples.

To support this, I show that *that*-clauses cannot merely denote propositions (type $\langle s,t \rangle$). Rather, *that*-clauses denote properties of individuals that carry propositional content (type $\langle e,st \rangle$). This is what nouns like *idea*, *rumor*, and *myth* denote. And that in turn explains why CPs may combine with non-argument taking nouns (as in (6)): they combine by predicate modification with nominals of the same semantic type (Kratzer 2006). With this existence argument for a predicative analysis of *that*-clauses established, I then show that a similar treatment is needed for *that*-clauses in other syntactic contexts, in particular as complements of (derived) nominalizations. This will in turn establish that clause-taking predicates select for arguments of type *e* that denote things with propositional content (not propositions directly).

If *that*-clauses do not saturate, then we must ask how they serve as arguments of verbs, in many cases as obligatory internal arguments:

(14) John believed/explained/admitted/regretted *(that pigs fly)

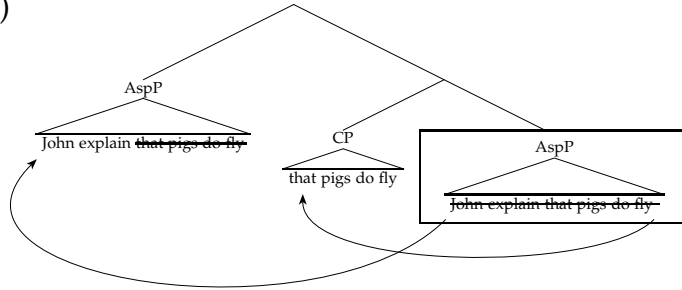
That-clauses are paradoxical: they don't saturate nouns, but they do appear to saturate verbs. It is tempting to resolve this tension by giving to *that*-clause complements of verbs a different semantics (and syntax) than *that*-clause complements of nouns. I will argue, however, that the syntax guides us toward a different conclusion—that movement resolves this tension. Finite clausal complements generally sit rightmost in the verb phrase. This fact can be best appreciated by Indo-European OV languages, like German (16), where CPs obligatorily extrapose, while DP and PP do not.

- (15) a. Martina hat diese Lüge verbreitet.
 Martina has this lie spread.about
 b. *Martina hat [dass Joachim Marlene liebt] verbreitet.
 Martina has that Joachim Marlene loves spread.about
 c. Martina hat verbreitet [dass Joachim Marlene liebt].
 Martina has spread.about that Joachim Marlene loves

I propose that the right-peripheral position of *that/dass*-clauses results from the type-clash they create in object position. They must move to leave a copy that denotes the right type to saturate the clause-taking verb. But as we will see in detail, CP movement alone will not resolve the type clash. And, correlatively, it turns out that the syntactic evidence suggests a yet more complex story for (15) is needed anyway—the right-peripheral position of *that*-clause complements cannot be merely the result of rightward extraposition. Various researchers, in particular Hinterhölzl 1999, have argued that CP positions result from two movements: *leftward* movement of the CP, followed by leftward remnant movement of the verb phrase. I will review evidence for this approach and I will add further evidence for English from freezing effects (Wexler and Culicover 1981, Stowell 1981). I will

argue that the remnant that moves is the phrase projected by Aspect, AspP. The target syntax is (16) (strikeouts indicate unpronounced copies).

(16)



This syntax is baroque, of course, but we will see that it fares better than conventional extraposition analyses (Stowell 1981, Büring and Hartmann 1997) and early Antisymmetry analyses (Zwart 1993). But most relevantly, it offers a natural resolution to the type-clash problem, once the resulting semantics of Aspect movement is invoked (Hacquard 2006, Kim 2007) in combination with CP movement. The payoff is a uniform semantics for *that*-clauses—one that reconciles their syntactic structure (which includes remnant movement) and their semantic type (as predicates that do not saturate). Further, we get an answer to the question we began with: why do *that*-clauses not move while CP proforms do, and how is this connected to their (in)ability to saturate? The answer is that *that*-clauses *do* move, but only to one very specific place—one that allows them to compose semantically. I will show in §4.1 that further movement is blocked, preventing *that*-clauses from alone topicalizing or moving to subject position (3). CP proforms, on the other hand, invoke none of this complexity. They semantically saturate and move like normal arguments. The contrasting behaviour of *that*-clauses and CP proforms with respect to nominalization and movement is thereby connected.

The proposal makes a number of independent predictions that are borne out, including reconstruction effects, extraction possibilities, and properties that distinguish *that*-clause complements from other ‘extraposed’ CPs (such as relatives) and heavy shifted NPs. Each of these predictions favors the complex remnant analysis and its consequences for semantic interpretation.

First, however, I make the case for a predicative treatment of CPs.

2 The semantic type of *that*-clauses

We usually think that the clausal complements of verbs like *believe* and *mention* denote propositions. In one useful tradition, propositions are sets of possible worlds (type $\langle s,t \rangle$). And indeed the standard treatment of the propositional attitudes (Hintikka 1969) encourages translating CPs into propositions, so construed.

That view is too simple. I will argue that *that*-clauses must denote something *related* to propositions, but not propositions *per se*. What is required is recovering a set of worlds from individuals with propositional content. Consider the following kinds of copular sentences, first broached by Higgins 1972:

(17) The idea/myth/story/rumor/fact is that Bob is a fraud.

As Potts 2002 points out, the predication here is *equative*: what the DP subject denotes, so too the CP. Now if the CP denotes a proposition, a set of possible worlds, then the DP subjects would have to denote propositions too. But literally equating ideas and stories with propositions cannot be correct.⁷ Stories can be long and boring. But propositions can't be. Rumors can be mean; they can be spread by people. But you can't spread sets of possible worlds, nor can worlds be mean. Myths can be old and Greek; ideas can be new and exciting. None of these is something that a proposition can be. The CP in (17) does not denote a proposition.

What *do* content nouns like *myth*, *story*, and *rumor* denote? They denote individuals, but of a special sort. They are individuals with propositional content, variables of which I subscript as x_c (see Moltmann 2013 for related and detailed discussion of these issues). They are things that can be mean, old, long and stupid and yet still carry propositional content.

(18) $\llbracket \textit{idea} \rrbracket = \lambda x_c \lambda w. \textit{idea}(x_c)(w)$

Given the identity expressed by (17), then it follows that *that*-clauses must denote something similar. Kratzer (2006) suggested that *that*-clauses are predicates that spell out propositional content and that complementizers are the bridge from *things* with propositional content to propositions proper. The idea of projecting modal domains from individual “anchors”—events, situations, and individuals—has its roots in Hacquard 2006. Kratzer 2006, 2012, 2013 and Hacquard 2006 argue for a “content mode” of projection, which requires anchors that have information content, like rumours, ideas, and even mental states.⁸ The content mode of projection involves the function *CONT*, which takes such a contentful individual at an evaluation world and returns a set of possible worlds compatible with the information content of that individual (19a). Kratzer 2006 suggests that the complementizer *C* houses this function (19b): *C* takes a proposition p , a content argument x_c and the usual world argument and identifies p as the propositional content of x_c .⁹

⁷I thank Angelika Kratzer (p.c.) for teaching me this argument.

⁸Kratzer 2012 presents evidence that modals like German *sollen* call upon an *informational conversational background*, which invokes the propositional content of information sources like rumors, etc.

⁹The individual argument in factives corresponds to a fact, from which a proposition is projected. Giving a formal extension of the proposal to knowledge ascription would take us to far

- (19) a. $\text{CONT}(x_c)(w) = \{w' : w' \text{ is compatible with the intentional content determined by } x_c \text{ in } w\}$ (after Kratzer 2013, 195(25))
 b. $\llbracket C \rrbracket = \lambda p \lambda x_c \lambda w [\text{CONT}(x_c)(w) = p]$ (after Kratzer 2006)
 c. $\llbracket \text{that Bob is a fraud} \rrbracket = \lambda x_c \lambda w. \text{CONT}(x_c)(w) = \lambda w'. \text{Bob is a fraud in } w'$

(19c) describes individuals whose content is that Bob is a fraud.¹⁰ This approach gives the correct result for the copular case in (17), where the (type *e*) subject DP is predicated of the $\langle e, st \rangle$ -type CP (taking *be* as vacuous).

- (20) $\llbracket \text{the idea is that Bob is a fraud}(w) \rrbracket =$ (Kratzer 2006, 4(11))
 $\lambda w [\text{CONT}(\iota x_c \text{idea}(x_c)(w))(w) = \lambda w'. \text{Bob is a fraud in } w']$

Now if *that*-clauses are predicates, this offers a natural extension to cases where the CP is a complement of a content noun as in (21). Both the CP and the content noun are type $\langle e, st \rangle$. They compose by Intensional Predicate Modification.

- (21) $\llbracket \text{idea that Bob is a fraud} \rrbracket =$
 $\lambda x_c \lambda w [\text{idea}(x_c)(w) \ \& \ [\text{CONT}(x_c)(w) = \lambda w'. \text{Bob is a fraud in } w']]$

(21) denotes ideas whose content is that Bob is a fraud. This explains why *that*-clauses may combine with nouns like *idea*, which don't take any arguments, as shown in (13) (e.g. **the idea of that*).

The natural question, of course, is whether *that*-clauses elsewhere have the same type. I am going to show that they do, even when they complement verbs—a non-trivial consequence. To get there we start with nominalizations. Just as with content nouns like *story* and *idea*, nominalizations derived from clause-taking verbs can be equated with *that*-clauses:

- (22) His explanation/claim/belief/suspicion/remark was that Fred was a fraud.

These examples tell us quite a bit about the meaning of their underlying verbs. As with non-derived content nouns, we don't want to equate these nouns directly with propositions. Explanations can be long and boring; claims can be bold; remarks can be mean or stupid. Propositions—construed as sets of possible

afield (see Kratzer 2002). The existence of constructions like *John regretted the fact that p*, warrants the inclusion of factives in the story I am telling.

¹⁰The content *is* the associated proposition. This ensures that further propositions cannot be added since they would be identified. Outside of mathematical statements, for which a possible worlds semantics has difficulty anyway, this correctly prevents “stacking” CP complements to nouns. A reviewer suggests that ‘stacked’ CP complements may be acceptable: *John's report that it's raining that he couldn't go*. If so, this must involve asyndetic coordination of propositions below C. A reviewer also points out that a plural content noun can associate with distinct propositions: *the rumours that John is sleeping and that Mary is working*. Something similar happens with *pictures of John and Mary*, on the interpretation where no picture has both John and Mary in it. Whatever explains this will extend to CPs.

worlds—can be none of these. *Explanation, belief* and so on must denote *things* with propositional content.

How do nominalizations of clause-taking verbs come to denote predicates of things with propositional content? As Grimshaw (1990) detailed, nominalizations describe a range of things: events (*the constant destruction*) or results (*the widespread destruction*). One variant of the result nominal is an ‘object nominalization,’ where the nominalization describes the thing that the parent verb’s object does. This is demonstrated by the equative relation in the (ii) examples below.

- (23) a. (i) I assigned Fred to fix the sink.
(ii) Fred’s assignment was to fix the sink.
b. (i) Sue loved Edna.
(ii) Sue’s great love was Edna.
c. (i) Bob offered just one candle.
(ii) Bob’s offering was just one candle.

