

# ATTRIBUTES OF ATTRIBUTION

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# Declaration

I, Zoë Charlotte Erica Belk, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.



# Abstract

Attributive adjectives have a number of properties that distinguish them from predicative adjectives and other modifiers of the noun. For example, attributives are subject to ordering restrictions that do not apply to other types of nominal modifier, and they exhibit scope interactions unlike predicatives or relative clauses. This thesis argues that these properties are best captured by an analysis in which all attributives share the same relationship with the noun and discusses the ways in which our understanding of a number of phenomena at the edges of attribution must change.

One influential theory of adjective ordering restrictions (discussed in Larson 2000a and Cinque 2010, among others) holds that violations of the ordering hierarchy that applies to many attributive adjectives are due to the existence of modifiers that superficially look like attributives but are in fact derived from reduced relative clauses. These derived attributives are merged higher than underived attributives and are unordered with respect to each other. I show that the offending adjectives do not behave syntactically like true relative clauses, whether full or reduced. In addition, while all attributive semantics is asymmetric, true relatives involve symmetric modification. This single-source approach entails a rethinking of some of the effects commonly understood to

result from attribution. I will address two such effects, which could be taken as evidence in favour of a derived attributive approach to attribution, and show that they are best analyzed using a homogeneous approach to attribution.

In languages where the noun follows its modifiers, the ordering of AP and PP modifiers is free and their scope varies with c-command. In noun-initial languages their order is fixed, with the AP preceding other modifiers, and their scope is ambiguous. This pattern could be taken as evidence for a second source of adnominal modification, if the high position of the AP in noun-final languages is a reduced relative clause. However, I show that both the ordering and scope effects are due to a novel constraint restricting the linear order of attributive and other modifiers. The ordering patterns of AP and PP modifiers are therefore not evidence for the existence of derived attributives.

One piece of evidence for the dual-source theory of attribution is that some adjectives have unexpectedly rigid requirements for adjacency and nonintersectivity (for example, in the phrase *hard worker*). I demonstrate that cases like these are not true attribution but are instead a type of bracketing paradox. I argue that these bracketing paradoxes are derived by movement at LF. This movement (and indeed all movement) is restricted in the type of information that must be retained before and after the operation takes place, but is otherwise free. Therefore, these examples do not provide evidence for two different types of attributive modifier.

The proposed analysis of attribution allows for a simplification of adjectival modification, as it does not require a distinction between derived and underived attributive adjectives. The analysis presented in this thesis entails a novel

categorization of certain adjectival phenomena, but readily accounts for the empirical intricacies of attribution.





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Chapter 3, “AP adjacency as a precedence constraint”, is joint work with Ad Neeleman, and is derived from an article published in *Linguistic Inquiry*.

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# Chapter 1

## Introduction

One cannot be too careful with words, they change  
their minds just as people do.

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*Death with Interruptions*, José Saramago

### 1.1 Attribution: One class or two?

Attributive adjectives are well studied but there remains a lack of agreement in the literature about even their most basic properties. For example, many authors, including Sproat and Shih (1988, 1991); Lamarche (1991); Teodorescu (2006) and Willis (2006) accept that attributive adjectives obey an ordering hierarchy, roughly like that in (1).

(1) Quality > Size > Shape > Colour > Provenance

This hierarchy describes the fact that in English (2a) is preferred to (2b) under ordinary circumstances.

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- (2) a. a big black bag  
b. ?a black big bag

However, as Truswell (2004, 2009) shows, the observed ordering effects are often quite weak. Certain adjectives, often modal adjectives or participles, do not have a preferred ordering when paired with another adjective, but the different orders have different interpretations:

- (3) a. a former famous actress  
b. a famous former actress (Teodorescu, 2006)
- (4) a. frozen chopped chicken  
b. chopped frozen chicken (Svenonius, 1994)

Cinque (2010) argues that only some adjectives are subject to the ordering hierarchy. This is claimed to explain the fact that, even where there is a preference between a pair of adjectives, as in (2), that preference can be violated. However, this approach does not explain the fact that violations of the hierarchy seem to require certain information-structural circumstances, and the resulting interpretation is subtly different from the non-violating order. The order in (2), for example, is completely acceptable where there are a number of big bags and the speaker wants to pick out the black one. While this thesis does not attempt to explain the origin of the adjectival hierarchy, it will prove to be a useful diagnostic in differentiating attributive from other, non-attributive modifiers of the noun.

Adjectives also vary in many aspects of their behaviour, in ways that are not well understood. One key difference is between what descriptive grammars call attributive and predicative adjectives. Predicative adjectives occur

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in copular constructions, relative clauses and the like, while attributive adjectives occur elsewhere (typically before the noun in a language like English). However, the term “attributive adjective” has been used to denote certain theoretical relationships, and to refer to a subset of non-predicative adjectives. For this reason, I will use the term ‘adnominal’ to refer to adjectives in a non-predicative position. Adnominal adjectives in this sense exclude adjectives appearing in copular constructions and full and reduced relative clauses, but include adjectives that can in principle appear in predication, like *red* and *big*, as well as adjectives that only appear attributively, like *former* and *alleged*. I will use the term ‘attributive’ to refer to a particular relationship between adjective and noun.

Some adjectives can only appear adnominally (*the main problem* vs. \**the problem is main*), others only predicatively (\**the ablaze house* vs. *the house is ablaze*<sup>1</sup>), and still others can be either attributive or predicative (*an ingenious solution* vs. *the solution is ingenious*); some adjectives are ordered with respect to one another (2) while others are not (3)–(4); some adjectives are intersective (*a female lion*), others subsective (*a good cellist*), and still others nonintersective (*an old friend*).<sup>2</sup>

Some authors have argued that these distinctions should be captured in the syntax, in the form of separate adjectival categories. Siegel (1976) and Cinque (2010) are two such authors. Siegel argues on the basis of Russian that there are two categories of adjective (roughly attributives and predicatives),

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<sup>1</sup>Coulter (1983) and Keenan (2002), among others, have argued that predicative adjectives with the *a-* prefix actually involve an incorporated preposition that heads its own projection. However, see section (42) for an argument that they are true adjectives.

<sup>2</sup>While the intersective vs nonintersective distinction is commonly accepted in the literature, the picture is not in fact that clear. See chapter 3 and for some discussion of this topic; see also Truswell (2004, 2009).

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that they have separate characteristics, and that they are not derivationally related. The former is pronounced in Russian as the long form of the adjective and the latter as the short form. Given that a large number of adjectives have both short and long forms, this entails a certain amount of redundancy in that these adjectives must be encoded as two distinct lexical items which happen to sound the same (barring the regular long form ending). However, this analysis does account for the fact that some adjectives (e.g. *old*) are ambiguous between an intersective and a nonintersective reading.

For Siegel, attributive adjectives are all of a kind but predicatives form a separate class. Cinque (2010), on the other hand, argues for two sources of adnominal modification. The reasoning is similar: some adnominal adjectives are intersective, others are nonintersective and still others ambiguous. Following Larson (2000a) and Larson and Takahashi (2007) he makes use of the observation that when adjectives like *visible* and *possible* appear postnominally in English (a position assumed to be a reduced relative clause), they are unambiguously stage-level while the same adjectives prenominal are ambiguous:

- (5) a. We looked at every star visible.  
b. Sherlock considered every solution possible.
- (6) a. We looked at every visible star.  
b. Sherlock considered every possible solution.

This pattern is used to argue that, when the prenominal adjective receives the stage-level interpretation, it shares a source with the postnominal adjective. The prenominal individual-level adjective on the other hand has a different source. If the reduced relative clause source is base-generated above the other

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(‘attributive’) source, and if the English order reflects the base-generated order, then we can explain why the stage-level reading always precedes the individual-level reading preminally in English:

(7) We looked at every visible visible star.

*(stage-level > individual-level; \*individual-level > stage-level)*

(8) Sherlock considered every possible possible solution.

*(stage-level > individual-level; \*individual-level > stage-level)*

The reduced relative clause source is associated with a number of additional properties (intersectivity, free ordering amongst the class, a restrictive reading) while the attributive source is associated with the opposite properties (nonintersectivity, fixed ordering amongst the class, a nonrestrictive reading). Cinque argues that adnominal reduced relative clauses in English appear to the left of adjectives with the attributive source, which accounts for a number of ordering patterns like those in (7) and (8).

While adjectives are, in a number of respects, a varied class, they also behave similarly in a number of ways; they must, after all, be similar enough to have been accepted as a coherent class over the course of centuries of descriptive and generative grammars. This thesis pursues this notion. I focus on adnominal adjectives and argue, following Siegel (1976) that they are in fact a homogeneous class. Their behaviour in a variety of syntactic and semantic respects is consistent, and is consistently different to the behaviour of other modifiers of the noun, including relative clauses. (However, unlike Siegel, I will argue that attributive and predicative adjectives do not form two distinct classes, with accidental homophony.) The relationship between the noun and

an adnominal adjective, that of attribution, is characterized by weak ordering effects and asymmetric scopal relations. Where adnominal adjectives appear to display different characteristics to these, I argue that that behaviour is the result of additional factors, and that at their root we still find the hallmarks of attribution.

This approach entails an adjustment of the boundaries of what can be considered pure attribution, both by including certain phenomena that have previously been considered non-attributive and by excluding some constructions that have traditionally been analyzed as attributive. However, attribution itself is simplified compared to analyses that make use of multiple sources of adnominal adjectives: it is not necessary to determine which adjectives are derived from one source or another, what the nature of each source is, where they are located in the extended nominal projection or how they came to be located there. Instead attribution can be seen as a single relationship with the noun, resulting in a unified set of behaviours and interacting in interesting ways with other nominal modifiers. Describing and analyzing those behaviours, and accounting for the behaviour of phenomena at the edges of attribution, is the focus of this thesis, and this discussion will lead to a new definition of attribution.

## 1.2 Summary

This thesis is laid out as follows. In chapter 2, I discuss the core characteristics of attribution and examine the relationship between adnominal adjectives and full and reduced relative clauses. These three categories can all modify nouns, and full and reduced relative clauses may have adjectives as their main

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predicates. For these reasons, various authors have argued for a derivational relationship between at least two of these categories. Smith (1964); Jacobs and Rosenbaum (1968) and Stockwell et al. (1973), among others, argue that adnominal adjectives are derived from full relatives via reduced relatives. Ross (1972); Quirk et al. (1985) and Sadler and Arnold (1994), among others, rely on rules that derive reduced relatives from full relatives. Larson (2000a); Larson and Takahashi (2007) and Cinque (2010), among others, argue that only some adnominal adjectives belong to the attributive category, the rest being derived from reduced relatives.

However, I will show that these three categories display different behaviour in a number of respects, and are therefore best analyzed as derivationally distinct. Full relatives allow a much wider range of predicates as compared to reduced relatives, and are more restricted in their temporal interpretation. A still narrower range of predicates is allowed adnominally, and adnominal adjectives display different behaviour to full and reduced relatives with regard to the Head-Final Filter (Williams, 1982), complexity, and the Dutch attributive schwa ending, among other factors.

While I will argue that these modifiers form three distinct syntactic categories, I will show that they fall into two semantic categories in terms of their relationship to the noun. Adnominal adjectives display scopal patterns that are best captured by an asymmetric semantic analysis, such as Truswell's (2004; 2005) JOIN. Such an analysis would allow an adjective to modify the set denoted by its syntactic sister (including any lower modifiers), accounting for the scopal asymmetries found in modal adjectives like *fake* and *former*, adjectival participles like *chopped* and *frozen* in Svenonius's (1994) comparison of

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*frozen chopped chicken* to *chopped frozen chicken*, and the ‘sortal’ effect found in violations of the well-known adjective ordering hierarchy. Relative clauses, whether full or reduced, do not display these same scopal effects. Their semantics are therefore best captured by a symmetric relationship with the nominal projection, such as Higginbotham’s (1985)  $\theta$ -identification. These facts mean that, while full and reduced relative clauses are not derivationally related, they are related in the sense that they share the same relationship with the noun they modify. Adnominal adjectives, on the other hand, relate very differently to the noun.

The central claim of this chapter, and of the thesis in general, is that adnominal adjectives behave as a coherent class, both syntactically and semantically. This class is distinct from the classes of full and reduced relative clauses, but encompasses some phenomena that have previously been considered non-attributive while excluding other constructions that are in some cases thought to define attribution. The rest of this thesis deals with these areas of boundary change, to show that this new understanding of attribution in fact allows for a simplification of adnominal adjectival modification.

In chapter 3 I discuss a case that may be argued to support a dual-source analysis of adnominal modification. This case involves the generalization, due to Giurgea (2009) (although see Adger 2012 for a slightly different formulation), that where an AP and another category (such as a PP or genitive DP) both modify the same noun, the order of the modifiers is free in languages where the noun comes last in its phrase but fixed in languages where it comes first. Thus, in noun-final languages like Japanese, Hungarian and Mandarin we get both XP-AP-N orders and AP-XP-N. However, in noun-initial languages like Welsh,



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Spanish and Arabic we find only N-AP-XP. Furthermore, scope between the AP and XP varies with c-command in noun-final languages, but the N-AP-XP string found in noun-initial languages is scopally ambiguous. Superficially, it might appear that noun-final languages have an additional, high position in the extended nominal projection for adjectives, and that this position could in fact host Cinquean reduced relative clauses. However, such an analysis proves unsatisfactory, as the behaviour of adjectives in this ‘higher’, left-most position is identical to the behaviour of ‘lower’, right-most adjectives; this is of course the same argument for a single source of adnominal modification as that made in chapter 2.

I will argue that the adjectives in all three attested orders are ordinary attributive modifiers, but that their unexpectedly asymmetric behaviour is due to a linear constraint that governs all modifiers in the noun phrase. The proposed source of asymmetry in attribution, namely JOIN, is the anchor for this constraint. The constraint, parallel to the Case-First Constraint as developed in Janke and Neeleman 2012, requires a certain linear relationship between categories bearing JOIN (attributive adjectives) and other modifiers, and is calculated with respect to the noun. The JOIN-First Constraint allows all and only the attested order of nominal modifiers: XP-AP-N, AP-XP-N, N-AP-XP, but not N-XP-AP. If both noun-final orders are base-generated, then the scope patterns are as expected given the c-command relations between the three categories. It is the creation of NP-shells (9a), parallel to the VP-shells found in Janke and Neeleman’s account, that allows ambiguity in the N-AP-XP string (cf. (9b)).

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- (9) a. [N [A [t<sub>N</sub> X ]]]  
b. [[N A] X]

This analysis applies to all attributive APs, and as such is another piece of evidence that there is a single source of adnominal adjectival modification.

That this effect is best captured by a linear constraint is shown by the fact that any linear string of the right description can satisfy it, no matter its underlying structure. Thus, I show that both base-generated N-AP-XP structures and NP-shells in (9) satisfy the constraint, as do a number of more complex derivations required by a language-specific surface filter in Spanish. Given that the JOIN-First Constraint applies to all adnominal adjectives, and not to other nominal modifiers, the AP adjacency effect should not be considered evidence for a second source of adnominal modification, but provides support for the idea that adnominal adjectives have a single source: attribution.

Chapter 4 provides discussion of another case of surprisingly rigid adjectival ordering requirements, which has previously been seen as indicative of a direct, attributive relationship between the adjective and noun. The case in question is exemplified by phrases like those in (10), which have a seemingly nonintersective reading only when the adjective is adjacent to the noun.

- (10) a. a nuclear physicist  
b. a hard worker
- (11) a. \*a nuclear experimental physicist  
b. \*a hard steel worker
- (12) a. \*This physicist is nuclear.  
b. \*This worker is hard.

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Larson (1998) makes use of the nonintersective reading in phrases like *beautiful dancer* (which is structurally and semantically similar to (10b)), *old friend* and *diligent president* to argue that the nouns in each of these phrases have event semantics, and that the adjective can modify either the individual denoted by the noun or the event associated with that noun. This analysis is parallel to Davies' (1991) account of adverbial substitution failure, itself based on the theory of adverbial modification proposed in Davidson 1967. However, this analysis has some drawbacks. Firstly, it is not clear how the event associated with the noun is determined. In the case of *beautiful dancer*, it is clear that the noun *dancer* is derived from the verb *dance*, so the adjective might plausibly be predicated of an event of dancing. However, in *diligent president*, despite the fact that *president* is derived from the verb *preside*, the adjective is unlikely to be predicated of the event of presiding; a more likely candidate would be an event of being a president. Similarly with *old friend*, there is no verb plausibly associated with the noun, and the event in question is unlikely to be an event of being a friend—after all, an *old friend* is not someone who has been a friend to somebody or other for a long time, it is someone who has a longstanding friendship with a particular person. Larson suggests that it is an event of friendship that is being modified in this case (and that does more closely match the meaning of the phrase), but here again, it is not clear how this particular event was settled on as the modifiee and not any one of a number of other possible candidates. Furthermore, this analysis does not seem to rule out the availability of the nonintersective reading in examples like (11).

Cinque (2010) takes the apparent nonintersectivity of both phrases in (10), as well as those discussed by Larson (1998), as evidence of a second source of

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adjectival modification (the first source being reduced relative clauses, characterized by intersectivity). In fact, the availability of a nonintersective reading is claimed to be indicative of a direct, attributive relationship with the noun (termed ‘direct modification’). However, I will argue that phrases like *hard worker* and *beautiful dancer* get their unexpected readings not directly from attribution, but from a different relationship between adjective and noun.

Both Larson and Cinque miss the crucial observation that the interpretation of phrases like *hard worker* and *beautiful dancer* is entirely systematic and in fact predictable: a *hard worker* is simply a [[hard work] er], just as a *beautiful dancer* is a [[beautiful dance] er]. Following Williams (2003) and Ackema and Neeleman (2004), I argue that these are a type of bracketing paradox that is parallel but not identical to phrases like *nuclear physicist*, which have long been analyzed as bracketing paradoxes (see for example Pesetsky 1979, 1985; Williams 1981; Hoeksema 1987), but I will develop a novel analysis of how the *beautiful dancer*-type mismatch comes about.

If a bracketing paradox is defined by a mismatch in the bracketing of two modules of grammar, I argue that the difference between these two types of bracketing paradox is the locus of the mismatch. Traditional bracketing paradoxes, those like *nuclear physicist*, have been analysed as mismatches between the syntax and PF, so that the syntactic structure is reflected in the meaning, rather than the pronunciation. I propose that the second type of bracketing paradox, which I call verbal bracketing paradoxes, are mismatches between the syntax and LF, so that the syntactic structure is reflected in the pronunciation rather than the meaning. This distinction is supported by data from Dutch: the declensional schwa ending normally required on attributive adject-

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tives is disallowed in traditional bracketing paradoxes (because, by hypothesis, the adjective does not modify the derived noun at the level of syntax) but required in verbal bracketing paradoxes (because the syntactic structure is that of normal attributive modification).

The focus of this chapter is on verbal bracketing paradoxes, and the need to regulate the ways in which the syntax and LF can be mismatched (for similar ideas see Williams 2003). I argue that the mismatch in question is a result of movement and that it, and indeed all movement, is governed by the principles of Information Preservation, which requires that information about the head of a structure, its selectional relations, and c-command relations between non-heads must not be destroyed by movement.

Movement itself is therefore separate from chain formation, meaning that a trace is only required (and must be bound) when movement cannot take place without violating Information Preservation. The result of this approach is that existing movement configurations remain unaffected, but a new movement configuration is introduced, which permits exactly the movement required in verbal bracketing paradoxes. I examine the repercussions of this view of movement in detail.

This analysis of phrases like those in (10) as bracketing paradoxes does not rely on the introduction of a second source of adnominal modification, but also does not result directly from attribution. The exceptional behaviour of the adjective in these cases is due to the availability of mismatches between modules of the grammar, which result in configurations that do not have the characteristics of attribution. These mismatches are only allowed where the

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order of elements in the linear string is not affected, a requirement which explains the unexpected rigidity of ordering found in bracketing paradoxes.

Overall, I will show that adnominal adjectives all modify the noun in the same way, through attribution. I will establish the core characteristics of attribution, including weak ordering preferences and asymmetric scopal relationships, and discuss two cases of adjectival modification on the periphery of attribution. The first, that of AP adjacency, will be argued to be an example of attribution, although it may at first appear to support a dual-source analysis. The second, that of bracketing paradoxes, will be argued to involve a mechanism other than attribution, despite the fact that they have previously been seen as primary examples of a direct relationship between adjective and noun. This new definition of attribution allows for a simplified view of adnominal adjectival modification compared to multiple-source analyses, and is better able to capture the behaviour of attributive adjectives.

## Chapter 2

### Defining attribution

I am the very model of a modern Major-General,  
I've information vegetable, animal, and mineral,  
I know the kings of England, and I quote the fights historical,  
From Marathon to Waterloo, in order categorical;  
I'm very well acquainted too with matters mathematical,  
I understand equations, both the simple and quadratical,  
About binomial theorem I'm teeming with a lot o' news—  
With many cheerful facts about the square of the hypotenuse.

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*The Pirates of Penzance*, W.S. Gilbert

#### 2.1 Introduction

There is general agreement in the literature that nominal modifiers include at least three separate classes: adnominal adjectives, reduced relative clauses and full relative clauses.<sup>1</sup> However, there have been various attempts over the years to argue that some of these categories might be related to each other. Some have suggested that reduced relative clauses might be derived from full relatives

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<sup>1</sup>Recall that ‘adnominal’ is being used to denote adjectives that are not involved in predication in the structure in question.

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(Smith, 1964; Jacobs and Rosenbaum, 1968; Burt, 1970; Thomson, 1971; Bever and Langendoen, 1971; Ross, 1972; Stockwell et al., 1973) or that adjectives might be derived from one or both types of relative clause (Smith, 1964; Jacobs and Rosenbaum, 1968; Thomson, 1971; Bever and Langendoen, 1971; Sadler and Arnold, 1994; Larson, 1998, 2000a,b; Larson and Marušič, 2004; Cinque, 2010). However, these three types of nominal modifier, while they have several interesting similarities, also differ in a number of ways. Attributive adjectives are well known for a number of restrictions they exhibit—they are ordered with respect to each other, they can display scope interactions, they are subject to the Head-Final Filter (Williams, 1982) and certain adjectives are disallowed in attributive position, among other constraints. Full and reduced relative clauses differ in their temporal interpretation and do not admit the same types of predicate. Any attempt to reduce attribution and full and reduced relative clauses to a single source must therefore explain how these differences arise.

In recent years, Cinque (1994, 2010), Larson (2000a); Larson and Marušič (2004) and Larson and Takahashi (2007) and have argued for a (reduced) relative clause source for only some adnominal adjectives. This approach introduces further complications. The restrictions seen with attributive adjectives do not hold of relative clauses, so it becomes necessary to explain when and how the restrictions occur. If this second source of adnominal adjectives is otherwise unrestricted, it is also imperative that we should be able to tell whether a given adjective is modifying a noun attributively, and is therefore expected to adhere to ordering and other restrictions, or as part of a (reduced) relative clause, and therefore expected to be free from these restrictions.<sup>2</sup> Therefore, if

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<sup>2</sup>Of course, relative clauses are subject to their own sets of restrictions, in terms of the adjectives allowed (only predicative), the predicates they may host, and so on.



a given adnominal adjective can in principle be derived from either an attributive or a relative clause source, we need reliable tests in order to determine which source is involved and to predict whether we should expect to see ordering preferences, scope effects, Head-Final Filter effects and so on. This question has not, in my opinion, been satisfactorily addressed in the literature.

This chapter argues that attributive adjectives, reduced relative clauses and full relative clauses form three separate categories, none of which is derived from another. I also refute the claim that there are two sources of adnominal attributive modification, providing arguments for the existence of only one source. I will argue that, although not derivationally related, full and reduced relatives modify the noun in the same way, by means of  $\theta$ -identification (Higginbotham, 1985), while attributive modification involves a version of JOIN (Baker, 2003; Truswell, 2004, 2005), which crucially allows scope-taking between modifiers. This chapter is laid out as follows. In section 2.2 I argue that attributive adjectives, reduced relative clauses and full relative clauses are not derivationally related to each other. In section 2.3 I discuss postnominal attributive adjectives in English (and the lack of them in Dutch), which are often argued or assumed to be reduced relative clauses (see e.g. Larson 2000a; Cinque 2010), arguing instead that these are attributive adjectives that exceptionally occur after the noun in English, similar to exceptionally prenominal adjectives in French. In section 2.4 I argue that full and reduced relative clauses are related in that they both modify the noun via  $\theta$ -identification (Higginbotham, 1985), but that the unique characteristics of adnominal adjectives are best captured using a version of Truswell's (2004) JOIN. Section 2.5 concludes the chapter.

## 2.2 Attributive adjectives and relative clauses

Attributive adjectives, reduced relative clauses and full relative clauses share many similarities, not least of which is the fact that they can all modify a noun. However, these three categories of modifier differ in substantial ways. There are three possible ways of conceiving of these categories: that they all share a single source (usually taken to be full relatives), that there are two sources (usually full and reduced relatives on one hand and adjectives on the other, but plausibly full relatives on the one hand and adjectives and reduced relatives on the other), or that there are three separate sources. In this section I will compare these options and conclude that the three-source analysis best accounts for the data. I will first explore the single-source analysis, where adnominal adjectives are derived from reduced relatives, which are in turn derived from full relatives, and conclude that such an approach both over- and under-generates. I will then compare full and reduced relative clauses to demonstrate that the differences between the categories are significant enough that they should not be seen as derivationally related. Finally, I will discuss the behaviour of adnominal adjectives in relation to reduced relatives and show that they are sufficiently different that a derivational relationship between the two categories cannot straightforwardly account for the data. The conclusion must therefore be that adnominal adjectives, reduced relatives, and full relatives are derived from three separate sources.

### 2.2.1 Adnominal adjectives and full relatives

No analyses of which I am aware claim that adnominal adjectives are derived directly from full relative clauses, but that reduced relatives form a separate

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category; the derivation is from full relatives to reduced relatives to adnominal adjectives. Smith (1964), for instance, proposes that reduced relative clauses result from deletion of the relative complementizer and copula from a full relative clause. Prenominal adjectives are then the result of reduced relatives moving to a prenominal position. Jacobs and Rosenbaum (1968) argue for a similar analysis. While Burt (1970); Thomson (1971); Bever and Langendoen (1971) and Stockwell et al. (1973) (among others) all propose analyses along similar lines, I will summarize Smith's proposal below for the sake of concreteness.

Smith (1964) provides a deletion rule that would take an input like (1a) and transform the full relative into a reduced relative, as in (1b).

- (1) a. He married a girl who is from Texas.  $\implies$   
b. He married a girl from Texas.

It can apply to PPs, sentences, adjectives with complements and adjectives without complements.<sup>3</sup> In this final case, the result is ungrammatical, as (2) demonstrates.

- (2) a. I have a hat that is green.  $\implies$   
b. \*I have a hat green.

In this case, a further rule must be applied, which moves adjectives from postnominal to prenominal position. Smith claims it must be applied to adjectives without complements and may apply to adjectives with complements. This rule takes the output of the deletion rule (2b) and reorders the adjective with respect to the noun:

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<sup>3</sup>Arguments against this rule are presented in section 2.2.2.

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- (3) a. \*I have a hat green.  $\implies$   
b. I have a green hat.

This type of analysis has several problems. Bolinger (1967) points out that a number of adjectives that can appear prenominal cannot appear in predication. This means that the grammar must generate an ungrammatical string in order to have the correct input for the reordering rule:

- (4) a. \*They caught the horse that was runaway.  $\implies$   
b. \*They caught the horse runaway.  $\implies$   
c. They caught the runaway horse.

Without further restriction, it would also seem to allow adjectives that are exclusively predicative to be moved to a prenominal position:

- (5) a. I found [a man that was asleep] in my room.  $\implies$   
b. ??I found [a man asleep] in my room.<sup>4</sup> $\implies$   
c. \*I found an asleep man in my room.  $\implies$

Note that the constituent [a man asleep] is acceptable as a kind of small clause (Williams, 1974) or what Safir (1983) calls an honorary NP. Honorary NPs are not true NPs in that they do not trigger plural agreement, and they seem to describe states rather than referring to individuals:

- (6) a. [A man asleep] is not what I want to be dealing with today.  
b. Men asleep is not what I want to be dealing with today.  
c. \*Men asleep are not what I want to be dealing with today.

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<sup>4</sup>This string is of course grammatical where *asleep in my room* in its entirety modifies the noun as a reduced relative; in this case it would adhere to the complexity requirement discussed below.

