

Quantifiers, *Again* and the Complexity of Verb Phrases.

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1. Introduction

Many linguists have used the modifier *again* as a diagnostic for syntactic complexity, whether in terms of lexical decomposition (McCawley 1976) or hidden functional categories (von Stechow 1996). Evidence for this complexity relied on establishing *again* as a propositional modifier. Sentence internal application of this modifier substantiated the existence of embedded propositions.

In this paper I follow this tradition of identifying embedded propositions, although I concentrate on the structural characteristics of verb phrases (VPs) rather than decomposition or hidden functional categories. I propose that VPs can be divided into two separate categories, those that contain more than one proposition and those that contain only one. Furthermore, this division is based on an aspectual distinction. VPs with non-stative, transitive verbs are propositionally complex whereas VPs with intransitive or stative, transitive verbs are propositionally simple.

To explain this partition, I propose that verbs combine with their arguments differently depending on their aspectual category. Non-stative, transitive verbs are functions that only take their objects as arguments (cf. Kratzer 1996). The subject is related to the verb through an agentive predicate. In contrast, other verbs take all their syntactic arguments as functional arguments.

I present this thesis in section 3 and then argue for it in section 4. The argument is structured as follows. First I establish that *again*'s syntactic complement strictly determines the content of the presupposition introduced by *again*. Then, I demonstrate that VPs with non-stative, transitive verbs allow *again* to introduce a presupposition that does not involve the subject (a subjectless presupposition). This suggests that the verb and object form a proposition independent of the subject. In contrast, VPs with intransitive verbs or non-stative, transitive verbs do not allow subjectless presuppositions. Hence, the verb and object do not form a proposition. As discussed in section 4, the different functional characteristics of verbs explain these facts.

In section 5, I explore some consequences of the theses in section 3. As discussed below, the complexity of non-stative, transitive VPs predicts that Quantifier Phrases (QPs) should be interpretable within the VP. The systematic interaction between *again* and QPs allows one to evaluate this claim. Surprisingly, evidence shows that QPs cannot be so interpreted.

2. Definitions, qualifications and key assumptions

Before discussing the details of my proposal, it is necessary to outline the terms

used and the semantic assumptions adopted in this paper. As discussed below, terms are used in an unconventional manner but with the hope of achieving a greater degree of generality.

2.1. Definitions and qualifications

To facilitate a general analysis of the data, certain terms will be used in a theory neutral way. Below I define *propositional level*, *propositional complexity*, *verb phrase* (or *VP*), and *introducing presuppositions*.

Propositional level will refer to syntactic entities that are assigned the same type of interpretation as declarative sentences modulo the particulars of the adopted semantic theory. *Propositional complexity* is defined through propositional levels. A syntactic phrase will be called *propositionally complex* if it contains more than one propositional level, otherwise it will be called *propositionally simple*.

Verb phrase or *VP* will be used to refer to the smallest syntactic domain that contains the underlying positions of the verb, subject and object.

Finally, I will often speak of words and/or sentences *introducing presuppositions*. However, I do not mean to imply a particular theoretical position with regard to presuppositions. It is of no consequence to the analysis whether presuppositions are strictly part of grammar (Beaver & Kraemer 1998) or pragmatic reasoning (Stalnaker 1974). Depending on reader preference, the presupposition *introduced* by a word or sentence can be understood as the presupposition maintained by the language user.

2.2. Key semantic assumptions

There are two main assumptions made throughout this paper. The first concerns the interpretation of declarative sentences and VPs. Specifically, such syntactic entities are assigned the same type of interpretation. The second involves a specific proposal for the interpretation of *again*. Namely, I assume that *again* introduces a presupposition but otherwise leaves the interpretation untouched.

2.2.1. Situation Semantics

Similar to Lasnik (1995) I adopt a version of Situation Semantics that interprets declarative sentences as sets of eventualities.¹ Under such a semantics, a sentence is true only if the event that is demonstrably picked out in a given context is a member of that set. This choice of interpretation is convenient when specifying a uniform interpretation of *again*. Syntactically, *again* appears in at least three positions: (1) adjoined to sentences, (2) adjoined to VPs, and (3) adjoined to adverbs as an adverbial modifier (See Bale 2005). There is already some evidence that verb phrases and adverbs are assigned the same type of interpretation. As discussed in Parsons (1990) and Landman (2000), the intersective property of adverbials favours such a thesis. In semantic theories that

are influenced by such arguments (i.e., those that follow the Davidsonian tradition), such categories are often interpreted as sets of eventualities. By extending this type of interpretation to declarative sentences, the complements of *again* can be stated as forming a natural class: a result that limits the proliferation of lexical items to account for each possible adjunction site.