Likewise, a large swath of clause-taking verbs (including factives and Cattell’s stance verbs) form object nominalizations (Higgins 1972, p.242, Stowell 1981, p.199):¹¹

- (24) a. (i) He admitted that he was stealing.
(ii) His admission was that he was stealing.
b. (i) I regret that I will be left out.
(ii) My only regret is that I will be left out.
c. (i) I believe that Edna was stealing.
(ii) The belief is that Edna was stealing.
d. (i) Andrea guessed that Bill was lying
(ii) Andrea’s guess was that Bill was lying.
e. (i) John claimed that he would go.
(ii) John’s claim was that he would go.
f. (i) Paul explained that he was temporarily insane.
(ii) Paul’s explanation was that he was temporarily insane.
g. (i) I know that they were hands off until they were “debriefed”...
(ii) My limited knowledge of returning missionaries was that they were basically hands off until they were “debriefed”...
(<http://exmormon.org/phorum/read.php?2,149729,149729,quote=1>)

Crucially, clause-taking verbs of various sorts select content nouns as objects:

¹¹Nominalizations of verbs like *prove* are often cited as counter-examples (Safir 1985). *Proof* is a “subject” nominal. It describes the thing that does the proving. We will see evidence, however, from aktionsart diagnostics that *proof* is not an argument-taking noun, and therefore its CP complement is not an argument. Whether a CP can be post-copular depends on a variety of idiosyncratic characteristics of the noun.

- (25) a. He believed the mean rumor
 b. I understood your silly idea.
 c. Sue claimed something false.
 d. I accepted/admitted/confirmed/mentioned his position/idea/claim.

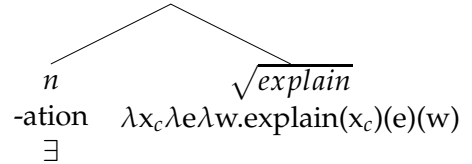
And this is why when clause-taking verbs form object nominalizations, they refer to things that have propositional content. So while we typically think of these verbs as selecting propositions, the nominalization facts force a move to *things* with propositional content (see also Chierchia 1984). (Of course, this doesn't preclude the possibility that these verbs may also select for propositions. But the objects in (25) show that these verbs must at least select for individuals with propositional content. In the the next sections, I will generalize.)

To make the proposal concrete, I assume roots may have an internal argument and an event(uality) argument (type *l*), which includes states and events proper. The external argument is added by a separate head, *v* (Chomsky 1995, Kratzer 1996).¹²

$$(26) \llbracket \sqrt{\text{explain}} \rrbracket = \lambda x_c \lambda e \lambda w. \text{explain}(x_c)(e)(w) : \langle e \langle l, st \rangle \rangle$$

I associate nominalizing morphology *-ation/ment* with the categorizing head *n* (Marantz 2001). In object nominalizations the eventuality argument is existentially closed off (Salanova 2010). We might associate this closure with the nominalizing morphology and give \exists the the denotation in (27). When the root in (26) nominalized it denotes things explained (28).

$$(27) \llbracket \exists \rrbracket = \lambda P \lambda x \lambda w. \exists e [P(x)(e)(w)] \quad (28) \text{ nP: } \lambda x_c \lambda w. \exists e [\text{explain}(x_c)(e)(w)]: \langle e, t \rangle$$



This derived nominalization can be equated with a CP just as non-derived nouns can (20), deriving the sentences in (22).

The analysis naturally extends to the clausal complements of derived nouns:

- (29) (I was taken aback by) his admission/belief/guess/explanation/knowledge/proposal/statement/hope/conviction that Sue was a fraud.

¹²On this proposal, attitude verbs are defined as (25), where the attitude holder is recovered via the eventuality argument (Anand and Hacquard 2009). I will return to how this captures the semantics for a verbal attitude report with a CP complement in footnote 24.

(i) $\llbracket \text{believe} \rrbracket = \lambda x_c \lambda e \lambda w. \text{Dox}(\iota x [\text{Holder}(x)(e)(w)])(w) \subseteq \text{CONT}(x_c)(w)$
 $\text{Dox}(\iota x [\text{Holder}(x)(e)(w)])(w) = \{w' : w' \text{ compatible with what } x \text{ believes in } w\}$

As with non-derived content nouns, Kratzer (2006) suggested that the CP combines with nominalizations by predicate modification. What is the evidence for this? This is a tougher case to make. These kinds of examples have been debated since Stowell 1981, who claimed that such CPs were not arguments but phrases in apposition to the noun. Stowell's analysis has been targeted by Safir 1985 and by Ogawa 2001 and Pesetsky and Torrego 2002. In the next section, I will show that the present analysis does make the right prediction, once diagnostics for argument-taking nouns are clarified.

2.1 Extension to Clausal Complements (of nouns)

A nominalization can describe the eventuality that its counterpart verb does, in which case it takes arguments. These are *Argument Structure Nominals* (ASNs). Another kind of nominalization creates *Non-Argument Structure Nominals* (NASNs), which describe a variety of things related to the verb. We've already encountered one type of NASN, the object nominal (e.g. *a belief, an assignment*). Grimshaw's discovery was that ASNs have more verbal characteristics than NASNs. One such characteristic is the ability to take aktionsart modifiers. Nominalizations can exhibit the same aktionsart distinctions as their associated verb phrases (Vendler 1967, Dowty 1979). Like *destroy, destruction* with a definite object is telic; *observe/observation* is only atelic. Crucially, as (32) shows, the aktionsart modifier requires the internal argument.

- (30) a. The Romans destroyed the city in three hours/*for three hours.
 b. The doctor observed the patient for three hours/*in three hours.
- (31) a. The total destruction of the city in two days/*for days appalled everyone.
 b. Only observation of the patient for several weeks/*in several weeks can determine the most likely course of action. (Grimshaw 1990:58(28b/29b))
- (32) a. *The total destruction in two days was widespread.
 b. *Only observation for weeks can determine the best course of action.

According to this diagnostic, CP-taking predicates cannot form ASNs—even in the presence of a CP complement. Grimshaw's minimal pair with DP- vs. CP-taking *observe/ation* illustrates the contrast.

- (33) a. We observed the butler for several weeks.
 b. Observation of the butler for several weeks is needed.
- (34) a. They observed that the butler was likely the killer for several weeks.
 b. *Their observation that the butler was likely the killer for several weeks was not supported by evidence.

The use of *observe* that takes a clause forms only an NASN. This is an entirely systematic property of CP-taking predicates when nominalized (35)–(39).

- (35) a. I decided that he was a fraud *in 5 minutes*.
 b. *my decision that he was a fraud *in 5 minutes*
 c. *my decision *in 5 minutes* that he was a fraud
- (36) a. John proved that he was competent *in only a few minutes*.
 b. *John's proof that he was competent *in only a few minutes*
 c. *John's proof *in only a few minutes* that he was competent
- (37) a. I explained *in under an hour* that I was innocent.
 b. *my explanation that I was innocent *in under an hour*
 c. *my explanation *in under an hour* that I was innocent
- (38) a. John claimed *for years* that the earth was flat.
 b. *John's claim *for years* that the earth was flat
- (39) a. John demonstrated that he was a skilled pianist *in just a few short minutes*.
 b. *John's demonstration *in just a few minutes* that he was a skilled pianist

According to aktionsart diagnostics, then, clause-taking nouns do not form ASNs.

I should pause here to address another diagnostic for ASNs. Grimshaw claims that singular ASNs may be modified by *frequent* and *constant* (40). NASNs must be plural (41) to take these modifiers.

- (40) The constant assignment of unsolvable problems is to be avoided. ASN
- (41) a. Frequent/constant assignments annoyed the students. NASN
 b. *The constant assignment is to be avoided. NASN

Pesetsky and Torrego (2002, ft.22, (ii)–(iii)) offer (42) as evidence that CP-taking nouns form ASNs: *claim* accepts *frequent/constant* and requires its CP complement.

- (42) His frequent/constant claim *(that he was about to resign annoyed us).

It turns out, though, that *frequent* and *constant* are just not good diagnostics for ASNs. In fact, Grimshaw herself noted the NASN in (43a) modified by *frequent*. Other examples are easy to find.

- (43) a. Only frequent examination by the doctors kept John healthy. (Grimshaw 1990: 178 ft 1.)
 b. More frequent demonstration is required.
 c. The constant construction next door will bother me.
 d. Frequent change is necessary if you want to stay competitive.

We must recognize in (43) members of a third type of nominalization identified by Grimshaw: *simple event nominals* (SENs) (Borer 2003, Alexiadou 2009). SENs describe the same eventuality as their verbal counterparts do,¹³ but they do not

¹³SENs should be distinguished from result nominals, which denote a resulting eventuality. For instance, the result interpretation of *construction* can refer to a mass of buildings, but the SEN in

take arguments (44).

- (44) a. His demonstration was too long. SEN
b. The construction lasted for years. SEN
c. Change takes a long time. SEN

Correlatively, SENs do not accept aktionsart modifiers:

- (45) a. *Construction for/in five months lasted a long time. SEN
b. *Observation for several weeks is required. SEN
c. *Examination by the doctors for hours kept John healthy. SEN

SENs are a subtype of NASNs. Nonetheless, as (43) shows, SENs *can* be modified by *frequent* and *constant*.

What about Pesetsky and Torrego's (42)? If this really involves an SEN, why should the CP be obligatory? What makes SENs good with *frequent/constant* has to do with how available the context makes the internal argument. This is true, I think, for Grimshaw's (43a). And as long as there is proposition in a preceding discourse, Pesetsky and Torrego's examples improve, even without a CP complement:

- (46) A: The constant belief that someone is trying to poison you is a sure sign of insanity, don't you think?
B: Yes, that/such a constant belief is a sure sign of insanity.
- (47) Don't forget that the liberals still claim that it was the fault of all the idiots that voted for him. That constant claim by the liberals still sticks in my mind. (<http://www.freerepublic.com/focus/f-news/1627062/posts>)

CP-taking nouns can form SENs, but as with object nominalizations, SENs do not take arguments like verbs or ASNs do (see footnote 11 on *proof*).

To summarize, clause-taking nouns do not form argument structure nominals. That means that their CP complements cannot be arguments. They must combine in some other way, and that is exactly what the predicative analysis of *that*-clauses predicts. The clause-taking root forms a (non argument taking) object nominalization (type ⟨e,st⟩, (28)) which combines with the CP by predicate modification just like non-derived nouns (21). More evidence for this idea can be found elsewhere, including syntactic evidence from reconstruction effects in Moulton 2013, which shows that CP complements of nouns may bleed Condition C in the way that modifiers do (cf. Riemsdijk and Williams 1981, Freidin 1986).

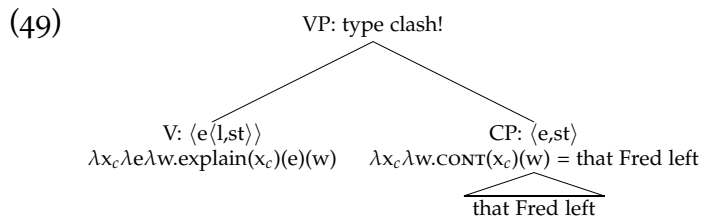
CP-proforms, on the other hand, do serve as arguments. That's why they cannot combine with non-argument taking nouns/nominalizations. They saturate, which suggests that they are type *e* (individuals with propositional content).

(43c) refers to events of constructing.

If they combine by Function Application with a NASN, this returns a proposition, not the semantic type of a common noun, and they are therefore ruled out.