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I will return to honorary NPs below.

Additionally, Bolinger points out that, as shown in (3), even where an adjective can appear both in predication and prenominally, it often cannot appear postnominally without a complement. This means that in order to derive a prenominal adjective, the grammar must derive an ungrammatical string:

- (7) a. I have a hat that is green.  $\implies$   
b. \*I have a hat green.  $\implies$   
c. I have a green hat.

Smith's fronting rule for bare adjectival reduced relatives does, however, avoid the over-generation problem that would arise if (7b) were allowed to be pronounced as is.

Finally, Bolinger shows that in predication the perfect participle is ambiguous between what he calls an action and a characteristic reading (8a). The action reading refers to a state that is the result of a particular (known) action, while the characteristic reading refers to a property that is more general. Postnominal participles are unambiguously actions ((8b) can only be used in reference to the result of a particular crime) but prenominal participial forms are unambiguously characteristic ((8c) is felicitous even when the events surrounding the theft are unknown).

- (8) a. the jewels are stolen  
b. the jewels stolen  
c. the stolen jewels

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If (8c) is derived from (8b), which is in turn derived from (something like) (8a), then we must explain the differences in interpretation between the three positions.

These data suggest that adnominal adjectives cannot be straightforwardly derived from full relative clauses. We will return to the relationship between adjectives and relatives in section 2.2.3, but I will first argue that full and reduced relative clauses are not derivationally related.

### 2.2.2 Full and reduced relatives

Many of the works cited above (Smith, 1964; Thomson, 1971; Bever and Langendoen, 1971), which argue for a derivational relationship between adnominal adjectives and full relative clauses include an intermediate step deriving reduced relatives from full relatives. This claim seems to be widely accepted, appearing as it does in Quirk et al. (1985, p.1294). Ross (1972) refers to a “well-known and uncontroversial rule” (p.65) to derive reduced relatives from full relatives, which he calls Whiz deletion. This rule is similar in effect to Smith’s relative reduction rule exemplified in (1), and it (or something like it) is argued for or assumed by Sadler and Arnold (1994), Larson (1998, 2000a,b); Larson and Marušič (2004) and Cinque (2010).

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Sag (1997) discusses different types of relative clauses, and shows that reduced and full relatives can be co-ordinated, suggesting they are of the same category.

- (9) a. The only people [being added to our group] and [who were at Harvard] are Jones and Abrams.  
b. The bills [passed by the House yesterday] and [that we objected to \_] died in the Senate. (p.471)

The two types of relatives can also appear without conjunction:

- (10) a. The only people [who were at Harvard] [being added to our group] are Jones and Abrams.  
b. The bills [that we objected to \_] [passed by the House yesterday] died in the Senate. (p.471)

It appears that the order of the relative clauses is not fixed (11), as is also the case when two full relatives modify a noun (12):

- (11) a. The only people [being added to our group] [who were at Harvard] are Jones and Abrams.  
b. The bills [passed by the House yesterday] [that we objected to \_] died in the Senate.
- (12) a. The only people [who were at Harvard] [who are being added to our group] are Jones and Abrams.  
a'. The only people [who are being added to our group] [who were at Harvard] are Jones and Abrams.

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- b. The bills [that we objected to \_] [that were passed by the House yesterday] died in the Senate.
- b'. The bills [that were passed by the House yesterday] [that we objected to \_] died in the House yesterday.

However, when a reduced relative is conjoined to a full relative, the order is not entirely free:

- (13) a. ?The only people [who were at Harvard] and [being added to our group] are Jones and Abrams.
- b. ?The bills [that we objected to \_] and [passed by the House yesterday] died in the Senate.

There appears to be a preference for the reduced relative to appear closer to the noun. Ordering preferences in conjunctions are not uncommon (see, for example, Bolinger 1962; Cooper and Ross 1975; Wright et al. 2005 on ordering preferences in binomial pairs; see also Sag 1997 for some relevant discussion), and this particular preference could be related to the phonological weight added by pronunciation of extra material in a full relative, as heavier relatives are easier to extrapose (Zec and Inkelas, 1990) (see also Quirk et al. 1972; Wasow 2002 on the Principle of End Weight), or to the fact that CPs, unlike APs tend to map onto intonational phrases in prosody (Nespor and Vogel, 1986; Selkirk, 2005).

The preference for heavier relatives to follow lighter ones can be seen in the conjunction of full relatives (although this preference is fairly easy to violate):

- (14) a. The only people who ski and who don't subscribe to the theory that a meteor killed the dinosaurs are Jones and Abrams.



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- b. ?The only people who don't subscribe to the theory that a meteor killed the dinosaurs and who ski are Jones and Abrams.

It can also be seen in the conjunction of two reduced relatives:

- (15) a. The women [in the room] and [hassled by the police] submitted complaints.  
b. ??The women [hassled by police] and [in the room] submitted complaints.

It is true, however, that the preference for reduced relatives to precede full relatives is stronger than the preference for lighter full relatives to precede heavier ones. This may be because full relatives tend to be both phonologically heavier and syntactically more complex, as I will argue below. Additionally, there seems to be a type of garden path effect at play, akin to a low attachment effect (Hwang et al., 2011). To my nativer speaker ear, there is a tendency to want to interpret the conjunction as low as possible in these examples, which can lead to infelicity:

- 15' a. ??The only people [who were [[at Harvard] and [being added to our group]]] are Jones and Abrams.  
b. ??The bills [that we [[objected to \_] and [passed by the House yesterday]]] died in the Senate.

In other words, if the first relative clause is a full relative, there is a tendency to interpret a second, reduced, relative as part of the first. This does not explain all of the gradations in acceptability in the examples above. Alternatively, it may be the case that there is a true ordering effect between full and reduced

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relative clauses, even in conjunction. Neither analysis would have a material effect on the analysis given below, so I leave the choice of which is preferable to the reader. It is clear, however, that full and reduced relative clauses are similar enough to be coordinated under the right conditions.

Hudson (1973) points out that full and reduced relative clauses do not have the same interpretive properties. Participial reduced relatives may be interpreted relative to the tense of the matrix verb or relative to the moment of speaking, but full relatives may only be interpreted relative to the moment of speaking. Stanton (2010, 2011) takes up this idea showing that, as the moment of speaking in (16a) is the present and the matrix verb is in the present tense, the sentence only has a paradoxical interpretation, in which the people who currently live here are dead. (16b) is expected to be semantically odd and (c) to be perfectly acceptable because the relative may only be interpreted relative to the moment of speaking, and the tense is explicit.

- (16) a. #The people living here are dead.  
b. #The people who are living here are dead.  
c. The people who were living here are dead. (Stanton, 2010)

Furthermore, as I will return to below, only certain kinds of predicates are permitted in reduced relatives. VPs with present, past or passive participles; predicative PPs; and predicative APs may appear here, but not finite or infinitival VPs or predicative NPs (Sag, 1997). As Stanton (2010, 2011) shows, the situation is slightly more complicated, as transitive and unergative verbs are not acceptable in reduced relatives, but passives are and unaccusatives

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are marginally acceptable (17).<sup>5</sup> All four types of verb are permitted in full relatives (18).

- (17) a. \*A man given his friend a gift is a generous man. (transitive)  
b. \*A man run regularly shows he has self-discipline. (unergative)  
c. ?A vegetable grown quickly has an evolutionary  
advantage. (unaccusative)  
d. A man given a gift by his friend is grateful. (passive)
- (Stanton, 2011, p.60)

- (18) a. A man who has given his friend a gift is a generous  
man. (transitive)  
b. A man who has run regularly shows he has  
self-discipline. (unergative)  
c. A vegetable that has grown quickly has an evolutionary  
advantage. (unaccusative)  
d. A man who has been given a gift by his friend is  
grateful. (passive)

A final difference between full and reduced relatives involves the grammaticality of purely stative verbs. Stanton shows that the present continuous is disallowed with purely statives like *surround* in full relative clauses (19a). However, the present participle is perfectly acceptable in reduced relatives (19b).

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<sup>5</sup>Note that the same pattern is found in adnominal adjectives. This suggests that both reduced relatives and adnominal adjectives require that the predicate has an unsatisfied  $\theta$ -role, because of the four categories in (17) this is only true of the passive. This pattern is expected under the analysis given in section 2.4 as both JOIN and  $\theta$ -identification rely on there being an unsatisfied  $\theta$ -role to relate to the noun.

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- (19) a. \*The wall that is surrounding the city has withstood a number of attacks.  
b. The wall surrounding the city has withstood a number of attacks.

The most plausible source for (19b), if it were derived from a full relative, would be something like (20).

- (20) The wall that surrounds the city has withstood a number of attacks.

Stanton uses these data to argue that reduced relatives lack an I and C layer completely, rather than these layers merely being unpronounced. This analysis is consistent with the proposal I present in section 2.4.<sup>6</sup>

Dutch also has postnominal reduced relative clauses, as shown in (21b).<sup>7</sup> (21a) shows a full relative.

- (21) a. Alle huizen die geschikt voor gehandicapten zijn staan op deze  
all homes that suitable for handicapped are stand on this  
lijst.  
list  
All homes that are suitable for handicapped people are on this  
list.  
b. Alle huizen geschikt voor gehandicapten staan op deze lijst.  
all homes suitable for handicapped stand on this list  
All homes suitable for handicapped people are on this list.

The properties of Dutch reduced relatives are broadly those of English. I will assume that Stanton's analysis of English reduced relatives will extend to

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<sup>6</sup>Note also that this analysis is not at odds with the ability of full and reduced relatives to be coordinated, as long as they relate to the noun in the same way (Sag et al., 1985). This is exactly the claim I will argue for below.

<sup>7</sup>Dutch reduced relatives have a heaviness or complexity requirement, akin to that found in English and discussed below.

Dutch, but will leave a more in-depth analysis of this construction to future research.

Despite their differences, full and reduced relative clauses behave similarly in a number of respects, especially when compared to the behaviour of adnominal adjectives. In the next section I will explore the differences between full and reduced relatives on the one hand and adnominal adjectives on the other. In section 2.4 I will propose an analysis that will account for some of the similarities between the two types of relative clauses, and their differences with adnominal adjectives.

### **2.2.3 Adnominal adjectives and reduced relatives**

Full and reduced relative clauses share many properties that are not shared by prenominal adjectives in English and Dutch. I will demonstrate these differences in this section by looking at the type of predicate that can appear pre- and postnominally, differences in the complexity allowed with pre- and postnominal adjectives, in the applicability of the Head-Final Filter (Williams, 1982), in the behaviour of the adjectival declensional schwa in Dutch, and in the determiner allowed in Dutch superlative constructions. In this section, I will begin with a description of some influential analyses holding that some adnominal adjectives are derived from reduced relative clauses. I will then present evidence that adnominal adjectives behave as a homogeneous class and so should be analyzed as having a single, attributive source.

**Previous analyses of adnominal adjectives as reduced relative clauses**

As we have seen, the idea that adjectives and relative clauses share a common source dates back to at least the 1960s. Larson (2000a) takes up the idea that adjectives are related to relative clauses. He observes that postnominal *possible* (assumed to be a relative clause) is unambiguously stage-level (22), while prenominal *possible* is ambiguous between a stage- and individual-level reading (23).

(22) Mary interviewed every candidate possible.

(23) Mary interviewed every possible candidate.

He therefore proposes that the stage-level reading of *possible* arises only in relative clauses, and that apparent adjectives with this reading are actually relative clauses that have undergone ellipsis. This idea accounts for the fact that when *possible* appears twice prenominally, as in (24), the stage-level (relative clause) reading consistently precedes the individual-level (attributive) reading, if the relative clause always moves higher than the attributive adjective.

(24) Mary interviewed every possible possible candidate.

The motivation for this landing site is not clear (despite being a crucial aspect of the explanation of the phenomenon), but assuming that it can be motivated, the derivation of postnominal *possible* in a sentence like (22) is argued to proceed as follows. *Possible* is generated in a postnominal relative clause with an empty complement licensed by Null Complement Anaphora (25a). *Every candidate* then undergoes quantifier raising (25b), and the CP from the

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matrix clause can reconstruct (25c), along the lines of analyses of Antecedent Contained Deletion (Sag, 1976; May, 1985).

- (25) a. [CP Mary PST interview [DP every candidate  
[ OP<sub>i</sub> possible [CP ∅ ] ] ] ]  
b. [DP<sub>i</sub> every candidate [ OP<sub>i</sub> possible [CP ∅ ] ] ] [CP Mary PST  
interview t<sub>i</sub>]  
c. [DP<sub>i</sub> every candidate [ OP<sub>i</sub> possible [CP for Mary to  
interview t<sub>i</sub> ]]] [CP Mary PST interview t<sub>i</sub>] (Larson, 2000a)

The ambiguity of prenominal *possible* in (23) can be understood if there are two sources for prenominal modification: a direct modification source, which receives an individual-level reading, and a relative clause source, which receives a stage-level reading and is derived by fronting the reduced relative clause that appears postnominally.

Larson and Takahashi (2007) argue for a similar analysis. Here, however, the authors argue that “prenominal adjectives with intersective properties are taken to originate postnominally in the position of relative clauses, and to achieve their surface position by movement” (p.15). Adjectives with intersective properties are those that receive the same reading as relative clauses, which are observed to be uniformly intersective (Larson, 1998, 2000b). These include adjectives that Cinque (2010) analyzes as RRC\*s (26).<sup>8,9</sup>

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<sup>8</sup>For the sake of clarity, I will use *RRC\** as an abbreviation for ‘reduced relative clause’ only in the Cinquean sense: adnominal adjectives with a putative reduced relative source. I claim that these RRC\*s are not distinct from other adnominal adjectives, derivationally or otherwise. For true ‘reduced’ relative clauses (argued to be derivationally distinct from full relatives in section 2.2.2), I will use *reduced relative (clause)*.

<sup>9</sup>I will argue in chapter 4 that (26c) is best analyzed as a bracketing paradox.

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- (26) a. the visible stars  
       (cf. the stars that are visible)
- b. the Thursday lecture  
       (cf. the lecture that was on Thursday)
- c. a beautiful dancer  
       (cf. a dancer who is beautiful)

Larson and Takahashi are more explicit about the nature of the postnominal source of the prenominal adjective. Following Larson 1998 and Larson 2000b, they argue that relative clauses are the “low, inner-most complements of D, which subsequently raises away from them; intersective [RRC\*] adjectives begin in the same site as relatives but later move to prenominal position for Case reasons” (p.15). This movement proceeds as in (28).

(27) [DP the<sub>i</sub> [DP [NP stars ] [D' t<sub>i</sub> [CP that are visible ]]]]

(28) a. [DP the<sub>i</sub> [DP [NP stars ] [D' t<sub>i</sub> [AP visible ]]]]

      b. [DP the<sub>i</sub> visible<sub>j</sub> [DP [NP stars ] [D' t<sub>i</sub> t<sub>j</sub> ]]]]

These moved prenominal adjectives are therefore not derived directly from a reduced relative, but begin in the same site as relatives. Ambiguity in prenominal modifiers is attributed to attachment of this modifier at either the DP or NP level: DP modification results in an individual-level interpretation, while NP modification results in stage-level interpretation. This is, strictly speaking, not a derivational relationship between adnominal adjectives and reduced relatives, but an analysis that relies on the idea that modifiers that are generated in the same structural position share an interpretation, regardless of the



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identity of those modifiers or where they might move to subsequent to their generation.

Cinque (2010) argues that adnominal adjectives have two separate sources: a direct attributive modification source, and a reduced relative clause source, similar to that argued for in Larson 2000a. The former source is associated with adjectives that display ordering requirements or preferences, and individual-level, nonintersective and absolute readings, among other properties. The latter source is associated with free ordering with respect to each other, and stage-level, intersective and relative (to a comparison class) readings. In English, and Germanic languages in general, direct modification adjectives are exclusively prenominal, and must appear closer to the noun than RRC\*s. RRC\*s may appear pre- or post-nominally. In other words, we find the linear order as demonstrated in (29a). The order in Italian, and Romance languages in general, is instead that of (29b).

- (29) a. RRC\* > direct modification > N > RRC\*  
 b. direct modification > N > direct modification > RRC\*

These orders can be seen in the following examples.

- (30) *stage-level* > *individual-level* > *N* > *stage-level*  
(Larson, 1998, pp.155–156)
- a. Every VISIBLE visible star  
 \*Every visible VISIBLE star
- b. Every visible star VISIBLE (Cinque, 2010, p.19)

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(31) *individual-level* > *N* > *individual-level* > *stage-level*

- a. una posizione invidiabile (oggi ancor più) INVIDIABILE  
a position enviable (today even more) enviable  
a (today even more) enviable enviable position

\*una posizione (oggi ancor più) INVIDIABILE invidiabile

- b. un invidiabile posizione (oggi ancor più) INVIDIABILE  
an enviable position (today even more) enviable  
a (today even more) enviable enviable position

(Cinque, 2010, p.21)

(32) *intersective* > *nonintersective* > *N* > *intersective*

(Larson and Marušič, 2004, p.281)

- a. She is a BEAUTIFUL beautiful dancer.

\*She is a beautiful BEAUTIFUL dancer.

- b. She is a beautiful dancer MORE BEAUTIFUL THAN HER  
INSTRUCTOR.

(Cinque, 2010, p.19)

(33) *nonintersective* > *N* > *nonintersective* > *intersective*

- a. un attaccante buono BUONO  
a forward good good  
a good-hearted good forward

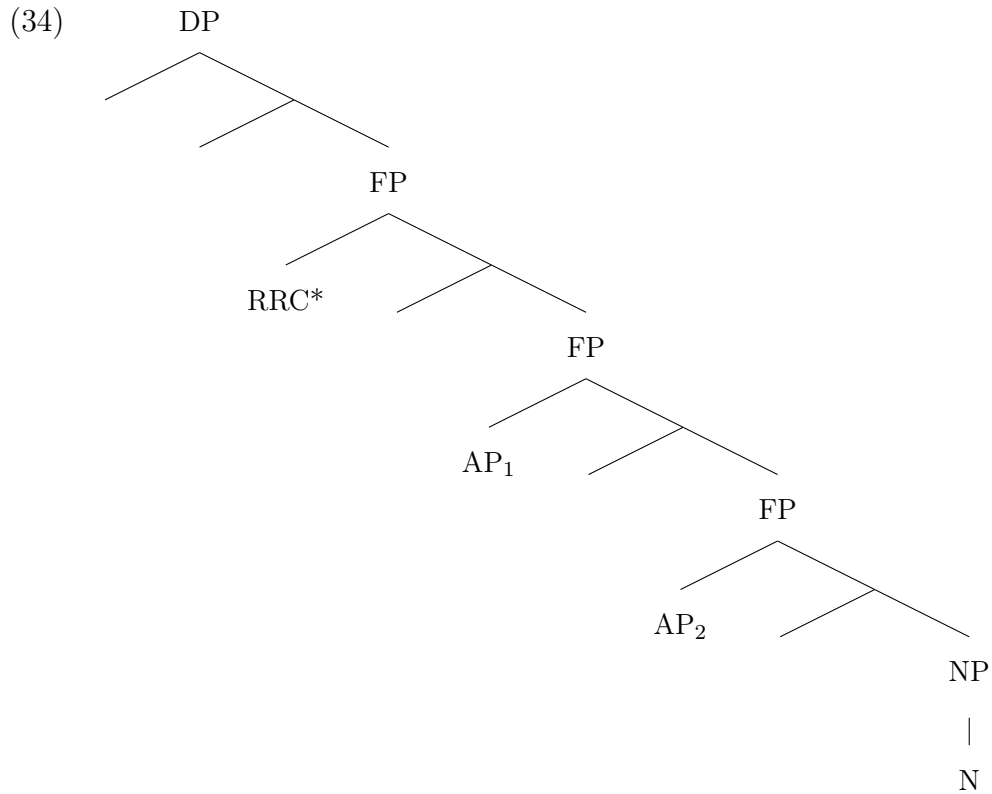
\*un attaccante BUONO buono

- b. un buon attaccante BUONO  
a good forward good  
a good-hearted good forward

(Cinque, 2010, p.21)

Cinque argues that adjectives and their nouns are base generated in the order RRC\* > direct modification > N, as indicated in the tree below (adapted from p.25).

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The postnominal position of reduced relativess in Germanic is derived through merging a complementizer (which may be covert) that attracts the NP together with any direct modification adjectives if present, as proposed by Kayne (1999, 2000, 2005):

- (35)
- a. [ [IP *e* recently arrived] nice Greek vases ] → (merger of C and attraction of the Head)
  - b. [ nice Greek vases] C [ [IP *e* recently arrived] *t* ] → (merger of the determiner)
  - c. [ the [ [ nice Greek vases] C [ [IP *e* recently arrived] *t* ] ] ]

(Cinque, 2010, p.26)

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The Romance order is derived through roll-up movement of the noun through the direct modification adjectives and the reduced relative clauses. This analysis explains why direct modification adjectives in these languages surface in a mirror image order to Germanic.

- (36) a. a(n) <enormous> black <\*enormous> dog  
b. un cane <\*enorme> nero <enorme>  
a dog <enormous> black <enormous>
- (37) a. a <round> Chinese <\*round> table  
b. un tavolo <\*rotondo> cinese <rotondo>  
a table <round> Chinese <round>
- (38) a. a <beautiful> big <\*beautiful> square  
b. una piazza <\*bellissima> grande <bellissima>  
a square <beautiful> big <beautiful>

Cinque argues that this analysis can account for the different behaviour of pre- and post-nominal adjectives, and for differences within the class of adnominal adjectives. However, without a clear understanding of when a given adjective is derived from each source, then the ability of this theory to make predictions about adjective ordering is undermined. For instance, *red* and *big* are subject to ordering restrictions with respect to each other:

- (39) a. the big red bus  
b. \*the red big bus

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This would suggest that at least *red* is a direct modification adjective (because these adjectives are closer to the noun in English than RRC\*s). However, both can appear predicatively:

- (40) a. The bus is red.  
b. The bus is big.

If they both have the option of being RRC\*s, then we might wrongly predict that they are not ordered with respect to each other, which is one of the properties Cinque 2010 associates with RRC\*s. It might be possible to specify that where an adjective can have either source, the DM source should be preferred (although Cinque himself does not propose such a restriction); however, this approach has its own problems. Williams (2013) provides the examples in (41).

- (41) a. the second green ball  
b. the green second ball (Williams, 2013, p.9)

The ordering in (41a) is preferred, but (41b) is allowed where there are a number of ‘second balls’ (in a grid of balls, or in a lottery, for example) and we are trying to pick out the green one. Given that there is an ordering preference, we must assume that both adjectives may be direct modification adjectives, and that their order in the attributive hierarchy is that in (41a). Given that both can appear predicatively, they must also have an RRC\* source, and it is the RRC\* source of *green* that accounts for the grammaticality of (41b). The assumption that, where both sources are available, the direct modification source is preferred all else being equal, ensures that (41b) is only available in marked situations like those described above.

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However if, as Cinque proposes, RRC\*s are always structurally higher than direct modification adjectives, the former should always outscope the latter. Furthermore, direct modification adjectives can only be found prenominal in English. Williams (2013) shows that (42) poses a problem given these assumptions.

(42) The second ball [as green as that one] (Williams, 2013, p.10)

This is because the preferred interpretation is that *second* scopes over *as green as that one*, leading to a paradox: *green* cannot be a direct modification adjective, because it is postnominal, but *second* cannot scope over an RRC\* unless it is an RRC\* itself. However if both adjectives are RRC\*s, there should be no preferred interpretation, because Cinque argues that RRC\*s are freely ordered. At least one of these assumptions must be false and a preference for direct modification would not solve this problem.

If adjectives and relative clauses can share the same source, we would *prima facie* expect those adjectives derived from relatives to behave in a similar way to relatives. The analyses discussed above use the readings available to adjectives in different positions to argue for a dual source of adnominal adjectives: the fact that some adnominal adjectives are interpreted as stage-level, identically to reduced relatives, is taken as evidence that they share a source. However, interpretation is not the only relevant characteristic of adnominal adjectives. In fact, apart from the similarity in reading between postnominal adjectives in English (previously analyzed as reduced relative clauses) and some prenominal adjectives, the behaviour of adnominal adjectives consistently differs from that of full and reduced relatives, which appear relatively

similar. I will therefore conclude that adnominal adjectives are never derived from relatives, whether full or reduced.

### **Evidence for a single source for adnominal adjectives**

Relative clauses of both types allow a variety of predicates, including APs (43), PPs (44), and participial verbs (45) (although see the previous section, and Stanton 2010, 2011 for a more detailed discussion on which participles are acceptable in reduced relatives).<sup>10</sup> Full relative clauses can also have nominal (46) and tensed verbal (47) predicates. Of these predicates, only APs and participles are allowed prenominally. (In the following, the [a] examples demonstrate the behaviour of prenominal adjectives, the [b] examples full relatives and the [c] examples reduced relatives.)

- (43) a. A happy man  
 b. A man who is happy  
 c. A man happy with his lot<sup>11</sup>

- (44) a. \*An on the corner man  
 b. A man who is on the corner  
 c. A man on the corner

- (45) a. A marching woman  
 b. A woman who is marching  
 c. A woman marching

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<sup>10</sup>Participles come in both adjectival and verbal variants (see Sleeman and Verheugd 1998; Ackema 1999; Sleeman 2007, 2011 for more detail), but I leave this distinction aside in this chapter.

<sup>11</sup>Postnominal reduced relatives in English must be complex, as discussed below.

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- (46) a. \*A doctor woman (marginal as an N-N compound)  
b. A woman who is a doctor  
c. \*A woman doctor (allowed where *woman* modifies  
*doctor* in an N-N compound)
- (47) a. \*A sings man  
b. A man who sings (will go far)  
c. \*A man sings (will go far)

However, not all adjectives are allowed to appear both pre- and postnominally. Some adjectives may only appear in prenominal position, and may not appear in either full or reduced relative clauses:

- (48) a. The utter fiend  
b. \*The fiend who is utter  
c. \*A fiend too utter for words
- (49) a. elke voormalig-e ambassadeur<sup>12</sup>  
every former-DECL ambassador  
b. \*elke ambassadeur dat voormalig is  
every ambassador that former is  
c. \*elke ambassadeur [(volgens Jan) voormalig]<sup>13</sup>  
every ambassador (according.to John) former

While the above illustrates the point for a nonintersective adjective, the same holds of intersective adjectives that cannot be used as predicates or post-

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<sup>12</sup>Rules surrounding the presence or absence of the declensional schwa are discussed briefly below, and in more detail in chapter 4.

<sup>13</sup>Postnominal reduced relatives in Dutch must also meet the complexity requirement found in English, or one like it.



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nominal modifiers. Such adjectives in Dutch typically refer to materials and are derived by *-en*:

- (50) a. elk sten-en / \*van steen huis  
every stone-EN / of stone house
- b. elk huis dat \*sten-en / van steen is  
every house that stone-EN / of stone stone is
- c. ?elk huis [(voor het grootste deel) \*sten-en / van steen]  
every house (for the biggest part) stone-EN / of stone

A smaller number of adjectives may only appear in a predicate or relative clause, including a reduced relative. In English, these are mostly those with the prefix *a-*, which is often analyzed as an incorporated preposition that heads its own projection (see Coulter 1983; Keenan 2002; Larson and Marušič 2004; Leu 2008 for details of such an analysis), although there are some other adjectives as well.

- (51) a. \*an asleep man  
b. a man who is asleep  
c. a man asleep (in bed)
- (52) a. \*a sorry person ( $\neq$  a person who is sorry for something they did)  
(Bolinger, 1967)
- b. a person who is sorry  
c. a person sorry (for their actions)

Here again, we see full and reduced relative clauses patterning together, to the exclusion of prenominal adjectives. While *asleep* and other adjectives in *a-* have been analyzed as having an incorporated preposition (and this is a plausible diachronic analysis), their categorial status is unclear. Many of these

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adjectives (including *asleep*, *ablaze*, *ajar*) are not gradable, so it is not possible to tell what type of modifiers they allow. However, at least some adjectives in *-a* are gradable, and appear to behave like true APs. Neeleman et al. (2004) show that modifiers like *too*, *very* and *as* (class 1 modifiers) can only attach to APs, while modifiers like *too much*, *a little* and *enough* (class 2 modifiers) can attach to any category. Class 1 modifiers can attach to postnominal *afraid*, for example:

- (53) a. a child very afraid of the dark (will find it difficult to sleep)  
b. a child too afraid to sleep  
c. a child as afraid as that (won't sleep)

Class 1 modifiers can also attach freely to both pre- and postnominal *sorry*, although the adjective receives different readings in each position. Prenominally it means roughly 'unfortunate', 'tragic', 'wretched' or 'pitiful', while postnominally it means 'regretful', 'sorrowful' or 'apologetic'.

