

# The Dual Analysis of Adjuncts/Complements in Categorial Grammar

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## Abstract

The distinction between COMPLEMENTS and ADJUNCTS has a long tradition in grammatical theory, and it is also included in some way or other in most current formal linguistic theories. But it is a highly vexed distinction for several reasons, one of which is that no diagnostic criteria have emerged that will reliably distinguish adjuncts from complements in all cases — too many examples seem to fall into the crack between the two categories, no matter how theorists wrestle with them.

In this paper, I will argue that this empirical diagnostic “problem” is, in fact, precisely what we should expect to find in natural language, when a proper understanding of the adjunct/complement distinction is achieved: the key hypothesis is that a complete grammar should provide a DUAL ANALYSIS of every complement as an adjunct, and potentially, an analysis of any adjunct as a complement. What this means and why it is motivated by linguistic evidence will be discussed in detail.

# 1 PRELIMINARIES: PHENOMENA AND THEORY

## 1.1 THE PRE-THEORETIC NOTIONS OF ADJUNCT VS. COMPLEMENT

We will begin with some basic, intuitive, characteristics that have motivated linguists to draw the adjunct/complement distinction over the years, whatever their theory (if any) of these categories. That is, we start from common *pre-theoretic* notions of how adjuncts differ from complements, and proceed to build a formal account that, as first goal, satisfies these:

- **Syntax: An adjunct is an ‘optional element’, while a complement is an ‘obligatory element’.**
- **Semantics: An adjunct ‘modifies’ the meaning of its head, while a complement ‘completes’ the meaning of its head.**

To try to spell out more concretely what these entail, I propose the following restatement of them; I have chosen this particular way of formulating them because it will help us to better see how the theory presented below does satisfy them, but I believe this formulation is still consistent with linguists’ pre-theoretic notions.

- **An adjunct is ‘optional’ while a complement is ‘obligatory’:**
  - A constituent  $Y$  in a phrase  $[XY]$  (or in  $[YX]$ ) is an ADJUNCT if and only if (i) phrase  $X$  by itself (without  $Y$ ) is also a well-formed constituent, and (ii)  $X$  (without  $Y$ ) is of the SAME syntactic category as phrase  $[XY]$ . ( $X$  is in this case the HEAD of the phrase  $[XY]$ .)
  - Then, a constituent  $Y$  in  $[XY]$  is a COMPLEMENT if and only if (i)  $X$  by itself (without  $Y$ ) is not well-formed, or else (ii) if it is grammatical, then  $X$  standing alone not have the same category as in  $[XY]$  (and does not have exactly the same meaning as it has in  $[XY]$ ).

The caveat in (ii) is needed to allow for *elliptical complements*, which this criterion might otherwise class as adjuncts; see more just below.
- **An adjunct ‘modifies’ the meaning of its head, while a complement ‘completes’ its head’s meaning.**
  - If  $Y$  is an adjunct, the meaning of  $[XY]$  has the same kind of meaning (same logical type) as that of  $X$ , and  $Y$  merely restricts  $[X Y]$  to a proper subset of the meaning/denotation of  $X$  alone.

- Where  $Y$  is a complement in  $[XY]$ , (i) the meaning of  $X$  by itself, without  $Y$ , is incomplete or incoherent. Else, (ii)  $X$  must be understood elliptically — the hearer must imagine/infer some context-dependent or anaphoric meaning of the general kind of  $Y$  to “fill in” the semantic slot that  $X$  requires semantically<sup>1</sup>. (For example both *eat lunch* and *eat* alone are grammatical VPs, but the latter must be understood as “eat something or other”, so *lunch* is a complement, not an adjunct.)
- Also, the same adjunct combined with different heads affects their meaning in the “same” way semantically (e.g. *walk slowly* vs. *write slowly*). But the same complement can have more radically different effects with different heads (e.g. *manage to leave* vs. *refuse to leave*).

There are, to be sure, a number of well-known problematic cases of adjuncts and complements that don’t quite fit these characterizations (for example, intensional adjuncts like *utter* in *utter fool*), but I still maintain that these general, pre-theoretic characteristics are the first and most basic properties that a linguistic accounts of adjuncts vs. complements should capture.

## 1.2 SOME CATEGORIAL GRAMMAR FUNDAMENTALS

Although the hypothesis of the dual analysis of Complements as Adjuncts could possibly be formulated within other current grammatical frameworks, it is the theory of Categorical Grammar<sup>2</sup> (henceforth: CG) that offers a particularly direct and compelling way of implementing this hypothesis: because of the tight connection between syntactic analysis and compositional semantics in CG, stronger than in any other current theory, we can show within CG that many of the semantic properties of the argument/modifier distinction follow directly from the syntactic CG characterization of adjunct/complement (and vice-versa).

For this reason, we need to explain some assumptions, familiar within CG for a long time now (cf. (Venneman & Harlow 1977)), as to how the basic distinction is to be made in that theory; these are stated further below in (2). But for this, in turn, we first need to review the way categories are named and are combined to form constituents in CG:

- (1) a. Standard definitions of syntactic categories: these include both PRIMITIVE CATEGORIES, denoted by simple symbols (usually only these three:  $S$ ,  $N$  (common nouns), and  $NP$ ), and COMPLEX CATEGORIES, formed (recursively) from a pair of more basic categories by “/” and “\”; e.g.  $S/NP$ ,  $NP\S$ ,  $S/S$ ,  $S/(NP\S)$ , etc.)
- b. How groups of syntactic categories are put together to form constituents:  $A/B + B \Rightarrow A$ . (“Where  $A$  and  $B$  stand for any categories, a category with a name of the form ‘ $A/B$ ’ will combine with a category named ‘ $B$ ’, to its right, to form a phrase ‘ $[A/B B]$ ’ of category ‘ $A$ ’”. Cf. a (nearly) equivalent phrase structure rule  $A \rightarrow A/B B$ ”). (This rule-schema is called the *Functional Application Rule Schema*, also known as *Slash Elimination* and as *the L-rule for /.*)

<sup>1</sup>Admittedly, the difference between elliptical complements and adjuncts is hard to establish empirically for certain individual examples. However, we will see later on in this paper why the indeterminacy of some particular examples is in fact just what the dual analysis view predicts.

<sup>2</sup>Since the audience for this paper includes readers unfamiliar with recent versions of categorial grammar (or *type-logical syntax*, as these are called), my presentation here is deliberately kept informal and simple, e.g. phrase structure trees will often be used in place of natural deductions or Gentzen sequent derivations. For a systematic and detailed introduction to categorial grammar, see Carpenter (1997) or Morrill (1994).

However, readers with more extensive knowledge of type-logical syntax should keep in mind that everything presented here is intended to be formulatable more precisely. To treat the problems in this paper, the Associative Lambek Calculus ( $\mathbf{L}$ ) will suffice, and all theorems of  $\mathbf{L}$  will therefore hold. For a larger fragment of English, one should choose a multi-modal system, to be able to treat both hierarchical and “flat” natural language constituents correctly, and to include both wrapping (Dowty 1996) and occasional free word order. The syntactic features mentioned below can be treated (conservatively) by introducing them only on the primitive types; the result is that the number of primitive types is large but still finite, and since no new provision is needed for features in the logical rules (Slash-Elimination and Introduction), the logic of  $\mathbf{L}$  remains intact.

Note that where the slash direction is reversed, ( $A/B$  vs.  $B\backslash A$ ) the left-right order in which the two constituents are combined is to be reversed:  $B + B\backslash A \Rightarrow A$ .

- c. Semantic interpretation via the CURRY-HOWARD ISOMORPHISM:<sup>3</sup> compositional meaning is uniquely and rigidly determined by syntactic structure; the only two possibilities are (semantic) functional application (for Slash-Elimination) and functional abstraction (for Slash-Introduction). In other words, all other kinds of compositional semantic effects, within a construction, must be attributed to meanings of one or more lexical items in the construction (usually, the head), not to compositional semantic rules specific to the construction. This can be viewed as the semantic counterpart of what has been called the “Radical Lexicalism” (Karttunen 1989) that CG demands.
- d. Categorical Grammar derivation trees have traditionally been conceived of as built up from the leaves of the tree (words) “upward” to the root node, rather than generating a tree from the top node (the root) downward as in PS grammars. Hence, the category that would “dominate” two constituents in PS terms is called the RESULT CATEGORY. This different viewpoint on derivations does not ultimately make any theoretical difference at all, but I will adopt the bottom-up terminology in this paper.