- (48) a. *the claim/belief/guess/explanation so.
 b. $\llbracket \llbracket [_{NP} \text{ explanation so }] \rrbracket \rrbracket = \lambda w \exists e. \text{explanation}(\text{so})(e)(w) : \langle s, t \rangle$

Nominalization has taught us something very important about *that*-clauses: they don't saturate, but CP proforms do. The explanation I've offered here gives to *that*-clauses a predicative semantic type. This conclusion, of course, has implications for CP complements of verbs. If clause-taking verbs select for terms of type *e* (individuals with propositional content), and we limit ourselves to standard modes of composition, *that*-clauses will not combine with verbs.¹⁴



At this point, one can imagine many possibilities. Maybe clause-taking verbs select propositions after all? That seems unlikely at this point given the above evidence: the kinds of object nominalization clause-taking verbs form suggest that their internal arguments denote individuals with propositional content. Furthermore, the null hypothesis is that *that*-clauses have a uniform denotation across environments.¹⁵ One temptation, of course, is to shift the denotation *that*-clauses when they serve as verbal complements. Maybe a null determiner lowers a *that*-clause to type *e*. That's not the right solution, though, since it will neutralize the category difference between DP and CP complements. Basic facts about the dis-

¹⁴Chung and Ladusaw (2004) argue for a mode of composition, *Restrict*, which combines these very types. Indeed, this was the route Kratzer (2006) initially took to compose V and her CPs. Here I take a different route—movement—which I believe is worth exploring for its syntactic predictions. Needless to say, Kratzer's (2006) conjecture about CPs should be kept distinct from the syntactic claims about it I alone am making here.

¹⁵The distribution of null complementizers is often used to separate CP complements of V and A from N (Stowell 1981, Pesetsky and Torrego 2002). But naturally-occurring examples of CP complements of N with null Cs are plentiful:

- (i) a. The fact there was no bus made it more acceptable.
 (www.csnchicago.com/pages/hawktalk)
 b. ...in the belief he was buying a kilo of skunk cannabis
 (www.bedfordshire.police.uk/.../280610_luton_drug_deal.html)

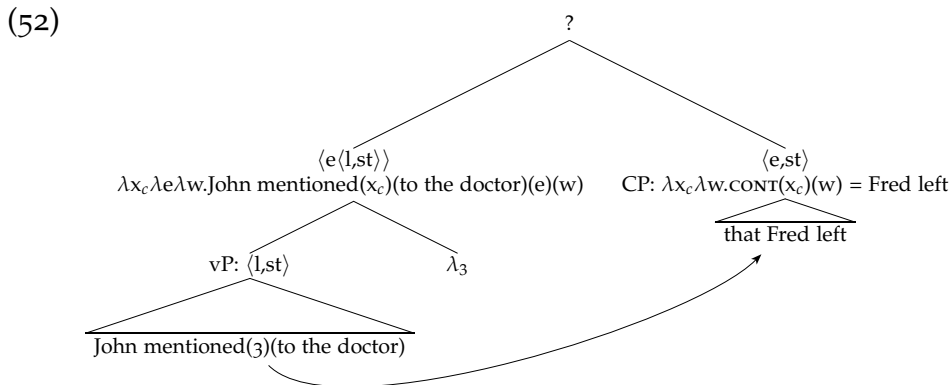
Judgments are variable here, which contrasts sharply with the obligatory nature of *that* in sentential subjects (**(That) Sue left surprises me*). In distinguishing sentential subjects on the one hand from complements of N, V and A on the other, the present proposal divides the phenomena in the right place.

tribution of *that*-clauses militates against treating them covertly as DPs (Emonds 1972):

- (50) a. *John complained/boasted/agreed/convinced me that.
 b. John complained/boasted/agreed/convinced me that Fred left.
- (51) a. Sue is aware (*of) that Fred left.
 b. Sue is aware of that fact.

Another option would be to shift the verb, so as to take a property-type complement (see e.g. Carlson 1977, Geenhoven 2000). But I don't know of any evidence for this. In fact, there is little semantic evidence here on which to conclude what compositional mechanism is at work.

Here we must look toward the syntax. The grammar offers another way to resolve type mismatches: movement. And there is plenty of syntactic evidence that clausal complements do undergo a little movement. As noted in the introduction, complement clauses (obligatorily) extrapose rightward, which in German (15) puts the CP on the right side of the verb. The order of complements in English also suggests that CPs move rightwards (Stowell 1981). Perhaps this movement resolves the type clash? CP extraposition could leave a trace (the index '3' below) that denotes an individual with propositional content, type *e*, which saturates the verb.¹⁶



While this resolves the type-clash in the complement position; it creates another one. In its landing site, the CP is sister to a node of the same type as the verb root, which created the type-clash in the first place. So, movement of the *that*-clause will not alone resolve the type clash.

Over the last decade and half, it's been argued that the syntactic derivations that position CP complements are more complex. Clausal complements indeed move, but leftward, followed by remnant movement of the verb phrase. In the next section I am going to review the evidence for this syntax. Then we will

¹⁶See Heim and Kratzer 1998 for this method of interpreting movement.

see that such movements actually resolve the type-clash too. The strength of the proposal lies in the way the syntax and semantics corroborate each other.

3 A remnant analysis of CP complements

The salient fact about CP arguments is that they appear in a position distinct from other complements. Stowell (1981) shows this for English by restricting our attention to the order of complements in gerundives.¹⁷ CP arguments, unlike DPs, must appear after other arguments (53) and verbal modifiers (54).

- (53) a. Did [Sally's mentioning to the doctor that there will be a problem] surprise you?
 b. *Did [Sally's mentioning that there will be a problem to the doctor] surprise you? (Stowell 1981, 109(12))
- (54) a. Did [Sally's saying quietly that there will be a problem] surprise you?
 b. *Did [Sally's saying that there will be a problem quietly] surprise you?

CPs must appear after extraposed relatives, too (55).

- (55) a. Sally convinced [_{Rel} a man who could fix the problem] of coming.
 b. Sally convinced a man_i of coming [_{Rel} who could fix the problem]_i.
 c. Sally convinced [_{Rel} a man who could fix the problem] that he should come.
 d. *Sally convinced a man_i that he should come [_{Rel} who could fix the problem]_i.

As mentioned, in OV languages the asymmetry between CP and other complements is even more striking (on Farsi see Farudi 2007, for Hindi see Subbarao 1984). As many have pointed out, however, rightward extraposition cannot be responsible for positioning clausal complements. Extraposition should render a phrase opaque to extraction, and yet clausal complements are nonetheless transparent for extraction in English, and in German (56).

- (56) (Ich weiß nicht) wen₁ er gesagt hat [_{CP} dass Claudia t₁ geküßt hat]
 I know not whom he said has that Claudia kissed has
 'I don't know who he said that Claudia has kissed' (Müller 1998: 145(58a))

Under some circumstances, CPs can appear to the left of the verb, but here they are opaque for extraction (57).

- (57) *(Ich weiß nicht) wen₁ er [_{CP} das Claudia t₁ geküßt hat] gesagt hat.
 I know not whom he that Claudia kissed has said has

¹⁷For independent reasons, gerundives appear to block further rightward shift and so reveal a more faithful picture of the base order of complements (Stowell 1981).

'I don't know who he said that Claudia has kissed'(Müller 1998: 146(58b))

Furthermore, Webelhuth (1992, p.107) reports that CPs in this sentence-internal position show the tell-tale signature of the DP Requirement, meaning that what's moved is not a CP but a DP. Not only does the contrast between (57) and (56) cast doubt on extraposition, it highlights that the rightward position of CPs cannot be due to pressures against centre-embedding alone.

Binding effects cast further doubt on rightward extraposition (Zwart 1993, cf. Buring and Hartmann 1997). Datives in the matrix clause c-command into CP complements, binding variables binding and creating Condition C violations:

- (58) a. weil der Direktor [jeder Putzfrau]_i persönlich mitteilte [daß sie_i
because the director each cleaning-lady personally told that she
entlassen sei]
fired was
'...because the director told each cleaning lady personally she was fired.'
b. *weil der Direktor ihr_i persönlich metteilte [daß die Putzfrau_i
because the director her personally told that the cleaning-lady
entlassen sei]
fired was
'...because the director personally told her_i the cleaning lady_i was fired.'
(Bayer 1995: 56(17a,b))

Zwart 1993 and others working in an antisymmetry framework (Kayne 1994) take the extraction and binding facts to support the Base Analysis, which strands the CP in complement position (assuming a VO base) and moves other arguments left of the verb. But the Base Analysis analysis cannot be quite right either. For one, CPs follow higher verbal heads, like auxiliaries:

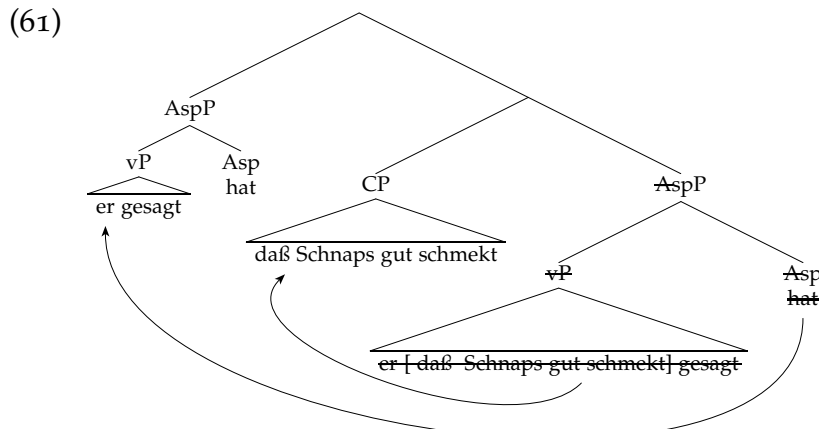
- (59) a. ...weil er gesagt hat [_{CP} dass Claudia Hans geküßt hat].
...because he said has that Claudia Hans kissed has
b. *...weil er gesagt [_{CP} dass Claudia Hans geküßt hat] hat.
...because he said that Claudia Hans kissed has has

Hinterhölzl 1999 provides a strong empirical argument for an alternative derivation that involves leftward movement of the CP out of its selecting phrase, followed by remnant movement of that phrase (see also Koopman and Szabolcsi 2000, p.136–137, for Dutch). Hinterhölzl shows that this is the only way to accommodate the following pattern with CP complements of adjectives in German.

- (60) a. ohne [_{AP} froh] zu sein, dass der Hans nicht kam.
without happy to be that the Hans not came
'without being happy that Hans did not come'

- b. *ohne [froh dass der Hans nicht kam] zu sein.
 without happy that the Hans not came to be
 (Hinterhölzl 1999: 101(25))
- c. [[_{AP} froh t_{CP}] zu sein [_{CP} dass der Hans nicht kam] [t_{AP}]]

Hinterhölzl first argues that the position of the adjective in (60a) is a result of AP movement to the left of the infinitival marker *zu*. But the CP cannot front with the AP (60b). This is unexpected on the Base Analysis. The only derivation that can produce (60a)—aside from a rule of rightward extraposition which we saw was inadequate for other reasons—is a remnant analysis, as shown in (60c). The CP must be forced to evacuate the AP before the latter fronts. Hinterhölzl was assuming that ‘sein’ selects the AP to its right, and the surface order is derived by AP movement. We don’t need to adopt antisymmetry assumptions like these to appreciate why remnant movement is needed. Assuming, as I will hereon, that the German VP is right-headed, (60a) must involve leftward movement of the CP out of the *sein*-phrase, followed by remnant movement of [t_{CP} *froh zu sein*]. Extending this to (59a), the remnant that moves leftward must be larger than the verb phrase. I identify it below as Aspect Phrase.



Somewhat similar derivations for CP complements have been advocated in Kayne 2005. In the next section I am going to add another piece of evidence from English to support this remnant movement.

3.1 Further evidence for a remnant analysis of CP position

CP complements, unlike other truly extraposed constituents, have an effect on the verb phrase that is unexpected if CP complements remained in situ or merely extraposed rightwards: they prevent P-stranding from within the VP they move out of (62) (Wexler and Culicover 1981, Stowell 1981).¹⁸ Heavy NP-shift has the

¹⁸These examples were first cited as one kind of violation of the *Clause Nonfinal Incomplete Constituent Constraint*, Kuno 1973, 381.

same effect (63).