- (54) a. a very sorry situation  
b. too sorry a situation for words<sup>14</sup>  
c. as sorry a situation as I've seen

- (55) a. a person very sorry for their actions  
b. a person too sorry for words  
c. a person as sorry as I've seen

These facts suggest that both *afraid* and *sorry* (meaning 'regretful' or 'apologetic') are true adjectives, and that they can only appear predicatively.

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<sup>14</sup>Prenominal APs modified by *more*, *-er*, *too* or *enough* in English must precede the determiner. See Bowers (1975, 1987) for details.

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Prenominal adjectives in English may not have complements, while postnominal full relative clauses may, and postnominal reduced relative clauses must:

- (56) a. a proud (\*of his son) man  
b. a man who is proud (of his son)  
c. a man proud \*(of his son)

The ungrammaticality of the complement in (56a) is explicable in terms of the Head-Final Filter (Williams, 1982) but it is not clear why postnominal reduced relative clauses in English must be complex in this way, a requirement which is not shared with full relatives. This complexity requirement seems to be satisfied if the AP includes a complement, but it does not seem to be satisfied by focus intonation, or by simple modification of the adjective (even if the modification introduces phonological weight):

- (57) a. \*A man proud stood to speak.  
b. \*A man proud is a terrible thing.  
c. A man proud of his son (stood to speak).  
d. \*A man PROUD (stood to speak).  
e. \*A man inordinately proud (stood to speak).

Example (57e) shows that, even where the reduced relative is phonologically a branching constituent, this is not in itself enough to license its presence postnominally (see Zec and Inkelas 1990 for a discussion of how phonological weight can affect syntax). This complexity requirement does not seem to be as strong with participial reduced relatives:

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- (58) a. ??A girl singing emerged from the wings.  
 b. A girl singing is a happy sight.  
 c. A girl singing at the top of her lungs emerged from the wings.  
 d. ?A girl SINGING emerged from the wings.  
 e. A girl <?loudly> singing <loudly> emerged from the wings.

It also cannot be the case that the requirement is simply that the head following the noun has a complement. While this would explain the grammaticality of full relatives and prepositional reduced relatives, it would also allow phrases like the following, if Neeleman et al. (2004) are correct in arguing that Class 1 modifiers are not modifiers at all but functional heads that select for APs:

- (59) \*A man too proud stood to speak.

For the remainder of this thesis, I will assume that the requirement is that adjectival reduced relative clauses require the adjective to have a complement.

A similar pattern is found in Dutch: postnominal reduced relatives must be complex, while prenominal adjectives and full relatives need not be. Furthermore, complex APs in predication structures, such as relative clauses, can be head-final or head-initial, but prenominal APs must satisfy the Head-Final Filter.

- (60) a. elk <voor gehandicapten> ongeschikt <\*voor  
 every for handicapped.people unsuitable for  
 gehandicapten> huis  
 handicapped.people house  
 Every house unsuitable for handicapped people Dutch

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- b. elk huis dat <voor gehandicapten> geschikt <voor  
every house that for handicapped.people unsuitable for  
gehandicapten> is  
handicapped.people is
- c. ?elk huis <voor gehandicapten> ongeschikt <voor  
every house for handicapped.people unsuitable for  
gehandicapten>  
handicapped.people

While the Head-Final Filter can explain why prenominal adjectives in English may not have complements, it would not explain why postnominal reduced relatives require complexity in both English and Dutch. Cinque (2010) is aware of this problem (pp.61–62), but offers no explanation. A further problem is the fact that the Head-Final Filter applies only prenominally, and applies to both (in Cinque’s terms) attributive adjectives and reduced relatives in that position, but does not apply to reduced and full relatives when they appear postnominally. Again, this fact suggests that reduced relatives cannot be a source for adnominal adjectives.

A small number of adjectives, including *present* and certain adjectives ending in *-a/ible*, may appear postnominally without a complement. I will argue in section 2.3 that these are not reduced relative clauses. However, to preview this argument somewhat, these adjectives, when bare, may only appear with certain determiners and not with others. Larson (2000a), who analyzes them as reduced relatives in line with much of the literature, claims that these postnominal adjectives are licensed by universal determiners like *every* or *all*, or by a superlative, while other determiners are not possible.

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- (61) a. Mary sampled every/all/the sweetest food(s) possible.  
b. \*Mary sampled a/no/three/more food(s) possible.

(Larson, 2000a, p.3)

This restriction is not well understood, and it will be discussed in more detail below. For the moment it will suffice to say that, while postnominal adjectives of this kind may only appear with certain determiners, there is no similar restriction for prenominal adjectives, even under the same, stage-level, reading found postnominally:

- (62) a. \*The stars visible shone brightly (that night).  
b. ??Three stars visible shone brightly (that night).  
c. Every star visible shone brightly (that night).  
d. No star visible shone brightly (that night).  
e. ?All stars visible shone brightly (that night).  
f. \*A star visible shone brightly (that night).  
g. The three stars visible shone brightly (that night).  
h. \*More stars visible shone brightly (that night).  
i. ?Some stars visible shone brightly (that night).
- (63) a. The visible stars shone brightly (that night).  
b. Three visible stars shone brightly (that night).  
c. Every visible star shone brightly (that night).  
d. No visible star shone brightly (that night).  
e. All visible stars shone brightly (that night).  
f. A visible star shone brightly (that night).  
g. The three visible stars shone brightly (that night).

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- h. More visible stars shone brightly (that night).
- i. Some visible stars shone brightly (that night).

Full relatives and reduced relatives with a complement are not restricted in this way.

Another difference between adjectives and relative clauses is related to the temporal interpretation of these modifiers that was discussed above. In an example like (64a), the adnominal participle can be interpreted as referring to a cow who habitually jumps or jumped, meaning that the whole sentence is interpretable. In (64b), however, the participle can only be interpreted as being contemporaneous with the moment of speaking (because the matrix verb is in the present tense), so the sentence is a contradiction.

- (64) a. The jumping cow is dead.  
b. # The cow jumping in the meadow is dead.

If prenominal adjectival participles were derived from reduced relative clauses, this interpretive difference would not be straightforwardly explicable.

Dutch provides further evidence of the distinction between relative clauses and adjectives. One difference is shown by the presence or absence of a declensional schwa on adjectives. This schwa obligatorily appears on prenominal adjectival constituents in certain genders and with certain determiners, but never appears postnominally or in predication structures. (The rules surrounding the use of this schwa are complicated; see chapter 4 and Kester 1996 for a more detailed discussion.):

- (65) a. elke [voor gehandicapten ongeschikt\*(-e)] villa  
every for handicapped.people unsuitable-DECL villa

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- b. elke villa die voor gehandicapten ongeschikt(\*-e) is  
every villa that for handicapped.people unsuitable-DECL is
- c. ?elke villa [ongeschikt(\*-e) voor gehandicapten]  
every villa unsuitable-DECL for handicapped.people
- d. Deze villa is ongeschikt(\*-e) voor gehandicapten.  
this villa is unsuitable-DECL for handicapped.people

Here and in examples above it is clear that the declensional schwa appears only and always on prenominal modifiers (if the gender and determiner require it) but never on full or reduced relatives.

A second difference can be seen with superlatives, of which Dutch has two types. One superlative construction is introduced by the neuter determiner *het*, while the other appears without a determiner. *Het*-superlatives are required or preferred in predication, relative clauses and postnominally, while they are disallowed prenominally:

- (66)
- a. de [op zo'n soort parcours waarschijnlijkst (\*het)  
the on such.a type course probably DET  
snelst-e] marathonloper  
fastest-DECL marathon-runner
  - b. de marathonloper die op zo'n soort parcours  
the marathon-runner who on such.a type course  
waarschijnlijk \*(het) snelst is  
probably DET fastest is
  - c. ?de marathonloper [waarschijnlijk \*(het) snelst op zo'n  
the marathon-runner probably DET fastest on such.a  
soort parcours]  
type course

In the superlative, as with the other examples discussed above, the adnominal adjectives behave differently to full and reduced relative clauses, suggesting that adnominal adjectives cannot be derived from reduced relatives.



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To summarize, full and reduced relative clauses allow a wider range of predicates (including APs, PPs and participles), may or must take complements, do not have to satisfy the head-final filter, and disallow non-predicative adjectives (whether these be intersective or nonintersective). In Dutch, they also do not take a declensional schwa, and require or preferably appear with *het*-superlatives. Adnominal adjectives display the opposite properties: they only allow AP and participial forms, disallow complements in English, must satisfy the head-final filter, and allow inherently non-predicative adjectives. In Dutch, they must take a declensional schwa in the appropriate contexts and disallow *het*-superlatives.

It might be possible to analyze this pattern in terms of a linear constraint: before the noun we find one set of behaviours in English and Dutch and after it we find a different set. This would allow us to maintain that reduced relatives can appear prenominal, and explain why they behave so similarly to adnominal adjectives and so differently to postnominal reduced relatives. However, the data do not support such an analysis.

Given that this linear constraint would apply to two categories prenominal, we might expect it to apply to all categories in the relevant linear domain. To take the declensional schwa as an example, we might expect this schwa to appear on all prenominal categories, including demonstratives and numerals. This prediction is not borne out in Dutch. Plural demonstratives already end in schwa (*deze* ‘these’, *die* ‘those’), as does the article *de* ‘the’, so it is not possible to test the prediction with these words. The articles *het* ‘the’ and *een* ‘a’ do not receive a schwa, but this could conceivably be due to phonological reasons: the presence of the schwa in the determiners themselves might rule

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out the addition of a declensional schwa. However, singular demonstratives and numerals in Dutch, which largely end in a consonant and do not themselves contain a schwa, uniformly do not receive the declensional schwa, even in phrases where adnominal adjectives do:

- (67) a. Dit(\*-e) oud\*(-e) huis  
           this-DECL old-DECL house
- b. Dat(\*-e) oud\*(-e) huis  
           that-DECL old-DECL house

- (68) De vier(\*-e) oud\*(-e) huizen  
       the four-DECL old-DECL houses

The schwa does appear on certain quantifiers, including *elk(e)* ‘every’, but these are very much the exception.

If putative prenominal reduced relative clauses and adnominal adjectives behaved the same due to a linear constraint, we would expect other prenominal modifiers to exhibit the same behaviour. As discussed above, adnominal adjectival phrases in Dutch and English must obey the Head-Final Filter—this is one consideration that rules out prenominal APs with complements in English. That PPs cannot appear prenominally in English is therefore expected, given that the complement of a preposition follows its head in that language. However, Dutch has some postpositional PPs, in which the head follows its complement:

- (69) de (oud-e) weg [het dorp in]  
       the old-DECL road the village in  
       the old road into the village

If it were merely a linear constraint dictating that prenominal modifiers in Dutch and English must satisfy the Head-Final Filter, we would expect these

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postpositional PPs to be acceptable prenominally in Dutch. This is not the case:

- (70) \*de (oud-e) [het dorp in] weg  
the old-DECL the village in road  
Intended: the old road into the village

It seems therefore that the Head-Final Filter is not what rules out prenominal PPs in Dutch, as they are disallowed even when they are head-final.

If agreement (exemplified by the declensional schwa in Dutch) and the Head-Final Filter both had linear domains, such that they only applied to prenominal modifiers in Dutch and English, based on the data above we would have to exclude not only demonstratives and numerals, but also PPs, leaving only attributive adjectives and adnominal RRC\*s. Of course, given that these two categories as they appear adnominally are both adjectival, a much more plausible analysis is that they are the same category, attributive adjectives, and that the restrictions above apply to attributives and nothing else.

Many of the other behaviours found in prenominal modifiers in English and Dutch cannot be tested on other categories. However the lack of declensional schwa on demonstratives and numerals and the ungrammaticality of even postpositional PPs in Dutch show that an analysis in which the uniform behaviour of adnominal adjectival modifiers is due to a linear constraint is not a viable option. Such an approach would require a number of unrelated, otherwise unmotivated rules and would only apply to two of the many categories that can appear prenominally, and is therefore insufficiently general. On the other hand, an analysis in which all seemingly adjectival modifiers are in fact adjectives explains why all such modifiers behave uniformly.

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The problem remains, however, of how to account for the fact that the stage-level reading seems to systematically precede the individual-level reading in (Germanic) noun phrases like (71).

- (71) a. the invisible visible stars (stage-level > individual-level)  
b. ??the visible invisible stars (\*individual-level > stage-level)

This pattern should not be taken as an argument for a RRC\* source for the stage-level adjective. First of all, as will be discussed in more detail in the next subsection, bare postnominal adjectives do not appear to be true relative clauses, and are unique in being unambiguously stage-level. Full relatives, and true reduced relatives (with a complement) are ambiguous between the two readings:

- (72) a. We will look at every star that is visible (on the day/with a telescope).  
b. We will look at every star visible on the day/through a telescope.

This fact means that, even if the stage-level prenominal adjective were derived from a (reduced) relative clause, we would still need to explain why it is suddenly unambiguously stage-level when it appears prenominally.

Furthermore, individual-level adjectives do not always precede stage-level adjectives:

- (73) a. Send me the altruistic available fireman.  
(individual-level > stage-level)  
b. Send me the available altruistic fireman.  
(stage-level > individual-level)

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- (74) a. An intelligent hungry student appeared at the door.  
(individual-level > stage-level)
- b. A hungry intelligent student appeared at the door.  
(stage-level > individual-level)

The observation in (71) can therefore not be a general observation about stage- and individual-level adjectives (or reduced relatives and direct modification adjectives, in Cinque's terms), but seems to be unique to situations where an adjective is repeated, or contrasted with its antonym. Given this fact, the ordering of stage-level adjectives before individual-level (where the two adjectives are either the same or direct opposites) is unsurprising. To preempt the discussion of JOIN in section 2.4, I will argue below that an adjective may either modify a contextually-determined set of entities (e.g. in the phrase *brave little elephant* the comparison class for *brave* might be elephants, animals, or similar) or a set determined by its syntactic sister (e.g. little elephants). In the cases at hand, a listener will assume that the repetition of an adjective is informative, but this can only be the case where the first adjective adds new information. If the second adjective in (71a) is to be interpreted as stage-level (i.e. the stars are visible at the moment) then an individual-level reading of the first adjective is ruled out—it is contradictory to talk about stars that are in principle invisible being visible at the moment, unless we are dealing with special, vision-enhancing equipment. However, it is perfectly consistent for stars to be in principle visible but invisible at the moment (a phenomenon often experienced under London's cloudy skies), which is reflected in the ordering individual-level > stage-level.

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The same analysis applies to any such repeated adjective: the left-most adjective has to give additional information, on top of what is expressed by the phrase composed of the right-most adjective and the noun. With adjectives that do not have the stage-level/individual-level distinction, this seems to be accomplished by interpreting the left-most adjective as a kind of intensifier, or as indicating that the N in question has particularly ‘A’ qualities:

- (75) a hoppy hoppy beer
- (75) a Canadian Canadian woman
- (75) an intelligent intelligent student

In brief then, the stage-level > individual-level ordering can be explained by the fact that repeated (or antonymous) adjectives take scope and an individual-level > stage-level order of scope-taking adjectives is uninformative.

A similar preference is found in postnominal relative clauses. Here, the individual-level reading is associated with the adjective that is closer to the noun.

- (76) a. The stars that are visible that are invisible include Deneb and Fomalhaut. (individual-level > stage-level)
- b. ?The stars that are invisible that are visible include Deneb and Fomalhaut. (?stage-level > individual-level)

This preference is weaker than that found in adnominal adjectives, and will be discussed in more detail in section 2.4, but it is further evidence that the stage-level reading of adnominal adjectives is unlikely to be due to their source as reduced relative clauses and is more plausibly to do with the interpretive effects of repeated adjectives.

In this section I have argued that there is no derivational relationship between adnominal adjectives, full relative clauses and reduced relatives. Reduced relative clauses do exist, but they only appear postnominally in English and Dutch, and adnominal adjectives are not derived from reduced relative clauses. Adnominal adjectives do not have the properties that we associate with relative clauses, whether full or reduced, but an analysis where at least some prenominal adjectives are derived from (reduced) relative clauses cannot explain this fact. The above data confirm Cinque's (2010) hypothesis that there are two types of adjectival modification, but they suggest that the relative clause source is only available postnominally in English and Dutch, and only the attributive source prenominally. In fact, it appears that all prenominal modification in English and Dutch is attributive, but this does not necessarily mean that all postnominal modifiers are relative clauses.

In the next section I discuss a second type of postnominal adjectival modification, with separate properties from both prenominal adjectives and postnominal reduced relative clauses. These adjectives are often assumed to be reduced relatives, but I will demonstrate that they do not share the traits of relative clauses, whether full or reduced, discussed above.

## 2.3 Bare postnominal adjectives in English and Dutch

We have seen that the prenominal slot in English and Dutch is reserved exclusively for attribution. However, the question remains whether attribution can also be found elsewhere in the noun phrase. In French, and Romance

languages generally, adjectives tend to follow the noun, but may precede it in certain situations. Suppose that the reverse is true of English: in general, adnominal adjectives precede their nouns but in certain situations they may follow it. This could account for the behaviour of bare postnominal adjectives like *visible*, *possible* and *present*. These postnominal adnominal adjectives do not appear to be a variety of relative clause, and are likely to involve attribution. However, Dutch does not seem to share these bare postnominal adjectives with English: in Dutch, we do seem to find complementary distribution between attribution before the noun and relative clauses after it.

The adjectives under discussion in this chapter are not the focus of this thesis, but they are an important part of the story. Bare postnominal adjectives have played a large part in the dual-source analysis of adnominal adjectives, because they are often analyzed as reduced relative clauses. I will offer a potential alternative analysis, the crux of which is that these adjectives do not behave like standard attribution or like true reduced relatives. I leave a full explanation of this class of modifier for future research.

### 2.3.1 Bare postnominal adjectives in English

All of the tests discussed above that can apply in both Dutch and English give the same results, namely that adnominal adjectives have different behaviour to relative clauses, whether reduced or not. However, the two languages differ in a number of ways with respect to bare postnominal adjectives. These differences suggest that postnominal adjectives are not all of a kind, and that they may sometimes have different sources in the two languages.



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As mentioned briefly above, a large majority of postnominal adjectives in English come with a certain heaviness restriction. Standard adjectives like *happy* or *proud* may appear postnominally if they have a complement, but not if they are simply modified or focused:

- (77) a. \*I talked to a man happy.  
b. I talked to a man happy with his lot.  
c. \*I talked to a man inordinately happy.  
d. \*I talked to a man HAPPY.

However, this heaviness requirement apparently does not hold of certain adjectives, including adjectives in *-able* or *-ible* that can receive a stage-level reading. This subsection will focus on determining the properties of the adjectives that can appear bare postnominally in English, including which adjectives have this option and any restrictions that exist on this position. The next subsection deals with differences between English and Dutch.

One source of bare postnominal adjectives are the honorary NPs discussed in section 2.2.1. These include examples like the following:

- (78) a. Students happy is/\*are what we strive for.  
b. Houses ablaze is/\*are the fear of the fire department.  
c. Workers striking is/\*are the last straw.

Recall that these are different from real NPs in that they don't trigger plural agreement on the verb. Bare adjectives are also by no means the only modifier allowed in these honorary NPs:

- (79) a. Under the bed is a cozy spot.

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- b. Angry/Unwanted is a terrible way to feel.
- c. Workers angry about the pay is just the sort of situation the ad campaign was designed to avoid. (Safir, 1983)

This construction is not well understood, but it appears to be distinct from the cases described by Larson (2000a) and Cinque (2010). I will leave it aside for the remainder of this thesis.

In the previous section, I described Larson’s (2000a) analysis of sentences like *Mary interviewed every candidate possible*. He argues that the sentence originates as something like *Mary interviewed every candidate possible for her to interview* and uses Quantifier Raising, reconstruction and movement to explain the similarity in meaning between the two sentences. However, he does not explain why many adjectives that can appear in a relative clause like *that it was possible for Mary to interview* cannot appear “bare” postnominally: *Mary interviewed every candidate easy for her to interview* is perfectly acceptable, but *\*Mary interviewed every candidate easy* is resoundingly bad. The first question to answer then is which adjectives are tolerated bare in the postnominal position. To start with, it appears that positive *-a/ible* adjectives that can receive a stage-level reading can appear postnominally:

- (80)
- a. Mary interviewed every candidate possible.
  - b. We looked at every star visible.
  - c. (I didn’t have my glasses that day, but) I transcribed every note legible.
  - d. We tried every solution conceivable.

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- e. The students attempted to answer every question comprehensible (six out of ten questions on the exam).
- f. ?We ate every cake edible. (*edible* tends towards an individual-level reading)
- g. ??We drank the only water potable. (*potable* is similarly individual-level)

However, stage-level *-a/ible* adjectives are not always possible postnominally. They are only tolerated in the presence of certain determiners:

- (81) a. \*We looked at the stars visible.
  - b. ??We looked at three stars visible.
  - c. We looked at every star visible.
  - d. \*We looked at no star(s) visible.
  - e. ?We looked at all stars visible.
  - f. \*We looked at a star visible.
  - g. We looked at the three stars visible.
  - h. \*We looked at more stars visible.
  - i. \*We looked at some stars visible (marginally acceptable with stress on *some*)
- 
- (82) a. \*The stars visible shone brightly (that night).
  - b. ??Three stars visible shone brightly (that night).
  - c. Every star visible shone brightly (that night).
  - d. ??No star(s) visible shone brightly (that night).
  - e. ?All stars visible shone brightly (that night).
  - f. \*A star visible shone brightly (that night).

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- g. The three stars visible shone brightly (that night).
- h. \*More stars visible shone brightly (that night).
- i. \*Some stars visible shone brightly (that night). (marginally acceptable with stress on *some*)

This is a complex and fairly unexpected pattern. I am not able fully to explain it, but there are a number of considerations that may go some way towards a full solution.

It appears that symmetric determiners (in the sense of Barwise and Cooper 1981 and Keenan 1987) are disallowed with postnominal *-a/ible* adjectives: *three*, *no*, *a* and *some* (in its weak form) are all ruled out. Most non-symmetric determiners allow such adjectives: *every*, *the three*, *the first* (and similar), *the only* and *the*+superlative are all acceptable. However, it is not clear why the symmetry of a determiner should matter to whether a given adjective may appear postnominally. Moreover, from the set above, this observation leaves *the*, *no*, *all* and *more* unexplained.

The grammatical examples are most acceptable with even stress on the determiner, noun and adjective: *évery stár vísible* is much better than *every stár visible*. I propose that, in addition to the ban on symmetric determiners, there is a strong prosodic preference for equal stress on the three parts of the phrase. This preference rules out *the* in its weak form, because it is a clitic and cannot be stressed. Indeed, acceptability of (81a) and (82a) moderately improve with equal stress on determiner, noun and adjective, although they are still not as acceptable as the examples with *every*.

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I cannot explain the ungrammaticality of *more* or why *all* is less acceptable than *every*. However, with regard to the latter, *all* is significantly more acceptable than *three* or any of the starred examples.

While stage-level *-a/ible* adjectives can appear bare postnominally, the negative forms of these adjectives never seem to be allowed here: \**Mary didn't interview any candidate impossible* is completely ungrammatical, despite the fact that it can be paraphrased in exactly the same way as the positive form of the adjective (“Mary didn’t interview any candidate (that it was) impossible for her to interview”). This factor does not seem to be related to the stage-level vs. individual-level distinction, to the symmetry restriction, or to the prosodic preferences of the construction. A full explanation of this pattern would take me too far afield from the topic of this chapter, so I leave a deeper analysis to future research.

One other adjective that can appear postnominally without a complement is *present*. However, *present* does not have many of the restrictions that apply to *-a/ible* adjectives. It can appear with many more determiners:

- (83)
- a. The members present came to this conclusion.
  - b. Three members present came to this conclusion.
  - c. Every member present came to this conclusion.
  - d. No member present came to this conclusion.
  - e. All members present came to this conclusion.
  - f. \*A member present came to this conclusion.<sup>15</sup>
  - g. The three members present came to this conclusion.
  - h. More members present came to this conclusion.
  - i. Some members present came to this conclusion.

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It is also unambiguous in both the prenominal and postnominal positions (84) (although it receives a different reading in each position), whereas adjectives like *possible* and *visible* tend to be unambiguously stage-level postnominally and ambiguous between a stage- and individual-level reading prenominally (85).

- (84) a. The present members came to this conclusion  
= The people who are currently members came to this conclusion.  
≠ The members who were not absent came to this conclusion.
- b. The members present came to this conclusion.  
≠ The people who are currently members came to this conclusion.  
= The members who were not absent came to this conclusion.
- (85) a. We looked at every visible star.  
= We looked at every star that was visible at the time.  
= We looked at every star that is generally visible.
- b. We looked at every star visible.  
= We looked at every star that was visible at the time.  
≠ We looked at every star that is generally visible.

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<sup>15</sup>The unavailability of the determiner *a* with postnominal *present* may be due to the prosodic factor discussed above, although this approach would then leave the grammaticality of *the* unexplained.

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Somewhat surprisingly, predicative *present*, in both copular and relative clause constructions, is also unambiguous. This contrasts with predicative *(in)visible* (see (87) below). Predicative *present* has the same reading as postnominal *present*:

- (86) a. The members present are having coffee.  
      ≠ The people who are currently members are having coffee.  
      = The members who are not absent are having coffee.
- b. The members who are present are having coffee.  
      ≠ The people who are currently members are having coffee.  
      = The members who are not absent are having coffee.
- c. The member is present.  
      ≠ The person is currently a member.  
      = The member is not absent.

These facts suggest that *present* is best analyzed as two distinct lexical items: an exclusively adnominal adjective meaning ‘who is currently an X’ and an exclusively predicative adjective meaning ‘not absent’. This approach is supported by the fact that in many languages including Dutch and German, English *present* corresponds to two distinct lexical items.<sup>16</sup> Given this difference, and the difference in the determiners *present* and the *-a/ible* adjectives can appear with, I consider the two to be slightly different cases.

Postnominal bare adjectives do not appear to be reduced relative clauses. As discussed above, postnominal adjectival reduced relative clauses require a complement, while *possible*, *present* and their like do not. Full relatives and

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<sup>16</sup>In Dutch, these are *huidig*, meaning ‘currently’ and *aanwezig*, meaning ‘not absent’. In German, *gegenwärtig* and *anwesend*, respectively.

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postnominal adjectives with a complement may appear with any determiner, while *-a/ible* adjectives and, to a certain extent, *present* can only appear with some. Finally, bare postnominal adjectives seem to be unambiguous, while full relative clauses are ambiguous:

- (87) a. We will look at every star visible.  
      = We will look at every star that is visible when we are looking.  
      ≠ We will look every star that is generally visible.
- b. We will look at every star that is visible.  
      = We will look at every star that is visible when we are looking.  
      = We will look every star that is generally visible.

Furthermore, postnominal *-a/ible* adjectives can be made ambiguous with the addition of a complement, which by hypothesis would render them true reduced relatives.

- (88) We will look at every star visible with the naked eye.  
      = We will look at every star that is visible with the naked eye when we are looking.  
      = We will look every star that is generally visible with the naked eye.

This fact provides additional evidence that bare postnominal adjectives are not true reduced relative clauses. If these adjectives were unique in being able to form a reduced relative without being heavy, then there would be no account for the difference in meaning when they appear with and without a comple-



ment. However, if reduced relatives must have complements, as suggested by the data earlier in this chapter, then the fact that *-a/ible* adjectives are ambiguous both in a full relative and in a reduced relative (with a complement) is as expected.

I propose that postnominal adjectives fall into at least three classes: reduced relative clauses, which require a complement, have no restrictions on their determiner, and have the same (un)ambiguity as full relative clauses; *-a/ible* adjectives, which do not require a complement, have a number of restrictions on their determiner, and are unambiguous; and *present*, which behaves similarly to a reduced relative clause in that it has the same (un)ambiguity as a full relative clause, but it does not require a complement and may not appear with the determiner *a*.