2.2.2. *A semantics for again*

The interpretation that I provide for *again* is similar to many other proposals in the literature (cf. von Stechow 1996; Beck & Johnson 2004; Jäger & Blutner 2003). Perhaps the only major difference is the use of Reichenbach's (1947) topology of tense. As shown below, the interpretation rule for *again* involves the point *E* which represents the contextually determined point in time when the asserted event is supposed to have occurred. Given this reference point, I propose the following semantics and pragmatics for *again*. In terms of meaning, *again* seems to do little more than introduce a presupposition, namely the presupposition that the interpretation of its sister held at some time previous to *E*. Otherwise, *again* merely passes up the semantic value of its sister.

In accordance with the assumption in section 2.1, I assume that *again* is interpreted as a function on sets of events. A precondition to the function's application induces a presupposition. (Note, '<' is a temporal ordering of events)

- (1) **Precondition:** $[[\textit{again}]](P)$ is defined iff $\exists e^1, e^2: (e^1 < e^2 < E)(P(e^1) \ \& \ \sim P(e^2))$.
Functional Definition: $[[\textit{again}]](P) = P$.

The precondition simply states that there must be two eventualities occurring before *E*, one that satisfies the predicate *P* and a second that does not. The condition that there be two predicates ensures that the presupposed eventuality is separate from the asserted eventuality. However, for simplicity I often assume this break without representing the second event variable, thus writing the presupposition as $\exists e:(e < E) (P(e))$.

3. The proposal: Staking out a middle ground

In comparison to other theories (Davidson 1966; Kratzer 1996; Parson 1990; Landman 2000), the proposal outlined in this section does not treat the composition of the subject in a uniform manner. Subjects of stative and/or intransitive verbs are different from those of non-stative, transitives. The former are functional arguments to the verb whereas the latter are not. The evidence for such a distinction is presented in section 4. However, to clarify the issue, let me first present the details of my theory.

Below I present three separate theses. The first relates to the interpretation of non-stative, transitive verbs while the second relates to stative transitives. The third bears on the interpretation of intransitives.

3.1. Non-stative, transitive verbs

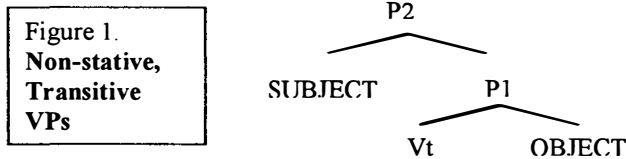
For ease of presentation, I classify all activity, accomplishment and achievement verbs (cf. Vendler 1969) as non-statives. I maintain that such verbs form a natural class in terms of their functional characteristics. For example consider the thesis in (T1) below. (Note, this thesis applies to all transitive verbs in Kratzer 1996.)

(T1) Non-stative, transitive verbs are functions from individuals (as denoted by the object) to propositions (sets of eventualities, see section 2.2).

As a consequence of (T1), the interpretation of a verb like *hit* might be as in (9), where x is a variable that ranges over individuals and e over eventualities.

(2) $[[hit]] = \lambda x \lambda e (\text{HIT}(x,e))$

There are two main consequences of (T1) and the interpretation in (2). First, since the subject is not a functional argument of the verb, it must be related to the verb by some other means. I use an agentive predicate to represent this *other means* but little depends on this specific proposal. Second, the verb and the object form a propositional level. This suggests the following syntactic structure for VPs with non-stative verbs.



The main point of interest is that non-stative VPs contain two propositional levels (P1 and P2) one of which (P1) does not contain the subject.

3.2. Stative, transitive verbs

Stative, transitive verbs contrast with non-statives in that the subject serves as a functional argument to a predicate. This thesis is summarized in (T2).

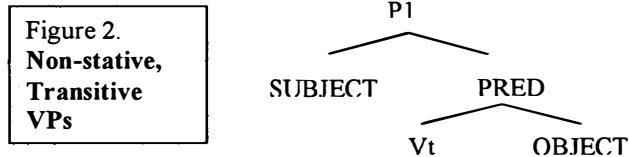
(T2) Stative, transitive verbs are functions from individuals to predicates.

As a consequence of (T2), stative, transitive verbs demonstrate an adjunct/argument distinction in accordance with the original hypothesis of Davidson (1966), where the subject and object of a transitive verb combine differently than adverbial phrases. (See Dowty 1989 for arguments in support of treating all transitive verbs in this way.)

Although (T2) is the general thesis, I should qualify that by *predicate* I mean a function from individuals to sets of eventualities. For example, the verb *hate* would have the following interpretation.

$$(3) \quad [[hate]] = \lambda y \lambda x \lambda e (\text{HATE}(x,y,e))$$

The functional characteristics outlined in (3) predict the following syntactic structure for VPs with stative, transitive verbs.



In figure 2, P1 represents the only propositional level in the VP whereas PRED represents a function from individuals to sets of eventualities. A consequence of such a structure is that the subject is contained in the only propositional level internal to the VP.

3.3. Intransitive verbs

In contrast to transitive verbs, intransitive verbs form a uniform semantic class. Such verbs (whether stative or non-stative, ergative or unaccusative) all have the same kind of semantic interpretation. They all take the subject as an argument. This proposal is summarized in (T3).