## 2 COMPLEMENT VS. ADJUNCT IN CATEGORIAL GRAMMAR

### 2.1 THE TRADITIONAL CHARACTERIZATIONS

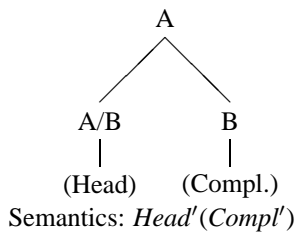
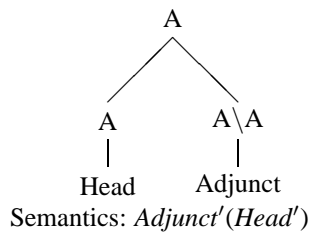
Now, we show how a formal but general definition of *complement* and *adjunct* can be made in CG in a way that generalizes across all kinds of syntactic categories. (These definitions can be traced back to Venneman & Harlow (1977).) The distinction is NOT made in terms of phrase-structure configurations and does not mention specific syntactic categories. Rather, the definitions of *head*, *complement* and *adjunct*, are META-CATEGORIAL DEFINITIONS: they use  $A$  and  $B$  as variables over category names, and the characterization depends on the relationship between the relative form of two category names that enter into a combination. Since both grammatical function and semantic interpretation in CG are fully determined by the form of a category name and the category name it is combined with, it is perfectly natural that these meta-categories are specifiable this way in CG.

- (2) a. A **Head-Complement Structure** is defined in CG as any syntactic combination of two constituents having the form  $[A/B B]$  (or else  $[B B\backslash A]$ ), where  $A$  and  $B$  are any categories with the condition that  $A$  and  $B$  are not the same category: here,  $A/B$  is the *Head*<sup>4</sup> and  $B$  is the *complement*.
- b. A **Head-Adjunct Structure** is defined in CG as any combination of two constituents having the form  $[A A\backslash A]$  (or else  $[A/A A]$ ), where  $A$  stands for any category; here,  $A$  is the head and  $A\backslash A$  is the *Adjunct*.

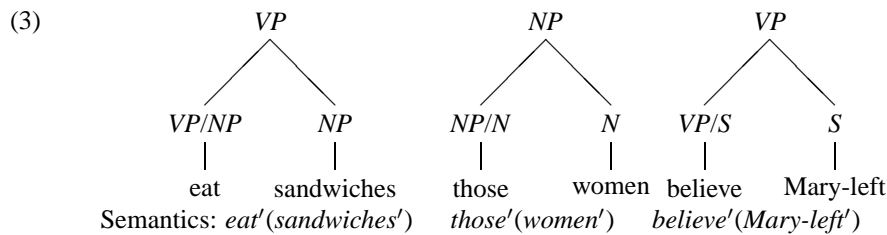
<sup>3</sup>See (Carpenter 1997) for an exact account of the so-called Curry-Howard Isomorphism

<sup>4</sup>This characterization of *Head* has been criticized because it appears that certain heads would incorrectly be classed as adjuncts, even when morphological features are taken into account. For example, in “John can *help* wash the car”, the form of the verb *help* is determined by its head (*can*), i.e. must bear the inflectional feature [BASE]. In turn, *help* itself governs a complement VP of form [BASE], so its fully specified category is ‘ $VP_{[base]}/VP_{[base]}$ ’. (In other Germanic languages this situation arises more frequently than in English.)

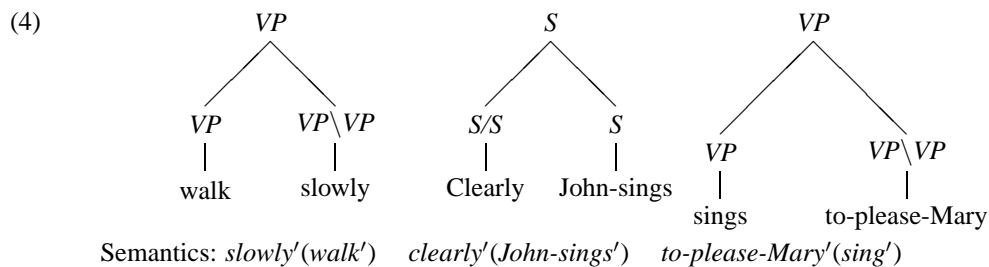
The first step to understanding this problem is distinguishing agreement from government in CG. This can be done by (i) incorporating features into category names (though only on the primitive categories, so the logic of  $\mathbf{L}$  remains fully intact), and (ii) assigning category membership of many words to category *schemata*, not just to fully specified categories. An item that should AGREE in all features with its VP ‘head’ (i.e., an adjunct modifying this VP) will be assigned to category  $VP_{\alpha}\backslash VP_{\alpha}$ , where  $\alpha$  stands for a range of features (finiteness, number, inflectional class, etc.) with feature values specified for these, as long as the corresponding feature values are the same in both occurrences of  $\alpha$ . A word that GOVERNS a morphological category has a fixed feature specification on its argument category, e.g.  $VP/NP_{[acc]}$  for transitive verbs. The verb *help* agrees with

**Head-Complement Structure:***A, B any categories,  $A \neq B$* **Head-Adjunct Structure:***A any category*

For example, all of the cases in (3) fit the characterization of Head-Complement structures: (here, *VP* is a notational abbreviation for  $N \setminus S$ ),



and (4) shows examples of adjunct constructions:



It is immediately clear why the obligatoriness of complements is captured: since the category of the head by itself is not the same as the category of [head + complement], the head alone cannot fill the same grammatical slots as the [head + complement] phrase can fill; likewise semantically, the meaning of the head alone is not the same semantic type as that of the phrase, hence the meaning of the head alone is 'incomplete' without the complement meaning and cannot yield a meaning of the required semantic type for the phrase as a whole. Conversely, it should be easy to see how it does follow from the characterization of Head-Adjunct structures that adjuncts are 'optional' in both syntax and semantics.

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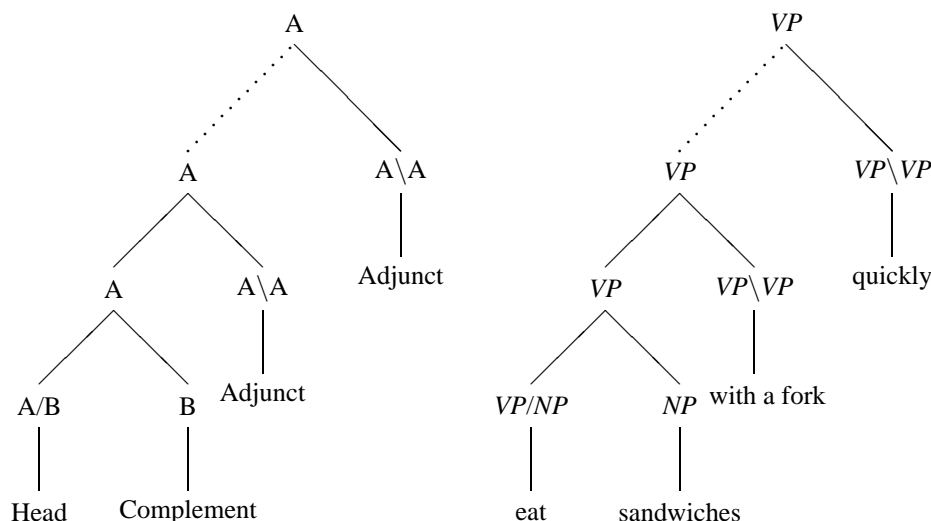
features of its 'head' (*is helping wash dishes, has helped wash dishes, etc.*) but governs the feature [BASE] on its complement, so it would belong to category  $VP_{\alpha}/VP_{[BASE]}$ . (Actually, we do not really need to refer to the notation  $VP_{\alpha} \setminus VP_{\alpha}$  to define agreement in adjuncts: since features play a role in distinguishing one category from another, these cases are just an instance of  $A/A$ . Similarly,  $VP_{\alpha}/VP_{[BASE]}$  is not really an instance of  $A/A$  but a kind of  $A/B$ .) Once we have such morphologically-specified categories and a treatment of category schemata like  $VP_{\alpha} \setminus VP_{\alpha}$  in the Lexicon, then there is no real purpose for the notion of *head* to play in the syntax itself. Even if the particular inflectional form of *help* in this example is  $VP_{base}/VP_{base}$ , all the morphosyntactic and grammatical properties are still correctly described in this and related sentences with *help*.