It is possible that *present* does in fact fall in to one or the other of the first two categories, but its behaviour appears to me sufficiently different to dissociate it for now. I am also unaware of other adjectives that behave like *present*—if adjectives with the prefix *a-* are really headed by that prefix (as suggested by Larson and Marušič, 2004), then their complement is inbuilt. One possible analysis of these bare postnominal adjectives is that they are similar to prenominal adjectives in French (see e.g. Delbecque, 1990; Bernstein, 1991 for a discussion of adjectives in French), Italian (see e.g. Cinque, 2010) or Welsh (see e.g. Willis, 2006); in other words, only certain adjectives may appear bare in this postnominal position, and the choice of which is an idiosyncratic property of the language. Although it does not explain the restrictions on determiners, I find this approach appealing, but I will leave a full analysis of bare postnominal adjectives in English for future research.

In the next subsection, I will show that Dutch differs significantly from English in the availability of bare postnominal adjectives. The facts suggest that bare postnominal adjectives do not exist in Dutch.

### 2.3.2 Bare postnominal adjectives in Dutch

Despite the fact that Dutch allows postnominal reduced relative clauses, as demonstrated above, it does not appear to tolerate bare adjectives like *invisible*, *possible* and *present* postnominally:

- (89) a. \*We keken naar elke ster zichtbaar.  
           we looked at every star visible
- b. \*Marie interviewde elke kandidaat mogelijk.  
           Marie interviewed every candidate possible
- c. \*Elke lid huidig/aanwezig kwam tot deze conclusie.<sup>17</sup>  
           every member present came to this conclusion

The determiner appearing with the postnominal adjective has no effect on the acceptability of the overall phrase.

Both translations of English *present*, *aanwezig* ‘present/not absent’ and *huidig* ‘present/current’ can appear prenominally, with all or nearly all determiners.

- (90) a. De huidige/aanwezige leden kwamen tot deze conclusie  
           the present-DECL members came to this conclusion  
           The <present> members <present> came to this conclusion.
- b. Het huidige/aanwezige lid kwam tot deze conclusie  
           the present-DECL member came to this conclusion  
           The <present> member <present> came to this conclusion.

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<sup>17</sup>Dutch has two lexical items for English *present*; one, *huidig*, corresponding to the meaning ‘who are X right now/currently’ and the other, *aanwezig*, corresponding to the meaning ‘who are physically present/not absent’. Neither is acceptable in this position.

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- c. Drie huidige/aanwezige leden kwamen tot deze conclusie  
Three presentDECL members came to this conclusion
- d. Elk huidig/aanwezig lid kwam tot deze conclusie  
every present member came to this conclusion
- e. Geen huidig/aanwezig lid kwam tot deze conclusie  
no present member came to this conclusion
- f. Alle huidige/aanwezige leden kwamen tot deze conclusie  
all present-DECL members came to this conclusion
- g. Een huidig/aanwezig lid kwam tot deze conclusie  
a present member came to this conclusion
- h. De drie huidige/aanwezige leden kwamen tot deze  
the three present-DECL members came to this  
conclusie  
conclusion
- i. Meer ?huidige/aanwezige leden kwamen tot deze conclusie  
more present-DECL members came to this conclusion
- j. Een paar huidige/aanwezige leden kwamen tot deze  
a pair present-DECL members came to this  
conclusie  
conclusion  
Some present members/members who were present came to this  
conclusion.

This behaviour contrasts with English postnominal *present*, which is more restricted in terms of the determiner it can appear with. It therefore seems that both *huidig* and *aanwezig* are standard adnominal adjectives, and that the restrictions on determiners appearing with bare postnominal adjectives do not apply here, as is the case with other prenominal attributives.

*Zichtbaar* ‘visible’ can appear preminally with no restriction on determiner, with or without a complement. It is ambiguous between a stage- and individual-level reading.

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- (91) We keken naar de (die nacht/in principe) zichtbar-e sterren.  
we looked at the (that night/in principle) visible-DECL stars  
We looked at the stars that were visible that night/in principle.

*Mogelijk* ‘possible’ is also possible with all determiners in Dutch, and it allows a complement. However, unlike *zichtbaar* ‘visible’, it is almost always unambiguous.

- (92) Marie interviewde elke mogelijk-e kandidaat.  
Marie interviewed every possible-DECL candidate  
Marie interviewed every potential candidate  
(≠Marie interviewed every person it was possible to interview)

- (93) We probeerden elke voor ons mogelijk-e oplossing.  
we tried every for us possible-DECL solution  
We tried everything that was a potential (for us) solution  
(≠We tried everything that might have been a solution).

This is perhaps unsurprising, given that a full relative clause is also unavailable with *mogelijk*. (94) is impossible, and must be expressed along the lines of (95).

- (94) \*Marie interviewde de kandidaten die het mogelijk was om te interviewen.  
interview  
Marie interviewed the candidates that it was possible for her to interview.

- (95) Marie interviewde de kandidaten die ze kon interviewen.  
Marie interviewed the candidates that she could interview.

However, *mogelijk* has another curious property when combined with a superlative. English *possible* can combine with superlatives under the modal reading:

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- (96) Give me the biggest possible glass of beer.  
= Give me the biggest glass of beer that it is possible for you to give me.

In this construction, *mogelijk* can also receive the modal reading.

- (97) Geef me het grootst mogelijk-e glas bier.  
give me the biggest possible-DECL glass beer  
Give me the biggest glass of beer that it is possible for you to give me.

In fact, it appears that it is only in this construction, and in one other, similar one (98), that this modal reading is possible at all.

- (98) Geef me een zo groot mogelijk glas bier.  
give me a so big possible glass of beer  
Give me the biggest glass of beer that you can give me.

However, it is not the case that this modal reading arises because the adjective is derived from a relative clause, as the modal reading is not available in a relative clause, as shown in (94). Furthermore, a postnominal reduced relative is also ungrammatical:

- (99) \*Geef me de glazen bier grootst(-e) mogelijk(-e).  
give me the glasses beer biggest-DECL possible-DECL  
Give me the biggest possible glasses of beer.

The adjectives can also not appear predicatively. To see this, compare (100) and (101). (100) involves ellipsis of the noun after the copula; this is evident from the presence of the *de* rather than the *het* determiner, and because of the declensional schwa, which can only appear prenominal. (101), on the other

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hand, involves truly predicative adjectives, as can be seen from the presence of the *het* determiner and the absence of the declensional schwa. The latter, truly predicative example is ungrammatical.

- (100) Deze glazen bier zijn de grootst mogelijke  $e_N$ .  
 these glasses beer are the biggest-DECL possible-DECL  
 These glasses of beer are the biggest possible
- (101) \*Deze glazen bier zijn het grootst mogelijk.  
 these glasses beer are the biggest possible  
 These glasses of beer are the biggest possible

The modal reading of *mogelijk* in Dutch cannot therefore be due to a potential reduced relative clause source. This fact is consistent with the idea that bare postnominal *possible* in English, which unambiguously receives the modal reading, is not a true reduced relative clause.

These seem to be the only constructions in which the modal reading of *mogelijk* is accessible. Even when *mogelijk* is used in conjunction with *potentiaal* 'potential' in a 'visible visible stars'-type construction, in order to try and emphasize the modal reading, the result is ungrammatical.

- (102) \*elke mogelijk(-e) potential-e kandidaten  
 every possible-DECL potential-DECL candidate

One final difference between *mogelijk* and *possible* involves constituency. It might come as a surprise that the declensional schwa does not appear on the superlative in (97), if the assumption is that all prenominal adjectives receive a schwa. However, the schwa in fact appears on prenominal adjectival constituents, not every individual adjective. In the following example, 'Chomskian' and 'generative' form a constituent, so only the latter receives a schwa:

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- (103) een Chomskiaans generatieve taalkundige  
 a Chomskian generative linguist

Therefore, the absence of the schwa in (97) is one piece of evidence that the superlative and *mogelijk* in this sentence form a constituent, rather than each modifying the noun separately:

Further evidence that *grootst* and *mogelijk* form a constituent in (97) comes from the fact that numerals cannot intervene between the superlative and *mogelijk*, although as the translation below suggests, such intervention is possible in English:

- (104) Geef me de <drie> grootst(-\*e) <\*drie> mogelijk-e  
 give me the <three> biggest-DECL <three> possible-DECL  
 <drie> glazen bier.  
 <three> glasses beer  
 Give me the three biggest/biggest three possible glasses of beer.

These facts suggest that *mogelijk* can only receive the modal reading when it combines directly with an adnominal superlative or similar expression.<sup>18</sup> This behaviour bears no resemblance to English *possible*. The Dutch data therefore support the claim that Dutch, unlike English, has complementary distribution between attributives and relative clauses, with the former appearing prenominally and the latter appearing postnominally. In English, however, there is some overlap between the two. In that language, the prenominal domain is reserved exclusively for attribution, but a small class of attributives can also be found postnominally, similar to what is found in French, Italian and Welsh. Relative clauses, however, are exclusively postnominal. In the next section I

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<sup>18</sup>There is a further question of which modifier in this constituent is the head. According to the Head-Final Filter, we would expect it to be *mogelijk*, but the meaning suggests that the head should be *grootst*. I leave this issue aside here.

will discuss the semantic differences between attribution and predication, and suggest how those differences might best be captured.

## 2.4 Attribution and predication

I have shown that adnominal adjectives display different behaviour to full and reduced relative clauses in a number of respects. The question now is how these differences should be captured. In this section I will argue that the semantics of adnominal and of predicative adjectives are different, and that this difference can be reflected in the syntax. I begin with a discussion of the semantics of attribution and predication, the crux of which is that attribution is an asymmetric relationship while predication is symmetric. I will suggest a locus for the asymmetry found in attribution, namely the abstract morpheme JOIN. I will then argue that the semantics of (R)RCs is intersective in nature, and is best captured by Higginbotham's (1985)  $\theta$ -identification.

Given that adjectives can be both predicates and modifiers, it is not a straightforward task to determine their semantic type. As predicates, they would be expected to be of type  $\langle e, t \rangle$ , that is, functions from entities to truth values. However, adnominal adjectives are optional, and a modified nominal has the same syntactic distribution as an unmodified one. This suggests that adnominal adjectives are functors, taking a nominal of type  $\langle e, t \rangle$  as their argument and returning a function of type  $\langle e, t \rangle$ . In other words, their semantic type should be  $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ .

There are essentially two ways to reconcile this apparent contradiction. We could add a new semantic operation to account for attribution (and other similar types of modification, like adverbs), or we could adjust the denotation of



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adjectives. Higginbotham (1985) has argued for the first option, introducing an operation called  $\theta$ -identification.  $\Theta$ -identification, unlike functional application, identifies the thematic roles of the noun and modifying adjective, leading to a semantics of conjunction: a *big butterfly* is something that is a butterfly and that is big (for a butterfly). This approach tackles intersective adjectives very easily, but subsective adjectives, and those like *alleged* and *fake*, require some additional finesse (in the form of a combination of  $\theta$ -marking and  $\theta$ -identification in the former case, and  $\theta$ -marking on its own in the latter).

The second approach involves changing the denotation of adjectives when they are used attributively or predicatively. It seems unparsimonious to store all adjectives that can appear as both predicates and attributives with two separate denotations, so many authors have argued that one type should be derived from the other via a type-shifting operation. It is a version of this approach that I will adopt below.

I have argued in previous sections that full and reduced relative clauses are not related by derivation. However, given their similarities in a number of respects, it might occur to us to wonder whether they are related in some other way, and in such a way that differentiates them from attributive adjectives. In this section I will argue that they are related in that they both modify the noun in the same way, namely by  $\theta$ -identification. This is in contrast to the way that adnominal adjectives modify the noun, through attribution. I will first discuss this latter relationship, and suggest that both the type-shifting mechanism and the source of asymmetry which are required for attribution could be unified with the functional morpheme JOIN. I will then discuss  $\theta$ -

identification, how it differs from the semantics of attributive adjectives and how it captures the semantics of relative clauses.

### 2.4.1 Attribution and JOIN

Bierwisch (1986), Partee (1986) and Zamparelli (2000) have argued that adjectives are basically predicative, not least because they can be coordinated with predicative DPs, which are also of type  $\langle e, t \rangle$ :

(105) The man is yellow and a coward.

Other authors, including Bolinger (1967) and Keenan and Faltz (1978) argue that predicative adjectives are derived from the attributive use—this is also the standard approach in Categorical Grammar (see e.g. Lewis, 1972; Kamp, 1975). However, as Hamann (1991) and Truswell (2004) point out, this kind of analysis often includes a kind of deletion, where *Dumbo is small* is in fact understood as *Dumbo is a small elephant*, and this deletion can prove problematic. Truswell (2004) therefore adopts the former approach.

Truswell assumes that adjectives are of basic type  $\langle e, t \rangle$ , and that an operator, JOIN, attaches to attributive adjectives to change their type (see also Chierchia and Turner, 1988; Baker, 2003). Truswell argues against Higginbotham's  $\theta$ -identification approach for two main reasons. Firstly,  $\theta$ -identification is essentially intersective modification, and many adjectives are not interpreted purely intersectively. In intersective modification, the combination of the adjective and noun denotes the intersection of the sets denoted by either the adjective or the noun on its own. In other words, a *female cat* lies at the intersection of cats and female things. However, some adjectives denote a

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subset of a superset of the items denoted by the noun. In these modal cases, like (106), the property denoted by the noun may not hold of the combination of adjective and noun.

- (106) a. a possible thief  
b. an apparent problem  
c. a former actor

For these adjectives, intersective modification clearly does not make sense. Although not the focus of Truswell's dissertation, subsective modification, or modification with respect to a comparison class, may also pose problems for  $\theta$ -identification. A *big ant* is big for an ant, and is likely to be smaller even than a *small elephant*. Subsective modification seems to be the case in a large majority of adjectives. Even commonly cited intersective adjectives are often subsective in reality: a *square face* is likely to be rounder than a *square table*, and *red cheeks* are a different kind of red to a *red apple* (see also Truswell 2005). Here again, it is not clear that intersective modification is the best approach, given the additional work required to take into account the comparison class.

A second problem Truswell points out has to do with the fact that the order of adjectives makes a difference to their interpretation. Set intersection (and conjunction) should not be sensitive to ordering effects: the intersection of set A with set B is the same as that of set B with set A. However, as Svenonius (1994) discusses, the examples below differ in their interpretation.

- (107) a. [chopped [frozen [chicken]]]  
b. [frozen [chopped [chicken]]]

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Example (107a) refers to chicken that has been frozen and then subsequently chopped (a relatively difficult task), while (107b) refers to chicken that has been chopped and then frozen (a relatively easy task). This fact is unexpected if attribution involves  $\theta$ -identification, as conjunction is associative: both examples in (107) should refer to chicken that has been frozen and that has been chopped.

I think that a second, more subtle example of the sensitivity of adjectival interpretation to ordering can be seen in violations of the well-known adjective ordering hierarchy (see Sproat and Shih 1991; Teodorescu 2006; Cinque 2010 among many others). While stacked adjectives in the neutral ordering may result in something like intersective (or subsective) modification, indicating a ball that is both red and big (for a ball) (108a), the opposite ordering of the adjectives (108b) is only felicitous in a situation where the speaker wants to pick out the red ball amongst the previously mentioned group of big balls.

- (108) a. big red ball  
b. red big ball

This shift in interpretation is also difficult to capture with  $\theta$ -identification.

Truswell's (2004, 2005) JOIN is an operator that allows the type-shifting of attributive adjectives from  $\langle e, t \rangle$  to  $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ . It includes a standard of sameness, to preclude adjectives modifying anything but nouns, ruling out examples like \**The car was big red*. It also avoids restricting attributive modification to  $\theta$ -identification, because it takes the NP it combines with (including any lower attributive APs) as an argument to which the AP it contains is

applied. This means that *chopped frozen chicken* is frozen chicken that is chopped, and *frozen chopped chicken* is chopped chicken that is frozen.

We have so far seen several examples of semantic scope effects in adjectives. However, the nature, or interpretation, of these scope effects is not necessarily uniform. There appear to be at least three types of interpretive scope effects, which I discuss below. However, I will claim that they can all be captured using the same mechanism, utilizing aspects of Truswell’s JOIN.

One variety of adjectival scope can be seen when attributive adjectives are reordered with respect to one another—this is often assumed to be a focus effect (Teodorescu, 2006; Cinque, 2010, p.123n.11). The NP in (108a) has (or at least can have) a roughly intersective reading, referring to a ball that is both big and red. However, under the reordering in (108b), there is a slight change in interpretation, resulting in a sorting effect: this phrase is most naturally used when a group of big balls are being discussed and the speaker wants to draw attention to the red one amongst them (or in other situations in which the red-ness of the ball is being focused and the big-ness backgrounded). The extensions of the noun and adjectives remain roughly the same, but the sister of the higher adjective, including any lower modifiers, seems to be what is being modified.

Contrasting with this sortal scope effect is the interpretation of modal adjectives like *alleged* and *former*. These adjectives always take scope over their NP sister (and any lower adjectives contained therein). Adjectives like this do change the extension of the NP to which they apply: the set of things denoted by *alleged thief* may include some things in the set of thieves but it also includes things outside of it. Similarly, the set of former actresses does not

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include anyone who is currently an actress. This is a different situation to *red big ball* because the current cases do not involve a particular comparison class as such, but a whole change in the meaning of the modified NP. This difference can particularly be seen when these adjectives are stacked with another modifier, as can be seen in the following (from Teodorescu, 2006):

- (109) a. a famous former actor  
b. a former famous actor
- (110) a. a famous alleged actor  
b. an alleged famous actor

The third case involves the *frozen chopped chicken* example. As discussed above, this case involves a different state of affairs from *chopped frozen chicken*. Again, this scope effect is not a result of a change in comparison class—*frozen chopped chicken* does not (necessarily) refer to the chicken that is particularly frozen compared to the rest of the chopped chicken, and vice versa for the opposite order of modifiers. It also does not result from a change in extension: the item in question is still frozen, chopped and chicken. Rather, here we are dealing with an additional temporal aspect, likely a result of the verbal nature of these modifiers.<sup>19</sup> At the time of the chopping in *chopped frozen chicken*, the chicken must be in a frozen state, and vice versa for the opposite order of the modifiers.

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<sup>19</sup>How much of this temporal aspect is due to these modifiers' relationship to verbs is unclear. We do not find the same effect in some other verb-like modifiers, like *open* and *closed*. (111) is a contradiction, and particularly cannot mean that, out of the doors that were previously closed, I like the open one.

- (111) \*I really like the open closed door

What these three different scope effects have in common is that the higher modifier (or only modifier in the case of *alleged* and *former*) is restricted to modifying its syntactic sister, rather than a contextually determined set of entities, as is the case with examples like (108a) (see Heim and Kratzer 1998, pp.65–73, and references therein for some discussion of the nature of this comparison class). The generalization then seems to be that, where scope matters ordering effects do not hold, but where it does not matter they do hold.<sup>20</sup> These scope facts cannot be captured by a symmetric semantics, such as  $\theta$ -identification. Rather, a mechanism is required to allow (or ensure, in some cases) that an attributive modifier modifies its syntactic sister, rather than modifying the noun directly with reference to some contextually determined comparison class. This mechanism will allow the requisite asymmetry in the semantic representation, leading to the observed scope effects. I propose that this mechanism is a version of JOIN. JOIN requires an adjective to take scope over its syntactic sister, including any lower modifiers. This explains why we find scope effects in modal adjectives and *chopped frozen chicken*-type examples. The case of adjectives that are normally subject to the ordering hierarchy requires some further discussion.

As discussed above, adjectives that are subject to ordering restrictions are interpreted with respect to a comparison class: a *red ball* is something that is relatively red for a ball, or for a toy, or for objects under discussion. However, this is not the case for modal adjectives or *chopped frozen chicken* examples:

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<sup>20</sup>Note that at least some of these scope effects rely on the existence of an independent adjectival hierarchy, which is only applicable to adnominal adjectives (we have seen that relative clauses are not subject to similar semantic ordering preferences). The co-occurrence of scope patterns with the hierarchy may not be coincidental: it may in fact be a condition of the existence of an ordering hierarchy that the items in question can be ordered scopally.

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a *former actress* is not someone who is relatively former for an actress and *chopped chicken* is not something that is relatively chopped for chicken. However, the nature of the comparison class for standard adjectives is not fixed; it can differ depending on the context. In the context of a discussion of animals seen on a trip to the zoo, it is acceptable to refer to the *huge elephant* and infelicitous to call it a *tiny elephant*, assuming the elephant to be the usual 2.7–3.3 m tall (depending on species). However, in the context of a discussion of Godzilla’s attack on a zoo, referring to a *huge elephant* carries an implication that the animal was (much) larger than usual—on a par with the huge lizard, for instance. Here, *tiny elephant* seems much more acceptable. This is because in the first discussion, the context class is something along the lines of "animals expected at a zoo", where 2.7–3.3 m tall is relatively huge. In the second discussion, the comparison class must include Godzilla, who is estimated to be anywhere between 50 and 118.5 m tall.<sup>21</sup> In many contexts, the comparison classes for standard adjectives modifying the same noun will be the same: a *small red apple* is usually something that is both small and red for an apple, or for a piece of fruit, or for the objects in the immediate environment. In neutral contexts, it will not be something that is red for an apple and small for everything in the grocery store—it might be sitting next to smaller objects like cherries or blueberries. The fact that the comparison classes for multiple adjectives are the same in neutral contexts means that the effects of scopal interactions between the adjectives will be invisible, and the overall effect akin to the symmetric semantics of  $\theta$ -identification. In other words, something that is both small for an apple and red for an apple is equally small and red for an

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<sup>21</sup>Discussion of the relative size of depictions of Godzilla and relevant references can be found on Wikipedia, at <https://en.wikipedia.org/wiki/Godzilla#Size>.



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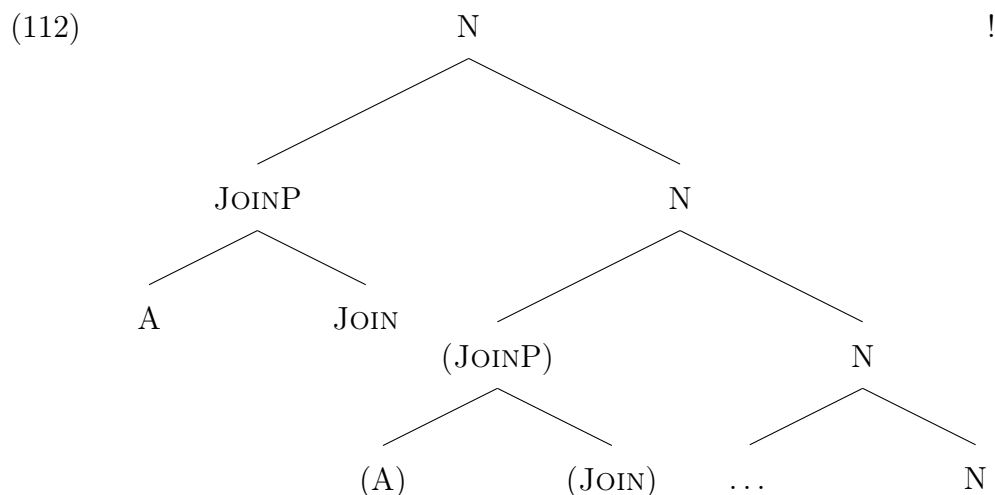
apple as well as being red and small for an apple. The adjectives here pick out of the comparison class things that are small and red (and apples), and the order in which this is done makes no difference to the ultimate interpretation of the phrase. Therefore, the lack of scope effects does not indicate that JOIN is not attached to these adjectives.

We can see the effects of *Join* with these adjectives in non-neutral contexts, and particularly when the adjectives do not appear in the order corresponding to the adjectival hierarchy. Here, as discussed above, the adjective that appears out of the hierarchical order must take the set denoted by its syntactic sister as its comparison class, and cannot take a contextually determined class. I propose that this effect is not a result of the semantics of JOIN per se, but rather that using the marked order is a tool for explicitly marking the comparison class of the higher adjective. Thus, when adjectives appear out of the hierarchical order, it must be so that they can take a comparison class denoted by the new syntactic sister; other contextually determined classes would be available in the hierarchical order.

In brief, *Join* accounts for the asymmetric semantics found in modal adjectives, *frozen chopped chicken* examples and adjective ordering violations. It also requires that non-hierarchy-violating adjectives modify their sisters asymmetrically. However, the effects of asymmetric modification in this latter case are masked by the fact that both adjectives have the same contextually-determined comparison class. Hierarchy-violating orders receive a different interpretation because the marked ordering indicates that the comparison class is syntactically, rather than contextually, determined.

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JOIN is thus a functional head that takes as its sister an attributive adjective. JOINP is then adjoined to a projection of the noun, as in (112). JOINPs can be stacked, as indicated below.



For the sake of simplicity I will abbreviate the trees in the rest of this thesis by omitting the JOINP and adjoining the adjective directly to the nominal projection. However, by hypothesis all attributive adjectives are actually complements to JOIN.

Due to the semantics of the different types of adjectives that can appear attributively, JOIN cannot be one single lexical item. An adjective like *black* must be related to a comparison class, denoted by a set. An adjective like *former*, on the other hand, is not related to a comparison class or set of entities, but refers to times at which the property denoted by the noun is true. In general, JOIN takes the property denoted by the adjective with which it is combined and relativizes it to the class denoted by the nominal projection to which it is adjoined. However, the precise nature of this relativization will depend on the nature of the JOIN-attached adjective: in the case of *black*, JOIN will set its comparison class as the set denoted by the sister of JOINP; in the

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case of *former*, JOIN will ensure that the property supplied by the syntactic sister of JOINP was at some point in the past true but no longer is.

In other words, JOIN must be a family of operators that share certain properties, rather than a single lexical item. Different versions of JOIN will be suitable for use with particular types of adjectives, but any adjective with a version of JOIN attached will be considered an attributive adjective. Under this approach, then, the key difference between attributive modifiers and other modifiers, including full and reduced relative clauses, would be the presence of JOIN. Indeed, the very definition of attribution would be the presence of this functional head.

If JOIN is the source of attribution, then some mechanism must exist to block it from attaching to predicative-only adjectives like ‘apologetic’ *sorry* and *asleep*. I can think of two ways to achieve this. One option would be to say that when JOIN attaches to an adjective, the combination can sometimes become ‘lexicalized’, and its meaning can drift from the meaning of the same adjective without JOIN. This could explain the two different readings of adjectives like *present* and *sorry* when they appear adnominally or predicatively. This would not allow a straightforward solution for adjectives like *asleep* and *ablaze*, which can only appear predicatively. For these, we might be forced to say that the *a-* morpheme disallows attachment of JOIN, perhaps by virtue of its being a preposition. Given that adjectives in *a-* appear to be true adjectives, as discussed in section (42), a preferable alternative might be to say that all predicative-only adjectives have some feature blocking attachment of JOIN, but the nature of this feature is unknown.

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If the earlier discussion is on the right track and JOIN is the source of adjectival scope, then we would not expect any such scope between coordinated adjectives. This is because a JOIN-attached adjective can either take the nominal projection to which it is adjoined as its comparison class, or a contextually salient class. If two adjectives are coordinated, then the first adjective should not have the option of taking the scope over the second adjective and noun. This is indeed what we find. There are no ordering effects between coordinated adjectives:

- (113) a. the big and red ball  
b. the red and big ball

This fact would be predicted under both an asymmetric and a symmetric approach to attributive semantics, but the difference between (113) and the effect in (108) is unexplained under a symmetric approach.

There are cases where adnominal adjectives cannot be coordinated:

- (114) a. ??Mary is a former and famous actress.<sup>22</sup>  
b. ??Mary is a famous and former actress

However, this fact is not an argument in favour of a dual-source analysis of adnominal adjectives. Modal adjectives like *former* and non-modals like *famous* have different semantics. Non-modals take the input set, denoted by the noun, and return a subset: the set of famous actresses is a subset of the set of actresses. Modals, on the other hand, shift the set and do not return a subset: the set of former actresses does not overlap with the set of (presumably

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<sup>22</sup>This string is more acceptable if *and famous* is an appositive, and pronounced with comma intonation.

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current) actresses. In other words, modals do not allow an inference from A-N to N (Truswell, 2009). The examples above are ungrammatical because the coordinated adjectives cannot return a subset of actresses and return a set of non-current actresses at the same time.

This is a semantic effect, rather than a syntactic problem with coordinating two different classes of adjective (an attributive-only with a non-specified adjective, for instance). As an example, it is possible to coordinate the attributive version of *sorry*, which does not have modal semantics but does not appear predicatively:

- (115) a. a sorry and unexpected state of affairs  
b. an unexpected and sorry state of affairs

Similarly, the semantic problem arises with *fake*, which can appear either predicatively or adnominally:

- (116) a. ??a fake and foreign coin  
b. ??a foreign and fake coin

However, these pairs of adjectives pose no problem when they are merely stacked rather than conjoined, because the modals modify their syntactic sister. This means that there is no competition between the sets that each adjective is trying to modify, as we found in examples like (114) and (116).