(T3) All intransitive verbs are functions from individuals to propositions.

More specifically, a verb such as *dance* will have the following interpretation.

$$(4) \quad [[dance]] = \lambda x \lambda e (\text{DANCE}(x,e))$$

A consequence of this interpretation is that the subject is contained in the only propositional level internal to the VP.

3.4. Section summary

In this section, I proposed that non-stative, transitive verbs only take their objects as arguments leaving the subject to be connected with the verb by some other means. In contrast, intransitive verbs and stative, transitive verbs both treat the subject as an argument. As a consequence of this theory, non-stative, transitive VPs are propositionally complex whereas other VPs are propositionally simple.

4. Arguments concerning propositional complexity of VPs

The difference between the proposal in section 3 and other theories (Davidson

1966; Kratzer 1996; Parsons 1990) is that the proposal in section 3 predicts that stative and non-stative, transitive VPs should interact differently with propositional modifiers. Furthermore, intransitive VPs should pattern with the stative VPs. *Again* is one such modifier where this prediction is confirmed.

Again is ideal for diagnosing propositional complexity. Not only does it modify propositions but its presupposition is uniquely determined by its complement. This allows one to test whether there are propositional levels below the attachment site of the subject. Specifically, if *again* can adjoin somewhere internal to the VP then the presupposition need not involve the subject.

The outline of this section is as follows. First I establish that *again* introduces a presupposition uniquely determined by its syntactic complement. I then demonstrate that the presupposition introduced by *again* need not involve the subject for non-stative, transitive VPs, whereas it necessarily involves the subject for intransitives and stative, transitives. Such data is easily explained by the three hypotheses proposed in section 3.

4.1. *Again* introduces a presupposition determined by its syntactic complement

In this section I argue that *again*'s functional argument is determined uniquely by its syntactic complement.² Evidence in English usually involves the lack of ambiguity with leftward adjoining *again* and negation (see McCawley 1976; Bale 2005). However, instead of reviewing these constructions I shall introduce new evidence involving adverbial modification.

To begin, *again* demonstrates interesting scope interactions with adverbial adjuncts. More specifically, information associated with an adverbial adjunct is necessarily a part of the presupposition if and only if the adjunct is contained within the complement of *again*. To show this, consider the following co-text and subsequent sentences. (Note, unless otherwise indicated *again* should be read without emphasis. Emphasis signals leftward adjunction which yields consistent but different results. See Bale 2005.)

- (5) a. **CO-TEXT:** Two weeks ago, I met Esme at her house on a Wednesday.
 At that time, we planned to meet the following week. So...
 b. I met her *again* in Jeanne-Mance Park on a Tuesday.
 c. #I met her in Jeanne-Mance Park *again* on a Tuesday.
 d. #I met her in Jeanne-Mance Park on a Tuesday *again*.

The sentence in (5b) introduces the presupposition that I met Esme before but presupposes nothing about the time or location, hence why the presupposition can be supported by the co-text in (5b).

In contrast, (5c) and (5d) introduce a presupposition that cannot be supported by the co-text, hence why they require accommodation to support the presupposition. The sentence in (5c) introduces the presupposition that I met Esme in Jeanne-Mance Park before rather than at her house. The sentence in (5d) introduces the presupposition that I met her in Jeanne-Mance Park on a Tuesday before rather than at her house on a Wednesday. (Note that sentences that require

accommodation will be marked with '#' through-out this paper. This simply signals that the presupposition cannot be supported by the co-text.)

However, if we change the information in the adjuncts for (5c) and (5d), the resulting sentences do not require any accommodation. This is shown in (6), where (6a) and (6b) introduce a presupposition supported by the co-text, although (6c) does not.

- (6) a. I met her at her house again on a Tuesday.
 b. I met her at her house on a Wednesday again.
 c. #I met her at her house on a Tuesday again.

In assuming that *again* is rightward adjoining like other VP adjuncts, one can conclude that the adverbial adjuncts to the left of *again* are contained within its complement while the adverbial adjuncts to the right are not. Given this consequence, the data above demonstrates that the presupposition introduced by *again* need only involve information associated with its complement. The adjuncts that are outside of its scope such as *in Jeanne-Mance Park* and *on a Tuesday* in (5b) put no constraints on the nature of the presupposition. In contrast, any information associated with the complement of *again* is necessarily a part of the presupposition as demonstrated by the awkwardness of (5c), (5d) and (6c).

4.2. *The evidence for thesis T1*

Having established how presuppositions are introduced by *again*, I shall now use this modifier to test whether there are multiple propositional levels within a VP. The first kind of VPs to be considered are non-stative, transitive VPs. As discussed below, such VPs permit the introduction of a subjectless presupposition when modified by rightward adjoining *again*. The thesis in (T1) explains how such presuppositions can be derived.