- (62) a. *Who did you say to that I would buy the guitar?
b. *Who will Andrew disclose to that he is married? (Stowell 1981: 208(177))
- (63) a. *Jim, I said to a few words about his workmanship.
b. *Who will he disclose to his marriage with Jane? (Stowell 1981: 211(185))

Compare with pied piping (64a) and indirect objects (64b):

- (64) a. To whom did you say that I would buy the guitar?
b. Whom did John tell that he would buy the guitar?

However, unlike *that*-clause complements and HNPS, CP-extrapolation from NP—of either complements or relatives—does not produce the P-stranding effect (Drummond 2009):

- (65) a. Who did you give the impression to [_{CP} that you were happy]?
b. Who did you give the book to [_{CP} that Mary wanted]?

All of this suggests that the kind of syntax that positions *that*-clauses must be similar to HNPS, not CP extraposition from NP. So this is yet more evidence against the extraposition of CP complements. Moreover, the syntax for HNPS and CPs must be responsible for the P-stranding constraint. One account of HNPS that may offer a purchase on the P-stranding constraint is den Dikken 1995's remnant movement analysis, in which the heavy-shifted DP moves leftward, followed by remnant verb phrase movement:

- (66) I gave to John all the books in the library.
[[gave t_{DP} to John]_{VP} [[all the books in the library]_{DP} t_{VP}]]

This is, of course, a derivation nearly identical to that proposed by Hinterhölzl (1999) for CPs. It seems reasonable, then, to think that VP/AspP movement is responsible for the P-stranding constraint. While the true source of the P-Stranding constraint deserves more space than I can afford it here, I want to sketch why remnant movement should be held responsible, and therefore why these data serve as further evidence for the remnant account for CPs. Relevant here is the fact that if the PP follows the shifted NP or *that*-clause, stranding is improved, especially if P is emphasized.

- (67) a. ?Who did you say, after the speech, that I would buy the guitar TO ___?
b. *Who did you say to ___, after their speech, that I would buy the guitar?
- (68) a. Who should he not send at any point a book of poems TO ___?
b. *Who should he not send to ___ at any point a book of poems?

I take (67) and (68) as showing that P-stranding is possible if the PP itself “extraposes” (using that term just descriptively now). German confirms that extraposed PPs are indeed transparent for extraction (69a), as they are *in situ* (69b).

- (69) a. Wo_1 hat keiner t_2 gerechnet [$_{PP}$ t_1 mit] $_2$?
 what has no-one counted with
 b. Wo_1 meinst du [$_{CP}$ t_1 dass keiner [$_{PP}$ t_1 mit] gerechnet hat]
 what think you that no-one with counted has
 (Müller 1998: 151(68, 70))

(The transparency of “extraposed” phrases will again be important when we turn to the transparency of CPs in §5.) On the remnant account of HNPS and CPs, the VP/AspP moves leftward. Extraction is not possible from the remnant VP/AspP; but it is possible from the PP only if that PP first escapes the remnant:

- (70) Who_1 did you [[$_{AspP}$ say t_{PP} t_{CP}] [[$_{CP}$ that I would buy the guitar] [$_{PP}$ to t_1] [t_{AspP}]]]

The surface effect is extraction from an extraposed PP (67)–(68).¹⁹ How does this explain the P-stranding effect in (62)? The question is why a *wh*-DP can’t by itself first undergo HNPS out of AspP (before AspP fronts), stranding P and deriving (62), as in (71).

- (71) * Who_1 did you [[$_{AspP}$ say to t_1 t_{CP}] [[that I would buy the guitar] t_1 [t_{AspP}]]]

Well here the other, more famous P-stranding constraint connected with HNPS is relevant. HNPS cannot strand prepositions (Larson 1988):

- (72) *We talked to about Joan’s problems all of her teachers.

The source of this famous restriction remains unknown (see Drummond et al. 2010 for recent discussion). For present purposes it is enough to see that the P-stranding constraint in (62)/(63) can be reduced to the one in (72)—both involve stranding P in a VP that undergoes further movement. Only the remnant analysis allows for this kind of unified account. When a *wh*-phrase undergoes HNPS but does not strand a P, then it may continue to move leftward. This is exactly what we find with indirect objects (64b).²⁰ We further predict that if the *wh*-word does not use HNPS to first escape the remnant VP, we won’t get a P-stranding violation. As a reviewer points out, (73) is an improvement over (62):

¹⁹The following derivation needs to be ruled out. If PP scrambles in front of CP, followed by subsequent remnant AspP movement, then incorrectly derived is (62). I suspect this derivation is grammatical but processing (late closure) makes it difficult to parse the PP outside AspP.

²⁰This derivation needs to be blocked in more familiar cases of VP fronting in German, where *wh*-movement is not possible from scrambled VPs. The obvious difference is the type of VP movement involved. See Müller 1996 on constraints of this nature.

(73) ?Who did you say to the brother of that you would buy the guitar?

Here the movement that lets the *wh*-word escape the remnant cannot be HNPS—it's embedded within the DP *the brother of*. So we don't expect the P-stranding constraint to apply here. In sum, not only does giving CPs and HNPS the same derivation make sense, the remnant derivation may help capture the P-stranding effects exhibit by both.

P-stranding provides more evidence for likening HNPS and *that*-clauses. As with heavy shifted DPs (72), *that*-clauses in English can never be selected by prepositions:

(74) We insisted (*on) that John come.

Since *that*-clauses must undergo remnant-creating movement to be interpreted and this remnant-creating movement cannot strand Ps, P will never be able to select *that*-clauses.

Pseudogapping provides a further argument. HNPS is one of the operations that licenses pseudogapping (75a) (Jayaseelan 1990). CPs can be the remnants in pseudo-gap constructions too ((75b) from Baltin 2003: 225(ft.6)).

- (75) a. Though John wouldn't suppress his anger, he would his fatigue.
b. Though John wouldn't complain that he's angry, he would that he's tired.

Complain doesn't select DPs (see §1), so it must be short CP movement that creates the elidable VP constituent deriving pseudogapping.

In summary, the syntactic evidence shows that when verbs take *that*-clause complements, both the CP and remnant verbal material moves leftward. And this analysis is preferable to the two plausible, but ultimately inadequate, alternatives for the placement of CP complements: the Base Analysis of Zwart and a classic rightward extraposition analysis (Koster 1978, Stowell 1981, Büring and Hartmann 1995). Since we have a target syntax, we can now return to the semantic composition. I am going to show that the remnant analysis resolves the type-clash identified in the last section, and ultimately will lead to an explanation for the problem we began with: why do *that*-clauses not move very far leftward.

4 How *that*-clauses fulfill the Projection Principle

When phrases move they can leave elements of a different semantic type. For instance, the quantifier in (76a) can leave a trace that denotes a bound variable. This is handled in the copy theory (76b) by Trace Conversion (Fox 2002).

- (76) a. Every square is not round.
b. ⟨every square⟩ is not ⟨every square⟩ round.

Trace Conversion replaces the quantificational determiner of lower copies with a definite determiner, *THE*, and then inserts a variable indexed with the moved term by way of an identity predicate that intersects with the denotation of the restrictor NP. The result is a trace-converted phrase of type *e*.

(77) Trace Conversion (Fox 2002)

- a. Determiner Replacement: $[_{QP} \text{ every square }]_1 \rightsquigarrow [_{QP} \text{ THE square }]_1$
- b. Variable Insertion: $[_{QP} \text{ THE square }]_1 \rightsquigarrow [_{QP} \text{ THE } [\lambda x.x \text{ is a square} \& \lambda y.y=1]]$

(78) a. Every square is not round.

- b. $\langle \text{every square} \rangle$ is not $\langle \text{every square} \rangle$ round. \rightarrow Det. Replacement
- c. $\langle \text{every square}_1 \rangle$ is not $\langle \text{THE square} \rangle$ round. \rightarrow Var. Insertion
- d. $\langle \text{every square}_1 \rangle$ is not $\langle \text{THE } x \text{ s.t. } x \text{ is a square and } x = 1 \rangle$ round.

Trace Conversion is designed for DPs. Now for those CPs that appear to leave DP category gaps (see §1), a trace conversion approach may be appropriate (Takahashi 2010). But as the pseudo-gapping example in (75) shows, *that*-clauses must be able to move a little and leave CP gaps. Moreover, CP proforms move (5) and they (or their associated CP null operators) do so in a way that is semantically interpreted to create an operator-variable chain (Potts 2002). So we must allow lower copies to denote variables without converting those lower copies to DPs. Category Neutral Trace Conversion (CNTC) in (79), modelled in part after Sauerland 2004, keeps the semantics of trace conversion without the commitment to category. A process of Quantifier Removal applies (if there is one). The second step coordinates how the index and restrictor combine.

(79) Category Neutral Trace Conversion (CNTC)

- a. Quantifier Removal: $[_{DP} \text{ every square }]_3 \rightsquigarrow [_{DP} \text{ square }]_3$
- b. Index Interpretation: $[_{DP} \text{ square }]_3 \rightsquigarrow [_{DP} 3 : 3 \text{ is a square }]$

(80) $\llbracket [_{DP} 3 : 3 \text{ is a square }] \rrbracket^g = g(3)$ iff $\llbracket \text{square} \rrbracket(g(3)) = 1$; undefined otherwise

The output of Index Interpretation is shorthand for the semantics, which interprets the index as a restricted variable (80) under an assignment function *g*. The net result is almost identical to standard Trace Conversion, but it does not carry commitments to syntactic category.²¹ The application of CNTC to *that*-clauses is straightforward (81), as is the resulting semantics (82).

(81) Category Neutral Trace Conversion applied to CPs

- a. Quantifier Removal (N/A)
- b. Index Interpretation: $[\text{that Bob is a fraud}]_3 \rightsquigarrow [3 : 3 \text{ is that Bob is a fraud}]$

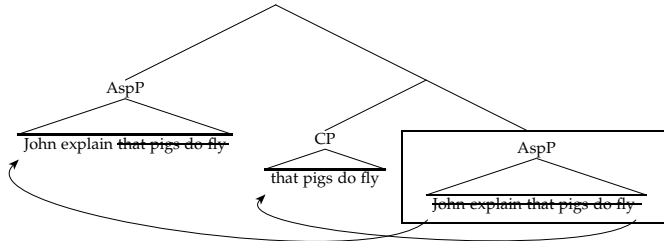
²¹The fact that trace conversion only applies to DPs is sometimes cited as a virtue; it ensures that VP fronting, for instance, is ‘semantically vacuous’ (Huang 1993). However, if a lower VP copy undergoes CTNC, it will denote a restricted event variable. This won’t let it compose with higher functional heads, which require properties of events (or times) not individual events.

(82) $\llbracket [_{CP} 3: 3 \text{ is that Fred left }] \rrbracket^g = g(3)$ iff $\llbracket \text{that Bob is a fraud} \rrbracket(g(3)) = 1$;
 otherwise undefined.

$\llbracket \text{that Bob a fraud} \rrbracket(g(3))(w) = 1$ iff $[_{\text{CONT}}(g(3))(w) = \lambda w'. \text{Bob is a fraud in } w']$

This means that when a CP moves leftward, its lower copy denotes in type e and saturates the verb (I return in the next section to why the type-repairing movement is overt). This constitutes the first component of the proposal. Recall though that this movement isn't enough to resolve a type clash (see (52)). But we learned that the syntax is more complex anyway. Aspect phrase moves, too (83).