- (117) a. Mary is a former famous actress.  
b. Mary is a famous former actress.

- (118) a. This is a fake foreign coin.  
b. This is a foreign fake coin.

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Stacked adjectives, which by hypothesis can or must modify their syntactic sisters through JOIN, therefore differ in their behaviour from coordinated adjectives, which modify the noun in parallel.

Finally, the *frozen chopped chicken* scope effect is absent under coordination. Recall Svenonius's (1994) observation that, in attributives, *chopped frozen chicken* differs from *frozen chopped chicken* in that the former is first frozen then chopped, while the latter is chopped and then frozen. Furthermore, in the former, it is the case that the chicken is chopped *while* it is in a frozen state, while the latter is frozen when it is in a chopped state. This is not the interpretation that obtains in coordination. Here, there is if anything a temporal ordering effect—a preference to interpret the event denoted by the first adjective as having occurred before the event denoted by the second adjective—but not a requirement that the noun be in the state denoted by the second adjective at the time of the even of the first.

- (119) a. frozen and chopped chicken  
b. chopped and frozen chicken

These facts are consistent with the prediction that the first adjective should not take scope over the second in coordination.

In this section, I have laid out several problems for traditional, symmetric analyses of adjectival semantics, most importantly that of scope between adjectives. I have proposed that JOIN be updated, to allow it to be the source of these scope effects. In the next section, I will show that (R)RCs do not exhibit the effects I have ascribed to JOIN, and are therefore best analyzed using an intersective semantics like  $\theta$ -identification.

## 2.4.2 Reduced relative clauses and $\theta$ -identification

Although full and reduced relatives are not related by derivation, they nonetheless display similar behaviour in a number of respects, as demonstrated in section 2.2.3. One way they are similar is in their relationship to the noun, as I will demonstrate below. The facts discussed in the previous subsection suggest that attribution does not involve  $\theta$ -identification or a semantics based on conjunction. However, that does not mean that such a semantics does not exist. In this section I will argue that  $\theta$ -identification can be found in the noun phrase, and that it is the semantics involved in relative clauses.

Truswell 2004's two main objections to  $\theta$ -identification in attribution are i) that  $\theta$ -identification is not appropriate for the modal adjectives found in attribution and ii) that the order of attributive adjectives affects their interpretation. If  $\theta$ -identification is the correct analysis for relatives, we would not expect to find either modal adjectives or ordering effects in full or reduced relative clauses.

If it is the case that modal adjectives only occur adnominally, then we might want to include the option of modality in the denotation of JOIN. If this were the case, then we would never expect to find modal adjectives predicatively. However this prediction does not appear to be borne out. *Fake* freely appears in predication and in relatives, and other modal adjectives have varying degrees of acceptability in this position.

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- (120) a. This gun is fake  
b. % (We thought we had a real problem on our hands but) the problem was (only) apparent<sup>23</sup>

Given these facts, it seems to me that modality is a separate phenomenon to attribution, although they may often coincide. I will therefore leave modal adjectives aside for the remainder of this chapter, and suggest that modality may not be a required component of the denotation of JOIN.

The question of whether ordering effects obtain in relatives is more subtle. As discussed above, the presence of ordering effects, and the unexpected semantics that occurs when they are violated, is evidence that something other than  $\theta$ -identification is at play in attribution. These ordering effects do not hold with relatives, although the phrases are somewhat degraded due to the presence of multiple relatives.

- (121) a. ?a ball redder than a tomato(,) bigger than a breadbox  
b. ?a ball bigger than a breadbox(,) redder than a tomato

These data demonstrate that the order of the relatives does not affect their interpretation, as was found with coordination of prenominal adjectives in the previous subsection. This can also be seen with coordination of relatives in the following example, where the interpretation is the same as that without coordination in (121):

- (122) a. a ball redder than a tomato and bigger than a breadbox  
b. a ball bigger than a breadbox and redder than a tomato

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<sup>23</sup>I personally do not like this predicative use of *apparent*, but have been told by a number of other native speakers that they find it perfectly acceptable.



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Furthermore, the same lack of *chopped frozen* scope effects found in prenominal coordination in the previous subsection is also found with reduced relatives following the noun. Compare the following phrases.<sup>24</sup>

- (123) a. chicken breast frozen in the Arctic tundra chopped by Japanese  
          masterchefs  
       b. chicken breast chopped by Japanese masterchefs frozen in the  
          Arctic tundra

I and my native speaker informants agree that in these phrases, the order of events follows the order of the relative clauses; that is, in (123a) the chicken was first frozen and then chopped, and vice versa in (123b). However, the interpretation is not exactly the same as with attributives. Here, the interpretation is merely of an order of events, while in *chopped frozen chicken* the chicken must still have been frozen when it was chopped. In fact, the interpretation available with stacked relative clauses is the same as would occur in coordination (124). This indicates that the semantics of stacked relatives is roughly the same as that of coordinated relatives, as would be expected if relative clauses are involved in  $\theta$ -identification.

- (124) a. chicken breast frozen in the Arctic tundra and chopped by  
          Japanese master chefs  
       b. chicken breast chopped by Japanese master chefs and  
          frozen in the Arctic tundra

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<sup>24</sup>The judgments here are fairly subtle, and the sentences are challenging. This is partly because reduced relatives must be heavy, as discussed above, so the sentences quickly become cumbersome. I find they work best if imagined on the box of a new frozen food product, or as the voice over on an advertisement: “*Introducing our (new/finest/whatever) chicken breast frozen in the Arctic tundra, chopped by Japanese masterchefs...*”.

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The intonation of the stacked relatives also resembles coordination. There is a preference for a pause after the first reduced relative (*tundra* in (124a) and *master chefs* in (124b)) as well as a final rising contour at the end of the reduced relative. There is also an upwards pitch reset at the beginning of the second reduced relative, indicating a second Intonational Phrase and which would be expected under the conjunction of two root sentences (see Selkirk 2005 and references therein for further discussion on the prosody of conjunction).

The order of events interpretation is also a preference rather than a requirement, and much more flexible than the equivalent adnominal adjectives. It is relatively easy to reverse the order of events interpretation in examples like (123), especially with the right intonation:

- (125) a. chicken breast frozen in the Arctic tundra on Saturday chopped  
by Japanese masterchefs on Friday  
b. chicken breast chopped by Japanese masterchefs on Saturday  
frozen in the Arctic tundra on Friday

However, there is also evidence of syntactic embedding, rather than coordination. Standard constituency tests indicate that the noun and first reduced relative can form a constituent:

- (126) a. (Pass me a) chicken breast frozen in the Arctic tundra chopped  
by Japanese master chefs and one shredded by Italian grand-  
mothers.

*Ok where chicken breast has been frozen and shredded*

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- b. (Pass me a) chicken breast chopped by Japanese master chefs frozen in the Arctic tundra and one preserved in Himalayan sea salt.

*Ok where chicken breast has been chopped and preserved*

- (127) a. (I'm looking for the) chicken breast frozen in the Arctic tundra and salmon fillet preserved in Himalayan sea salt chopped by Japanese master chefs.

*Ok where both chicken and salmon have been chopped*

- b. (I'm looking for the) chicken breast chopped by Japanese master chefs and salmon fillet shredded by Italian grandmothers frozen in the Arctic tundra.

*Ok where both chicken and salmon have been frozen*

In these sentences, it should be noted, the prosodic upstep at the left edge of the second reduced relative clause is smaller than that in (124).

These facts suggest that both syntactic embedding and coordination are possible with multiple reduced relative clauses, although it may be the case that coordination is preferred in neutral contexts as it more closely reflects the semantics. The fact that the embedded and coordinated sentences have the same interpretation (namely, an “order of events” reading, rather than an “overlapping states” reading) further supports the idea that  $\theta$ -identification is implicated in reduced relatives. This is because no difference between the two would be expected if the interpretation of reduced relative clauses results from identifying the available  $\theta$ -roles with the nominal position. This operation

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is essentially set intersection, and there is no difference between intersecting three sets or intersecting one set with the intersection of two other sets.

The interpretations found in reduced relatives also hold of full relatives. The same lack of ordering effects are found, both with and without coordination (although the examples without coordination are degraded due to the presence of multiple relatives, as seen above).

- (128) a. ?a ball that is redder than a tomato(,) that is bigger than a breadbox  
b. ?a ball that is bigger than a breadbox, that is redder than a tomato
- (129) a. a ball that is redder than a tomato and that is bigger than a breadbox  
b. a ball that is bigger than a breadbox and that is redder than a tomato

The interpretation of *frozen* and *chopped* is of a temporal ordering effect, unlike the effect seen prenominally. It is the same interpretation found under coordination, and is also as flexible as that found in reduced relatives.

- (130) a. a chicken breast that was frozen in the Arctic tundra(,) that was chopped by Japanese masterchefs  
b. a chicken breast that was chopped by Japanese masterchefs(,) that was frozen in the Arctic tundra
- (131) a. a chicken breast that was frozen in the Arctic tundra and that was chopped by Japanese masterchefs

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- b. a chicken breast that was chopped by Japanese masterchefs and that was frozen in the Arctic tundra
- (132)
- a. a chicken breast that was frozen in the Arctic tundra on Saturday(,) that was chopped by Japanese masterchefs on Friday
  - b. a chicken breast that was chopped by Japanese masterchefs on Saturday(,) that was frozen in the Arctic tundra on Friday

This suggests that, although there are differences in the structure of full and reduced relatives, leading to some differences in their interpretation (as discussed in section 2.2.2), both types of relatives seem to lack the scope effects found with JOIN and therefore seem to participate in intersective modification of the noun.

We have seen that scope effects exist between attributive modifiers but not between relative clauses. This begs the question of whether they exist across the two classes. If attributives can take scope over their sister (and any lower modifiers contained therein), then we would expect scope between attributives and relatives to be free, as long as relatives can adjoin to the nominal projection either above or below attributives. This is indeed the case.

- (133) a frozen chicken breast chopped by Japanese masterchefs

This ambiguity of structure is confirmed by standard constituency tests. Where the sister of the adjective is a constituent that includes the relative, it takes scope over that relative. If the relative is not dominated by the adjective's sister, then the adjective does not take scope over it.

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- (134) a. a frozen [chicken breast chopped by Japanese masterchefs] and  
a thawed one  
b. a [frozen chicken breast] chopped by Japanese masterchefs and  
one shredded by Italian grandmothers

This fact further confirms the scope-taking properties of attributive adjectives.

In section 2.2 I discussed an ordering preference in examples like (76), repeated below:

- (135) a. The stars that are visible that are invisible include Deneb and  
Fomalhaut. (individual-level > stage-level)  
b. ?The stars that are invisible that are visible include Deneb and  
Fomalhaut. (?stage-level > individual-level)

Here there seems to be a preference to interpret the first relative as individual-level and the second as stage-level, the mirror-image pattern to what we find with adnominal adjectives. At first sight, this might appear to be a scopal relationship, just as I have argued that the adnominal pattern is. If this were the case, it would be a counter-argument to the claim that relatives do not exhibit scope and therefore do not involve JOIN. However, just as we saw in (125), this preference is relatively easy to violate:

- (136) a. The stars that are visible in principle that are invisible at the  
moment include Deneb and Fomalhaut.  
(individual-level > stage-level)

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- b. The stars that are invisible at the moment that are visible in principle include Deneb and Fomalhaut.

(stage-level > individual-level)

The same is not true of adnominal adjectives. I illustrate this point with Dutch, because that language allows complements to adnominal APs as long as they precede the adjective.

(137) A: This map shows you the stars that are visible in principle.

B: OK, but can to tell me which are...

- a. de sterren die in principe zichtbaar zijn die op het moment  
the stars that in principle visible are that at the moment  
zichtbaar zijn.  
visible are

(individual-level > stage-level)

- b. de sterren die op het moment zichtbaar zijn die in principe  
the stars that at the moment visible are that in principle  
zichtbaar zijn.  
visible are.

(stage-level > individual-level)

(138) A: This map shows you the stars that are visible in principle.

B: OK, but can to tell me which are...

- a. de op het moment zichtbare in principe zichtbare sterren.  
the at the moment visible in principe visible stars

(stage-level > individual-level)

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- b. \*De in principe zichtbare op het moment zichtbare sterren  
the in principle visible at the moment visible stars  
(individual-level > stage-level)

I conclude that the preference for the individual-level > stage-level interpretation of multiple relative clauses is a very mild preference, unlike the ordering patterns in adnominal adjectives, and therefore does not present a serious problem for the  $\theta$ -identification analysis of relative clauses.

One final issue for the  $\theta$ -identification analysis is the issue of the  $\theta$ -roles themselves, namely the question of how a relative clause comes to have a  $\theta$ -role that can be identified with the noun. Given Stanton's (2010; 2011) argument that full and reduced relative clauses are not derivationally related, it is plausible that reduced relatives are by nature predicates, and therefore are generated with a  $\theta$ -role. Full relatives on the other hand are not necessarily inherent predicates, being CPs. I will assume that full relatives involve operator movement, and thus generate a  $\theta$ -role. Chomsky (1977, 1981) and Browning (1987) show that operator movement must independently generate a predicate, so if operator movement occurs in relative clause formation, a  $\theta$ -role must also be generated. It is this  $\theta$ -role that can be subsequently identified with that of the noun under  $\theta$ -identification.

In this section I have argued that, while there are three distinct categories of modifier (adnominal adjective, reduced relative clause and full relative clause), there are only two categories of nominal modification: attribution, involving JOIN, and  $\theta$ -identification. Attribution allows scope between adjectives, but  $\theta$ -identification, being a symmetric relationship, cannot engender scopal relations. Attribution, and therefore JOIN, is associated with adnominal adjectives



and  $\theta$ -identification is found with both full and reduced relatives. It is the difference between attribution and  $\theta$ -identification itself, in conjunction with an independent ordering hierarchy for adnominal adjectives, that can explain the ordering and scopal patterns found pre- and postnominally.

## 2.5 Conclusion

I have argued that adnominal adjectives, reduced relative clauses and full relative clauses are not derivationally related, but that full and reduced relatives modify the noun by the same mechanism,  $\theta$ -modification. Attributive adjectives, on the other hand, modify the noun by means of the functional head JOIN. I have also argued against a dual-source analysis of adnominal adjectives, demonstrating that adnominal adjectives consistently behave differently to full and reduced relative clauses. Furthermore, some of the interpretive effects that have been ascribed to reduced relative clauses, and used as evidence for the dual-source analysis of adnominal adjectives, have been shown to be effects of bare postnominal adjectives in English, a separate class from true reduced relatives. I have also argued that JOIN is the sole source of attribution, the mechanism that accounts for the semantic type of adnominal adjectives and the semantic scope effects discussed above. The lack of JOIN in full and reduced relatives explains the lack of scope effects between modifiers of this class. I have sketched an outline of what the denotation of JOIN should include.

The remainder of this thesis will deal with other aspects of attribution. I will argue for the existence of a linear constraint in the noun phrase, parallel to Janke and Neeleman's (2012) Case Adjacency Constraint, to account for the

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fact that, crosslinguistically, the relative order of AP and PP modifiers after the head is fixed while before the head it is free. I will show that JOIN is the crucial head to which this constraint is anchored, just as the Case Adjacency Constraint is anchored to Case. As JOIN is, by hypothesis, present on all adnominal adjectives, the Case Adjacency Constraint is predicted to hold of all adnominal adjectives, not just a subset; this prediction is borne out.

I will also discuss a case of adnominal adjectival modification that cannot be accounted for solely by JOIN, that of bracketing paradoxes. I will introduce a new category of bracketing paradox, exemplified in (139), and show that they are best analyzed as mismatches between syntax and LF.

- (139) a. heavy drinker  
b. beautiful dancer  
c. quiet talker

These adjectives are interpreted as though they modify the verb inside of the agentive noun, a fact which JOIN does not seem able to account for. In order to explain this mismatch, I will introduce a new constraint on movement, Information Preservation, and show how it allows restructuring of the syntactic structure at LF in exactly the way needed to capture these verbal bracketing paradoxes.

Examples like (139) have been taken as further evidence for a dual source for adnominal modification. This is because they have been analyzed as diagnostic of attribution, in opposition to the relationship between supposed prenominal RRC\*s and the noun (Larson, 1995; Cinque, 2010). However, I will show that

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these examples are best analyzed as a separate phenomenon from attribution, and argue that they are the result of movement at LF.

The crucial idea in the rest of this thesis will be that a single-source analysis of adnominal adjectives entails a boundary change for some adjectival phenomena. I will examine a case of adjectival modification that should be viewed as attributive, although its surface characteristics may make a dual-source analysis tempting. I will then discuss bracketing paradoxes, and argue that they are not a direct result of attribution, despite their previous analyses.

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# Chapter 3

## AP adjacency as a precedence constraint

And the angel said unto them,  
Fear not: for, behold, I bring you good  
tidings of great joy, which shall be to all  
people.

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Luke 2:10

### 3.1 Introduction

We have seen that some variations in the behaviour of adnominal adjectives (or adjectives that are not being used predicatively), such as ordering restrictions (or the lack thereof) and various interpretative effects, have been taken as evidence for two separate sources of adnominal adjectival modification. This chapter explores another surprising effect, of both ordering and interpretation, that might at first sight appear to lend support to the dual-source analysis of adnominal adjectives. I will discuss an ordering generalization proposed

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by Giurgea (2009) and Adger (2012), concerning the ordering of AP and PP modifiers of the noun. In brief, when both an AP and another category (such as a PP, or a genitive DP) modify a noun, and both appear on the same side of the noun, the ordering is free in languages where the noun comes last in its phrase but fixed where the noun comes first. In other words, we find the strings XP-AP-N, AP-XP-N, N-AP-XP but not \*N-XP-AP. Furthermore, in head-final languages, scope varies with c-command (and linear order), such that the left-most modifier scopes over the modifier that is linearly and structurally closer to the noun. However, in head-initial languages, such phrases are scopally ambiguous, despite the linear order being fixed.

This pattern may be argued to result from the availability of reduced relative clauses if the free linear ordering and scope patterns in head-final languages are the result of a special, high position for adjectives. Under such an analysis, the AP in the AP-XP-N order would be analyzed as a reduced relative clause. I will show that this approach is not viable, because the properties of the AP in the AP-XP-N order are exactly the same as those in the XP-AP-N order, which would not be expected if the two APs have different sources. Instead, I argue that the best explanation of this generalization is a linear constraint on the ordering of nominal modifiers, parallel to that proposed by Janke and Neeleman (2012) on the ordering of verbal modifiers and objects. This generalization, and the analysis proposed for it, crucially applies to all and only adnominal adjectives, and thus is another argument that these adjectives form a homogeneous class.

Similarities between nominal and verbal grammar have been a theme in generative research since at least Lees 1960. Lees observed that clauses like

*the army destroyed the city* and nominalizations like *the army's destruction of the city* display certain syntactic and semantic parallels. For example, the event denoting word is preceded in both structures by an agentive phrase and followed by a patient. Moreover, both structures seem to allow passivization (as in *the city was destroyed by the army* and *the city's destruction by the army*).

Perhaps the most influential account of such parallels is given in Chomsky 1970. In this paper, Chomsky introduces X-bar theory, an abstract system of projection that applies to both verbs and nouns. X-bar theory defines positions relative to the projecting head that are associated with specific grammatical functions. The syntactic and semantic parallels between nominal and verbal projections can then be captured if we assume (simplifying matters considerably) that agents are specifiers in the schema in (1a), while patients are complements (compare (1b)-(1c)).

- (1) a. [<sub>XP</sub> *Specifier* [<sub>X'</sub> X *Complement*]]  
 b. [<sub>VP</sub> [the army] [<sub>V'</sub> destroyed<sub>V</sub> [the city ]]]  
 c. [<sub>NP</sub> [the army's] [<sub>N'</sub> destruction<sub>N</sub> [of the city]]]

Although details have changed, the core idea behind Chomsky's proposal has endured. Many linguists would accept that parallels between the nominal and verbal extended projection originate in a shared abstract layering of structure, where specific layers are associated with specific grammatical functions. What has changed is the nature of the layers: functional projections have in many cases replaced X-bar-levels.

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In this chapter I will explore a potential parallel between nominal and verbal structures that does not easily lend itself to an account based on shared abstract layering. The parallel involves an asymmetry between head-initial and head-final structures. It is well known that within the clause OV languages consistently allow object and verb to be separated, while VO languages typically require verb and object to be adjacent:

	<i>Head-final</i>	<i>Head-final</i>
(2)	<i>Straight order</i>	AdvP DP V      V DP AdvP
	<i>Scrambled order</i>	DP AdvP V      *V AdvP DP

I believe that a similar pattern can be observed in the extended nominal projection. In head-final languages, adjectival modifiers may be separated from the noun by other material (such as PPs or genitive DPs), but in N-initial languages, adjectives must immediately follow the noun:

	<i>Head-final</i>	<i>Head-final</i>
(3)	<i>Straight order</i>	XP AP N      N AP XP
	<i>Scrambled order</i>	AP XP N      *N XP AP

There are two reasons why this parallel—if real—cannot be analyzed in terms of shared abstract layering. First, DP objects are very different animals from AP modifiers. However, the idea of shared abstract layering only makes sense if the elements hosted by a specific layer have similar grammatical functions.

Second, an account based on structural layers would not predict an asymmetry between pre- and post-head order. On the contrary, variation in order under a constant hierarchy leads to the expectation that admissible post-head orders will mirror admissible pre-head orders, as shown in (4) (where h is a



head and XP and YP are constituents in its extended projection). Therefore, there is either one head-final order too many or one head-initial order too few in (2) and (3).

- (4) a.  $[_{\text{Layer-2}} \text{XP} [_{\text{Layer-1}} \text{YP h}]$   
 b.  $[_{\text{Layer-2}} [_{\text{Layer-1}} \text{h YP}] \text{XP}]$

I will develop an alternative explanation of the pattern in (3) that crucially presupposes that grammatical constraints may mention linear order. In particular, I adopt a version of Case Adjacency (from Janke and Neeleman 2012) that is asymmetrical in that it allows adverbial intervention in head-final, but not head-initial languages. Once this is in place, I argue that a similar constraint forces AP adjacency in head-initial structures. The constraint in question does not mention case, but rather JOIN, the functional head argued for in the previous chapter that allows an adjective to modify a noun attributively (see Partee 1986; Truswell 2004, 2005). So, in order to account for (2) and (3) I do make use of an abstract schema that applies to both nominal and verbal projection. However, the schema in question does not define structural layers, but rather provides a template for linear constraints that demand proximity of certain morphological elements to the lexical head.

The chapter is organized as follows. In section 3.2 I establish the pattern in (3) and show that it cannot be captured using designated structural layers in which AP and XP are attached. In section 3.3 I outline in what ways the pattern in (3) resembles the better-known pattern of Case Adjacency and scrambling found in the verbal domain. In section 3.4 I introduce the new linear constraint that regulates the distribution of AP modifiers within the

noun phrase. I provide additional evidence for the linear nature of this new constraint in section 3.5 on the basis of some surprising Spanish data. Section 3.6 contains some concluding remarks on the status of linear constraints.

## 3.2 AP adjacency

I use the term AP adjacency to refer to the generalization that in languages with noun-adjective order, adjectival modifiers precede certain other post-nominal categories. This is not my observation. Giurgea (2009), who explores the distribution of complements of nouns *vis-à-vis* AP modifiers, states it as in (5), basing himself on data from various Celtic, Romance and Semitic languages:

- (5) In languages with postnominal adjectives, APs, with the exception of heavy APs, precede complements. Heavy APs may either precede or follow, depending on their weight and on the language. (Giurgea, 2009, p.276; formulation slightly adjusted)

Adger (2012), who explores the syntax and semantics of PP complements to nouns, refers to the same phenomenon as ‘PP peripherality’. His claim, based on data from Hawaiian as well as from the language families studied by Giurgea, is that when an AP and a PP complement appear in the same noun phrase, the PP must be peripheral. This of course implies that in noun-initial structures, AP must precede PP.<sup>1</sup>

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<sup>1</sup>The category that must be adjacent to the noun is always an AP, but the category that must be peripheral is not necessarily a PP. I therefore prefer the term ‘AP adjacency’ over ‘PP-peripherality’.

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- (6) When (intersective) AP modifiers and PP ‘complements’ both occur on one side of N inside a noun phrase, the PP is separated from the N by the AP. (Adger, 2012, p.93)

Notice that while Giurgea’s generalization expresses an asymmetry between languages with NA and AN order, Adger’s generalization treats the two on a par.

Both Adger’s and Giurgea’s generalizations are restricted to complements. However, AP adjacency can also be observed in structures containing two modifiers, one of which is adjectival and the other is not. Below I illustrate this using Spanish, Arabic and Welsh examples of nouns modified by both an AP and a PP:<sup>2</sup>

- |     |  |         |
|-----|--|---------|
| (7) | el cuadro <falso> del siglo XV <??falso><br>the picture fake of-the century XV fake<br>‘the fake picture from the fifteenth century’     | Spanish |
| (8) | as-suura <l-muqallada> min al-qarn al-xamis-?ashar<br>the-picture the-fake from the-century the-fifteenth<br><*al-muqallada><br>the-fake | Arabic  |
| (9) | y llun <ffug> o’r 15fed ganrif <*ffug><br>the picture fake from-the 15th century fake  | Welsh   |

One way of accounting for AP adjacency is to make use of structural layers. In particular, one could argue that adjectives occupy designated positions structurally closer to the noun than the positions open to other categories, as in

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<sup>2</sup>Unless otherwise stated, data were gathered by the author (see the acknowledgments for more information). I return to the Spanish judgment in (7) below (see the discussion surrounding (32)).

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(10). (The nature of the layers in (10) need not concern us here, but see Adger 2012 for a specific proposal.)

- (10) a.  $[_{\text{Layer-2}} [_{\text{Layer-1}} \text{N AP}] \text{XP}]$   
 b.  $*[[\text{N XP}] \text{AP}]$

On the assumption that linear order within each layer can vary across languages, two typological predictions are made. First, in noun-final languages, the only permitted linearization should be XP-AP-N (compare (11)). Second, the assumption that XP universally occupies a structurally higher position than AP implies that in noun-medial languages XP should take scope over AP and that AP and N should behave like a constituent (compare (12) and (13)).

- (11) a.  $[_{\text{Layer-2}} \text{XP} [_{\text{Layer-1}} \text{AP N}]]$   
 b.  $*[\text{AP} [\text{XP N}]]$

- (12) a.  $[_{\text{Layer-2}} [_{\text{Layer-1}} \text{AP N}] \text{XP}]$   
 b.  $*[\text{AP} [\text{N XP}]]$

- (13) a.  $[_{\text{Layer-2}} \text{XP} [_{\text{Layer-1}} \text{N AP}]]$   
 b.  $*[[\text{XP N}] \text{AP}]$

I will argue in this section that both predictions are incorrect (that is, the data are in line with Giurgea's generalization, rather than Adger's). Of course, this does not directly falsify the proposal in (10). However, there is a clear risk that the additional assumptions needed to generate  $[\text{AP} [\text{XP N}]]$ ,  $[\text{AP} [\text{N XP}]]$  and  $[[\text{XP N}] \text{AP}]$  will also permit the unattested N-XP-AP order. If so, the proposal in (10) will no longer account for the data that motivated it in the first place.



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The interpretation of examples like (14) suggests that the constituent further to the left c-commands the one further to the right. Thus, the PP-AP-N order would naturally be used when there are multiple handsome teachers, and we are trying to identify the one from America, while the AP-PP-N order could be used if there are multiple American teachers, and we are trying to identify the handsome one. As we will see, this same pattern is found in other languages with head-final noun phrases.

In Japanese, the neutral word order appears to be XP-AP-N, but the order AP-XP-N is grammatical as well. Whitman (1981) and Tsujioka (2002) note that the latter order is naturally used in contexts where the AP has an identifying function, much as in Korean. Thus, if there are several bunches of flowers from Hanako in the room, we could identify a specific one by using the AP-PP-N order. This is expected if the order of attachment corresponds with the order of interpretation:

- (15) <akai> Hanako-kara-no <akai> hanataba  
 red Hanako-from-LNK red bunch.of.flowers  
 ‘a/the red bunch of flowers from Hanako’ Japanese

Japanese adjectives come in distinct morphological classes: some end in *-i* (like *aka-i* in (15)); others in *-na* (like *kakkiteki-na* in (16)). This variation, whose significance remains a matter of debate, does not affect word order:

- (16) <kakkitekina> kono mondai-no <kakkitekina> kaiketsusaku  
 revolutionary this problem-LNK revolutionary solution  
 ‘a/the revolutionary solution for this problem’ Japanese

So, although AP-XP-N may not be the neutral word order, it is clear that Japanese allows structures in which an AP is not adjacent to the noun.