4.2.1. *Subjectless presuppositions*

There are certain constructions in English where the presupposition introduced by *again* involves the same kind of eventuality as the main clause but does not involve the subject of the main clause. Such a potential reading was discussed in von Stechow (1996) where he argued that it was too difficult to distinguish this reading from a restitutive reading. However this reading is prominent with verbs that do not allow a restitutive reading.³

These kinds of presuppositions will be called *subjectless presuppositions*. Below, some sentences are presented with non-stative, transitive verbs. When *again* appears to the right of the verb, subjectless presuppositions are possible. When it appears to the left of the subject, such presuppositions are impossible.

As the first example, consider the sentence and co-text in (7).

- (7) a. **CO-TEXT:** Jon and his wife love their daughter Esme, and Esme is

reassured by their love. For example, yesterday Esme felt reassured when her mother gave her a hug. The effect was doubled when...

- b. Jon hugged her again.
- c. #Again Jon hugged her.
- d. She was hugged again.

The presupposition introduced in (7b) is supported by the information given in the co-text. Jon need not have been the person who hugged her before. In fact the presupposition is no different than the one introduced in (7d). The same cannot be said of (7c). (7c) presupposes that Jon was the one who hugged Esme before.

The same kind of contrast is demonstrated in (8) and (9).

- (8) a. **CO-TEXT:** Seymour's dryer broke. He called a repair-woman who simply hit the dryer until it started working. The dryer broke down two days later. So...
 - b. Seymour hit the dryer again.
 - c. #Again Seymour hit the dryer.
 - d. The dryer was hit again.
- (9) a. **CO-TEXT:** Brendan kicked the soccer ball towards the net but it did not quite make it. So...
 - b. Anne kicked it again.
 - c. #Again Anne kicked it.
 - d. It was kicked again.

In each example, the presupposition introduced by the (b) sentence is no different from the one introduced in the (d) sentence, both of which are supported by the information given in the co-text. In contrast the presupposition introduced in (c) necessarily involves the subject from the main clause. More specifically, (8c) presupposes that Seymour was the one who hit the dryer before while (9c) presupposes that Anne was the one who kicked the ball before.⁴

4.2.2. Thesis T1 explains subjectless presuppositions

Subjectless presuppositions can be explained by the thesis (T1), namely the thesis that non-stative, transitive verbs are functions that take the object (but not the subject) as an argument. In this section, I demonstrate how this is the case.

As mentioned in section 3, the thesis in (T1) predicts that non-stative transitive verbs are functions from individuals to event predicates. Stated otherwise, (T1) predicts that the result of merging the verb and its object is a propositional level. Also given the semantics for *again* presented in section 2, *again* should be able to adjoin to this level. Thus, it is possible for the complement of *again* to not contain the subject. The fact that the presupposition introduced by *again* is strictly determined by the content of its sister suggests that when *again* is adjoined to this propositional level the presupposition will not

contain information about the subject: hence a subjectless presupposition.

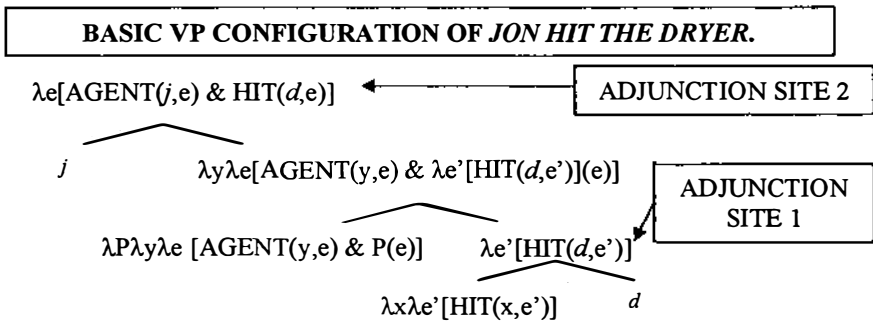
Let me illustrate this reasoning with a concrete example. According to the thesis (T1) the denotation of [[hit]] is equivalent to $\lambda x\lambda e(\text{HIT}(x,e))$. I assume the denotation of [[the dryer]] is the individual dryer, let's call it d . Thus the denotation of [[hit the dryer]] should be equivalent to $\lambda e(\text{HIT}(d,e))$, that is the set of events where the dryer was hit. If *again* applies to this proposition, the result would be the presupposition in (10).

$$(10) \quad \exists e: e < E (\text{HIT}(d,e))$$

This presupposition identifies a hitting-of-the-dryer event with no specific requirement on who the agent is. In contrast, consider the potential presupposition when *again* adjoins after the subject has been combined syntactically. For example if the VP were [[Jon hit the dryer]] and *again* adjoined to this VP then the presupposition would be as in (11).

$$(11) \quad \exists e: e < E (\text{Agent}(j,e) \ \& \ \text{HIT}(d,e))$$

This presupposition identifies a hitting-of-the-dryer event where the agent must be Jon. The two possible adjunction sites for *again* are depicted below.