If for convenience we want to speak of "heads" in the traditional sense, we can do so via implicit reference to the *lexeme* a word belongs to in the Lexicon, not the particular *inflectional form* that realizes the lexeme in a given sentence.

## 2.2 WHEN A HEAD HAS BOTH COMPLEMENT AND ADJUNCTS

Two further predictions follow immediately from these characterizations which correspond to old observations about adjuncts vs. arguments: (i) multiple adjuncts (an unlimited number), can accompany the same head (indicated by the dotted line in the diagram), while only a fixed number of complement(s) can accompany a head (viz. just the one (or two, etc.) subcategorized by the particular head), and (ii) when both complement(s) and adjunct(s) accompany the same head, the complement must generally be “closer” to the head, with the adjunct(s) “outside” the complement. The reasons for these predictions can be seen from this schematic derivation tree and example:

### (5) Both Complements and Adjuncts of the same Head:



Because the addition of an adjunct to a head leaves the result category the same as the head’s category, one can continue to add on more and more adjuncts at will: this is because the highest phrasal category in the tree will always be the same category (here,  $A$ ) as the one below it. But the combination of a complement (here  $B$ ) with a head ( $A/B$ ) produces a different result category from that of the head (result is  $A$ ), hence each specified complement must be added exactly once, never more than once. Also, the adjunct(s) can be added only *after* the complement, because the category with which the adjunct can combine is not present until the complement has been added, thus explaining why adjuncts (in this category configuration) occur “outside” complements. And of course the observation that complements typically occur closer to their head than adjuncts do.<sup>5</sup>

Similar predictions of course follow from *X-Bar Theory* in other syntactic frameworks, but usually only as a result of stipulating the principles of *X-Bar Theory* separately from the underlying definition of a phrase-structure grammar.

<sup>5</sup>A further caveat is needed here. While it is clear from the tree above why a complement  $B$  should appear closer to the head than the adjunct  $A \setminus A$  does, what about the case of a phrase  $[[A/B (A/B) \setminus (A/B)] B]$  in which there is an “inner” adjunct that would seem to have to appear closer to the head than the complement  $B$ ? We can fix this problem by relativizing the characterization of adjunct (and complement) to the particular configuration in which it appears: (i)  $A \setminus A$  is an adjunct in a phrase  $A$  iff  $A$  is an instance of the configuration  $[A A \setminus A]$ ; we may also say that  $A \setminus A$  is an adjunct to  $A$  or, if  $A$  is phrasal, an adjunct to the head of  $A$ . (ii)  $B$  is a complement in phrase  $A$  iff  $A$  is an instance of  $[A/B B]$  (or an instance of  $[A/B/C C B]$ , etc.) The generalization about closeness to the head should apply only to elements that are “in” the same phrase: in  $[[A/B (A/B) \setminus (A/B)] B]$ ,  $B$  is a complement in the phrase  $A$ , while  $(A/B) \setminus (A/B)$  is an adjunct only in the phrase  $A/B$ .

The important point here is that here these predictions already follow simply from the bare fundamentals of CG theory, together with our definition of *adjunct* and *complement*.

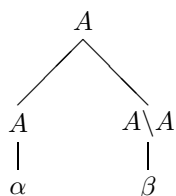
### 2.3 SUBCATEGORIZED ADJUNCTS

Traditional grammar has sometimes viewed *adjunct* and *complement* as fixed sets of syntactic categories – for example, Adjective and Adverb were considered adjunct categories, once and for all, and Noun (Phrases) were considered complement categories. But more recently it has been recognized that adjectives and even adverbs do in certain contexts appear to behave like complements. Some examples are in (6): the verb *tower* seems to take a locative PP as a complement, and verbs *treat* and *behave* take adverbs as complements:

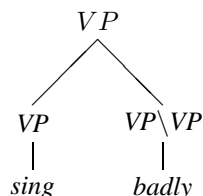
- (6) a. The campanile towers over the Berkeley campus  
 #The campanile towers.  
 b. He always treated me fairly.  
 #He always treated me. (*OK only with different meaning for treat*).<sup>6</sup>  
 c. Johnny behaved badly.  
 #Johnny behaved. (*OK only with different meaning for behave*)

The term SUBCATEGORIZED ADJUNCT has been used for such cases.<sup>7</sup> Notice that the CG account of adjuncts above, in not treating “adjunct” as a fixed set of categories list of categories, does already offer an interesting way of characterizing a subcategorized ‘adjunct’. In a head-complement configuration,  $[A/B B]$ , the complement  $B$  can be any category whatsoever, including one that is an adjunct category in other configuration: viz., where  $B = C \setminus C$ . Also,  $C$  can be equal to  $A$  here, so that  $B = A \setminus A$ . This possibility is illustrated in (7), where (7a) is the typical configuration in which  $VP \setminus VP$  (the category of (verb-phrase) adverbs) occurs as an adjunct. But (7b) shows the case where an adverb occurs as a complement:

- (7) a. **normal adjunct structure:**



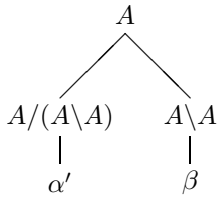
**Example:**



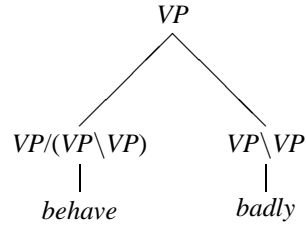
<sup>6</sup>To be sure, *He always treated me* can in fact be a grammatical string, but in the grammatical reading of it *treat* does not have the same meaning as it does in *treat me fairly*, and the same is true for *behave (badly)*.

<sup>7</sup>Do not confuse this with theories in which ALL heads subcategorize for their adjuncts, as in some versions of HPSG

b. **Head-Complement structure with “subcategorized adjunct”:**



**Example:**



In fact, we now adopt the category configuration in (7b) as the basis of our definition of SUBCATEGORIZED ADJUNCT.

Many readers will notice that (7b) is reminiscent of TYPE TRAISSING, a rule (or theorem) in most versions of CG which can at any time convert a category  $A$  to  $B/(A \setminus B)$ . We do not however intend such type raisings to count as heads of subcategorized adjuncts. There are two differences:

- The adjunct-taking head has the more complex category ‘in the Lexicon’, it is not derived syntactically from the less complex category. Thus, ‘reanalysis of adjuncts’ is a change that happens within the Lexicon, in one way or another.
- Whereas the semantics of true type-raising constructions is strictly determined by the rule itself, the semantics of the head (functor) is not completely rule-predicted and can be obtained only from the lexical entry:

Type Raising of  $\alpha$ :  $\alpha' \Rightarrow \lambda f[f(\alpha')]$   
 Adjunct reanalysis of  $\alpha$ :  $\alpha' \Rightarrow \alpha'', \quad \alpha'' \neq \lambda f[f(\alpha')]$

This semantic difference is in fact a very important characteristic of argument-to-adjunct reanalyses as presented in this paper, as we will see in the following sections.

### 3 THE DUAL ANALYSIS HYPOTHESIS

#### 3.1 A CASE STUDY: LOCATIVE VS. DATIVE *To*

Perhaps the best way to begin to see motivation for the dual analysis is to examine a (very) familiar case where the same prepositional phrase has different meanings with different verbs: English PP’s headed by *to* which sometimes have directional, sometimes non-directional meaning. The directional readings, which are systematic and perfectly compositional, are exemplified in (8a)–(8c):

- (8) a. Mary kicked the ball to the fence.  
 b. John pushed the desk to the wall.  
 c. Sue slid the paperweight to the edge of the table.

In these cases, the transitive verb always denotes an action performed on the direct-object’s referent, and the *to*-PP always adds the information that the object of *to* denotes the new location at/near which the direct object referent ends

up as a result of the action performed on it. Such examples can readily be constructed with dozens of transitive verbs of motion.

But (9a)–(9c) are different semantically from the above:

- (9) a. Mary explained the memo to John.  
b. Mary rented the apartment to John.  
c. John offered a glass of tomato juice to Mary.

(9a) does not mean that the memo itself came to be at/near John, but only that the *information* contained in the memo came to be more fully understood by John, as a result of Mary’s explanation. In (9b), however, neither the apartment nor its “semantic content” changes location: rather, because the verb is *rent*, we understand that a kind of temporary ownership of the apartment is acquired by John (subject to the conditions of the rent agreement). With *offer*, neither the glass of tomato juice nor its ownership changes location or possession — what happens is that Mary acquires the *option* to take possession of of the tomato juice, if she so chooses.