Like Japanese and Korean, Mandarin requires that a linker accompany non-adjectival modifiers in the noun phrase. In addition, the language requires that AP-modifiers have a linker. The only exception is when APs are adjacent to N—omission of the linker is allowed in that case.<sup>4</sup> However that may be, there is no very clear preference for any particular word order in the presence of the linker. Both orders in (17) are fully acceptable. As expected, the VP-AP-N order refers to a fifteenth-century fake picture (a picture that comes from the fifteenth century and is fake in some unspecified way), while the AP-VP-N order corresponds to a fake fifteenth-century picture (that is, something that is not a fifteenth century picture – most typically a picture that pretends to be from the fifteenth century but really is not).<sup>5</sup>

- (17) <jia de> lai zi 15 shi ji de <jia de> hua  
 fake LNK come from 15 century LNK fake LNK painting  
 ‘a/the fake picture from the fifteenth century’ Mandarin

In (17), the non-adjectival category is presumably verbal, given that its head, *lai*, is a verb. However, the same variation in word order can be observed with PP-modifiers:

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<sup>4</sup>There are at least two accounts of the distribution of *-de*. One is that adjectives carrying *-de* are reduced relatives, while adjectives without this particle involve regular attribution (see Sproat and Shih 1988, 1991, among others). This analysis has been shown to be problematic by Paul (2005, 2010) (see also (29) below). A well-known alternative is to treat structures without *-de* as A-N compounds or structures akin to such compounds. Again, Paul (2005) argues against this. Here, the argumentation seems less convincing to me (see Yang 2005 for some relevant discussion). I would therefore be inclined to accept an account in terms of compounding for the time being. Another possibility would be to model the analysis of *-de* omission on the phenomenon of accusative case drop as found in Japanese and Korean—however, it would take me too far to explore this option here.

<sup>5</sup>These readings can be told apart most easily if the object under discussion is taken to be a picture not painted by the person claimed to be its creator. The scopal relation *fake* > *from the fifteenth century* allows the actual creator of the picture to be a nonfifteenth-century forger. The scopal relation *from the fifteenth century* > *fake* implies that the object in question is really from the fifteenth century, which in turn implies that its forger must be from the fifteenth century.

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- (18) <jiu de> zhuozi shang de <jiu de> shu  
 old LNK desk on LNK old LNK book  
 ‘a/the old book on the desk’ Mandarin

The word order alternation found in Korean, Japanese and Mandarin is replicated in Finnish. Both orders in (19) are fully grammatical. The only difference seems to be that in Finnish the constituent translated as *from the fifteenth century* is realized as a genitive DP. Finnish allows this kind of word order alternation quite freely, apparently without either order being more marked than the other. (Please note that the most common Finnish word for ‘fake/forged’ (*väärennetty*) is participial in form, and may therefore not be adjectival. However, *feikki*, which shows the same distribution, is an underived adjective and must therefore project an AP.)

- (19) <feikki> 1400-luvu-n <feikki> kuva  
 fake 1400-century-GEN fake picture  
 ‘a/the fake picture from the fifteenth century’ Finnish

Interpretation again suggests that the constituent further to the left *c*-commands the constituent further to the right. Thus, the DP-AP-N order refers to a fifteenth-century fake picture, while the AP-DP-N order refers to a fake fifteenth-century picture.

The fifth language I consider is Hungarian. In Hungarian, APs can be freely separated from the noun by expressions corresponding to *from the fifteenth century*, as (20) illustrates. Interpretation varies with word order in the expected way.

- (20) a <hamis> tizenötödik század-i <hamis> festmény  
 the fake fifteenth century-LNK fake picture  
 ‘the fake picture from the fifteenth century’ Hungarian



Note that the non-adjectival modifier in (20) is a nominal phrase, but it can also be a PP, as the example below illustrates (on the status of Hungarian postpositions, see Asbury 2008 and references cited there):

- (21) a <vaskos> polc mögött-i <vaskos> könyv  
 the thick shelf behind-LNK thick book  
 ‘the thick book behind the shelf’ Hungarian

There is a potential morphological complication in Hungarian. I have taken the *-i* ending present in (20) and (21) to be a linker (following Kenesei 2005). However, traditionally it is seen as a morpheme that derives adjectives from other categories (see Szabolcsi’s 1994 discussion of ‘adjectivalization’). If so, we are dealing with sequences of two adjectives in the examples above, which would undermine the relevance of the grammaticality of the AP-XP-N order. However, the evidence for this traditional view is weak.

First, linkers attach to phrases while derivational affixes almost exclusively attach to words. The item in question attaches to phrases (the internal syntax of the NP in (20) and the PP in (21) are not affected by attachment of *-i*).

Second, it is typical for linkers to mark elements that are used attributively, but to the best of my knowledge suffixes that derive adjectives never specify their output as attributive or predicative. Phrases suffixed by *-i* can only be used attributively; predicative use is out:

- (22) a könyv a polc mögött(\*-i) van  
 the book the shelf behind-LINK COP  
 Hungarian

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Third, there is no evidence that the output of phrases derived by *-i* is adjectival.<sup>6</sup> For example, they do not permit suffixation with *-it*, the Hungarian counterpart of *-ify*, which selects adjectives (see (23)). (Note that word-final vowels are normally deleted before *-it*. The example in (23b) is ungrammatical whether *-i* surfaces or not.)

- (23) a. por-talan-it  
           dust-less-ify  
           ‘dust (v.)’ Hungarian
- b. \*polc mögött(-i)-it  
           shelf behind-LNK-ify  
           intended: ‘cause to be behind a shelf’

In sum, although there are some minor complications, the data discussed above seem to be counterexamples to the claim that adjectival phrases form a constituent with the noun to the exclusion of other material (as in (11)). Such an account leads to the expectation that the AP-XP-N orders are ungrammatical, while in fact they are either fully acceptable, or acceptable but marked. Thus, while AP adjacency seems to be a feature of noun-initial languages, it does not carry over to noun-final languages.

One way to save an account of AP adjacency in terms of structural layering is to make use of Cinque’s 2010 proposal that some apparent adjectives are in reality reduced relatives. As discussed above, Cinque makes this claim against the background of the hypothesis that attributive APs are part of a strict hierarchy. That is, by hypothesis, certain classes of adjectives must c-command certain other classes of adjectives. This captures the contrast between the two

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<sup>6</sup>It is important to distinguish the item under discussion from a second suffix *-i*, which attaches to place names and derives genuine adjectives.

noun phrases in (24), for example, as long as *big* is higher on the adjectival hierarchy than *red*.

- (24) a. the big<sub>A</sub> red<sub>A</sub> bus  
 b. \*the red<sub>A</sub> big<sub>A</sub> bus

However, in the right context, reordering is possible. Suppose we are talking about different big buses. We may then identify a specific big bus by using the order in (24b) with focus on *red*; see (25). This should be impossible if *red* is an adjective and if adjectives come in a strict hierarchy. Cinque's solution to this puzzle is to say that *red* in (25) is a reduced relative clause, and that reduced relatives are not part of the adjectival functional sequence.<sup>7</sup>

- (25) the RED<sub>RR</sub> big<sub>A</sub> bus

One could try to extend this analysis to AP-XP-N orders. Regular APs would have to be structurally closer to the noun than other material, but reduced relatives could appear in a higher position:

- (26) [AP<sub>RR</sub> [XP [AP N]]]

Of course, this proposal would be empirically vacuous unless regular APs and reduced relative clauses can be distinguished. The main test that Cinque uses to do so is based on the assumption that non-predicative APs cannot function as reduced relative clauses. Therefore, if the proposal just outlined were correct, the word order variation observed in head-final languages should disappear when we consider non-predicative APs. However, in the languages I have

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<sup>7</sup>See chapter 2 and Williams 2013 for a discussion of why a preference for direct modification over the use of reduced relatives would not solve this problem.

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considered, the distinction between predicative and non-predicative adjectives does not seem to have such distributional consequences.

Thus, in Korean, Japanese and Mandarin, the adjective in the AP-XP-N order can be non-predicative. None of the adjectives in (27)–(29) can be used in copula constructions or other structures requiring predication: <sup>8</sup>

- (27) a. <chudeon> nongchon-eseo-uy <chudoen> mukgeori  
 main rural.areas-in-LNK main food  
 ‘the main food in rural areas’ Korean
- b. <tto-dareun> hakkyo-eseo-uy <tto-dareun> chueuk  
 another school-in-LNK another memory  
 ‘another memory of school’
- (28) a. <?omona> John-no seikou-no <omona> riyuu  
 main John-LNK success-LNK main reason  
 ‘the main reason for John’s success’ Japanese
- b. <hurui> John-no <hurui> tomodati  
 long-time John-LNK long-time friend  
 ‘An old friend of John’s’
- (29) a. <dangqian de> lai zi yulun de <dangqian de> yali  
 current LNK come from media LNK current LNK pressure  
 ‘the current pressure from the media’ Mandarin
- b. <dangqian de> nongcun li de <dangqian de> wenti  
 current LNK countryside in LNK current LNK problem  
 ‘the current problem in the countryside’

The same pattern is found in Finnish. The adjective *epäilty* ‘suspected’ has an intersective and a non-intersective reading. The non-intersective reading is incompatible with predication. This is the reading most prominent in (30), which confirms that we are not dealing with reduced relative clause.

<sup>8</sup>The Japanese example in (28b) is from Tsujioka 2002, p.127. Tsujioka explicitly states that *hurui* ‘long-time’ is non-predicative and that the AP-DP-N order can therefore not be the result of a rule that allows fronting of predicates.

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- (30) <epäilty> Yhdysvallo-ista tullut <epäilty> vakooja  
 suspected USA-from come.PPT suspected spy  
 ‘a/the suspected spy from the USA’ Finnish

In Hungarian, *fő* ‘main’ cannot be used as a predicate, but can be separated from the noun:

- (31) a(z) <fő> emigráció mellett-i <fő> érv  
 the main emigration next.to-LNK main argument  
 ‘the main argument for emigration’ Hungarian

These data contrast with the situation in Spanish. In this language, N-XP-AP is allowed as a marked order, with the AP focused and offset by a prosodic break (recall Giurgea’s generalization in (5)):

- (32) a. ??un cuadro del siglo XV falso  
 a picture of-the century XV fake Spanish  
 b. un cuadro del siglo XV, FALSO  
 a picture of-the century XV, fake

However, this option is not open to non-predicative APs, which suggests that in Spanish extraposed adjectives are indeed reduced relative clauses:

- (33) a. un antiguo director de máster  
 a former director of master  
 ‘a former director of the Master’s program’ Spanish  
 b. ?un director antiguo de máster  
 a director former of master  
 c. \*un director de máster, ANTIGUO  
 a director of master, former (OK: antique/old-fashioned)

I conclude that Cinque’s 2010 proposal that there are two sources for adjectives is correct, but cannot be used to reconcile a structural account of AP-adjacency with the data found in head-final languages.

Other attempts to reconcile word order freedom in head-final languages with the hypothesis of fixed structural layers could be based on movement of adjectival modifiers across other material. I will discuss this option at the end of the next subsection.

### 3.2.2 Head-medial languages

The structural account of AP-adjacency in (10) makes a further prediction for languages with AP-N-XP order, such as English. It predicts that a string like *the fake picture from the fifteenth century* must always be structured such that the adjective forms a constituent with the noun. However, there are reasons to believe that strings like this are structurally ambiguous. To begin with, *the fake picture from the fifteenth century* has the two readings familiar from the previous section: either the picture is a fake produced in the fifteenth century, or the picture is purported to be from the fifteenth century, even though it has been produced more recently. As we have seen, this kind of scope alternation coincides with an alternation in word order, and hence c-command relations, in head-final languages. The null hypothesis is that such a link between structure and interpretation also exists in languages in which nouns surface between APs and PPs, such as English:<sup>9</sup>

- (34) [the [<fake> [[<fake> picture] from the fifteenth century]]]  
 (from the 15th century > fake; fake > from the 15th century)

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<sup>9</sup>Intonation can help disambiguate DPs like *the fake picture from the fifteenth century*. If a brief pause is inserted between *fake* and *picture*, then *fake* takes wide scope, and if a brief pause is inserted between *picture* and *from the fifteenth century*, then the PP takes wide scope. The first of these two intonations requires fast pronunciation of the string following the pause for reasons that escape me. However, the two readings are still available under a neutral intonation without pauses.

One might hypothesize that scope-taking adjectives like *fake* have access to a special high position from which they can take scope over PPs, thus excluding them from the structural account of AP-adjacency. But this would be a self-defeating move, because the ambiguity observed in (34) persists even if *fake* is preceded by a regular intersective adjective like *beautiful*:

- (35) [the beautiful [<fake> [[<fake> picture] from the fifteenth century]]]  
 (from the 15th century > fake; fake > from the 15th century)

The fact that the substring following *beautiful* allows the reading *from the fifteenth century* > *fake* suggests that the PP can c-command the AP; the availability of the inverse reading, *fake* > *from the fifteenth century*, suggests that AP can c-command the PP. If the ambiguity is due to *fake* having access to a special high position, then *beautiful* (and other adjectives that can precede *fake*) must also have access to such a position, in contradiction to the structural account of AP-adjacency.

Standard constituency tests confirm that the ambiguity of strings like those in (34) has a structural origin, in that the noun may either form a constituent with the adjective or with the PP. Consider *one*-substitution and coordination. In the pairs below, the grammaticality of the first example requires a structure in which the adjective forms a constituent with the noun, while the grammaticality of the second example requires an alternative structure in which the noun merges with the PP first (compare (34)).<sup>10</sup>

<sup>10</sup>The example in (38a) might be a case of right-node raising. However, it does not have the tell-tale intonation that right-node raising requires, as in *Mary's story about, and John's sketch of, the great Harry Houdini will appear in The New Yorker*. Moreover, right-node raising does not give rise to wide scope of the right-peripheral constituent:

- (36) Every man loves, and every woman hates, some present his mother gave to her.

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- (37) a. the [fake picture]<sub>i</sub> from the fifteenth century and the one<sub>i</sub> from  
the eighteenth century  
b. the fake [picture from the fifteenth century]<sub>i</sub> and the real one<sub>i</sub>
- (38) a. the [[[fake picture] and [real triptych]] from the fifteenth century]  
b. the [fake [[picture from the fifteenth century] and [triptych from  
the eighteenth century]]]

In these examples, scopal interpretation varies with structure. The temporal PP takes scope over *fake* in (37a) and (38a), while *fake* takes scope over the temporal PP in (37b) and (38b).

Again, we need to explore whether the structural ambiguity found in noun-medial languages like English could be due to a Cinquean analysis involving reduced relative clauses. The idea, familiar by now, would be that if the AP takes wide scope it is a reduced relative clause, while if it takes narrow scope it directly modifies the noun:

- (39) [<sub>RR</sub>AP > [[<AP> N] XP]]

Recall that non-predicative adjectives cannot be used as reduced relatives. Therefore, an analysis along the lines of (39) predicts that the observed ambiguity will disappear when the AP is non-predicative, contrary to fact. Consider the DP in (40), which is ambiguous in a way that suggests that the AP could be merged higher or lower than the PP.

- (40) a. the [[former spy] with a license to kill]  
b. the [former [spy with a license to kill]]

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In any case, the example crucial to the argument is (38b), which shows that APs can be structurally higher than PPs.



If the AP is merged lower than the PP, the person described is someone who used to be a spy and who has retained her license to kill (for instance, she may now be a CIA assassin but no longer involved in espionage). If the AP is merged higher than the PP, the person described is someone who used to be a spy and had a license to kill in that capacity. The constituency tests mentioned above can be shown to remove ambiguity, as expected. Thus, the left conjunct in *the former spy with a license to kill and the current one* will be interpreted as someone who used to be a spy with a license to kill if the N-PP string serves as the antecedent for one. Data of this type make clear that a Cinquean gambit will fail.

We find the same pattern of constituency and scope in other head-medial languages, such as Swedish and Dutch. For reasons of space, I will not demonstrate this here.

Basque represents a second type of noun-medial language: APs follow the noun, while other material precedes it. An account of AP adjacency that relies on structural layering would again predict that in a string XP-N-AP the noun forms a constituent with the adjectival modifier to the exclusion of the prenominal XP. But the Basque data suggest that strings of this type are structurally ambiguous. First, both N-AP and XP-N may serve as antecedents in elision:

- (41) a. 15. mende-ko [koadro txiki]<sub>i</sub> bat eta 16. mende-ko e<sub>i</sub>  
 15th century-GEN picture small one and 16th century-GEN  
 bat.  
 one  
 ‘one small picture from the 15th century and one small one from  
 the 16th century’ Basque

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- b. [15. mende-ko koadro]<sub>i</sub> txiki bat eta e<sub>i</sub> handi bat.  
 15th century-GEN picture small one and big one  
 ‘One small picture from the 15th century and one big one from  
 the 15th century’ Basque

Second, the prenominal modifier may take scope over the AP, or the other way around, as the ambiguity of (42) shows. This suggests that the example can be structured in two ways, just like its English counterpart in (34). In addition to [GenP [N AP]], [[GenP N] AP] is a possible parse.

- (42) 15. mende-ko koadro faltsu bat  
 15th century-GEN picture fake one  
 ‘One fake picture from the 15th century’ Basque  
 (from the 15th century > fake; fake > from the 15th century)

As in English, it is not possible to analyze the structure in which the AP is attached higher than the XP as involving a reduced relative clause. Such an account would incorrectly predict that non-predicative adjectives are restricted to low positions. In fact, though, *ohi* ‘former’ must be able to c-command the genitive phrase in (43). The example can denote a former spy who now wears a red beret or someone who used to wear a red beret when they were a spy.

- (43) [[txapela gorri-dun [espioi <ohi>]] <ohi>-a.  
 beret red-having spy former-DEF  
 ‘The former spy with a red beret’ Basque

In sum, while a structural account of AP-adjacency requires that the noun and adjective always form a constituent, evidence from noun-medial languages shows that this is incorrect.

Can movement be used to save the hypothesis that APs are located in a designated structural layer below PPs, genitive DPs, and so on? Suppose that

the templates in (10)–(13) hold of the underlying, but not the surface structure. If an AP ends up c-commanding some other constituent, this could then be the result of the AP moving away from the noun. In head-final languages, this optional movement would lead to variation in order (see (44a)). In languages with AP-N-XP order, it would be string-vacuous (see (44b)).

- (44) a. [PP [AP N]] → AP [PP [ $t_{AP}$  N]]  
 b. [[AP N] PP] → AP [[ $t_{AP}$  N] PP]

In order to capture the key observation that in head-initial languages APs precede PPs, it would have to be assumed that the relevant movement has no rightward counterpart (see (45)). This may seem stipulative, but it would fit in with the general asymmetry between leftward and rightward movement: the latter seems more restricted in a number of ways.

- (45) [[N AP] PP] → \*[[N  $t_{AP}$ ] PP] AP

I see three problems with this proposal. First, the structural ambiguity of XP-N-AP strings in Basque would seem to require rightward movement of APs after all:

- (46) [PP [N AP]] → [PP [N  $t_{AP}$ ]] AP

Second, allowing leftward movement of adjectives would predict that at least some head-initial languages permit the order AP-N-XP under the same subtle interpretive requirements that permit the order AP-XP-N in head-final languages. However, such a movement process is not attested, as far as I can tell:

(47)  $[[N\ AP]\ PP] \rightarrow *AP\ [[N\ t_{AP}]\ PP]$

Of course, some head-initial languages do allow APs to appear prenominal, but this is typically restricted to a specific class of adjectives and never seems to be the result of the kind of general process that would be needed to generate the AP-XP-N orders found in head-final languages.<sup>11</sup>

Third, in structures in which the AP occupies a high position, there seems to be a systematic lack of evidence for it having a low origin. We can illustrate this using coordinate structures in languages with a rich system of adjectival agreement. Where the adjective modifies a combination of two N-PP conjuncts, a base-generation analysis predicts concord with the coordination as a whole (possibly mediated by rules of resolution in case the conjuncts have conflicting features). This prediction is correct: in the Slovenian example in (48a) only the use of a dual form of the adjective guarantees that both the bull and the calf are brown. The movement account would have to rely on across-the-board movement of the adjective. The trouble with this is that a dual form of the adjective is not grammatical in either of the purported underlying positions (compare (48b)).

(48) a. [rjava            [[bik    iz    Bitenj] in [tele    iz  
           brown-DU.MSC bull.MSC from Bitnje and calf.NEUT from  
           Kranja]]]  
           Kranj  
           ‘the brown bull from Bitnje and (brown) calf from Kranj’

Slovenian

<sup>11</sup>In French, for example, deviations from neutral adjective order used in the context of focus involve a reordering of postnominal adjectives. Thus, *le piano noir antique* ‘the piano black old’ (the old black piano) is the neutral order, but if there are many old pianos to choose from, *le piano antique noir* ‘the piano old black’ may be used. The prenominal slot is reserved for a certain class of adjectives (e.g. *petit*, *grand*, etc.) and to achieve a certain poetic effect.

- b. [[[rjav bik] in [rjavo tele]] iz Bitenj]  
 brown.MSC bull.MSC and brown-NEUT calf.NEUT from Bitnje  
 the brown bull and brown calf from Bitnje'

In other words, concord must be calculated on the basis of the surface representation. This is not problematic in itself, but it begs the question what evidence could be given for the trace in (44b). None, it seems to me.

### 3.2.3 Generalizations

Below I summarize my findings for the languages discussed above in the form of three generalizations. (Apparent exceptions to Generalization A are discussed in sections 3.4.3 and 3.5.)

#### GENERALIZATION A:

In N-AP-XP languages, reordering of AP and XP is prohibited.

#### GENERALIZATION B:

In AP-N-XP and XP-N-AP languages, there are two possible structures: one in which the noun is merged with the AP first, and another in which the noun is merged with the XP first. Scopal interpretation coincides with c-command relations in these structures.

#### GENERALIZATION C:

i. In noun-final languages, there is variation in word order. All such languages have XP-AP-N as an unmarked order. Typically such lan-

guages allow AP-XP-N as an alternative order. In some, this alternative order is experienced as marked.

ii. The XP-AP-N order is interpreted with the XP taking scope over AP and N, while the AP-XP-N order is interpreted with the AP taking scope over XP and N.

The data in head-final and head-medial languages is as expected if (i) there is no restriction on the order of merger of APs and PPs, genitive DPs, etc., and (ii) scopal interpretation is determined by syntactic structure. What is to be explained is why this simple analysis does not extend to head-initial languages, where the word order seems to suggest that there is only a single order of merger. I will argue that there is actually nothing special about the structure of noun-initial languages. Instead, they are subject to a constraint that bans linear separation of nouns and adjectival phrases.

### 3.3 Case Adjacency and VP-shell formation

AP adjacency has an interesting parallel in the verbal domain. As is well known, a verb and a DP object in English cannot be separated by adverbial material:

(49) John read <\*slowly> the letter <slowly>.

The English pattern can be observed in several other VO languages, including the Scandinavian languages, Bantu, Chinese, Celtic and Arabic (see also Neeleman 2015). It is not easy to prove that it is a universal, because in a number of languages the verb moves out of VP. Thus, in French the order V-Adv-DP is grammatical as a consequence of the verb moving across adverbials

to a position relatively high in the clause (see Emonds 1978 and Pollock 1989). Nonetheless, there is evidence for verb-object adjacency even in French. The order of adverbials sandwiched between object and verb follows Cinque's 1999 adverbial hierarchy, suggesting that the first adverb c-commands the second. Adverbials that follow the object, however, come in reverse order, suggesting right-to-left c-command (in both examples in (50) the order of adverbs is fixed; see Abeillé and Godard 2003, p.3 and Jones 1996, p.7, the sources of these data).

- (50) a. Jean fait [souvent [vite [t<sub>V</sub> son travail]]].  
 John does often quickly his work  
 'John often does his work quickly.' French
- b. Ce garçon mangeait [[[t<sub>V</sub> une pizza] lentement] hier].  
 this boy ate a pizza slowly yesterday

If right-adjoined adverbs could intervene between the trace of the verb and the object, it would be impossible to capture this pattern. So, verb-object adjacency must hold.

In Slovenian, too, adverbs that separate verb and object surface in scopal order. In neither (51a) nor (51b) can 'slowly' precede 'yesterday' (unless the former is contrastively focused). This again suggests that the separation in (51b) is due to verb movement:

- (51) a. Janez je [včera] [počasi [prebral pismo]].  
 John has yesterday slowly read letter  
 'John has read the letter slowly yesterday.' Slovenian
- b. ?Janez je [prebral [včera] [počasi [t<sub>V</sub> pismo]]].  
 John read yesterday slowly letter

In other VO languages the option of verb-object separation disappears when verb movement is controlled for. In Icelandic clauses containing an auxiliary,

for example, the main verb remains in situ, so that the effects of Case Adjacency can be observed on the surface (see Vikner 1994):

- (52) Jón hefur lesið <\*rækilega> bækur-nar <rækilega>  
 John has read thoroughly books-DEF thoroughly  
 Icelandic

The overall pattern is reminiscent of Generalization A, if DP is taken to correspond to AP:<sup>12</sup>

GENERALIZATION A':

In V-DP-AdvP languages, reordering of DP and AdvP is prohibited.

There is a classical account of Generalization A' in terms of structural layering. Chomsky (1965) argues that the verb and its object form a core constituent to the exclusion of all adverbials. This proposal was recast later in terms of the sisterhood condition on internal theta-role assignment (Chomsky, 1986).

The best-known alternative explanation of Generalization A' relies on a linear constraint known as Case Adjacency, introduced by Stowell (1981). Case Adjacency requires that no category intervene between the verb and a complement dependent on it for case. One immediate advantage of Case Adjacency is that it explains the fact that complements that do not require case (PPs and CPs) can be separated from the verb, as (53) illustrates.

- (53) a. John looked pensively at the telegram.  
 b. John said hesitantly that he should probably leave.

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<sup>12</sup>One genuine counterexample to generalization A' comes from VOS languages like Malagasy, as described in Pearson (2007). I cannot go into what relates VOS order to lack of case adjacency effects.



The parallel between Case Adjacency and AP adjacency becomes stronger when we consider head-final languages. It has been observed, for example by Corver and van Riemsdijk (1997), that OV languages systematically allow intervention of material between the object and the verb, the most common case being intervention of adverbials (a phenomenon I refer to as ‘scrambling’).<sup>13</sup> In Dutch, for example, the orders in (54) are both grammatical. The extensive literature on scrambling has established that in the DP-AdvP-V order the object occupies an A-position (for discussion of the syntactic properties of Dutch scrambling, see Vanden Wyngaerd 1989; Zwart 1993 and Neeleman 1994).

- (54) Jan heeft <langzaam> de brief <langzaam> gelezen.  
 John has slowly the letter slowly read.  
 ‘John slowly read the letter.’ Dutch

These observations are reminiscent of the first part Generalization C, with DP taken to correspond to AP:

GENERALIZATION C’:

- i. In verb-final languages, there is variation in word order. All such languages have AdvP-DP-V as an unmarked order, and all such languages allow DP-AdvP-V as an alternative order.

As expected, scope corresponds to word order in the OV languages. Thus, the AdvP-DP-V order in (55) expresses that what was quick was John’s reading of the three letters, while in the DP-AdvP-V order the reading of each individual letter was quick, although the reading of all three letters might have taken a long time.

<sup>13</sup>Many languages allow scrambling across arguments, but this does not seem to be linked to OV order. There are OV languages that lack such scrambling (e.g. Dutch), as well as VO languages that allow it (e.g. Icelandic); see Collins and Thráinsson 1996.

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- (55) Jan heeft <snel> drie brieven <snel> gelezen.  
 John has quickly three letters quickly read.  
 ‘John read three letters quickly.’ Dutch

These kinds of effects seem to be present in all OV languages, suggesting a parallel to the second part of Generalization C.<sup>14</sup>

GENERALIZATION C’:

- ii. The AdvP-DP-V order is interpreted with the AdvP taking scope over DP and V, while the DP-AdvP-V order is interpreted with the DP taking scope over AdvP and V.