(83)



To interpret this tree we must ask what the semantic pieces are. The head of AspP is the verbal functional head Viewpoint Aspect (Smith 1991), which is a quantifier over events. It locates the (running time of an) event with respect to a reference time t (Klein 1994). Here are some standard denotations for aspectual heads of different values (Kratzer 1998).²²

- (84) a. $\llbracket \text{perfect} \rrbracket = \lambda P_{\langle l, st \rangle} \lambda t \lambda w. \exists e [P(e)(w) \ \& \ \tau(e) < t]: \langle \langle l, st \rangle, \langle i, st \rangle \rangle$
 b. $\llbracket \text{perfective} \rrbracket = \lambda P_{\langle l, st \rangle} \lambda t \lambda w. \exists e [P(e)(w) \ \& \ \tau(e) \subseteq t]: \langle \langle l, st \rangle, \langle i, st \rangle \rangle$
 c. $\llbracket \text{imperfective} \rrbracket = \lambda P_{\langle l, st \rangle} \lambda t \lambda w. \exists e [P(e)(w) \ \& \ \tau(e) \supseteq t]: \langle \langle l, st \rangle, \langle i, st \rangle \rangle$

Since Aspect is a kind of quantifier, we should look to the behaviour of other overtly-moved quantifiers. Take *wh*-movement. A *wh*-word pied-pipes its complement but the semantics interprets the various pieces in different copies. This familiar profile of *wh*-movement, schematized below, accounts for the bound variable interpretation in (85).

- (85) Which book about him_i did John $_i$ read which book about him_i .
 a. $[_{DP} \text{Which book about } him_i]$ should nobody $_i$ read $[_{DP} \text{which book}]$ PF
 b. $[_{DP} \text{Which}] \lambda_1$ should nobody $_i$ read $[_{DP} 1 \text{ book about } him_i]$ LF

The quantificational *wh*-word is interpreted in the high copy, while its NP restrictor/complement is interpreted in the low copy (Chomsky 1995). That is, pied-piped constituents are interpreted as though they never moved (Stechow 1996).

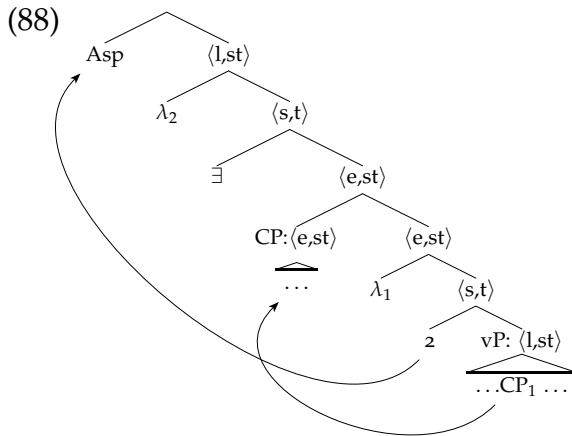
²²I must leave to future research the exact morphological spell-out of Aspect. I do not wish to suggest that the denotation for perfect above corresponds one-to-one with auxiliary *haben* in German, for instance.

Aspect movement has a similar profile. The vP is pied-piped with the Aspect head, but it is interpreted low. The Aspect head is interpreted high, binding a variable in the lower copy.

- (86) a. $[_{AspP} Asp VP] \dots [_{AspP} Asp VP]$ PF
 b. $[_{AspP} Asp] \lambda_{2l} \dots [_{AspP} 2l VP]$ LF

Consider, now, how such a structure is interpreted. Like a quantifier, Asp^0 leaves a low-type variable, which in its case denotes an event. This bound event variable can saturate the event argument slot of the vP, which returns a node of type $\langle s,t \rangle$. This is not an innovation: Hacquard (2006) and Kim (2007) argue for Aspect movement for independent reasons.²³ Now, we have seen that the syntax moves the *that*-clause to the position between the launching and landing site of AspP. Here it triggers predicate abstraction. Given that the event argument is saturated, this predicate abstraction will give the CP a sister of $\langle e,st \rangle$ —a node with which it can combine by predicate modification (88). I assume Existential Closure (EC) is available at the edge of verbal phrases (Diesing 1992) to close off the content argument x_c . I will implement EC as \exists , defined below:

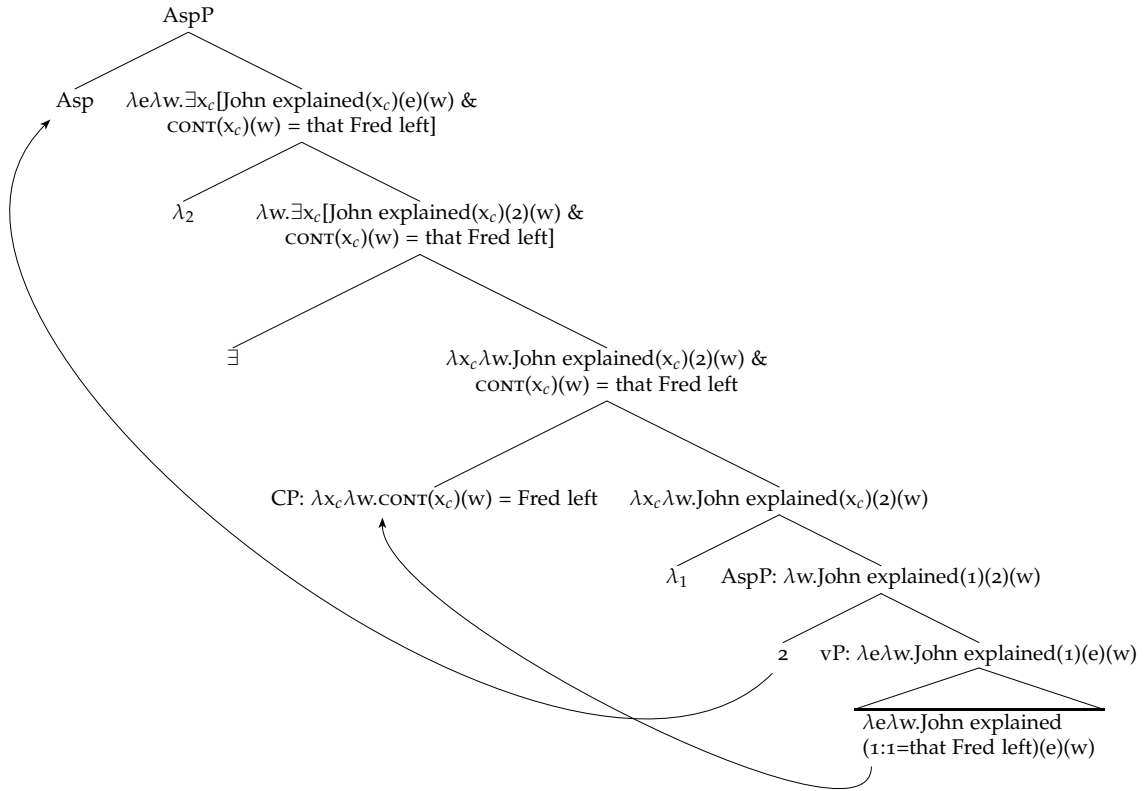
(87) $[[\exists]] = \lambda P_{\langle e,st \rangle} \lambda w. \exists x [P(x)(w)]$



A full composition is given in (89) (I omit the restriction of the lower CP copy for brevity in higher nodes).

- (89) John explained that Fred left

²³There have been similar claims about the semantic effects of head movement (Lechner 2006, Szabolcsi 2011). Stechow 2002, following Heim 2001, argues that attitude verbs are verbal quantifiers.



To recap, through two applications of movement (along with the attendant effects of CNTC and predicate abstraction), there is a node that denotes just the thing *that*-clauses can combine with. Essentially, we've created a noun meaning (a property) out of the verb phrase by "temporarily" saturating the vP's event argument. Copy theory allows one *that*-clauses to simultaneously compose in two different ways: one copy saturates the verb, as is required by the Projection Principle, and the other copy modifies a node of the same type, as is required by the basic type of *that*-clauses.²⁴ The type-clash is resolved, and in a way that is reflected in the overt syntax. Indeed, the fact that the movements resolve the type-clash provides a motivation for the remnant movement proposed by Hinterhölzl 1999. As with work that uses complex movements to derive word orders (Kayne 1994), Hinterhölzl's remnant account invokes movements whose motivation might be held suspect. The present remnant analysis, however, motivates the movements: they are type-driven.

I will next demonstrate how the account explains the apparent immobility of *that*-clause arguments, in comparison to other arguments including CP proforms.

²⁴The semantics of an attitude ascription remains standard (Hintikka 1969):

- (i) John believes that Fred left (evaluated at w_0)
 - (i) $\exists e \exists x_c [\text{Holder}(\text{John})(e)(w_0) \ \& \ \text{believes}(x_c)(e)(w_0) \ \& \ \text{CONT}(x_c)(w_0) = \text{Fred left}]$
 - (ii) $\text{Dox}(\iota x [\text{Holder}(x)(e)(w_0)])(w_0) \subseteq \text{CONT}(x_c)(w_0)$
 - $\therefore \text{Dox}(\text{John})(w_0) \subseteq \{w' : \text{Fred left in } w'\}$

4.1 Why *that*-clauses move no further

Recall that we began with a puzzle about the difference between *that*-clauses and CP proforms. The paradigm is repeated below.

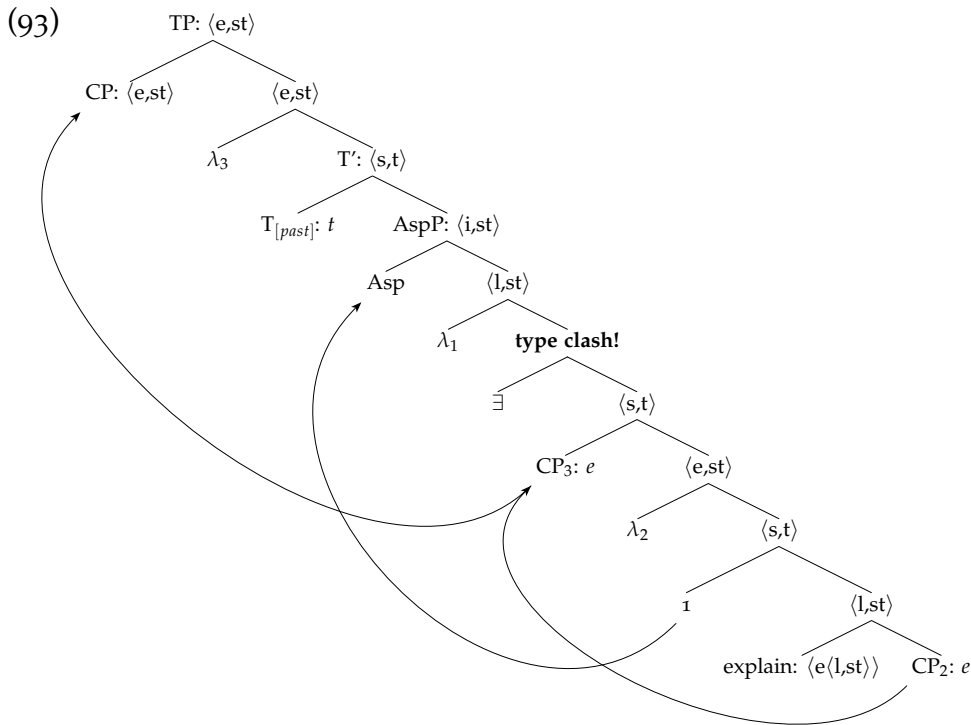
- (90) a. my insistence that John leave.
b. *my insistence so
- (91) a. *That John leave I insisted.
b. So you insisted.