Examples of such “ambiguity” can be reproduced with many other prepositions (locative *remove it from the table* vs. non-locative *learn it from the doctor*), and in other languages. We want to reexamine it here in detail anyway, to delve into the reasoning behind the two best-known ways to try to solve it.

### 3.1.1 FIRST APPROACH: “ABSTRACT THEMATIC ROLES”

Gruber (1965), Jackendoff (1972) (and later papers by Jackendoff), Fillmore (1968), and others urged us to analyze the preposition meanings in (8) as well as (9) so that all signify the same thematic role (or abstract deep case), called *GOAL*. The meaning of *GOAL* is broad enough to represent both literal change in physical location (directional) in (8), and abstract change in some property not involving literal motion, thus no ambiguity in *to* need be postulated at all. The same is done with *SOURCE* and *LOCATION*, so all non-locative “changes of state” marked by preposition are reduced to abstract versions of locative prepositions; this approach has been called the ‘Localist Hypothesis’ by Anderson (1971))

This idea gained widely support. But what Gruber and Jackendoff do not ever fully explain to us is how, exactly, the semantic component of the grammar determines which kind of meaning *GOAL* has in which example. After all, *kick the ball to the fence* cannot mean that the fence acquires possession of the ball, any more than (9a) can mean that the memo itself moved to John’s location.

The situation is actually worse than this: the various abstract instances of *GOAL* differ semantically from each other in unpredictable ways. With *explain*, the *GOAL* apparently means “transfer of the information contained in something to NP, but in a more intelligible form.’. With *rent* does not mean “transfer the information in the apartment”, nor conversely can *GOAL* with *explain* refer to a change in possession of (something). With *offer*, *GOAL* refers to a transition in an *option to acquire*, but neither a transfer in information content nor a change in possession. (There are even examples of *to* that don’t refer to a transition into a state at all, but rather the avoidance of such a transition: *refuse a hearing to the prisoner*, *deny requests to all of them*.)

Thus (as has been recognized by the critics of Jackendoff and Gruber for some time), the abstract element *GOAL* is not really a semantic element that can play any consistent, useful part in the compositional semantics of all sentences involving *to*: *GOAL* is merely a label for a class of cases which may intuitively seem somehow related, but for which we still do not have a real semantic analysis.

### 3.1.2 SECOND APPROACH: AMBIGUITY BETWEEN ADJUNCT AND SYNTACTIC MARKER

Logicians, and many semantically conscious linguists, have long regarded the various non-locative occurrences of prepositions as purely grammatical markers, with the verb of the sentence being the sole semantic source of the multi-place relation being expressed: *Mary gives the book to John* is thus represented logically using a 3-place relation *give*:

**give(m, the-book, j)**

A currently popular syntactic implementation, then, is to postulate an ambiguity in every relevant preposition (*to*, *from*, *at*; *off of*, *on*, *onto*, etc.) between (i) a meaning-bearing literal locational preposition, and (ii) a syntactic artifact, a (semantically vacuous) idiosyncratic “case marker”, “case marking preposition”. This permits us to give a correct account of sentences with non-locative PP’s, but it is ultimately satisfactory?

Note that this approach fails to make any connection in the grammar or semantics between locative *to* and abstract “dative” *to*, between locative *from* and abstract “Source”; it leaves it entirely as a grammatical accident that example after example of prepositions and morphological cases, in language after language (though not in every language), shows this synchronicity.<sup>8</sup>

Ultimately, this connection must have its origin in the psychology of language acquisition or cognition itself: Clark & Carpenter (1989) show that many English-speaking children make several systematic “errors” in acquiring the ways that “Source” is expressed in English, which taken together, imply unmistakably that children are at some stages working with an underlying concept of “Source” of just the Gruber-Jackendoff kind.

### 3.1.3 THE DUAL ANALYSIS: CASE-MARKING-*to* AS A REANALYSIS OF DIRECTIONAL ADJUNCT-*to*

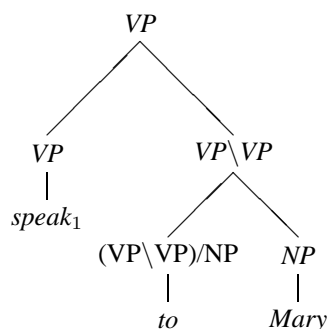
Is there no way to better describe the case-localist connection in terms of grammar, or must grammar theorists sit back until some other field (psychology of language?) solves this difficult problem? In fact, I think we can improve on the formal theoretical side of the problem significantly, and the first important step is the DUAL ANALYSIS HYPOTHESIS.

The idea behind the dual analysis view can be thought of (for now, anyway) as the claim that the locative adjunct analysis of *all* occurrences of *to*, *from* and other locative prepositions is a PRELIMINARY ANALYSIS which serve language-learners as a semantic “hint” or “crutch” to figuring out the idiosyncratic correct meaning of the complement analysis for the non-locative instances: a preliminary *adjunct* analysis of the *to*-PP (as locative) (10a) gives way to a *complement analysis* of *to*-PP structure as in (10b):

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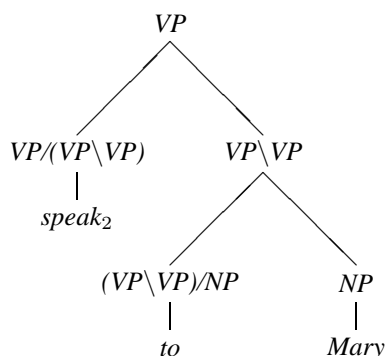
<sup>8</sup>Finnish, a non-Indo-European language, would at first seem devoid of this kind of connection, since it has three complete sets of four kinds of cases (which replace prepositions in that language): one set relating to enclosures (for “out of”, “in”, and “into”), a parallel set for surfaces (“off of”, “on”, “onto”), a third set relating to proximate location (“at/near to”, “away from”, etc.) and a fourth, (morphologically distinct) set for abstract, non-locative transitions (non-locative Source, State, and Goal). However, it turns out that this last set is historically derived from an older set of case markers which signified locative transitions, before the first three sets came into the language. So even Finnish, though its history, reveals the same deeper connection between Local and corresponding Non-Local case marking as seen elsewhere.

(10) a. **adjunct structure:**



Sem:  $(to'(Mary))(speak_1')$

b. **complement reanalysis:**<sup>9</sup>



Sem:  $speak_2'(to'(Mary'))$

The semantic interpretation of *John speaks to Mary*, under the adjunct analysis as in (a) is “John speaks, and the result of this action is that John ends up in a location next to Mary”—not the real intended meaning of the sentence of course, but a rough “hint” for the learner who has not grasped the “speak-to” construction. Note that in the complement interpretation of  $speak_2$  (in (b)) cannot be the same as  $speak_1$  in (a): rather, it takes the change-of-place *to*-“adjunct” as its semantic argument, and its meaning is something like “speak, with the intention that the verbal content of what one is saying will end up at a certain place (*to-Mary*) and will be understood there”<sup>9</sup>; in other words, the proper way to interpret *to Mary* here is now built into the meaning of  $speak_2$ .

### 3.2 THE COGNITIVE ‘TRADE-OFF’ BETWEEN ADJUNCTS AND COMPLEMENTS

But why should languages really need an adjunct analysis as a “preliminary step” toward a complement analysis, anyway? If we step back and reflect on the communicative advantages of each, vs. the language-learning advantages of each, we can see that there is a trade-off between the two analyses.