There are some languages in which the verb surfaces between objects and adverbials. In particular, several West African languages have DP-V-AdvP order (see Koopman 1992 on Bambara; see also Dryer 2013). This suggests that there may be a parallel to Generalization B in the verbal domain. Unfortunately, I have not found descriptions of the relevant languages detailed enough to determine whether they display the kind of structural ambiguity found in the noun phrase. However, in at least some head-final languages PPs optionally follow the verb. Such extraposed PPs may be in the scope of DP objects or vice versa, as shown by the Dutch example in (56) (where the PP is an idiom meaning ‘quickly’). If the pattern in (56) extends to other verb-medial structures, there is a reflex of Generalization B in the verbal domain after all.

- (56) Jan heeft drie boeken gelezen in sneltreinvaart.  
 John has three books read in fast-train-speed  
 ‘John read three books quickly’  
 quickly > three books; three books > quickly Dutch

---

<sup>14</sup>An exception to this general pattern involves structures in which DP is contrastively focused. Under contrastive focus, the DP can take scope under the adverbial, presumably because it has been fronted through A’-movement.

The correlation between the position of the head and the possibility of adverbial intervention does not follow in any obvious way from the structural account suggested for the English data in (49). If object and verb form a core constituent that excludes adverbials, then leftward movement of the object must account for the Dutch data. This raises the question why a rightward variant of this movement operation should not be available in English.

Of course, English does have heavy-XP shift, but structures derived by this operation are different in their syntactic and interpretive properties from structures like (54). If heavy-XP shift is analyzed as movement of the heavy constituent, it must presumably land in an A'-position (see Rochemont and Culicover 1990).<sup>15</sup> However, scrambled DPs, as already mentioned, occupy an A-position. Moreover, they tend to be given, while there is no reason to think that heavy-XP shift is a means of marking givenness (quite the opposite). Heavy NP shift is therefore an unlikely rightward counterpart of scrambling.<sup>16</sup>

So, although a movement account of adverbial intervention is probably the standard view, it is fair to say that it does not provide an explanation of the very robust typological association between head finality and scrambling, nor of the somewhat less robust association between head initiality and Case Adjacency.

At first sight, a linear approach to Case Adjacency runs into exactly the same problems. Suppose that we require that a verb and any DP it case-marks

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<sup>15</sup>The core argument is that heavy-XP shift can license parasitic gaps (see Engdahl 1983). An alternative analysis would be to treat the relevant data as instances of right-node raising (see Postal 1993, 1994). However, Nissenbaum (2000) argues that heavy-XP shift can license gaps even where right-node raising is not available.

<sup>16</sup>Neeleman (1994) and Neeleman and van de Koot (2008) make a distinction between 'neutral scrambling' or 'A-scrambling' and 'focus scrambling' or 'A'-scrambling'. The phenomenon illustrated in (54) is A-scrambling; heavy-NP shift could be seen as a rightward counterpart of A'-scrambling.

must be adjacent. Then the English data in (49) and (53) fall out neatly, but the Dutch example in (54) would still need to be derived by a movement operation that for mysterious reasons has no counterpart in English.

However, this difficulty can be avoided if the relevant constraint is formulated not in terms of adjacency, but in terms of precedence. The following formulation is based on a proposal in Janke and Neeleman (2012).

(57) *Case-First Constraint*

- a. The assignment domain of a case C in a DP-argument consists of that DP and any XP intervening between it and V.
- b. No category lacking C can precede a category that carries C in C's assignment domain.

This constraint needs to be paired with a parameter that regulates the linear order of verb and case-marked DP. The exact nature of this parameter is an intricate matter, but it will suffice here to state it in terms of the way case domains are constructed:<sup>17</sup>

(58) *OV/VO Parameter*

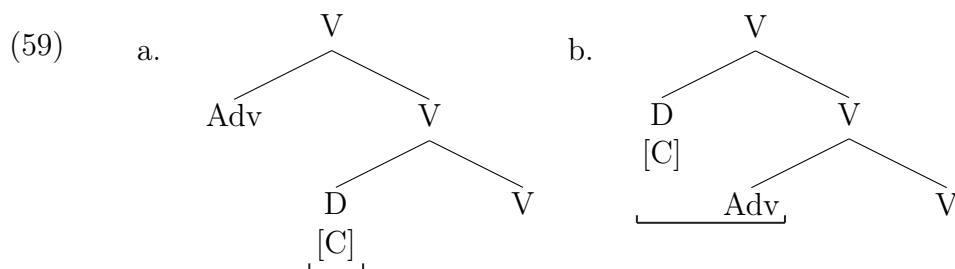
Case domains are constructed with reference to a preceding/following V.

Object placement in OV languages like Dutch is a consequence of the setting of the OV/VO Parameter. If case domains are constructed with reference to a following V, case-marked DPs must appear to the left of the case-assigning

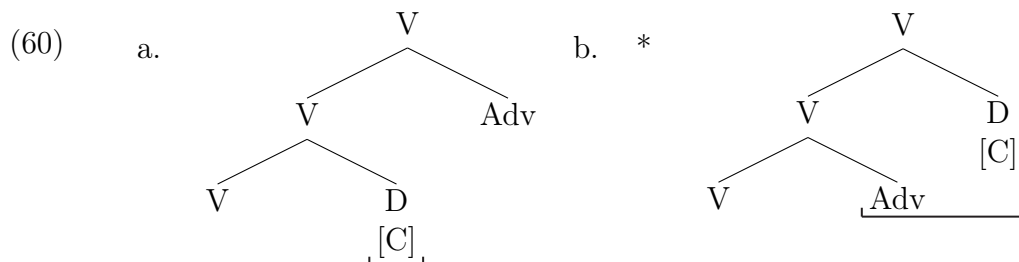
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<sup>17</sup>This formulation of the OV/VO parameter is specific to the order of case-marked DPs with respect to the verb. Of course, many other word order restrictions correlate with OV/VO order. I think that these are best dealt with through a parameter hierarchy of the type proposed in Roberts (2012) and Biberauer and Roberts (2015). This is because the correlations in question often face exceptions.

head. Moreover, if we assume that objects can be structurally separated from the verb, the availability of scrambling in OV languages is unsurprising. Both structures in (59) satisfy the Case-First Constraint, as in both the case-marked DP is leftmost in its assignment domain (I have indicated the relevant domains below the trees).<sup>18</sup>



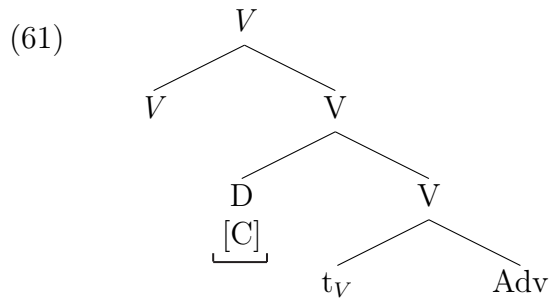
The situation is rather different in VO languages, where case domains are constructed with respect to a preceding verb; I use italics to indicate shell structures here and below. The counterpart of (59a), which is given in (60a), is grammatical. However, the counterpart of (59b) is ruled out. The assignment domain of the case feature [C] in (60b) consists of DP (which carries it) and Adv (which intervenes between DP and the case licenser). In contrast to what (57) requires, DP is not leftmost in [C]'s assignment domain.



At first sight, this analysis seems to imply that whereas OV languages allow two structures, namely (59a) and (59b), VO languages allow only one, namely

<sup>18</sup>I label trees here and below according to the conventions of bare phrase structure theory (see Chomsky 1995). In order to avoid confusion I will refer to maximal projections as XPs, rather than Xs in the text.

(60a). However, Janke and Neeleman (2012) argue that a process of VP-shell formation that can be used to generate structures in which the verb merges first with an adverbial and subsequently with a case-marked object. If the object is linearized to the left of its verbal sister, and the verb undergoes a short leftward movement across it, the object ends up right-adjacent to the verb, in accordance with both (57) and the relevant setting of the OV/VO parameter (notice that verb movement is necessary if case domains are constructed with reference to a preceding verb):



Janke and Neeleman (2012) analyze the movement in (61) as self-attachment. That is, the movement does not target a pre-fabricated position; rather the verb re-projects in its surface position (Ackema et al., 1993; Koenenman, 2000; Hornstein and Uriagereka, 2002; Bury, 2003; Fanselow, 2003; Surányi, 2005; Bayer and Brandner, 2007). One advantage of the absence of a pre-fabricated position is that it explains why there is no verb movement when there is no DP to be licensed. If there were a prefabricated head position, it could attract the verb even when Case Adjacency is not at stake, thus undermining my account of the word order facts.

It is important to realize that the Case-First Constraint is not an adjacency condition. If there is an independent trigger for verb movement, the verb can move away from the object, leaving case to be assigned by its trace. Such

movement does not affect the predictions of the Case-First Constraint, as this condition still regulates word order in the assignment domain anchored in the verb's trace. Therefore, case adjacency effects will persist in VO languages with V-to-I or V-to-C.

The picture that emerges, then, is the following. Where case plays no role, word order in VO languages will generally be the mirror image of that in OV languages. This can be seen in the case of adverbials, where English postverbal order mirrors Dutch preverbal order:

- (62) Jan heeft [ $\langle$ \*prachtig $\rangle$  [gisteren [ $\langle$ prachtig $\rangle$  gezongen]]].  
 John has beautifully yesterday beautifully sung  
Dutch

- (63) John [[[sang beautifully] yesterday]  $\langle$ \*beautifully $\rangle$ ].

However, if a category is merged prior to a case-marked object, an asymmetry emerges. Whereas in OV languages the category in question will simply surface between object and the verb, the grammar of the VO language will require VP-shell formation, leading to a non-mirroring order and a descending structure, as in (61), rather than the ascending structure in (59b).

Object-oriented depictives can be used to illustrate this effect. As is well known, depictives must be c-commanded by the DP they are associated with. An object-oriented depictive must therefore be merged with the verb before the object itself is merged. This explains why in Dutch such depictives must follow the object:

- (64) Jan heeft [ $\langle$ \*rauw $\rangle$  [de vis [ $\langle$ rauw $\rangle$  gegeten]]].  
 John has raw the fish raw eaten  
Dutch

The English counterpart of (64) cannot be (65a), because this representation violates the Case-First Constraint. VP-shell formation rescues the structure, but leads to a non-mirroring word order:

- (65) a. \*John [[ate raw] the fish]  
 b. John ate [the fish [<sub>VP</sub> raw]].

Subject-oriented depictives do not have to be c-commanded by the object, although they must of course be c-commanded by the subject. This means that we may assume that they are adjoined to VP in a simple ascending structure:<sup>19</sup>

- (66) John [[ate the fish] drunk].

Three further facts follow. First, if a sentence contains both an object- and a subject-oriented secondary predicate, they come in this order (see (67a)). Second, object-oriented secondary predicates cannot be stranded by VP-fronting, but subject-oriented secondary predicates can be (see (67b)).<sup>20</sup> This is because in (66), but not (65b), verb and object form a constituent. Third, an object-oriented secondary predicate can be preceded by an object-oriented floating quantifier, but a subject-oriented secondary predicate cannot (see (67c)).

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<sup>19</sup>The claim that object-oriented and subject-oriented depictives in English occupy different positions is not mine. It goes back to at least Williams 1980; see also Andrews 1982; Culicover and Wilkins 1984 and Rothstein 1985. Specific proposals that object-oriented depictives occupy the lowest position in a VP-shell structure can be found in Larson 1989 and Vanden Wyngaerd 1989. These authors thus also argue that English allows adverbials that structurally intervene between verb and object, but they do not provide an analysis of the correlation between headedness and scrambling/case adjacency.

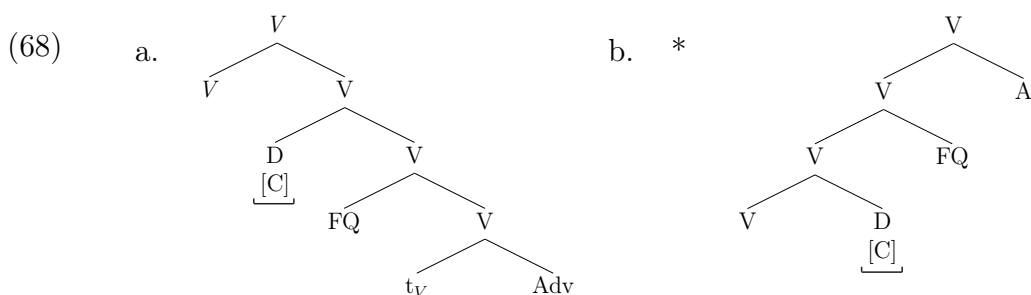
As to why subject-oriented secondary predicates cannot be merged lower in the tree, one option is to make use of Williams' 1980 notion of c-subjacency, a locality constraint on predication. I suspect, however, that a more general constraint is at work, as subject-oriented floating quantifiers are also excluded from appearing inside VP: \**We gave John both a good talking to.*

<sup>20</sup>This contrast is real, but not as sharp as expected. I have no account for this.



- (67) a. John ate the fish <?raw> drunk <\*raw>.  
 b. John wanted to eat the fish no matter what, and eat the fish he did drunk/??raw.  
 c. If John ate the fish at all, he ate the fish both raw/\*drunk.

The explanation of the observation in (67c) is a little involved. Janke and Neeleman (2012) argue that floating quantifiers must be c-commanded by the DP they are interpretively linked to and—in English—precede the category they are attached to. According to these criteria, there is a position in a descending structure like (67a) that can host object-oriented floating quantifiers, but this is not the case in an ascending structure like (67b). For details, I must refer the reader to the original paper.



Further evidence for the existence of both ascending and descending structures in English comes from adverbial scope. As observed by Phillips (2003), an example like (69a) is ambiguous between a collective reading of *quickly* and a distributive reading. Given the analysis above, this follows: in the ascending structure the adverbial c-commands the indefinite, while in the descending structure the indefinite c-commands the adverbial. The prediction, then, is that an adverbial stranded by VP-fronting will get a collective reading. This is indeed the case; there is a strong tendency for *quickly* in (69b) to take scope over *three letters*.

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- (69) a. John read three letters quickly.  
b. John wanted to read three letters, and read three letters he did quickly.

That English has descending structures involving verb movement is hardly controversial. In fact, it has been the standard analysis for the double-object construction ever since Larson 1988. However, the proposal sketched above differs from alternatives outlined in the literature in that it assumes that verb movement serves to create a representation in which a DP object is adjacent to the verb. This leads to the prediction that the verb cannot move across adverbials. Thus, examples like (70) are ruled out as a violation of the Case-First Constraint in (57).

- (70) \*John [ate slowly [the fish [t<sub>V</sub> raw]]]]].

Alternative proposals, even if they require adjacency between the verb and its complement in the underlying structure, struggle to explain the ungrammaticality of (70).

The data in this section suggest an extension of Generalization A':

#### GENERALIZATION A':

- i. In V-DP-AdvP languages, reordering of DP and AdvP is prohibited.
- ii. The order V-DP-XP permits two structures: one in which the object is c-commanded by the material that follows it, and one in which the object c-commands the material that follows it.

Although not all tests available in English can be applied elsewhere, evidence for the structural ambiguity of V-DP-XP strings can be replicated, for instance in the Scandinavian languages.

## 3.4 Extending the analysis to AP adjacency

### 3.4.1 The basic pattern

The data discussed in sections 3.2 and 3.3 show a striking parallelism between the nominal and verbal extended projections. The order of adjectival and non-adjectival modifiers in head-final languages is much freer than in head-initial languages, where only one order is allowed (N-AP-XP). In the same vein, OV languages systematically allow scrambling, while VO languages do not. This parallelism in the data of course suggests that a parallel account should be developed. I will therefore argue that the Case-First Constraint as motivated above for the extended verbal projection has a counterpart in the extended nominal projection (see van Riemsdijk 1992 for related ideas).

In order to develop this account, we need to establish the morpho-syntactic factor in which the nominal counterpart of the Case-First Constraint is anchored. In the same way that (57) mentions Case, its counterpart in the noun phrase must mention some property of APs that affects the linear positions in which they can occur. My proposal is that this anchor is JOIN, as developed in the previous chapter.<sup>21</sup>

Recall that JOIN is intended to solve the tension between two basic observations. First, given the use of APs as predicates in copula constructions, it is likely that their basic type is  $\langle e, t \rangle$  (see Partee 1986 and Zamparelli 2000). However, when an AP functions as a nominal modifier, it has to shift to a

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<sup>21</sup>An alternative anchor could be provided by the hypothesis that APs need to receive case from the head N, as argued by Larson and Yamakido (2008). This idea is promising as it would allow a more direct parallel with Case Adjacency in the verbal domain. However, for the time being, it seems to me that the idea that APs must undergo type-shift in order to function as attributive modifiers is better established than the idea that they need case.

different type, namely  $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ . This allows adjectives to combine with the nominal, which is itself of type  $\langle e, t \rangle$ , and yield a constituent of the same type, thus accounting for the distributive similarities between bare nominals and nominals modified by APs.

JOIN is the abstract morpheme responsible for this shift. It was originally proposed in Chierchia and Turner 1988 and its content has since been modified in Baker 2003 and Truswell 2004, 2005, as well as in the previous chapter. I assume that JOIN is attached to the AP, and that it derives a modifier that selects a nominal category. The latter assumption captures the fact that APs can act as modifiers of nouns, but not as modifiers of, say, other adjectives (cf. \**The bus is big red*). Both Baker and Truswell encode this selectional requirement in the lexical entry for JOIN.<sup>22</sup>

An analysis of attributive modification based on JOIN has two advantages over analyses based on  $\theta$ -identification or similar mechanisms.  $\Theta$ -identification, as proposed by Higginbotham 1985, necessarily leads to a semantics of intersective attribution as coordination: *this is frozen chicken* means ‘this is frozen and this is chicken’. However, when multiple intersective adjectives are attached, their order matters. As Svenonius (1994) points out, *frozen chopped chicken* is not the same thing as *chopped frozen chicken*. This fact is hard to understand under a  $\theta$ -identification analysis, as both expressions would mean ‘this is chicken and this is chopped and this is frozen.’ It follows from a JOIN-

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<sup>22</sup>Demonstratives, numerals and relative clauses do not require prior attachment of JOIN to be used as nominal modifiers. The basic type of PPs and genitives is subject to debate. However, PPs, in contrast to APs, can modify APs. Hence, if PPs require type-shift in nominal contexts, this cannot be the result of attachment of JOIN. There is independent evidence for the claim that what is needed to ‘glue’ a PP to a nominal projection is different from what is needed to glue an AP to a nominal, across languages. In particular, many languages, for example a wide range of Niger-Congo languages, allow APs to modify NPs but do not allow PPs to do so.

based account, however. JOINP takes the NP it combines with (including any lower attributive APs) as an argument to which the AP it contains is applied. So, *frozen chopped chicken* is chopped chicken that is frozen, while *chopped frozen chicken* is frozen chicken that is chopped.

The second problem with a  $\theta$ -identification account has to do with adjectives that can only be attributive. If nothing distinguishes the attributive and predicative use of adjectives, it is hard to capture such a restriction. On a JOIN-based theory, however, the two usages are associated with different types. Exclusively attributive adjectives, like *former* and *main*, can therefore be stored with  $\langle et, et \rangle$  as their lexical type, or with JOIN pre-attached (i.e. they are cranberry morphs). Languages that do not have attributive adjectives at all (such as Slave; see Rice 1989) may simply not have JOIN in their lexicon.<sup>23</sup>

There are several languages that may have an overt correlate of JOIN. Russian is a prime example. Its adjectives have a short and a long form (see Babby 1975; Siegel 1976; Pereltsvaig 2001). As Siegel argues, the short form is predicative, while the long form is used in attribution. There are cases in which a long form is apparently used as a predicate, but these are plausibly analyzed as involving nominal ellipsis. It is therefore tempting to say that the long form is derived from the short form through attachment of JOIN, now spelled out. A second possible overt realization of JOIN was suggested to me by Klaus Abels (p.c.). Adnominal adjectives in German carry an inflectional ending that systematically begins with a schwa. This ending is absent in predicative adjectives. One can treat the systematic occurrence of schwa as coincidental,

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<sup>23</sup>Some languages, including Yoruba, only have a closed-set of apparent attributive adjectives and no predicative adjectives. This situation must be analyzed by saying that the language has no adjectives at all and by reassigning the apparent prenominal adjectives to a different, possibly functional, category (see Cinque 2010).

but it seems more elegant to analyze it as JOIN, which is attached before the inflectional ending that expresses  $\phi$ -features (which has a variety of forms –  $r$ ,  $n$ ,  $m$ ,  $s$  and  $\emptyset$ ).

Although case and JOIN are very different elements, there is a certain functional equivalence between them: a DP can only be an argument if it bears case; an AP can only be an attributive modifier if accompanied by JOIN.

With this much in place, I can formulate my analysis of the special ordering restrictions that hold of AP-modifiers. I propose that the order in which adjectival and non-adjectival modifiers are merged with the noun is free in principle. However, JOIN is subject to the condition in (71):

- (71) *JOIN-First Constraint*
- a. a. The JOIN domain of an AP-modifier consists of that AP and any XP intervening between it and the noun.
  - b. No category lacking JOIN can precede an AP in its JOIN domain.

Like the Case-First Constraint, the JOIN-First constraint must be paired with a parameter that regulates order, in the case at hand between attributive adjectives and nouns:<sup>24</sup>

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<sup>24</sup>For reasons of space, I abstract away from potential differences between the OV/VO parameter and the AN/NA Parameter. These parameters are of course important, but my current focus is on the Case-First and JOIN-First Constraints, and the effects of these constraints are, to a large degree, independent of the exact formulation of the parameters in question.

There are two potential differences that I am aware of. First, as mentioned before, French and other Romance languages allow certain APs to appear in prenominal position, and as I argued in the previous chapter, English allows some attributives postnominally. I do not know how this affects the AN/NA parameter.

Second, the choices that the OV/VO parameter offers are often taken to be mutually exclusive, but in many languages APs can optionally appear on either side of the noun. Whether this is a principled difference is not easy to decide; it depends, among other things, on the status of post-verbal DPs in OV languages like Old English and Middle Dutch. At

(72) *AN/NA Parameter*

JOIN domains are constructed with reference to a preceding/following noun.

I first consider languages in which JOIN domains are constructed with reference to a preceding noun. In such languages, attributive APs must appear to the right of the noun. As no adjectival modifier may be preceded in its JOIN domain by a non-adjectival category, any other material that follows the noun must also follow attributive APs. The JOIN domain of the AP in (73a) consists of just the AP itself, which is therefore leftmost, as required (I return to the structure of the N-AP-XP order below). However, the JOIN domain of the AP in (73b) contains XP, in violation of (71).

- (73) a. N AP XP  
 b. \*N XP AP

In languages where JOIN domains are constructed with reference to a following noun, AP-N order is forced. The implication of this order is that the noun and the AP may be adjacent or that they may be separated by one or more non-adjectival categories. In the first case, the JOIN-First Constraint is satisfied trivially, as there is nothing in the JOIN domain other than AP; in the second case, the JOIN domain contains multiple elements, but the AP remains leftmost, in accordance with (71):

- (74) a. XP [AP N]  
 b. [AP [XP N]]

---

least at first sight, these languages allow case-marked objects to either precede or follow the verb, which would restore full parallelism.

### CHAPTER 3

So, both head-final orders XP-AP-N and AP-XP-N are allowed by the JOIN-First Constraint (Generalization C(i)), but the only noun-initial order allowed is N-AP-XP (Generalization A).

My account also captures patterns of adjectival scope. In general, I expect scope to follow c-command relations. In noun-final languages, linear order reflects order of attachment: the first element combined with the noun will be adjacent to it, with subsequent additions further to the left. Consequently, in the XP-AP-N order, the XP will c-command and therefore take scope over the AP, while in the AP-XP-N order, the AP will take scope over the XP (Generalization C(ii)).

In noun-medial languages like English, Swedish and Dutch, APs precede and PPs follow the noun. This means that the order of merger can vary without this leading to potential clashes with the JOIN-First Constraint. In both structures, the AP is adjacent to the noun and therefore alone and thus leftmost in its JOIN domain. The same reasoning applies, *mutatis mutandis*, to Basque and other languages with XP-N-AP order. Consequently, scope in noun-medial languages can vary without variation in word order (Generalization B):

- (75) a.  $\underbrace{[[\text{AP N}] \text{XP}]}$   
 b.  $\underbrace{[\text{AP} [\text{N XP}]]}$   
 c.  $[\text{XP} [\text{N} \underbrace{\text{AP}}]]$   
 d.  $[[\text{XP N}] \underbrace{\text{AP}}]$

I now return to noun-initial languages. As we have seen, the JOIN-First Constraint permits only one linear order, namely N-AP-XP. A naïve analysis would assume that the XP always c-commands the AP and must therefore



systematically take scope over it. However, this is not what the data show. In Welsh, for example, the N-AP-PP order is scopally ambiguous. The phrase in (76) can refer both to a fake picture that was made in the fifteenth century and to a later forgery attempting to replicate an earlier work.

- (76) y llun ffug o'r 15fed ganrif  
 the picture fake from-the 15th century  
 (from the 15th century > fake; fake > from the 15th century) Welsh

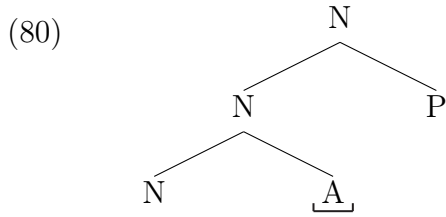
The same is true for the other noun-initial languages I have discussed:

- (77) a. el cuadro falso del siglo XV  
 the picture fake of-the century XV  
 (from the 15th century > fake; fake > from the 15th century)  
 Spanish
- b. as-suura l-muqallada min al-qarn al-xamis-ʔashar  
 the-picture the-fake from the-century the-fifteenth  
 (from the 15th century > fake; fake > from the 15th century)  
 Arabic

The first reading in (76) and (77a)–(77b) is trivial. But where does the second reading come from?

In fact, if we take the parallel with the extended verbal projection seriously, the answer to this question is straightforward. Just like the Case-First Constraint can trigger the formation of a VP-shell, the JOIN-First Constraint can trigger the formation of an NP-shell. Consider a situation in which a noun in a head-initial language merges with a PP before it merges with an AP. The structure cannot surface as in (78), as that would violate the JOIN-First Constraint.





The proposal that the N-AP-PP order is structurally ambiguous (allowing either (79) or (80)) makes a crucial prediction. The substring N-AP is a constituent in the structure in (80), but not in (79). This means that if N-AP passes a constituency test, it must be the case that PP c-commands AP, and consequently takes scope over it. There are two constituency tests that can be used to test this prediction: ellipsis and coordination.

The prediction is correct. Consider the Spanish examples in (81). If in (81a) the elided nominal constituent in the right conjunct is to be interpreted as ‘fake picture’, then in the left conjunct the PP must take scope.

- (81) a. el [cuadro falso]<sub>i</sub> del siglo XV y el e<sub>i</sub> del  
 the picture fake of-the century XV and the (one) of-the  
 siglo XVIII  
 century XVIII  
 ‘the fake pictures from the fifteenth and eighteenth centuries’  
 (from the 15th c. > fake) Spanish
- b. el cuadro auténtico y el cuadro falso del siglo XV  
 the picture real and the picture fake of-the century XV  
 ‘the real and fake pictures from the fifteenth century’  
 (from the 15th century > fake)

The fact that the reading in which the AP takes scope over the PP disappears in examples of this type strengthens my conclusion that this reading relies on the availability of the structure in (79). Note that this structure is incompatible

with an account of AP-adjacency based on structural layering, as N and AP do not form a constituent in (79).

The observations made for Spanish in (81a) carry over to Arabic and Welsh:

- (82) a. as-suura l-muzayafa min al-qarn al-xamis-ʔashar w  
 the-picture the-fake from the-century the-fifteenth and  
 al-waḥda min al-qarn al-thamin-ʔashar  
 the-one from the-century the-eighteenth  
 ‘the fake pictures from the fifteenth and eighteenth centuries’  
 (from the 15th c. > fake) Arabic
- b. y darlun ffug o’r 15fed ganrif a’r un o’r 18fed  
 the picture fake of-the 15th century and-the one of-the 18th  
 ganrif  
 century  
 ‘the fake pictures from the fifteenth and eighteenth centuries’  
 (from the 15th c. > fake) Welsh

In sum, a convincing case can be made for a linear account of AP-adjacency. Such an account fits the data better than a structural account and it has a precedent in Janke and Neeleman’s 2012 analysis of the English VP.