The contrast in (90) has been explained by (i) the fact that clause-taking nouns only form non-argument structure nominals (NASNs) and (ii) the proposal that CP proforms saturate, while *that*-clauses modify, which allows the latter but not the former to combine with NASNs. Now I want to show how the movement contrast in (91) falls out from the same basic difference, coupled with the derivation proposed in (89). One ingredient is the well-documented fact that EC (shown as \exists in (89)) sits at the edge of the verb phrase (Diesing 1992). This explains why the *that*-clause moves only as low as it does; if it moved further, and didn't fall under EC, the composition would fail.²⁵

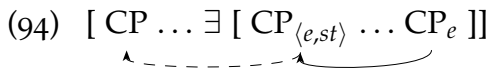
Further movement is ruled out, too. Take the derivation in (92), where the *that*-clause moves further to, say, Spec,TP. CNTC will convert the intermediate copy to type *e*. But this creates a type-clash, because it gives \exists (whose denotation I repeat below) a sister of the wrong type.

$$(92) \llbracket \exists \rrbracket = \lambda P_{\langle e, st \rangle} \lambda w. \exists x [P(x)(w)]$$

²⁵A reviewer asks why \exists is not available lower, i.e. just above V. It may well be, but that won't resolve anything here. Asp has to be merged and moved to derive something of type $\langle e, st \rangle$ for the CP to modify. This will force the CP higher than the merge position of Aspect.



There is one other derivation to consider, in which the CP undergoes semantically vacuous movement from this intermediate position. Semantically vacuous movement (sometimes described as movement that undergoes *total* or *radical reconstruction*) would allow the CP to move to subject or topic position, but be interpreted just below EC. (The dotted arrow indicates semantically vacuous movement.)



This derivation composes semantically, so what rules it out? For the record, this is a question that all accounts of CPs that I am aware of must face. To rule out semantically vacuous CP movement, Takahashi 2010 suggests the following general principle of economy: semantically vacuous movement is blocked for a phrase if that phrase can also undergo semantically non-vacuous movement. However, it's hard to reconcile Takahashi's idea with the fact that DPs can undergo both semantically vacuous and non-vacuous movement (think scope ambiguities with A-moved quantified DPs).

The present proposal, however, offers a natural way to approach the issue. It does so by appealing to the likeness between *that*-clauses and bare nominals (BNs). In semantic type, our *that*-clauses most resemble certain weak indefinites (see e.g. van Geenhoven and McNally 2005 on property-type indefinites). BNs often resist movement outside of existential closure. For instance, BNs in Italian can receive an existential interpretation in object position, but not subject position

(95).²⁶ Singular BNs in Catalan are possible as objects of certain verbs (96a), but they cannot be moved to subject position (96b).

- (95) a. Ho preso acqua dalla sorgente.
I took water from the spring.
b. *Acqua viene giù dalle colline.
water comes down from the hills. (Longobardi 1994: 616(14))
- (96) a. M'acabo de comprar cotxe.
REFL.finish.1ST of buy car
b. *Pis ha estat comprat.
apartment has been bought (Espinal and McNally 2011: 101(26a),(29a))

If these BNs get their existential interpretation by being interpreted below \exists , then they must be prevented from undergoing semantically vacuous movement outside of \exists .²⁷ The cross-linguistic tendency for weak indefinites and BNs to stay low is one that Diesing (1992)'s Mapping Hypothesis exploited, e.g. scrambling of indefinites in Dutch and German. Of course, as we now know, a strong version of Diesing's program cannot be sustained: some weak indefinites do scramble (see e.g. Dayal 2004), and not all of Diesing's other evidence has held up. But there is nonetheless good evidence that semantically vacuous movement, just like QR, may be the more marked option. Invoking Szabolcsi 1997's motto that many languages wear their "their LF on their sleeves", Bobaljik and Wurmbrand 2012 have argued for a universal but violable constraint that requires a correspondence between scope and word order. This idea has been expressed in various ways, including Bobaljik 2002's *Minimize (LF:PF) Mismatch*, Diesing 1997's *Scope Principle*, and Bobaljik and Wurmbrand 2012's *Scope Transparency (ScoT)*. Bobaljik and Wurmbrand (2012) argue, in fact, that a language may vary from construction to construction in whether *ScoT* can be violated in service of other constraints. From this perspective, in the absence of mitigating factors the behaviour of CPs is expected: they are interpreted where they are pronounced. In fact, we have seen corroborating evidence for this: the type-repairing movements that CPs undergo are overt (as

²⁶Focused (ia) and clitic left-dislocated (CLLD) (ib) BNs are possible:

- (i) a. ACQUA ho preso dalla sorgenti.
WATER I.have taken from the spring.
b. Studenti, ne ho molti
students of-them I.have many.
(Chierchia 1998: 384(73c))

I return below to the relevance for CPs of the CLLD examples.

²⁷One popular explanation for restrictions of this sort (Longobardi 1994 et. seq.) is that BNs are headed by null determiners which must be governed, hence not licensed in subject position. Espinal and McNally 2011 argue that this won't cover the Catalan cases: if there were a null D heading these complements, such BNs would be expected to appear freely as verbal complements, but this is not the case.

is AspP movement). Again, this fits the general, and expected picture from the cross-linguistic perspective, which favors overt movement to resolve type-clashes and prevents semantically vacuous movement.

CPs differ from English DPs in this respect, which can undergo semantically vacuous movement and can QR. The proposal, which likens CPs to weakly quantified arguments, nudges us closer to an explanation. It also reframes the question. From Bobaljik and Wurmbrand’s perspective, we would ask what construction/category specific factors can and cannot over-ride *ScOT*. In fact, the burden of the explanation may be in understanding why DPs in English can QR and move semantically vacuously, not why other categories like CPs can’t.

Returning to CP-proforms, they saturate in complement position. They are not trapped below existential closure; they’re type *e* and in this respect move like a DP. (As a reviewer points out, more needs to be said about *so*, given it’s propensity to move like an operator in other contexts.) Sentential subjects and topics must rely on a DP strategy to move. Following Koster 1978, Alrenga 2005 recruits a null DP-operator and base-generates the CP high (anti-reconstruction evidence for this analysis can be found in Moulton 2013). To deliver a proposition, a sentence-level \exists is required.

(97) a. [that Fred left] $\text{Op}_{\lambda x_c}$ John could not believe x_c

b. $\lambda w \exists x_c$ [[CONT(x_c) = Fred left] & John could not believe x_c in w].

Berman 1996 contends that sentential subjects and topics are clitic left-dislocated (CLLD). If that’s true, then evidence for this high existential quantification may come from existentially interpreted bare nominals that may undergo CLLD in Italian, see footnote 26.

Here then is an analysis of *that*-clauses that reconciles their paradoxical behaviour: they can combine with nouns that don’t take arguments at all, but they can saturate verbs which do require their internal arguments. Instead of positing an ambiguity for *that*-clauses, I have shown how movement reconciles this behavior. At the same time, the analysis correctly rules out movement of bare *that*-clauses beyond AspP. The next section details a number of other benefits of the analysis.

5 Further Benefits

As discussed in §3, facts about extraction and binding have often been used to argue against an extraposition analysis of CP complements. As shown by (58), CP complements are low for the purposes of Condition C and variable binding. The present analysis accounts for these facts because it ensures that the CP merges in

complement position. This is required so that the CP can move and leave a copy that saturates. This copy is subject to the binding principles.²⁸

Extraction is possible from clausal complements (56), which also precludes a rightward extraposition analysis. We likened *that*-clauses to HNPS. However, HNPS is opaque for extraction (Wexler and Culicover 1981):

- (98) a. Who did you tell John that you had met ___?
b. ?*What did you give to John a book about ___? (Lasnik and Saito 1992:103)

So does our analysis predict that clausal complements are likewise opaque, contrary to fact? No, because not all moved phrases are opaque to extraction. We've already seen that extraposed PPs are transparent for extraction ((67), (69a)). Abels (2008) argues that movement from moved constituents is constrained according to a hierarchy of the types of movement involved—e.g. *wh*-movement can't proceed from certain \bar{A} -moved constituents, but it can from A-moved constituents (see also Müller 1996). This predicts that (the leftward DP movement involved in) HNPS is \bar{A} while *that*-clause movement is A-movement. This prediction is confirmed by considerations of locality. HNPS can proceed from finite embedded clauses, indicative of \bar{A} -movement:²⁹

- (99) a. I claimed that I liked ____, in order to get you to rent, that movie with Fred Astaire and Audrey Hepburn. (Nissenbaum 2000: 89(3a))

CP extraposition is, however, famously clause-bound (Baltin 1978).

- (100) a. *John was believed to be certain by everybody that the Mets would lose.
b. John was believed by everybody to be certain that the Mets would lose.

The clause-boundedness of *that*-clauses follows on the present account since movement beyond EC is ruled out. Nonetheless, as an A-moved term, the CP is transparent for *wh*-extraction.

5.1 The position of *that*-clauses

It should be made clear that factors other than compositionality can play a role in positioning CPs. The present proposal positions finite complements after AspP. This isn't quite far enough right to capture all the attested surface positions of *dass*-clauses in German, for instance. They follow not just aspectual auxiliaries, but also modals (101) and infinitive-selecting matrix verbs (102). CPs cannot

²⁸Extraposed CP relatives bleed Condition C (Culicover and Rochemont 1990). One popular way of bleeding of Condition C is counter-cyclic adjunction (Lebeaux 1991, Fox 2002). This cannot be invoked for *that*-clause complements because there is neither a determiner nor NP to which the *that*-clause can late merge.

²⁹These examples demonstrate another fact in support of HNPS being \bar{A} -movement: parasitic gaps. But see Postal 1994.

appear *within* the verbal complex formed by these elements. (Examples from Büring and Hartmann 1997: 72(31–35).)

- (101) a. ...weil er behaupten muss [_{CP} dass er Hemingway geschlagen hat].
 ...because he claim must that he Hemingway beaten has.
 ‘...because he must claim that he has beaten Hemingway.’
 b. ...weil er *[_{CP}...] behaupten *[_{CP}...] muss.
- (102) a. ...weil er behaupten können wollte [_{CP} dass er Hemingway
 ...because he claim be-able want that he Hemingway
 geschlagen hat].
 beaten has.
 ‘...because he wanted to be able to claim that he has beaten Hemingway.’
 b. ...weil er *[_{CP}...] behaupten *[_{CP}...] können *[_{CP}...] wollte.

At first this would appear to pose a problem for the proposal. However, there’s good reason to think that restrictions against the CP appearing within the verbal complex are due to independent constraints on the formation of the verbal complex itself. We can see this because the CP doesn’t have to move above modals when other factors relieve it from interrupting the verbal cluster. This happens, for instance, when a constituent containing AspP and the CP undergo topicalization (Büring and Hartmann 1997).

- (103) [sagen dass Schnaps gut schmeckt] muss er nicht.
 said that schnapps tastes good must he not.

This indicates that CPs needn’t in principle move higher than aspect (Büring and Hartmann 1997). A ‘hybrid’ solution is required to rule out (101b)–(102b): successful semantic composition forces the CP to sit in a position just following Aspect. If the contents of T do not undergo V2 (or a larger phrase doesn’t move the CP away, as in (103)), leaving the CP within the verbal cluster renders the cluster ill-formed. According to some research, the verbal cluster forms a morphological or prosodic unit, one that cannot be interrupted by a phonological phrase like a CP (Truckenbrodt 1995, Riemsdijk 1998, Wurmbrand and Bobaljik 2005, but cf. Koopman and Szabolcsi 2000 for a syntactic view.) I suggest that a PF rule positions the CPs to the right of the verbal complex (Truckenbrodt 1995, Wurmbrand and Bobaljik 2005). I must stress that PF movement is not alone sufficient to account for the position of CPs in German. (Otherwise, nothing would explain why the CP doesn’t stay to the left of the verb to avoid interrupting the verb cluster.) The first step—the semantically-motivated movement I have argued for—squeezes *that*-clauses between Aspect and other elements in the verbal complex, which may trigger further movement.