In summary, the thesis in (T1) explains how subjectless presuppositions are possible when a sentence contains a non-stative, transitive verb. Such sentences have two possible propositional levels within the VP. The lower level is associated only with information about the object and the nature of the event. It does not contain information about the subject. Thus if *again* adjoins here, the result would be a subjectless presupposition.

4.3. The evidence for theses T2 and T3

The evidence for the theses in (T2) and (T3) is the mirror of the evidence for (T1). Intransitive verbs and stative transitive verbs do not allow for subjectless presuppositions. The presupposition introduced by *again* always requires that the subject be involved in the presupposed eventuality. In this section I present

evidence for the lack of subjectless presuppositions before explaining how the theses in (T2) and (T3) accounts for this result.

4.3.1. *There are no subjectless presuppositions for stative, transitive verbs*

Evidence suggests that stative, transitive verbs do not allow for a subjectless presupposition. Consider (12) and (13) below where the principal verbs are *hate* and *love*. The presupposition introduced by sentence initial *again* in the (d) sentences is no different from the presupposition introduced in the (b) sentences with sentence final *again*. In both cases, the presupposed event must involve the subject. Due to this fact, the co-text in each example does not support the presuppositions introduced by the (b) and (d) sentences. This contrasts with the passive sentences in (c) whose presuppositions can be supported by the co-text.

- (12) a. **CO-TEXT:** Seymour's sister hated George, but she seemed to be the only one who did. After a while her hatred subsided. Later, Seymour realised that George's charm was fake. Underneath, he was evil. So...
- b. #Seymour hated George again.
- c. George was hated again.
- d. #Again Seymour hated George.
- (13) a. **CO-TEXT:** Seymour's mother loved Frank, although she was the only one. After a while she no longer cared for him. However, Seymour developed strong feelings after his mother's love subsided. So...
- b. #Seymour loved Frank again.
- c. Frank was loved again.
- d. #Again Seymour loved Frank.

Other verbs with a similar pattern are *imagine*, *taste*, *need*, *know*, *own*, *doubt*, *owed*, *guess*, *smell*, *possess*, and *respect*. All such verbs are statives as defined by Vendler's classification. None of these verbs allow subjectless presuppositions.⁵

4.3.2. *There are no subjectless presuppositions for intransitive verbs*

Like the stative, transitive verbs, intransitive verbs do not allow for a subjectless presupposition. This generalization applies whether the verbs are ergative or unaccusative. Consider the unaccusative and ergative verbs in (14) and (15).

- (14) a. **CO-TEXT:** Seymour's wife was the first person to ever arrive at the new airport. Then a week later...
- b. #Seymour arrived again.
- (15) a. **CO-TEXT:** This morning, Bob danced until he dropped from exhaustion. Mary was inspired by his moves. So...
- b. #Mary danced again.

In each example, the co-text in (a) does not support the presuppositions introduced by the sentences in (b). This is due to the fact that the event described in (a) does not involve the participation of the subject of the sentence in (b).

4.3.3. *The theses in T2 and T3 explain the lack of subjectless presuppositions*

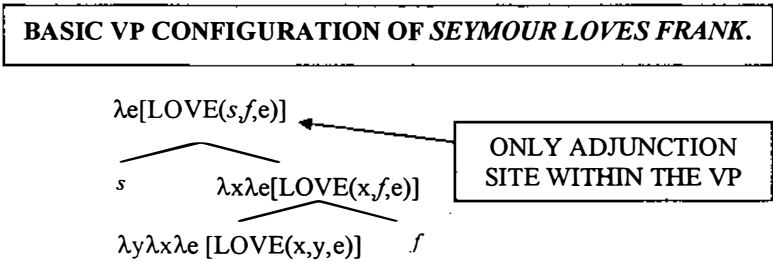
The theses advanced in (T2) and (T3) can explain the lack of subjectless presuppositions when the verbs are intransitive or stative transitives. Below, I first sketch-out the general account before introducing more explicit examples.

The explanation for the lack of a subjectless presupposition rests on the fact that (T1) and (T2) only allow one propositional level within the VP. Recall that (T2) maintains that stative, transitive verbs are functions from individuals to predicates. The subject serves as an argument to this predicate. As a result there is only one propositional level that occurs within the VP and this level contains the subject. Similarly, (T3) maintains that intransitive verbs are functions from individuals to propositions. As a result there is only one propositional level within intransitive VPs and this level contains the subject. Hence the lowest position in the VP to which *again* can adjoin contains the subject. Since the presupposition introduced by *again* is strictly determined by its complement, the structural consequences of (T2) and (T3) predict that it should be impossible to derive a subjectless presupposition.