- If we focus on the effort required from the learner of a language, then an adjunct analysis offers the advantage of yielding more quasi-multi-place predications at a lesser load on lexical memory —because they are semantically compositional. Suppose the lexicon of a language has  $n$  different intransitive verbs (say, 100 verbs) and  $m$  different prepositions that can form adjuncts (say 10 prepositions), then compositional syntactic and semantic rules automatically produce  $(n \times m)$  different two-place predications (= 1000 in this case), all of which have distinct meanings. By contrast, if the learner had to express all these two-place predications by learning individual transitive verbs, she would need to learn 1000 different lexical items. But adjunct analyses achieve this advantage at the cost of a limitation on the range of meanings that can be expressed:
- If we focus on the semantic expressivity of the language, then lexical two-place predicates (verbs taking an object as well as subject) have an advantage over the quasi-two-place predications derived by adding adjuncts: Though there may be 1000  $(m \times n)$  of the adjunct-derived meanings, these meanings are all limited, in a way

<sup>9</sup>Although this structure is actually perfectly adequate for both the semantics and syntax of complement reanalysis, there is no reason why it could not be further simplified, if desired, to replace the adjunct category  $VP \setminus VP$  with a simple, non-adjunct category like  $PP$ —i.e.  $speak_2$  would also belong to  $VP/PP_{[TO]}$  here, and  $to$  to  $PP_{[TO]}/NP$ , with  $to$  translating as the identity function, insofar as its adjunct meaning is otiose.

that the lexical meanings are not, to what is produced by a consistent compositional semantic rule that combines a verb meaning with a preposition meaning.<sup>10</sup> Each lexical two-place predicates can express ANY imaginable (humanly ‘processable’) two-place semantic relation Thus we achieve greater expressivity at the cost of a larger burden for the language learner.

This is just the trade-off we saw with *to*: we can compositionally generate lots and lots of adjunct-derived locative two-place semantic relations with little effort (*walk to, drive to, swim to, walk from, drive from, swim from, etc.* but none of these can correctly express the semantic relation lexicalized in *speak to, rent to* and *offer to*, which instead must be learned as individual items. However, by allowing the language learner to access the adjunct analysis as a fruitful preliminary “clue”, one would soften the learning burden. If some multi-place relations like *speak to, rent to* look superficially the same as an adjunct structures, then the learner will be led through the preliminary step automatically.

This “trade-off” may not be a very earth-shaking idea for locative-*to* vs. “dative” *to*, but note that my claim here is that this same trade-off applies to *all* parallel cases of an adjunct vs. a superficially similar complement – for example, infinitive adjuncts (e.g. *sing to please Mary*) vs. infinitive complements (*try to please Mary*), and the dozen other cases in §??.

### 3.3 EXTENSION TO ADJUNCTS/COMPLEMENTS IN GENERAL

Against this background of the need for dual analyses of derived words and collocations, I believe we can better understand what is being claimed about dual analyses of complements and adjuncts:

- Virtually all complements have a dual analysis as adjuncts, and any kind of adjunct can potentially receive an analysis as a complement.
- The dual analysis is often hard to recognize because:
  - Often, the adjunct analysis serves merely as a mnemonic for the complement analysis, and/or as an aid to learning what the complement means when the structure is first acquired by the language learned
  - Or else only a few members of a pattern have salient complement readings, while adjunct readings appear in most cases.

### 3.4 A SECOND CASE STUDY: AGENT PHRASES IN PASSIVES

In the case of the dual analysis just discussed, individual verbs differ fairly sharply as to whether they ultimately take adjunct or complement *to*. In other cases to be discussed below, a single verb may still permit, in “adult” speech, both

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<sup>10</sup>This claim about expressive advantages of complements actually only follows if we make some further (but plausible) formal limitation on adjunct meanings beyond that which is implicit in the standard semantic interpretation of CG categories  $A \setminus A$ . Logicians and linguistic semanticists have traditionally treated most adjectives and adverbs as one-place predicates (i.e., a *Republican senator* is simply anyone who is both a Republican and a senator), hence the compositional semantic rule for  $\text{Adj-N plus N}$ , or for  $\text{VP-Adv plus V}$ , must yield the intersection of two predicate denotations. To be sure, Montague (1974) chose the type  $vp \setminus vp$  (etc.) precisely because it allowed for intensional as well as set-intersective modifiers to be accommodated, and Parsons (1980) showed exactly how the semantics of the intersective cases would work out. Nevertheless, the category  $VP \setminus VP$  itself inherently allows both kinds of meanings, so a further limitation needs to be imposed: specifically, all modifiers must initially have the semantics of intersective modifiers. See Dowty (1997) for details.

On a related topic, Kasper (1997) shows that there is apparently a fundamental problem with employing modifiers only in categories  $A \setminus A$  that arises in instances of recursive modification (e.g. *an unbelievably expensive hotel*); if unsolvable, this problem could put CG’s whole compositional approach to modifiers in question. Fortunately, WHITMAN:2001 has devised a fairly simple way to circumvent the problem within standard CG, which has parallels to the way Kasper proposes to treat it within HPSG.

an adjunct reading and a complement reading equally, or else a whole construction may prefer the adjunct reading almost exclusively, or the complement reading almost exclusively—the last possibility being illustrated by agent phrases in passives. My proposal is that all these possibilities should to be treated formally via dual analyses, with it being left to psycho-linguistics to determine exactly how these cases differ in mental processing.

The agent phrase of a passive (*by Mary in John was visited by Mary*) has been frequently analyzed as an adjunct, but just as frequently analyzed as an instance of “prepositional case marking”. I.e. the *by*-phrase is a complement of the passive verb, but *by* has no independent meaning of its own, it is merely the marker that passive verbs subcategorize for. The dual analysis of *by*-phrases will provide a second useful case study, because it differs from the dative *to*-phrase in several ways; notably, it involves a syntactic/morphological construction, not just single verbs, and more importantly, it shows how the dual analysis is motivated by diachronic and typological facts, not just “thought experiments” in language acquisition.

One reason to believe that passive agent phrases are possibly adjuncts is that the meaning borne by the *by*-phrase in a passive, as in (11) seems intuitively very similar to that of other *by*-phrases as in (12) that do not accompany a passive verb and hence must necessarily be analyzed as adjuncts:

(11) John was touched by Mary

(12) This book is by Frege.

A dress by Chanel.

She sent him a letter by courier.

He washed the dishes by hand.

She died by her own hand.

*cf.* Cheating by students is punishable with expulsion. (*Keenan (1985): NB cheating here is not from a passive verb.*)

Note the *by*-phrases in (12) all seem to entail a semantically-related sentence that is a true passive: for *This book is by Frege*, compare “This book was written by Frege”; for *She sent him a letter by courier* compare “A letter was delivered by courier”, and so on.

Nevertheless, it has been recognized in the semantics literature for some time that a semantically correct adjunct analysis of agent phrases in passives is either impossible or else very difficult (and has not been achieved in any case; cf. Thomason (1974), Cresswell (1985), Dowty (1979). For one thing, pairs like (13) show that an adjunct analysis cannot be extensional but must be handled intensionally in some way, while a complement analysis never requires this complication:

(13) a. This chair was sold (at noon today)

b. This chair was bought (at noon today).

Since (13a) is true if and only if (13b) is true, it follows that the predicate *is bought* has the same denotation as *is sold*. But if so, then if the result of applying an extensional adjunct to one predicate must be equivalent to the result of applying that same adjunct to the other: if *by John* is such an adjunct, then *bought by John* must be equivalent to *sold by John*, which of course a wrong result. If *by John* is a complement rather than an adjunct, then this problem does not arise, cf. (22), (23) below. (See the above-cited references and Dowty (1989) for comment.) It is sometimes claimed that a “Neo-Davidsonian” analysis in terms of events can circumvent this problem (cf. Parsons (1990)), but as argued in Dowty (1989) and Dowty (2001), this will not really work. This approach appeals to an abstract Thematic Role ‘AGENT’, but this fails for the same kind of reason that we saw with GOAL earlier: there is no possible semantic

definition of AGENT that is independent of the particular verb meaning that it occurs with. Notably, passives of stative verbs occur with agent phrases (in English and other languages), but these are not “Agents” in a semantic sense, rather they are “Experiencers”:

- (14) This rumor has now been heard by almost every voter, and it is believed by many of them.

The only correct way to identify what the *by*-phrase refers to here is to appeal to the meaning of the active verbs *hear* and *believe*, and this demands a complement analysis of the *by*-phrase.