Turning to the positions that CPs take more generally, the prediction is this: CPs that *do* saturate predicates should not trigger this complex series of

movement. In this respect, those German infinitives with ‘nominal’ distribution (pre-verbal, restructuring infinitives) are predicted to be true arguments. In more uniformly head final languages, such as Japanese and Korean, complement CPs sit in preverbal position. Why don’t they trigger the kinds of movements Indo-European CPs do? First, many of the CPs that sit preverbally in OV languages like Korean and Japanese are nominal (Hiraiwa 2010), and so their DP distribution is unexceptional. More interesting are those those preverbal CPs that don’t have nominal characteristics, such as Korean CPs headed by the complementizer *ko*, (104a). The present account entails that this (non-nominal) clause can sit in a typical preverbal complement position precisely because it is a saturating CP. This makes the prediction that unlike familiar Indo-European CPs, *ko*-clauses won’t be able to combine with non-argument taking nouns. This prediction is borne out: *ko*-clauses can’t combine with combine content nouns (104b).

- (104) a. Mina-ka [Swuna-ka ku mwuncey-lul phwul-ess-ta]-**ko**
 Mina-NOM Swuna-NOM that problem-ACC solve-PAST-DECL-C
 cwucangha-ess-ta
 claim-PAST-DECL
 ‘Mina claimed that Swuna solved the problem.’
 b. *[Swuna-ka ku mwuncey-lul phwul-ess-ta]-**ko** cwucang
 Swuna-NOM that problem-ACC solve-PAST-DECL-C claim
 ‘the claim that Swuna solved the problem’ (C.H. Han, p.c.)

Ko-clauses are *in situ* saturators. Relatedly, English ECM complements appear to be *in situ* saturating clausal arguments, too. This is confirmed by their inability, unlike *that*-clauses, to combine with NASNs (Kayne 1984).

- (105) *Sue’s belief (of) Mary to be wicked cool.

Korean *ko*-clauses, although finite, are like ECM complements in being transparent for A-movement, as exhibited by the following raising-to-object construction.

- (106) John-un Mary-lul mitep-ta-**ko** sangkakha-n-ta.
 John-NOM Mary-ACC reliable-DECL-C think-PRES-DECL
 ‘John thinks Mary to be reliable’ (Hong and Lasnik 2010: 281(40))

I speculate that what regulates raising is the semantic status of the complement clause: raising is possible from CPs that saturate *in situ*. This just happens to correlate with tense in most Indo-European languages. This offers a fresh perspective on raising-to-object/ECM, one that is neither dependent on case or tense.

6 Conclusion

This paper has offered a general theory of CPs and their distribution. It did so by way of giving a principled explanation for the contrasts between *that*-clauses and CP proforms. Those contrasts made it clear that the ability of *that*-clauses to combine with nouns (unlike CP proforms) must be connected to their inability to move (again, unlike CP proforms). The analysis made that connection. Treating *that*-clauses as type $\langle e, st \rangle$ lets them combine with non-argument taking nouns. In the verbal domain, however, this triggers an (independently motivated) syntax-semantics that prevents bare *that*-clauses from moving very far.³⁰

CPs have taught us something about movement and the copies it produces. Lower copies may manufacture individuals from predicates. Moreover, this characterization of copies does not rely on determiners to perform this type shift, as do the proposals in Fox 2002, Takahashi 2010, and Johnson 2012. This is exactly what CPs tell us: lower copies denote restricted variables, even if they're not DPs.

Finally, it is worth remembering what Emonds (1972) taught with his arguments against Rosenbaum 1967's NP-over-S analysis of argument clauses: sentential arguments distribute differently from nouns. This lesson sometimes gets lost when ideas about DP-CP parallelism are suggested (see also Bruening 2009). The role of D and C are quite different: C, unlike D, does not "turn" something into an argument. In fact, the complementizer proposed here frustrates the predicate-argument relation, triggering movements that give Indo-European finite CPs their typical peripheral distribution. Why would language exhibit such a complicating imperfection? Perhaps it is vestigial, a remnant of older Indo-European syntax when argument clauses were adjoined (Kiparsky 1995). It seems that *that*-clauses have retained, at least in semantic type, their non-argument status, but now movement resolves the composition problem, rather than the older strategy in which the CP is base adjoined high and a correlative proform sits in the argument position (a strategy still available).³¹ This contrasts with other language families in which finite argument clauses are either nominalized or introduced by grammaticalized verbs of saying (Bayer 1999). It's not surprising where the cross-linguistic variation resides: what one language does with the morpho-syntax, another does with movement.

³⁰Question complements remain to be elucidated from this perspective, but there are obvious connections between the present account and indirect dependency approaches to *wh*-scope marking (Dayal 1996).

³¹Binding theoretic diagnostics (58) supply the crucial data for a low source for the CP in the synchronic grammar. We might be uneasy about how much rides on Condition C, given the results about variable binding into CPs in Moulton 2013.

References

- Abels, Klaus. 2008. Towards a restrictive theory of remnant movement. *Linguistic Variation Yearbook* 7.
- Alexiadou, Artemis. 2009. On the role of syntactic locality in morphological processes. In *Quantification, Definiteness, and Nominalization*, ed. Anastasia Giannakidou and Monika Rathert, 253–280. Oxford: Oxford University Press.
- Alrenga, Peter. 2005. A sentential subject asymmetry in English and its implications for complement selection. *Syntax* 8:175–207.
- Anand, Pranav, and Valentine Hacquard. 2009. Epistemics with attitude. In *Proceedings of SALT 18*.
- Arsenijevic, Boban. 2009. Clausal complementation as relativization. *Lingua* 119:39–50.
- Baltin, Mark. 1978. Toward a theory of movement rules. Doctoral Dissertation, Massachusetts Institute of Technology.
- Baltin, Mark. 2003. The interaction of ellipsis and binding: Implications for the sequencing of Principle A. *Natural Language and Linguistic Theory* 21:215–246.
- Bayer, Josef. 1995. On the origin of sentential arguments in German and Bengali. In *Studies in comparative Germanic syntax*, ed. Hubert Haider, Susan Olsen, and Sten Vikner, 47–76. Dordrecht: The Netherlands: Kluwer Academic Publishers.
- Bayer, Josef. 1999. Final complementizers in hybrid languages. *Journal of Linguistics* 35:233–271.
- Berman, Judith. 1996. Topicalization vs. Left Dislocation of Sentential Arguments in German. In *Proceedings of the First Annual LFG Conference*, ed. Miriam Butt and Tracy Holloway King. Stanford University: CSLI Publications.
- Bhatt, Rajesh. 2010. Comments on “Referential CPs and DPs: An operator movement account”. *Theoretical Linguistics* 36:173–177.
- Bobaljik, Jonathan. 2002. A-chains at the PF-interface: copies and ‘covert’ movement. *Natural Language and Linguistic Theory* 20:197–267.
- Bobaljik, Jonathan, and Susi Wurmbrand. 2012. Word Order and Scope: Transparent Interfaces and the 3/4 Signature. *Linguistic Inquiry* 43:371–421.
- Borer, Hagit. 2003. The forming, formation and the form of nominals. Ms, USC.
- Bruening, Benjamin. 2009. Selectional asymmetries between CP and DP suggest that the DP hypothesis is wrong. *University of Pennsylvania Working Papers in Linguistics* 15:26–35.
- Büring, Daniel, and Katharina Hartmann. 1995. All right! In *On extraction and extraposition in German*, ed. Uli Lutz and Jürgen Pafel, 179–212. Amsterdam: John Benjamins.
- Büring, Daniel, and Katharina Hartmann. 1997. The Kayne mutiny. In *Rightward movement*, ed. Dorothee Beerman, David LeBlanc, and Henk van Riemsdijk, 59–79. Amsterdam: John Benjamins Publishing Company.

- Caponigro, Ivano, and Maria Polinsky. 2011. Relative embeddings: a Circassian puzzle for the syntax/semantics interface. *Natural Language and Linguistic Theory* 29:71–122.
- Carlson, Gregory N. 1977. Reference to kinds in English. Doctoral Dissertation, University of Massachusetts, Amherst.
- Cattell, Ray. 1978. The source of interrogative adverbs. *Language* 54:61–77.
- Chierchia, Gennaro. 1984. Topics in the syntax and semantics of infinitives and gerunds. Doctoral Dissertation, University of Massachusetts, Amherst.
- Chierchia, Gennaro. 1998. Reference to kinds across languages. *Natural Language Semantics* 6:339–405.
- Chomsky, Noam. 1995. *The minimalist program*. Cambridge, Massachusetts: MIT Press.
- Chung, Sandra, and William A. Ladusaw. 2004. *Restriction and saturation*. MIT Press.
- de Cuba, Carlos, and Barbara Ürögdi. 2009. Eliminating factivity from syntax: Sentential complements in Hungarian. In *Approaches to Hungarian*, ed. Tibor Laczkó and Catherine O. Ringen. John Benjamins.
- Culicover, Peter W., and Michael S. Rochemont. 1990. Extraposition and the complement principle. *Linguistic Inquiry* 21:23–47.
- Davies, William D., and Stanley Dubinsky. 2010. On the existence (and distribution) of sentential subjects. In *Hypothesis A/hypothesis B: Linguistic explorations in honor of David M. Perlmutter*, 211–228. MIT Press.
- Dayal, Veneeta. 1996. *Locality in Wh-quantification: Questions and relative clauses in Hindi*. Dordrecht: Kluwer Academic Press.
- Dayal, Veneeta. 2004. Number marking and (in)definiteness in kind terms. *Linguistics and Philosophy* 27:393–450.
- Delahunty, Gerald. 1983. But sentential subjects do exist. *Linguistic Analysis* 379–398.
- Diesing, Molly. 1992. *Indefinites*. Cambridge, Massachusetts: MIT Press.
- Diesing, Molly. 1997. Yiddish VP order and typology of object movement in Germanic. *Natural Language and Linguistic Theory* 15:369–427.
- den Dikken, Marcel. 1995. Extraposition as intraposition. Ms.
- Dowty, David R. 1979. *Word meaning and Montague grammar*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Drummond, Alex. 2009. The Unity of Extraposition and the A/A' Distinction. Presented at the Chicago Linguistics Society.
- Drummond, Alex, Norbert Hornstein, and Howard Lasnik. 2010. A Puzzle about P-Stranding and a Possible Solution. *Linguistic Inquiry* 41:689–692.
- Emonds, Joseph. 1972. A reformulation of certain syntactic transformations. In *Goals of Linguistic Theory*, 21–61. Englewood Cliffs, NJ: Prentice-Hall.
- Espinal, M. Teresa, and Louise McNally. 2011. Bare nominals and incorporating verbs in Spanish and Catalan. *Journal of Linguistics* 47:87–129.
- Farudi, Annahita. 2007. An anti-symmetric approach to Persian clausal complements. Ms, University of Massachusetts, Amherst.