Let me illustrate this reasoning with an example. According to the thesis in (T2) the denotation of $[[\text{loves}]]$ is equivalent to the extension of $\lambda y \lambda x \lambda e$ (LOVE(x,y,e)). Thus, the denotation of $[[\text{loves Frank}]]$ should be equivalent to $\lambda x \lambda e$ (LOVE(x, f, e), where *f* is Frank. *Again* cannot apply to this predicate. It is not of the right functional type. The first proposition that *again* can apply to is the VP with the subject already integrated into the verb; a VP such as $[[\text{Seymour loves Frank}]]$ which is equivalent to λe (LOVE(s, f, e), where *s* is Seymour. However, this VP contains the subject and hence the presupposition introduced by *again* would be as in (16).

(16) $\exists e: e < E$ (LOVE(s,f,e)), where *E* is the asserted time of the event.

As a consequence of (16), Seymour must be included as part of the presupposition. Graphically, the only possible adjunction site is depicted below.



A similar example can be provided for intransitive verbs. According to the thesis in (T3), the denotation of $[[\text{danced}]]$ is equivalent to the extension of $\lambda x \lambda e (\text{DANCE}(x,e))$. *Again* cannot apply to this predicate since it is of the wrong functional type. In fact, *again* can only adjoin within the VP after the verb has combined with the subject. For example, *again* can adjoin to the VP $[[\text{Mary danced}]]$ which is extensionally equivalent to $\lambda e (\text{DANCE}(m,e))$, where m is Mary. However, adjoining to this position results in the presupposition in (17).

(17) $\exists e: e < E (\text{DANCE}(m,e))$, where E is the asserted time of the event.

Such a presupposition includes the subject as a participant in the presupposition.

In summary, the theses in (T2) and (T3) predict that there is only one propositional level within VPs headed by intransitive verbs or stative, transitives. Furthermore, such a position necessarily contains the subject.

4.4. Section summary

In this section, it was argued that the presupposition introduced by *again* is determined by its syntactic complement. Considering this property of *again*, the theses in (T1), (T2) and (T3) were able to account for how non-stative, transitive verbs allowed for subjectless presuppositions whereas other verbs did not. According to the thesis in (T1) a non-stative transitive verb and its object form a proposition. Hence *again* is able to adjoin to this syntactic level, a level that does not contain the subject. Adjunction at this point predicts that the subject need not be involved in the presupposition. According to the theses in (T2) and (T3), there are no propositional levels below the point where the subject first merges. Hence *again* can only adjoin to a syntactic node that contains the subject. Adjunction at this point predicts that the subject is necessarily involved in the presupposition.

5. Consequences for quantifiers

The argument for propositional complexity within the VP allows for a unique evaluation of quantifiers. As has been long discussed within the literature, limitations on how high QPs can raise has been guided by evidence from scope interactions and pronominal binding. However, such evidence is not relevant to issues concerning the opposite question; what is the lowest possible position for QPs that is semantically interpretable. With *again* as our tool of analysis, we can make some progress towards addressing such issues. In this section I provide some evidence that QPs cannot be interpreted *in situ* within the VP.

The outline of this section is as follows. First the systematic interaction between QPs and *again* is shown. The presuppositions introduced by *again* demonstrate a different kind of behaviour within the scope of a QP as opposed to outside the scope. Surprisingly, certain readings that are predicted to occur given standard assumptions in Generalized Quantifier Theory (GQT) do not occur.

5.1. Behaviour of quantifiers within and outside of the scope of *again*

The question of how a QP interacts with a variable in a presupposition is a complex issue not addressed in this paper (although see Heim 1988 and Beaver 1994). Rather in this section I will merely be satisfied to note the empirical facts related to the interaction of presuppositions and quantifier variables.

There are two observations to be made. First, in sentences where a QP scopes over *again*, the following generalization holds: when the sentence is true, the participants identified by the QP's variable in the presupposed event are identical to those in the asserted event. Note that although I use the label *presupposed event*, there is some doubt as to whether it is part of a presupposition (see Beaver 1994). Sometimes it seems as if quantification can turn presuppositional information into entailments.

Second, in sentences where *again* scopes over a QP, the following generalization holds: when the sentence is true, the participants identified by the QP in the presupposed event can be different from those in the asserted event. Note, here the presupposed event is truly presuppositional. Below I present sentences to establish the first generalization before addressing the second.

5.1.1. QPs scoping over *again*

When a variable appears within the scope of rightward adjoining *again* while the QP that binds the variable does not, the result is that the participants involved in the asserted event and the presupposed event are identical. This is best demonstrated through examples. Consider the sentences in (18).

- (18) a. For every dryer, I hit it again forcefully.
 b. For at least two tires, Brendan kicked them again forcefully.

In both sentences the QP appears in a *for*-clause that scopes over *again* while also binding a pronoun contained within *again*'s complement. As a consequence, the two presuppositions introduced by (18) pattern the same. The individuals participating in the asserted event are also involved in the presupposition.

This point is best exemplified by the truth conditions for (18a&b). For example, for (18a) to be true, all the dryers that I hit before must be the same ones I hit again. Similarly, for (18b) to be true, the two tires that Brendan kicked before must be the same ones he kicked again.