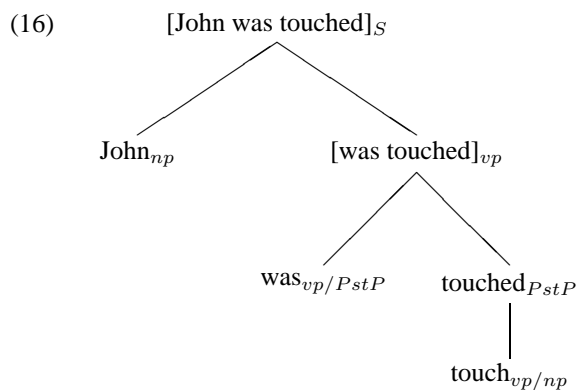
The account in terms of a dual analysis begins with the assumption (well-justified by cross-language typological studies) that the agentless passive is the most basic form of passives — they occur in more languages than agentive (or “full”) passives occur in, while there are no languages with only the agentive passives but no agentless passives. The agentless passive can be analyzed adequately and very simply as a detransitivizing, “relation-reducing” operation on transitive verbs:

- (15) *Passive as a detransitivizing operation:*

**(Agentless) Passive:**

Lexical Rule:  $\alpha \in vp/np \rightarrow PST-PRT(\alpha) \in PstP$

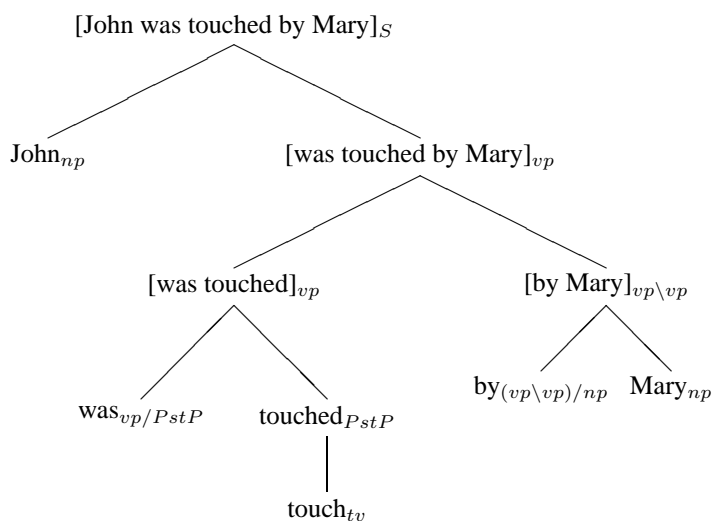
Semantic Interpretation:  $\alpha' \rightarrow \lambda x \exists y [\alpha'(x)(y)]$



- (17) Translation of (16b):  $\exists x [\text{touch}'(\text{John}')(x)]$

Assuming that *by*-phrase adjuncts (as in (12) above) exist in the language already, then the meaning of a full passive can be approximated, without any addition to the syntax, by adding a *by*-phrase adjunct to an agentless passive:

(18)



(19) Translation of (18):

**by'**(**Mary'**)( $\lambda y[\exists x \text{touch}'(y)(x)]$ )(**John'**)

“John was touched, and Mary was a causal factor in this event”

As the paraphrase in (19) suggests, the meaning of **by'** here, which is the adjunct meaning, does not produce the correct meaning of the actual English passive sentence but only approximates it, and of course it also cannot possibly serve as the final analysis of full passive for the reasons cited above (and it is important to note in this regard (cf. below) that many languages exist in which agent phrases are not found with passives of stative verbs, only active verbs). And so, I argue, the adjunct analysis serves as a preliminary step through which the complement analysis is reached. That analysis is:

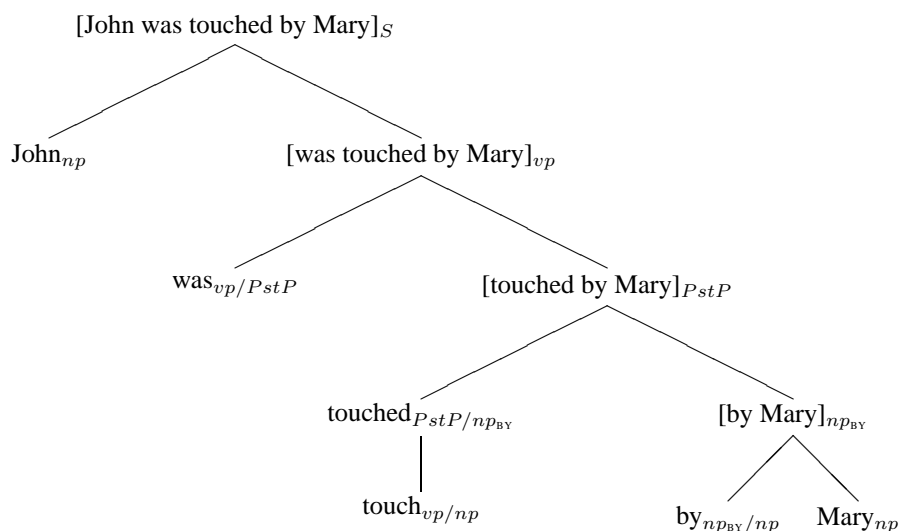
(20) **(Reanalyzed) Passive** (as yielding 2-place predicate):<sup>11</sup>

syntactic rule:  $\alpha \in vp/np \rightarrow \text{PST-PRT}(\alpha) \in \text{PstP}/np_{[by]}$

semantic rule:  $\alpha' \rightarrow \lambda y \lambda x [\alpha'(x)(y)]$

In this rule, *PstP* stands for the category of past participles (semantically the same type as the *VP* category), and I have incorporated the further simplification of the category of passive *touched* from *PstP/(VP\VP)* to *PstP/NP<sub>[by]</sub>* (see footnote 8).

(21)



(22) *Transl. of (21) is equivalent (by  $\lambda$ -conversion) to:*    **touch'(John')(Mary')**

For passive agent phrases, typological data about the distribution, form, and semantic restriction on agent phrases cross-linguistically imply that there are observable diachronic manifestations of the reanalysis hypothesis as just sketched above. The following typological generalizations about passive agent phrases were observed in (Keenan 1985:247):

- (23) a. Some languages exist in which **only** agentless passives occur, though no languages apparently exist in which agentive passives occur but no agentless passives.  
b. In many languages, passives of stative and other “not highly transitive” verbs are ungrammatical.  
c. Either instrumental case or a preposition with instrumental meaning is (almost) always used to mark the agent of a passive in natural languages, according to Keenan (1985:261). (Actually, it seems that prepositional phrases with SOURCE meaning sometimes appear instead, e.g. English *from*, German *von*.)

These typological generalizations are just what we would predict if the dual analysis/reanalysis of agent phrases is given the following diachronic interpretation, as five (possibly hypothetical) stages in the development of passives in a language:

(24) *Hypothesized stages in the development of passives with agent-phrases:*

1. Passive is a relation-reducing (detransitivizing) rule (Dowty 1982). Only the ‘agentless forms’ of passive sentences appear in the language; what will become agent phrases (*by*-phrases, in English) only occur as instrumental adjuncts of non-passive VP’s (*send the package by airmail* or the like).
2. Agent Phrases occur as adjuncts (with instrumental/source meaning) to passive verbs; as instrumental agent phrases would not make sense with stative and other non-volitional and non-causative passive verbs, agent phrases never occur with them.

3. Agent-phrases are reanalyzed as complements of passive verb phrases, thus leading to step 4:
4. The agent-phrase-marking preposition (*by* in English) or instrumental case marking is reanalyzed as a marker of grammatical function (without independent semantics), a so-called CASE-MARKING PREPOSITION and does not contribute any meaning per se to the compositional semantics of the sentence.  
Passive is now an argument-permuting rule (“relation-changing” rule), i.e. one that yields the same 2-place lexical meaning as the active verb but with subject and non-subject arguments interchanged.
5. Passives of stative verbs, other non-causatives, etc. now occur.

Before going on to the next section, we may note that our two case studies of adjunct reanalysis—directional PPs and full passives—differ in that the first involves replacing lexical items (verbs) one by one by their reanalyzed counterparts, whereas the second involves a reanalysis of the lexical rule for passives. I intend both cases to fall under the rubric dual analysis hypothesis as used here. The original passive lexical rule produces individual verbs as outputs, and the outputs of the revised lexical rule are also individual verbs: the first vs. second version of each passive verb stand in the same kind of relationship to each other as the two versions of a verb taking a *to*-phrase as adjunct vs. complement. (This point may be clearer if considered under the view of lexical rules in which they operate “off-line” to create possible lexical items, and then these possible additions can be transferred, one at a time, into the actual, or “on-line”, lexicon.)

## 4 PREDICTIONS ABOUT WORD ORDER AND MEANING OF ADJUNCTS VS. COMPLEMENTS

In English and typologically similar languages, adjuncts in general can often occur at various positions within the clause, while superficially similar complements have more restricted distributions. Specifically, complements in English always follow verbal heads, as for example (25).