- Fox, Danny. 1999. Reconstruction, binding theory, and the interpretation of chains. *Linguistic Inquiry* 30:157–196.
- Fox, Danny. 2002. Antecedent-contained deletion and the copy theory of movement. *Linguistic Inquiry* 33:63–96.
- Freidin, Robert. 1986. Fundamental issues in the theory of binding. In *Studies in the acquisition of anaphora*, ed. Barbara Lust, volume 1, 151–188. Dordrecht: Reidel.
- van Geenhoven, Veerle, and Louise McNally. 2005. On the property analysis of opaque complements. *Lingua* 115:885–914.
- Geenhoven, Veerle Van. 2000. Pro properties, contra generalized kinds. In *Proceedings of SALT X*, ed. Brendan Jackson and Tanya Matthews, 221–238. Cornell University, Ithaca, NY: CLC Publications.
- Grimshaw, Jane. 1982. Subcategorization and grammatical relations. In *Subjects and other subjects: Proceedings of the harvard conference on the representation of grammatical relations*, ed. Annie Zaenen, 35–55. Indiana University Linguistics Club.
- Grimshaw, Jane. 1990. *Argument structure*. Cambridge, Massachusetts: MIT Press.
- Hacquard, Valentine. 2006. Aspects of modality. Doctoral Dissertation, Massachusetts Institute of Technology.
- Haegeman, Liliane, and Barbara Úrögdi. 2010. Referential CPs and DPs: An operator movement account. *Theoretical Linguistics* 36:111–152.
- Hallman, Peter. 2006. A Cateogrial difference between Stative and Eventive Verbs. In *Proceedings of the North East Linguistic Society 36*, ed. C. et. al. Davis.
- Heim, Irene. 2001. Features of pronouns in semantics and morphology. Universit'at Tübingen.
- Heim, Irene, and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Malden, MA: Blackwell.
- Higgins, F. Roger. 1972. The pseudocleft construction in English. Doctoral Dissertation, Massachusetts Institute of Technology.
- Hinterhölzl, Roland. 1999. Restructuring infinitives and the theory of complementation. Doctoral Dissertation, University of Southern California, Los Angeles.
- Hintikka, Jaako. 1969. Semantics for propositional attitudes. In *Philosophical logic*, ed. J. W. Davis, Hockney, and Wilson, 21–45. Reidel.
- Hiraiwa, Ken. 2010. Complement types and the CP/DP parallelism—A case of Japanese. *Theoretical Linguistics* 36:189–198.
- Hong, Sungshim, and Howard Lasnik. 2010. A Note on Raising to Object in small and full clauses. *Journal of East Asian Linguistics* 19:275–289.
- Huang, C.-T. James. 1993. Reconstruction and the structure of VP: some theoretical consequences. *Linguistic Inquiry* 24:103–138.
- Jayaseelan, K. A. 1990. Incomplete VP deletion and Gapping. *Linguistic Analysis* 20:64–81.
- Johnson, Kyle. 2012. Towards deriving differences in how Wh Movemwent and QR are pronounced. *Lingua* 122:529–553.
- Kaplan, David. 1968. Quantifying in. *Synthese* XIX:178–214.

- Kastner, Itamar. 2013. Selection: factivity and interpretation. Ms., NYU. Available at <lingbuzz/001786>.
- Kayne, Richard. 2005. Antisymmetry and Japanese. In *Movement and silence*, 215–240. Oxford: Oxford University Press.
- Kayne, Richard S. 1984. *Connectedness and binary branching*. Dordrecht, Holland: Foris Publications.
- Kayne, Richard S. 1994. *The antisymmetry of syntax*. Cambridge, Massachusetts: MIT Press.
- Kayne, Richard S. 2009. Antisymmetry and the lexicon. *Linguistic Variation Yearbook* 8:1–31.
- Kim, Min-Joo. 2007. Formal Linking in Internally Headed Relatives. *Natural Language Semantics* 15:279–315.
- Kiparsky, Paul. 1995. Indo-European origins of Germanic syntax. In *Clause structure and language change*, ed. Adrian Battye and Ian Roberts, 140–172. Oxford: Oxford University Press.
- Kiparsky, Paul, and Carol Kiparsky. 1970. Fact. In *Progress in linguistics*, ed. M. Bierwisch and K.E. Heidolph, 143–73. The Hague: Mouton.
- Klein, Wolfgang. 1994. *Time in language*. London: Routledge.
- Koopman, Hilda Judith, and Anna Szabolcsi. 2000. *Verbal complexes*. Cambridge, Massachusetts: MIT Press.
- Koster, Jan. 1978. Why subject sentences don't exist. In *Recent transformational studies in European languages*, ed. Samuel Jay Keyser. Cambridge, Massachusetts: MIT Press.
- Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase structure and the lexicon*, ed. Johan Rooryck and Laurie Zaring, 109–137. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Kratzer, Angelika. 1998. More structural analogies between pronouns and tense. In *Proceedings of SALT VIII*, ed. Devon Strolovitch and Aaron Lawson, 92–110. Cornell University, Ithaca, NY: CLC Publications.
- Kratzer, Angelika. 2002. Facts: Particulars or information units? *Linguistics and Philosophy* 25:655–670.
- Kratzer, Angelika. 2006. Decomposing attitude verbs. *Semantics Archive*, 24 November 2009, <<http://semanticsarchive.net/Archive/DcwY2JkM/attitude-verbs2006.pdf>> (24 June 2013).
- Kratzer, Angelika. 2012. *Modals and Conditionals*. Oxford: Oxford University Press.
- Kratzer, Angelika. 2013. Modality for the 21st Century. In *L'interface Langage-Cognition/The Language-Cognition Interface: Actes du 19^e Congrès International des Linguistes Genève*, ed. Stephen R. Anderson, Jacques Moeschler, and Fabienne Reboul, 179–199. Librairie Droz.
- Kuno, Susumu. 1973. Constraints on internal clauses and sentential subjects. *Linguistic Inquiry* 4:363–385.
- Larson, Richard. 1988. On the double object construction. *Linguistic Inquiry* 19:335–392.

- Lasnik, Howard, and Mamoru Saito. 1992. *Move α* . Cambridge, Massachusetts: MIT Press.
- Lebeaux, David. 1991. Relative clauses, licensing, and the nature of the derivation. In *Perspectives on phrase structure*, ed. Susan D. Rothstein and Margaret Speas, 209–239. Academic Press.
- Lechner, Winfried. 2006. An interpretive effect of head movement. In *Phases of Interpretation*, ed. Mara Frascarelli, 45–71. Berlin: Mouton de Gruyter.
- Longobardi, Giuseppe. 1994. Reference and proper names. *Linguistic Inquiry* 25:609–666.
- Marantz, Alec. 2001. Words. Paper presented at the 20th West Coast Conference on Formal Linguistics, USC, 23–25 February 2001.
- Moltmann, Friederike. 2013. *Abstract Objects and the Semantics of Natural Language*. Oxford University Press.
- Moulton, Keir. 2009. Natural selection and the syntax of clausal complementation. Doctoral Dissertation, Doctoral Dissertation, University of Massachusetts, Amherst.
- Moulton, Keir. 2013. Not Moving Clauses: Connectivity in Clausal Arguments. *Syntax*. doi: 10.1111/synt.12007.
- Müller, Gereon. 1996. A constraint on remnant movement. *Natural Language and Linguistic Theory* 14:355–407.
- Müller, Gereon. 1998. *Incomplete Category Fronting*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Nissenbaum, Jon. 2000. Investigations of covert phrase movement. Doctoral Dissertation, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- Ogawa, Yoshiki. 2001. *A unified theory of verbal and nominal projections*. Oxford: Oxford University Press.
- Pesetsky, David, and Esther Torrego. 2002. Tense, Case, and the Nature of Syntactic Categories. In *The syntax of Time*, ed. J. Lecarme and J. Geuron, 495–537. Cambridge, Massachusetts: MIT Press.
- Postal, Paul. 1986. *Studies of passive clauses*. Albany, N.Y.: SUNY Press.
- Postal, Paul M. 1994. Parasitic and pseudoparasitic gaps. *Linguistic Inquiry* 25:63–118.
- Potts, Christopher. 2002. The Lexical Semantics of Parenthetical-*as* and Appositive-*which*. *Syntax* 5:55–88.
- Riemsdijk, Henk van. 1998. Head movement and adjacency. *Natural Language and Linguistic Theory* 16:633–678.
- Riemsdijk, Henk van, and Edwin Williams. 1981. NP-structure. *The Linguistic Review* 1:171–217.
- Rosenbaum, Peter S. 1967. *The grammar of English predicate complement constructions*. Cambridge, Massachusetts: MIT Press.
- Ross, John. 1984. Inner islands. In *Proceedings of the Tenth Annual Meeting of the Berkeley Linguistics Society*, ed. Claudia Brugman and Monica Macaulay, 258–265. Berkeley: Berkeley Linguistics Society, University of California.

- Safir, Kenneth. 1985. *Syntactic chains*. Cambridge: Cambridge University Press.
- Sailor, Craig. 2012. On Embedded Polar Replies. Handout from the Workshop on the Syntax of Answers to Polar Questions.
- Salanova, Andrés P. 2010. Action nominalizations do not embed verbal projections. Handout of talk presented at McGill, January 2010.
- Sauerland, Uli. 1998. The meaning of chains. Doctoral Dissertation, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- Sauerland, Uli. 2004. The interpretation of traces. *Natural Language Semantics* 12:63–127.
- Smith, Carlota S. 1991. *The Parameter of Aspect*. Dordrecht: Kluwer.
- Stechow, Arnim von. 1996. Against LF pied-piping. *Natural Language Semantics* 4:57–110.
- Stechow, Arnim von. 2002. Binding by verbs: tense, person, and mood under attitudes. In *Proceedings of NELS*, volume 33, 379–403. de Gruyter.
- Stowell, Timothy. 1981. Origins of phrase structure. Doctoral Dissertation, Massachusetts Institute of Technology.
- Stowell, Timothy. 1987. *As so not so as*. Ms. University of California, Los Angeles.
- Subbarao, K. V. 1984. *Complementation in Hindi Syntax*. Delhi, India: Academic Publications.
- Szabolcsi, Anna. 1997. *Ways of scope taking*. Dordrecht: Kluwer Academic Publishers.
- Szabolcsi, Anna. 2006. Strong vs. weak islands. In *The Blackwell Companion to Syntax*, volume 4, 479–531. Blackwell.
- Szabolcsi, Anna. 2011. Certain verbs are syntactically explicit quantifiers. In *The Baltic International Yearbook of Cognition, Logic and Communication*, volume 6.
- Takahashi, Shoichi. 2010. The hidden side of clausal complementation. *Natural Language and Linguistic Theory* 28.
- Truckenbrodt, Hubert. 1995. Extraposition from np and prosodic structure. In *Proceedings of the North East Linguistic Society 25*, ed. Jill Beckman, 503–518. University of Pennsylvania: Graduate Linguistic Student Association.
- Vendler, Zeno. 1967. *Linguistics in philosophy*. Ithaca: Cornell University Press.
- Webelhuth, Gert. 1992. *Principles and parameters of syntactic saturation*. Oxford: Oxford University Press.
- Wexler, Kenneth, and Peter Culicover. 1981. *Formal principles of language acquisition*. Cambridge, Massachusetts: MIT Press.
- Williams, Edwin. 1981. On the notions ‘lexically related’ and ‘head of a word’. *Linguistic Inquiry* 12:245–274.
- Wurmbrand, Susanne, and Jonathan D. Bobaljik. 2005. Adjacency, PF and Extraposition. In *Organizing Grammar: Linguistic Studies in Honor of Henk van Riemsdijk*, ed. Hans Broekhuis, Norbert Corver, Jan Koster, Riny Huybregts, and Ursula Kleinhenz, 679–688. Mouton de Gruyter.
- Zucchi, Alessandro. 1989. The language of propositions and events. Doctoral Dissertation, University of Massachusetts at Amherst, Amherst.

Zwart, C. Jan-Wouter. 1993. Dutch syntax: A minimalist approach. Doctoral Dissertation, University of Groningen.