5.1.2. *Again* scoping over QPs

The influence of *again* on QPs is quite different from the facts above when the QP appears within the scope of *again*. There are two main effects. First the QP appears as part of the presupposition. Second, the QP can be understood as quantifying over a different set of individuals in the presupposition as it does in the assertion. These effects are best demonstrated by some examples. Consider

the sentences below.

- (19) a. Again, I hit every dryer in the Laundromat.
 b. Again, Brendan kicked at least two tires.

In these sentences the participants in the presupposed event can be different from the ones in the asserted event. For example, in assuming the sentences in (19) to be true there is no requirement that the dryers I hit and the tires Brendan kicked be identical to the ones I hit before and Brendan kicked before respectively. It is possible for (19a) to be true and yet for me to never have hit the same dryer twice. In fact, I might not have even been in the same Laundromat. Similarly, it is possible for (19b) to be true and yet for Brendan to never have kicked the same tire twice. He could have kicked two tires on a blue sedan and then two on a green Toyota.

Unlike the examples in 5.1.1, this effect follows naturally from the semantics of *again*. For instance, if *again* combines with [[I hit every dryer in the Laundromat]] the result would be the following presupposition:

- (20) $\exists e: e < E$ ([[I hit every dryer in the Laundromat]]) (e)

With a presupposition like (20), it is as if there are two instances of the QP *every dryer*, one presupposed and the other asserted. This allows QPs to quantify differently in the presuppositional domain as opposed to the asserted domain.

5.2. Unavailable readings for non-resultative, propositionally complex VPs

An interesting consequence of the generalization in 5.1 is that we can test whether a QP is interpretable within the scope of *again*. If the quantificational domains can switch between the assertion and the presupposition then this is good evidence that *again* is scoping over the QP. Furthermore, given the arguments in section 4, it can be assumed that *again* is adjoined VP internally when the sentence introduces a subjectless presupposition. In this section both kinds of diagnostics are combined to test whether object QPs can be interpreted within the VP. As discussed below, the results do not support this possibility.

5.2.1. Standard assumptions and their consequences

A key assumption of GQT (see Barwise & Cooper 1981) is that QPs are interpreted as functions from predicates to propositions. The consequence of this assumption for QR is that QPs can optionally be raised to a propositional level where a satisfaction set can be λ -abstracted to derive a predicate. Whether a QP undergoes QR or is interpreted *in situ*, the VP structure of non-stative, transitive verbs predicts that object QPs should be interpretable VP internally.

Recall that non-stative, transitive verbs are interpreted as a predicate. Hence, object QPs of such verbs should be able to take the verb as an argument in

its base position, yielding a proposition. Also, even if the QP undergoes QR, it should still be interpretable within the VP. As discussed in section 4.2.2, the first propositional level dominating the object position is below the adjunction site for the subject (see figure 3 above). QR should be able to adjoin the QP to this propositional level. In fact, some theories (Fox 2000) predict that it must raise to this (the closest) propositional level. Interestingly, such an interpretation for the QP seems to be unavailable. This is demonstrated in the next section.

5.2.2. *Non-resultative transitive verbs*

Given the predictions about QP interpretation discussed above, rightward adjoining *again* should be able to scope over the object QP while still scoping under the subject. This structure is possible when *again* adjoins just before the merger of the subject. As a result, the QP should be able to quantify differently in the presupposition as opposed to the assertion and yet the sentence should still be able to introduce a subjectless presupposition.

I test this consequence in (21) and (22) below. For each sentence in (21d) and (22d) I give three possible co-texts. The first supports a subjectless presupposition but maintains the same quantificational domain as the assertion. The second supports a presupposition where the quantificational domain of the QP has changed but maintains the involvement of the subject. These two co-texts are meant to demonstrate that the sentences in (d) allow for subjectless presuppositions and quantificational shifts. The co-text in (c) is designed to only support a subjectless presupposition where the quantificational domain of the QP has changed. It is (c) that tests whether the QP is interpretable VP internally.

- (21) a. **CO-TEXT A:** Heather hit every dryer and then ...
 b. **CO-TEXT B:** Jon hit every dryer on 5th Ave. Then, upon entering the Laundromat on 7th Ave...
 c. **CO-TEXT C:** Heather hit every dryer in a Laundromat on 5th st. Jon was told not to imitate. Yet, in the Laundromat on 7th Ave...
 d. Jon hit every dryer again. (A, B, #C)
- (22) a. **CO-TEXT A:** Charlotte kicked the tires on the blue sedan. Then ...
 b. **CO-TEXT B:** Two days ago, Esme kicked at least two tires on the blue sedan. The next day when she saw a similar looking car...
 c. **CO-TEXT C:** Charlotte kicked at least two tires on the blue sedan. Esme was told not to imitate. Yet, upon seeing a similar car...
 d. Esme kicked at least two tires again. (A, B, #C)

As the '#' is meant to symbolize, the co-text in (c) does not support any potential presupposition resulting from the sentence in (d). In other words, the QP cannot be interpreted within the VP despite having the proper structural requirements.