### 4.1 INFINITIVE ADJUNCTS VS. INFINITIVE COMPLEMENTS

- (25) a. John sang to please Mary      (*to please Mary* is adjunct)  
To please Mary, John sang  
John, (in order) to please Mary, sang for hours.
- b. John tried to please Mary      (*to please Mary* is complement)  
\*To please Mary, John tried  
\*John, (in order) to please Mary, tried for hours.      (*acceptable only if tried is taken to have an elliptical complement distinct from try.*)

### 4.2 SUBCATEGORIZED ADVERBS

Subcategorized adverbials, are distinguished from true adjunct adverbials in just this way:

- (26) a. They criticized him harshly      (*adjunct*)  
They harshly criticized him
- b. They treated him harshly      (*subcategorized adverb*)  
\*They harshly treated him<sup>12</sup>

Allowing multiple syntactic positions for adjuncts can be accomplished in various ways in CG; one way is to give adjuncts multiple category membership (e.g.  $S/S$  vs.  $S \setminus S$  for sentential adjuncts). Another is to introduce them as permutable constituents within a multi-modal CG, allowing adverbs to obey the logic of LP. But once we observe the (independently verifiable) typological demand in English that complements always follow their heads, then the implication for adjunct reanalysis is this:

- An adjunct can be reanalyzed as a complement (in English) only when it follows its head; the same adjunct in any other syntactic position cannot be reanalyzed.

#### 4.3 POSITION OF REPETITIVE VS. RESTITUTIVE AGAIN (*wieder*)

At this point it is interesting to look at the word order possibilities for the repetitive (external) reading of English *again* and German *wieder* vs. those for the restitutive (internal) *again* and *wieder* (Dowty 1979), (Fabricius-Hansen 1983). (This ambiguity is present in a sentence like *Mary shook John awake again*: the external (or REPETITIVE) reading entails that this was the second time that Mary had shaken John awake; the internal (or RESTITUTIVE) meaning only entails that John became awake for a second time as a result of Mary's shaking him, not that she shook him for a second time, i.e. Mary has merely *restored* the state of John's awakeness.) Dowty (1979:260-264) proposed that this meaning difference results from a complement vs. adjunct ambiguity (an ambiguity in the verb's category), not an ambiguity in the adverb per se<sup>13</sup>, so this predicts that the availability of both readings will depend on word order. Fabricius-Hansen (in the cited paper and elsewhere) and others have argued for a different analysis of this ambiguity, thus not immediately predicting any word order sensitivity.

In fact, the two readings are indeed limited by syntactic position, just like infinitives and subcategorized adverbs (*treat harshly*). When *again* occurs to the right of the verb, both readings for *again* are available; in any other position, only the external (repetitive) reading exists:

- (28) a. Mary shook John awake again (*Both readings*)  
 b. Again, Mary shook John awake (*Only repetitive reading*)  
     Mary again shook John awake. (*Only repetitive reading*)  
 c. When the power failed, the satellite entered the atmosphere again. (*Both readings*)  
 d. When the power failed, the satellite again entered the atmosphere. (*Only repetitive reading*)

Arnim von Stechow ((von Stechow 1996) and p.c.) has noted that the restitutive reading of *wieder* in German is only available when *wieder* appears in a syntactic position where a verbal complement can appear in in German, while

<sup>12</sup>Mike Calcagno has observed the paradigm below, which shows in more detail that this restriction cannot be an artifact of the particular choice of adverb; rather *treat* (in this sense) requires an adverb complement on its right, and a pre-verbal adverb cannot satisfy this subcategorization requirement:

- (27) a. They treated him harshly.  
       They treated him cruelly  
 b. They harshly treated him cruelly  
       They cruelly treated him harshly  
 c. \*They harshly treated him.  
       \*They cruelly treated him.

<sup>13</sup>It should be noted that Dowty (1979) actually proposed TWO analyses of this adverb problem; in addition to the complement/adjunct analysis (pp. 260–264), another analysis was entertained (pp. 264–269) that attributes the ambiguity to the category of the adverb; subsequent examination showed that the complement/adjunct analysis is the more viable one.

the repetitive reading is available for *wieder* in any position German allows for an adverb. Thus for both English and German, the syntactic prediction of the reanalysis hypothesis are met for *again* (*wieder*). See Dowty (1979, 1993, to-appear) for more data and details.

## 5 ARGUMENTS FOR SIMULTANEOUS MULTIPLE ANALYSES FROM HISTORICAL LINGUISTICS

The postulation of simultaneous multiple analyses has often been regarded with suspicion within the methodology of modern linguistic theory — a sign of a “missing generalization” at least, and always deemed inferior to a proposed alternative that appeals only to a single analysis.

In spite of this, several papers over the years have argued explicitly for multiple syntactic analyses, even when there is little or no detectable accompanying semantic ambiguity. A few of these are: Hankamer (1977), “Multiple Analyses”; Kroch (1989) “Reflexes of Grammar in Patterns of Language Change”; Ladusaw & Dowty (1988) and Bresnan (1982a), Syntactic Control of complements vs. ‘Real-World Control’ of actions and objects, and the unexpected acceptability of *she was promised to be allowed to leave*.

But many historical linguists have long accepted the idea that multiple analyses must be assumed to be available to a single generation of speakers in order to explain fully the facts of language change. One clear explicit statement of the reasoning behind this deserves quoting here, from A. Harris and L. Campbell, *Historical Syntax in Cross-Linguistic Perspective*, (Harris & Campbell 1995:81, ff):

### 4.4.3 Multiple analyses during actualization

During the period of actualization, a single input structure continues to have multiple analyses in the grammar of the individual speaker. For descriptive purposes it is convenient to recognize three stages to reanalyses:

Stage A, Input: The input structure has all of the superficial characteristics of the input analysis.

Stage B, Actualization: The structure is subject to multiple analysis: it gradually acquires the characteristics of an innovative analysis, distinct from that of Stage A.

Stage C, Completion: The innovative structure has all of the superficial characteristics of the innovative analysis

Reanalysis is the transition from Stage A to Stage B. Stage B is the period of actualization, and the speaker makes both (or many) analyses, which may be related to each other in different ways at different times. Stage B typically consists of multiple changes, reflecting the characteristics of the particular construction in the particular language. It may be noted that the gradualness of change is due in part to the duration of actualization in some changes. Some reanalyses may not reach Stage C; they are never completed, in the sense that all the characteristics of the innovative analysis may not be acquired.

It has often been assumed, especially in the description of change in individual languages, that in reanalysis the period of multiple analyses is only transient, and that the innovative analyses rapidly *replaces* the earlier analysis. There are at least three kinds of evidence that multiple analyses continue to be available in individual grammars for some time, though that time of course is different for different changes. Evidence comes from the possibility of multiple reflexes, from variation and conflicting data, and from the possibility of reversibility of change. . . .

## 6 EVIDENCE FOR THE ADJUNCT ORIGIN OF MOST COMPLEMENTS IN ENGLISH

Probably one of the most compelling arguments for dual analyses in English comes from the very large set of pairs of cases where (i) an adjunct construction is found that parallels a complement construction exactly, at least in “surface”

syntax, (ii) the two parallel constructions can be shown to have the same kinds of semantic similarities and differences between adjunct and complement already discussed above, and (iii) the same syntactic differences also occur (i.e. word order possibilities).

Because of space limitations, all I can do here is enumerate a representative list of these pairs, with examples for each pair: this is in **Table 1** below.<sup>13</sup>

It will have to be left as an exercise for the reader (i) to find more examples for each pair of constructions, (ii) to verify that the allowable word orders are usually broader for the adjunct than the complement case, (iii) to figure out the (regular) adjunct meaning of each case, and (iv) to verify that the “specialized” meanings of the complement examples do in fact differ (sometimes subtly) from the corresponding regular adjunct meaning.