5.2.3. For resultatives, QPs can be interpreted VP-internally

Before concluding this section, let me address and reject one potential analysis for why the QP cannot take scope VP internally, namely the hypothesis that QPs cannot combine with sets of eventualities. In assuming that QPs are functions from predicates to propositions in an event-base Situation Semantics, I have also assumed that QPs have the following kind of interpretation:

$$(23) \quad [[\text{Every dryer}]] = \lambda P \lambda e (\forall x (\exists e' \leq e (\text{DRYER}(x, e') \rightarrow P(x, e'))))$$

Such functions are of the type $\langle\langle e, \langle i, t \rangle \rangle\rangle, \langle i, t \rangle\rangle$, where i is the type assigned to eventualities. However, this need not be the case. If one gives up on a parallel between sentences and VPs, then the facts above could follow from the interpretation rules. For example, one could adopt an event-predicate interpretation for VPs but assign sentences to truth-values. Given this interpretation, the QPs could be assigned the type $\langle\langle e, t \rangle, t \rangle$. Such an assignment would predict that QPs could not take scope within the VP.

There are two reasons why this is not the best explanation. First, such assumptions would lose the uniform interpretation of *again*. There would have to be two *again*'s, one operating on event predicates and another on truth-values. Yet, the two *again*'s would have to generate the same kind of presupposition. It is unclear how this could be done.

Second, there is evidence that resultative VPs allow QPs to take scope within the VP. Thus, it is not true that QPs cannot be interpreted within VPs in general. (Note, this reading is only allowed for verbs that demonstrate a causative/inchoative alternation.) Consider (24) below.

- (24) a. **CO-TEXT:** Every house Seymour and Wanda moved into, the first thing Wanda did was open at least two windows to get a nice breeze. After Wanda took tragically ill and died, Seymour missed her so much that he kept her windows open. It reminded him of her presence. In fact, when he moved into his next apartment...
- b. Seymour opened at least two windows again in memory of Wanda.

The co-text in (24a) supports the presupposition introduced by (24b). Note that in the co-text, Seymour did not open the windows the first time. Hence, *again* in (24b) is scoping under the adjunction site for the subject. Furthermore, no window needed to be opened twice for (24b) to be true. This suggests that *again* is scoping over the quantifier. In summary, *again* can scope under the adjunction site of the subject but over the QP. Hence, the QP is interpretable within the VP.

Note, it could be argued that resultative VPs (especially those with verbs that demonstrate a causative/inchoative alternation like *open*) are more propositionally complex than simple non-statives (see von Stechow 1996 and Beck & Johnson 2004). The added complexity might be the key to explaining why QPs can take scope within the VP. However, I leave exploration of this connection to future research.

5.3. Section summary

In this section it was argued that common assumptions stemming from GQT predict that object QPs should be interpretable within the VP of a non-stative, transitive verb. As shown above, sentences with non-resultative, transitive verbs generally do not allow QPs to be so interpreted. However, sentences with resultative verbs that demonstrate a causative-inchoative alternation do. Such verbs arguably generate a more complex VP than other non-statives.

6. Conclusion

In this paper, I used facts about syntactic complexity to argue for a certain semantic interpretation of verbs, namely that non-stative, transitive verbs are functions from individuals to propositions while intransitive verbs and stative, transitive verbs are function from individuals to predicates. The result of this semantic thesis is that only non-stative, transitive verbs permit a propositional level before the merger of the subject. Stated otherwise, only non-stative, transitive VPs are propositionally complex.

This consequence was supported by evidence from *again*. As I argued, *again*'s syntactic complement is a proposition that strictly determines the content of the presupposition. Thus, the fact that sentences with rightward adjoining *again* and non-stative, transitive verbs permit subjectless presuppositions suggests that the verb and object form a propositional level before the merger of the subject. In contrast to non-stative transitive verbs, sentences with intransitive or stative-transitive verbs do not permit subjectless presuppositions, thus suggesting that the verb and object do not form a propositional level before the merger of the subject.

Endnotes

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¹ Basic assumptions are consistent with other versions of Situation Semantics (see Barwise & Perry 1981; Kratzer 1989 and references therein).

² The evidence for the German word *wieder* is well-documented (see von Stechow 1996) although not without controversy (see Jäger & Blutner 2003).

³ Bale (2005) justifies the separation of restitutive from subjectless readings.

⁴ There are some exceptions. *Look at*, *won*, and *think* do not permit subjectless presuppositions. A reviewer suggested a division class in terms of the affectedness of the object. However, verbs such as *listen to* and *complain about* allow subjectless presuppositions. See Bale (2005) for details.

⁵ *Hear* and *see* are two exceptions. See Bale, 2005 for details.

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