The case of complement vs. adjunct genitives is worth special comment, all the more so in this context because of the interesting connections between it and Partee and Borschev’s paper on genitives in this volume. It has been widely recognized for years that possessives (and genitives) have a different semantic function when they combine with relational nouns (*friend, mother, top*, etc.) than with non-relational nouns (*team, dog, table*, etc.) This idea has been thoroughly investigated (independently) by Barker (1991), (1995) and by Partee (1997) (based on unpublished work by Partee from 1983 and developed in subsequent papers). The reading (normally) found with relational nouns (*Mary’s mother*) is called LEXICAL, INTRINSIC (Barker) or INHERENT (Partee), and that with non-relational nouns (*Mary’s book*) is called EXTRINSIC (Barker) or FREE (Partee), or MODIFIER. The meaning of the extrinsic possessive is quite broad but is also context dependent — for example, *John’s team* could mean, depending on the context in which it is uttered, either “the team that John plays on”, or “The team that John owns”, or “the team that John cheers for”, or “The team that John placed a bet on today”. The extrinsic/free reading, it has been proposed, has a meaning such that *Poss Noun* is, uniformly “the unique *Noun* that stands in some contextually-determined but salient relation to *Poss*”; it is up to the hearer to figure out exactly what kind of relation is intended, though the relation of ‘ownership’ is probably the most common. If so, this extrinsic meaning can be semantically analyzed as an adjunct reading in my sense. The intrinsic/inherent possessive (*Mary’s mother, mother of Mary*) differs, in that the nature of the relation between Possessor and Noun is determined by the relational noun (so it is of course different for each relational noun). Thus in terms of this paper’s hypothesis, the inherent genitive must be a complement of the relational noun, not an adjunct.

The syntax of these two kinds of possessives and genitives is different from the other complement/adjunct cases above: the pre-nominal possessive is the one case I know of where a complement can precede its head (in English), e.g. *Mary’s mother*. But the two readings do differ syntactically in the post-nominal position, albeit in a subtle way: the so-called “double genitive”, as in *a book of Mary’s* is only found with extrinsic (adjunct) genitive meaning<sup>15</sup>: note that *#The mother of Mary’s* sounds quite odd, which is because *mother* is relational. Conversely, the post-nominal genitive with no possessive suffix occurs only with inherent/intrinsic (relational) readings (*The mother of Mary*) and not with non-relational heads (*#A book of Mary* sounds odd). (Cf. also Partee and Borschev’s paper in this volume.)

The significance of all the cases A–I in the table above can be summarized this way: If it is important to the grammatical structure of a language, (and important to the learners of the language) to distinguish adjuncts from complements, why should the grammar of English have dozens of cases where an adjunct construction and a complement construction look superficially exactly alike? This seems rather counter-productive.

<sup>13</sup>When examining all examples of adjuncts and complements to *transitive* verbs, it is important to keep in mind that I am assuming a WRAPPING analysis of direct objects (cf. Bach): thus what I call a complement (or adjunct) to a transitive will never appear immediately adjacent to the transitive, but rather after the direct object. Thus, the combination of *persuade* with its complement *to leave* form a DISCONTINUOUS CONSTITUENT in *persuade Mary to leave*

<sup>15</sup>Barker (1998) argues that the “double genitive” is actually a partitive reading (*a book of Mary’s* = “a book of Mary’s books”); if so, this is not an extrinsic reading but nonetheless still not an intrinsic reading either, but my general point still holds that genitive complements to relational nouns are syntactically distinct from other post-nominal genitives. See also (Partee & Borschev 1998).



But, if it somehow *helps* the language learner that each complement construction should look so similar to an adjunct construction as to be initially “mistaken” for one, then this is exactly the distribution of data that we should expect!

## 7 DUAL ANALYSIS IS A MORE COMPLEX MATTER THAN JUST REANALYSIS IN LANGUAGE ACQUISITION

We can better understand that there are broader implications of the dual analysis hypothesis by digressing for a moment to examine the semantics of compounding and other word formation rules.

### 7.1 COMPOUNDS AND DERIVED WORDS

In the history of the study of compounding in generative transformational grammar, linguistic theory has alternated repeatedly between deriving compounds by grammatical rule ((Lees 1960), (Levi 1975)) and arguing that derived compounds are not derived grammatically but are only listed individually “in the lexicon”; the latter position is supported by pointing to the idiosyncrasies of the meanings of individual examples that cannot possibly follow from any general rules ((Chomsky 1970), and in a different sense, also (Downing 1977)). The mistake that I think has usually been made in this debate is the assumption that if compounds (etc.) are listed individually in the lexicon (and each is assigned a meaning there), then there cannot also be a rule that derives meanings of compounds by general rule.

Instead, I believe that a speaker’s knowledge of her/his language includes *both* ways of deriving meanings for most compounds. This is best shown with English Adjective–Noun compounds. All English speakers, I propose, know that any compound of the form “*Adj-Noun*” has associated with it a general, rule-predicted meaning paraphrasable as “*Noun that is Adj*”. Thus a blackberry must be “a berry that is black”, a bluebonnet is “a bonnet that is blue”, and so on. But at the same time, speakers are perfectly aware that “berry that is black” (etc.) is not the **real** meaning of *blackberry*; that is rather “a certain species of bush that produces edible black, tiny berries in clusters.” Other examples:

|      |                 |                             |   |
|------|-----------------|-----------------------------|---|
| (29) | <i>example:</i> | <i>predictable meaning:</i> | <i>real meaning:</i>  |
| a.   | big shot        | “shot that is big”          | important or influential person   |
| b.   | blackboard      | “board that is black”       | surface made for writing on with chalk, often black in color                |
| c.   | quicksand       | “sand that is quick”        | fine sand mixed with water that sucks down an object resting on its surface |

To deny that speakers know there is some elementary sense in which *soft drink* means “drink that is soft” is to deny an obvious facet of speakers’ knowledge of their language, notwithstanding the fact that they also know a “real” or “correct” meaning for such compounds.

Why should languages have such double meanings for compounds? With only a moment of reflection, the answer is obvious, I believe: the “predictable” meaning of a compound:

- gives the hearer a “clue” or “hint” to the compound’s real meaning upon first encountering the compound
- serves as a mnemonic for more easily retrieving that real (and individually learned) meaning from memory when the compound is encountered again later

(Try as a mental exercise to imagine what English would be like if all compounds were replaced by mono-morphemic words that had to be learned individually, without any morphological clues: English would be *far* harder to learn!)

On encountering the compound *software* for the first time, a speaker at least has a clue from its derivational meaning (“wares that are soft”) where to start guessing what the real meaning might be. That is, one does not necessarily assume for a initial period of time that it really literally means “ware that is soft” and then correct that assumption later: more likely, a person realizes *already at first hearing* that *software* must have a much more specific, probably technical meaning.

What exactly is the relationship between the two meanings of a pair in the speaker’s mind? What should it be in a linguist’s grammar? The first question is no doubt highly interesting for psycholinguistics and the psychology of memory, but I doubt that much can be specified about this relationship in linguistic theory — nor should we try to. What we can and should do is simply specify that there are two kinds of meanings for each: (i) a predictable but only approximate meaning (and the rule that gives it from the meanings of the parts), and (ii) an individually-learned meaning for it—just like the individually-learned meanings of all monomorphemic words.

Other kinds of derivational word formation also show the need for dual analysis: it is intuitively felt by all speakers of English that all derivations of VERB + *-able* have a uniform approximate meaning: “capable of being *verb*+ed” — so that *washable* means “capable of being washed”. At the same time, speakers know that many such forms have a more specific actual meaning: *readable* does superficially mean “capable of being read”, but its actual meaning is something narrower.<sup>16</sup>

My general point in making these observations about word formation is to argue that the two analyses for each instance of word formation are almost certainly not simply a matter of the lexicalized analysis *replacing* the preliminary analysis, then disappearing forever; rather the preliminary, semantically compositional analysis is still employed, in some subtle psychological way, in on-line processing — though in a way that only connectionism or some other other future theories of the psychology of language can explain.

If this is plausible, then *simultaneous* on-line processing is just as plausible for the “dual” complements-adjunct analyses.

So what the dual analysis hypothesis accomplishes (for both domains) is to allow theorists to formalize—for now—the two endpoints of a complex psycholinguistic “continuum”, a psychological phenomenon where we are not ready to try to formalize the intermediate points. I have argued that being able to acknowledge and isolate these endpoints, within a formal linguistic theory, improves our understanding the phenomena of *adjunct* and *complement*.

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<sup>16</sup>In their book *On the Definition of Word*, Di Sciullo and Williams (DiSciullo & Williams 1987) introduce the term *listeme* for linguistic units that are thought to be “listed individually” (as opposed to generated ‘on-line’): their listemes include all root morpheme, most derived words, certain syntactic phrases (idioms, and probably collocations) and a few sentences. Although this term does seem to draw the same distinction I am making here, Di Sciullo and William go on to deny that their ‘listemes’ have any relevance to linguistics at all, much less do they even raise the possibility of dual analyses for any one form, morphological or syntactic. Hence, I will not adopt their term ‘listeme’ here.

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