In the remainder of this section, I discuss two issues that require clarification, the possibility of AP stacking and the existence in some languages of apparent counterexamples to the JOIN-First Constraint.

### 3.4.2 Stacking

The first issue I consider involves an asymmetry between the nominal and verbal extended projections. I have drawn a parallel between case-marked DPs and adjectival modifiers (in the form of the Case-First and JOIN-First Constraints). However, when it comes to stacking, there seems to be an unexpected



- b. le [[[chien <?moyen>] blanc] <moyen>]  
 the dog      average      white average

French

So,  $AP_2$  in  $[[[N AP_1] AP_2]$  apparently does not violate the JOIN-First Constraint, but  $DP_2$  in  $[[[V DP_1] DP_2]$  does violate the Case-First Constraint.

Why should this be?

My account relies on the assumption that no head can contain the same attribute twice, a constraint discussed in some detail by Neeleman and van de Koot 2002 under the rubric of ‘Distinctness’. This constraint has implications for the case system if it is true that the cases borne by the direct and indirect object in a double-object construction are checked against the same head (V in the proposal outlined in section 3.3). In particular, if both cases are represented in V, then they must be distinct. The orthodox view is that one DP will bear dative and the other accusative.<sup>25</sup>

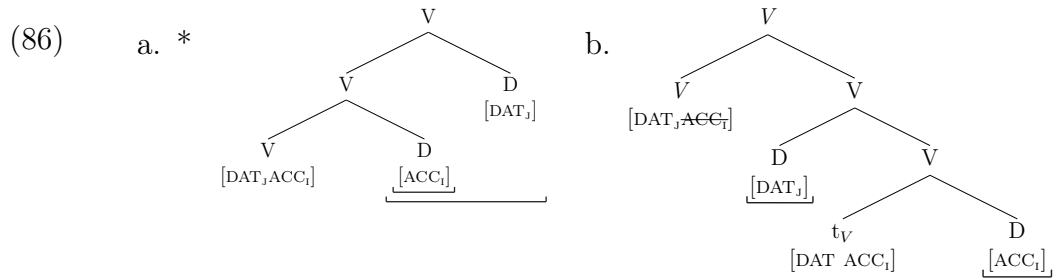
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<sup>25</sup>The orthodox view is too simplistic in two ways. First, in languages with morphological case, there are verbs that assign the same case twice. Second, it is not obvious that in languages without morphological case, the two internal arguments in a double object construction carry different case features. To illustrate this, take the case of quirky subjects, which are found in languages with morphological case when a DP moves to subject position and retains its case, rather than switching to nominative. The absence of quirky subjects in languages without morphological case might be suggestive of an impoverished case system that lacks the distinction between dative and accusative.

There are two kinds of analysis for heads that apparently assign the same case twice. The first is to adopt a formal indexing mechanism that makes it possible to distinguish multiple occurrences of the same attribute in a single head. Such a mechanism has been proposed in Neeleman and van de Koot 2002 for a parallel problem in theta theory. The mechanism in question is very restrictive, but could in principle be extended to the case system. As long as the relevant indices are visible to the Case-First Constraint, VP-shell formation will be forced in double object constructions.

A second approach is to argue that, contrary to appearances, the two cases assigned by a double-object verb are always distinct. This means that in double-dative or double-accusative constructions the similarity of the cases must be a surface phenomenon. Indeed, some proposals assert that apparently identical morphological cases assigned by the same verb have different feature content in syntax, and are only similar in that they are realized at PF by the same set of affixes (see Wunderlich 2003 and references mentioned there). For languages without morphological case, the problem of the missing quirky subjects can be addressed by assuming that certain empty functional heads are tolerated in object position

It then follows that VO languages require VP-shell formation in double-object constructions. Given that both objects must satisfy the Case-First Constraint, an ascending structure is ruled out: the dative DP in (86a) is preceded in its assignment domain by a category that does not carry dative. However, in the VP-shell structure in (86b), the dative DP can be licensed by the verb, while the accusative DP can be licensed by the verb's trace. Both are therefore the only elements in their respective assignment domains, so both satisfy the Case-First Constraint.<sup>26</sup>



There is a key difference between case licensing and the distribution of the JOIN operator. Although the JOIN operator c-selects a nominal category and therefore appears in the nominal extended projection only, it does not stand in a checking relationship to the noun. This implies that each AP-modifier can carry an instance of the JOIN operator without this violating Distinctness. But this in turn implies that the structure in (87), which I assumed for the French examples in (84b) and (85b), is grammatical. Admittedly, the JOIN domain of the higher of the two adjectives includes the lower adjective, which precedes it. However, as both adjectives carry JOIN, this does not result in a

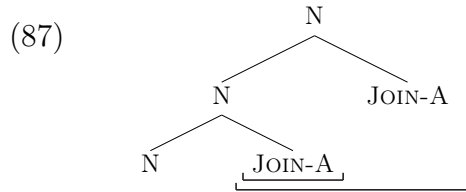
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but not in subject position. There is some independent evidence for this from the distribution of null complementizers in English (Stowell, 1981) and null determiners in Italian (see Longobardi 1994).

I leave the choice between these two general approaches open for now.

<sup>26</sup>Note that in head-final structures, both objects will satisfy the Case-First Constraint without VP-shell formation.

violation of the JOIN-First Constraint: neither is preceded in its JOIN domain by a category lacking JOIN.



### 3.4.3 Independent noun movement

We have seen in section 3.3 that Case Adjacency holds of the base positions of the verb and the object. If the verb moves independently of the Case-First Constraint, VO structures can be generated in which Case Adjacency is satisfied despite the fact that verb and object are separated by other material. Perhaps the best-known case in point is verb movement in French (see (50)). My account permits such verb movement, because the Case-First Constraint only imposes ordering restrictions on the elements in the case domain of a DP, and the case domain is defined in such a way that it excludes the case-assigning head. There is hence no need for the verb to be adjacent to the object, as long as the object is adjacent to the verb's trace.

The parallel formulation of the Case-First and JOIN-First Constraints leads to the expectation that APs in head-initial structures do not have to be adjacent to the surface position of the noun either. If the noun moves independently of the JOIN-First Constraint, structures can be generated that apparently violate AP adjacency, but in fact satisfy it because the AP is adjacent to the noun's trace.

An example of this comes from work on Greenberg's (1963) Universal 20 (Cinque, 2005; Abels and Neeleman, 2012). Any account of Universal 20 as-



sumes that there is a cross-linguistic hierarchy Dem(onstrative) > Num(eral) > Adjective > Noun. That is, numerals are merged after adjectives and demonstratives are merged after both these categories. This implies that orders like N-Dem-Num-A (found in Kĩĩtharaka) or Dem-N-Num-A (found in Maasai) must involve leftward noun movement. But if this is the case, these orders do not in fact constitute counter-examples to AP adjacency, even though Dem and Num intervene between the noun and attributive adjectives.

- (88) a. [N [Dem [Num [<AP> t<sub>N</sub> <AP>]]]]  
 b. [Dem [N [Num [<AP> t<sub>N</sub> <AP>]]]]

Abels and Neeleman (2006) argue, on the basis of data in Cinque 2005, that movement reduces the typological frequency of neutral orders. In the realm of Universal 20, no order derived by movement is typologically frequent, and all typologically frequent orders can be base-generated (in addition, there are base-generated infrequent orders that violate harmony principles). Thus, apparent exceptions to AP adjacency are relatively rare.

As was true for Case Adjacency and verb movement, even languages with independent noun movement can provide evidence for AP adjacency. I demonstrate this by looking at Welsh adjectival orders. As is well known, merger of adjectives is regulated by the following cross-linguistic hierarchy: *other* > quality > age > size > color > provenance (see Cinque 2010 and references given there). In other words, adjectives describing provenance are merged before adjectives describing color, and so on. This hierarchy can be used to detect independent noun movement (just like the earlier hierarchy Dem > Num > A > N).

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If the noun remains in situ, any adjectives following it are predicted to come in ascending order (see (89a)). So, adjectives describing provenance should precede adjectives describing color, and so on. This is the case in two of the languages with noun-adjective order that I have looked at, Arabic and Spanish, possibly suggesting absence of noun movement in these languages (Spanish follows the general Romance pattern in this respect; the Arabic adjectival order is described in Kremers 2003).

If the noun moves leftward, however, any adjectives between it and its trace are expected to come in descending order (see (89b)). Indeed, this criterion has been used to argue for noun movement in Celtic (see Guilfoyle (1988) and Sproat and Shih (1991) for Irish, and Rouveret (1994) for Welsh).

- (89) a.  $[[N AP_1] AP_2]$   
 b.  $[N [AP_2 [AP_1 t_N]]]$

I now look at Welsh in more detail. Willis (2006) establishes that the language has the following order of adjectives:

- (90)  $N - AP_{\text{SIZE}} - AP_{\text{COLOUR}} - AP_{\text{PROVENANCE}} - AP_{\text{AGE}} - AP_{\text{QUALITY}} - \textit{other}$

Given the cross-linguistic hierarchy of adjectives given earlier, it seems that adjectives in Welsh come in descending order initially (size – color – provenance) and then appear in ascending order (age – quality – *other*). There is a straightforward analysis of this pattern: (i) the APs lower on the hierarchy are left-attached, (ii) the APs higher on the hierarchy are right-attached, and (iii) the noun moves across the lower APs. This movement targets a position below the numerals, given that the neutral order in the Welsh noun phrase is Num-N-A-Dem:

(91) [[Num [[[[N [AP<sub>SIZE</sub> [AP<sub>COLOUR</sub> [PROVENANCE  $t_N$ ]]]] AP<sub>AGE</sub>] AP<sub>QUALITY</sub>] *other*]] Dem]

PPs in Welsh follow all adjectives. That this is true of the lower adjectives cannot be seen as evidence for AP adjacency: these adjectives are attached to the left of the noun's trace, while PPs are attached to its right. However, the fact that PPs also follow the higher adjectives is an instantiation of the general pattern of AP adjacency. Just like French, on close inspection, provides evidence for the Case-First Constraint, so Welsh provides evidence for the JOIN-First Constraint.<sup>27</sup>

### 3.5 Two additional arguments from Spanish

In this section I discuss two additional arguments for my account. Although the discussion is intricate, the arguments are simple in structure. First, my account leads me to expect a specific type of exception to the descriptive generalization that APs cannot be separated from the noun in NA languages. In particular, under very specific circumstances, the string N-AP-PP-AP is predicted to be grammatical. I am not aware of other accounts of AP adjacency that generate the same prediction. Second, my account predicts that any structure with the correct word order can in principle satisfy the JOIN-First Constraint. I show that, in addition to ascending structures and NP-shell structures, this is true for structures with N-AP-AP-PP order when generated by extraposition.

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<sup>27</sup>It is tempting to analyze N-movement in Welsh as triggered by the AN/NA parameter. If the setting of that parameter requires that JOIN domains are constructed with reference to a preceding noun, the noun will have to move across attributive adjectives that are left-attached. (This is of course already part of the logic of NP-shell formation.) I will have to leave this issue to future research.

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Both arguments are based on the interaction between the JOIN-First Constraint and a restriction on adjectival stacking in Spanish. Consider (92).

- (92) a. una [[película antigua] fantástica]  
           a film old fantastic  
           ‘a wonderful old movie’ (fantastic > old) Spanish
- b. una [[antigua película] fantástica]  
           a old film fantastic
- c. una [fantástica [película antigua]]  
           a fantastic film old
- d. \*una [fantástica [antigua película]]  
           a fantastic old film

As (92a-c) show, Spanish allows adjectives to either follow or precede the noun. However, as (92d) shows, stacking of adjectives that are left-attached is not possible. That is, both *antigua* ‘old’ and *fantástica* ‘fantastic’ may appear prenominal, but not simultaneously. I attribute the ungrammaticality of (92d) to what Chomsky and Lasnik (1977) would have called a surface filter.<sup>28</sup> It is formulated below:

- (93) In the Spanish extended nominal projection, AP<sub>1</sub> may not c-command AP<sub>2</sub> if AP<sub>1</sub> precedes AP<sub>2</sub> in an uninterrupted adjectival sequence.

An adjectival sequence counts as uninterrupted if no overt material separates the adjectives. This is of course true of the sequence *fantástica antigua* in (92d), with the consequence that *fantástica* may not c-command *antigua*. However, in the structure at hand it must, in violation of (93).

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<sup>28</sup>An alternative analysis of the ban on prenominal stacking in Spanish could be based on the assumption that there is a unique prenominal position into which adjectives can move. There is reason to be suspicious of such an account. Work on Universal 20 has established that unmarked movement within the noun phrase must target a constituent containing the noun (Cinque, 2005; Abels and Neeleman, 2012).

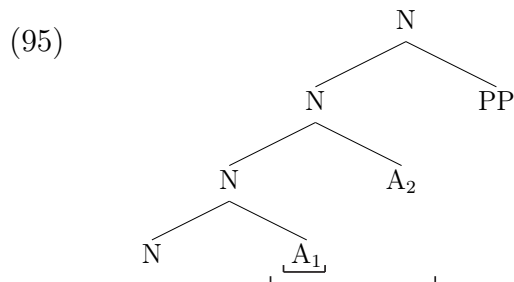
Note that if two APs are separated by overt material, (93) allows left-to-right c-command. Thus, (92c) is grammatical on an interpretation in which *fantástica* takes scope over (and hence c-commands) *antigua*, while the string in (92b) permits a second structural parse in which *antigua* takes scope over *fantástica*:

- (94) una [antigua [película fantástica]]  
 a old film fantastic  
 ‘an old fantasy movie’ (old > fantastic) Spanish

In both structures the noun interrupts the adjectival sequence.

As it stands, the condition in (93) is a language-specific stipulation that requires further scrutiny. It would take me too far afield to explore its status here. What is relevant in the current context is that (93) interacts in interesting ways with the JOIN-First Constraint in structures that contain two APs and a PP.

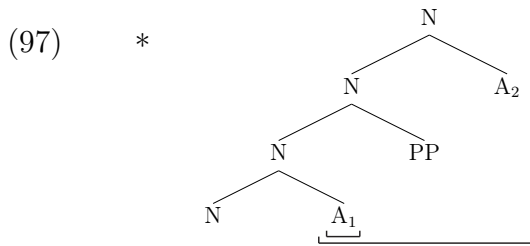
One obvious structure that can accommodate two APs and a PP is a simple ascending one (see (95)). This structure is appropriate when the PP takes scope over the two APs (or when there is no scopal interaction between the PP and the APs). Thus, it characterizes extended nominal projections like the one in (96).



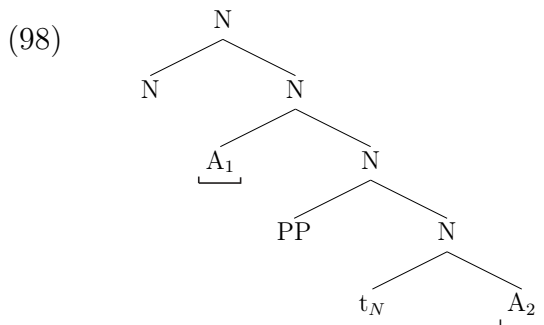
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- (96) una película antigua fantástica de Buñuel  
 a film old fantastic of Buñuel  
 ‘a wonderful old movie by Buñuel’ (fantastic > old) Spanish

A more complex situation arises when the PP is merged following one AP, but preceding the other. In that case, an ascending structure cannot be built, as that would violate the JOIN-First Constraint: in (97), the rightmost AP is preceded in its JOIN domain by the PP.



Hence, NP-shell formation is necessary. One relevant structure that satisfies the JOIN-First Constraint and the condition in (93) is given in (98). Here, the JOIN domain for the leftmost AP is constructed with reference to the noun in its derived position, while the JOIN domain of the rightmost AP is constructed with reference to the nominal trace. As a consequence, neither AP is preceded by other material in its JOIN domain:

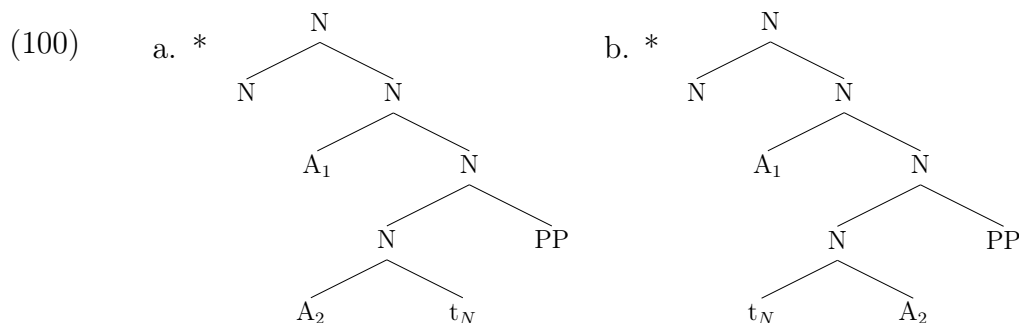


In (98), AP<sub>1</sub> precedes and c-commands AP<sub>2</sub>. This does not violate the condition in (93), however, because the two APs are separated in the surface string by the PP. The prediction, then, is that the order N-AP<sub>1</sub>-PP-AP<sub>2</sub> is grammat-

ical in Spanish, as long as the first AP takes scope over the second. This is a fair description of the facts. The example (99) is grammatical and denotes a fake faultless painting, not a faultless fake.<sup>29</sup>

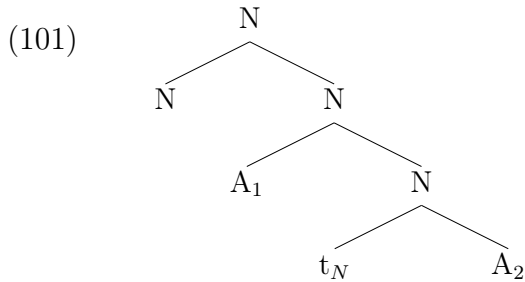
- (99) un cuadro falso del siglo XV impecable  
 a painting fake of-the century XV faultless  
 ‘a fake faultless painting from the fifteenth century’ Spanish  
 (fake > from 15th C. > faultless)

Two other candidate structures in which the PP is merged between the two APs violate (93). In both (100a) and (100b), AP<sub>1</sub> c-commands AP<sub>2</sub> and AP<sub>1</sub> and AP<sub>2</sub> form an uninterrupted sequence.



I therefore predict that in the post-nominal domain the order in (98)/(99) is the only one that permits left-to-right scope between the adjectives. I also predict that omission of the PP will result in the unavailability of left-to-right scope, as it would lead to a violation of (93):

<sup>29</sup>Notice that the PP in (98) precedes its sister. This is not the normal situation in Spanish. It suggests that for PPs there is an attachment requirement that can be overruled under specific circumstances. The N-AP-PP-AP order is not found in Welsh, which suggests that in this language PPs can never precede the node to which they are attached. I do not know why this difference should exist.



Both predictions are correct, as the data in (102) show. These examples are grammatical, but only on the reading in which the painting is a faultless fake. They cannot be used to refer to a fake faultless painting.

- (102) a. un cuadro falso impecable del siglo XV  
 a painting fake faultless of-the century XV  
 ‘a fake faultless painting from the fifteenth century’ Spanish  
 (faultless > fake; \*fake > faultless)
- b. un cuadro falso impecable  
 a painting fake faultless  
 ‘a fake faultless painting’  
 (faultless > fake; \*fake > faultless)

This, then, is the first additional argument for my account: I correctly predict that under very specific circumstances AP adjacency can be violated, yielding an N-AP-PP-AP order. I am not aware of other theories that can capture this pattern.

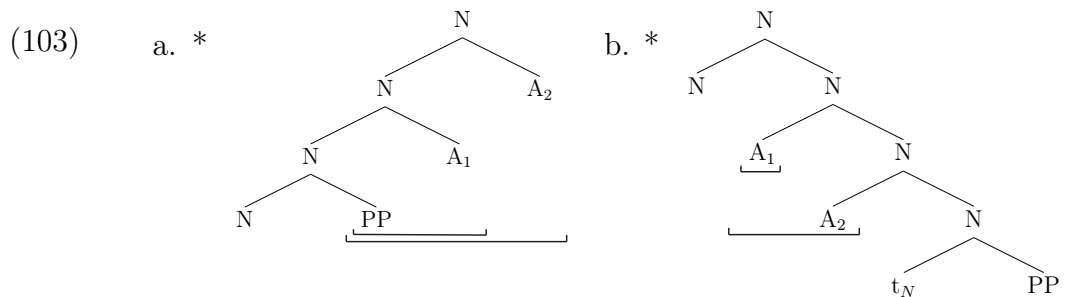
I now turn to my second additional argument. The best possible evidence for any linear constraint consists of data showing that it can be satisfied by different structures with the same terminal yield. I have already made an argument along these lines: in head-initial languages, both ascending and descending structures satisfy the JOIN-First Constraint as long as any APs precede other material. It can be shown that under particular conditions an underlying-



ing structure N-PP-AP-AP can be reconciled with the JOIN-First Constraint through extraposition of the PP. If so, this is a third way of generating the required terminal yield (N-AP-AP-PP).

VP-shell and NP-shell formation are the default repair strategies for potential violations of the Case-First and JOIN-First Constraints. However, repair through extraposition of potentially offending material is an additional possibility, at least in principle. That such repair is uncommon is probably because A'-movement typically requires an interpretive license. By contrast, head movement need not feed semantics or pragmatics and can therefore be employed to generate neutral word orders.

However, where NP-shell formation is not an option, we might expect extraposition to be used for repair of potential violations of the JOIN-First Constraint. Such circumstances are present in Spanish DPs in which the noun combines with a PP before it combines with two APs. This order of merger is not possible in a simple ascending structure, as both APs would violate the JOIN-First Constraint (see (103a)). It is also not possible to generate an NP-shell structure. The two APs in (10b) form an uninterrupted adjectival sequence in which AP<sub>1</sub> c-commands AP<sub>2</sub>, contra (93).



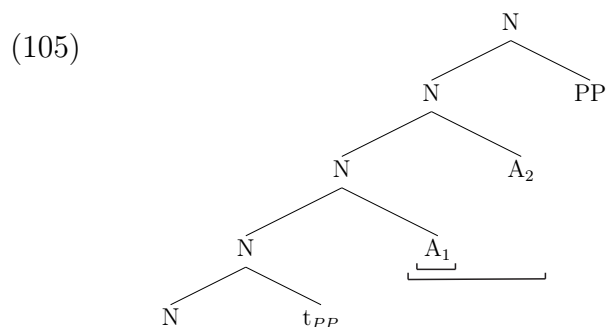
We can demonstrate that both structures are indeed ungrammatical if we consider the Spanish equivalent of *a beautiful fake painting from the fifteenth*

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*century* (where the painting purports to be from the fifteenth century). The DPs below are not possible translations. (104a) is ungrammatical and (104b) has the wrong scope (namely: fake > beautiful).

- (104) a. \*un cuadro del siglo XV falso precioso  
 a painting of-the century XV fake beautiful Spanish
- b. un cuadro precioso falso del siglo XV  
 a painting beautiful fake of-the century XV  
 (fake > beautiful > from the 15th c.; \*beautiful > fake > from the 15th c.)

The only noun-initial structure that allows the intended interpretation and satisfies both the JOIN-First Constraint and the condition in (93) is one in which the PP undergoes extraposition. In (105), the two APs satisfy the JOIN-First Constraint (on the assumption that traces do not count; compare Janke and Neeleman’s (2012) discussion of ‘collapsing shells’), and in the adjectival sequence AP<sub>2</sub> c-commands AP<sub>1</sub> (as required by (93)). The target interpretation can be recovered following reconstruction of the PP.



Indeed, (106) is a possible translation of *a beautiful fake painting from the fifteenth century*.

- (106) un cuadro falso precioso del siglo XV  
 a painting fake beautiful of-the century XV  
 (beautiful > fake > from the 15th c.) Spanish

Thus, for structures in danger of violating the JOIN-First Constraint there are two repair strategies: NP-shell formation in the first instance and extraposition as a secondary option. The resulting structures are syntactically different, both from each other and from the ascending structure in (96). The only thing they have in common is their linear order. This of course confirms that AP-adjacency is a phenomenon better accounted for by a linear than a structural constraint.

One may hope to find extraposition as a secondary repair strategy in the verbal extended projection as well, in case VP-shell formation is not available. However, as I am not aware of a verbal counterpart to the condition in (93), I have not been able to build a convincing case and will have to leave this issue for future research.

### 3.6 Concluding remarks

In this chapter I have identified parallel generalizations that suggest a basic similarity between the nominal and verbal extended projections. Interestingly, this similarity does not seem amenable to an analysis in the classical style of *Remarks on Nominalization*. The elements involved have very different syntactic and semantic functions, and are therefore unlikely to be associated with parallel structural layers. I have instead argued for an account in terms of linear constraints, in particular a reformulated version of Case Adjacency and a similar constraint governing the distribution of attributive adjectives.

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Syntacticians working in the Principles and Parameters tradition have long been skeptical as regards linear constraints (especially after Reinhart's 1976 seminal work on binding). But the undeniable fact that many syntactic phenomena are not sensitive to linear order does not imply that no such phenomena exist. Indeed, specific proposals to abandon all reference to linear order in the description of syntactic phenomena have run into difficulties. The prime example is Kayne's 1994 anti-symmetry program, (for discussion, see Sternefeld 1994; Chametzky 2000; Ackema and Neeleman 2002; Guimaraes 2008; Abels and Neeleman 2009, 2012). Even in the domain of binding and coreference, it is not obviously true that linear order plays no role (either in addition to c-command; see, for instance, Williams (1997), or under a weaker form of command; see, for instance, Bruening (2014)).

If it is accepted that there are linear constraints that regulate word order, three questions present themselves: what restrictions hold of such constraints, where are they located, and why should they hold? I will answer these questions in turn.

On the basis of the material discussed in this chapter, precedence constraints seem strictly local. This is a good thing, as it would obviously be undesirable if any two elements, no matter how far away, could be subject to an ordering restriction. Locality is partly built into the constraints I propose via the notions of case domain and JOIN domain, which in turn are dependent on the syntactic locality of case assignment and modification. I would speculate that this is not a coincidence, but that all precedence constraints make reference to an ordering domain.

In addition, it is striking that both constraints have a morphosyntactic anchor that can be represented as the topmost functional head in the relevant extended projection: case has been argued to project a KP that embeds DP; JOIN could be seen as a functional head that takes AP as its complement. This means that Case and JOIN project labels that are accessible on the extended projection as a whole. Again, I think that this is not a coincidence, but would suggest instead that ordering restrictions that affect a syntactic category  $\alpha$  must refer to properties of the top-node of  $\alpha$ .

The answer to the question of where precedence constraints apply depends on one's view of syntax. If syntax is a derivational system without look-ahead, then linear constraints driving syntactic movement (such as the Case-First and JOIN-First Constraints) must be part of the syntax proper, which would lead to the conclusion that the syntax encodes precedence relations. If the syntax is a representational system (see Brody 1995 and subsequent work) or a derivational system with look-ahead, then linear constraints driving syntactic movement could be filters that operate at the PF interface. In either case, one would have to assume a certain degree of free movement subject to licensing at the interfaces; see Buring 2013 for relevant discussion and references.

It is often claimed that syntax cannot represent linear order, because rules of interpretation never refer to it. This is not the strongest of arguments (if the observation is correct, it could simply be a property of interpretive rules that they are not sensitive to everything represented in syntax). However, if one were to accept it, it would favour a view of the proposed precedence constraints as applying at the PF interface, and of syntax as representational or derivational with look-ahead. If the precedence constraints indeed apply

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at the PF interface, it follows that they are insensitive to traces of phrasal movement (see the discussion of extraposition in section 3.5 of this chapter).

The answer as to why the Case-First and JOIN-First Constraints should exist can only be tentative. One aspect of the language faculty that is uncontroversially sensitive to linear order is the parsing process. Ackema and Neeleman (2002) and Abels and Neeleman (2012) suggest that the ban on rightward head movement might find an explanation in this. If parsing involves immediate structure assignment (see Gorrell 1995) and movement is dealt with using a filler-driven strategy (see Phillips and Wagers 2007), it follows that there is a fundamental difference between leftward and rightward movement: the former involves insertion of a trace while the structure is being built, while the latter involves insertion of a trace in an already built structure. In particular in the case of head movement, this can lead to rather extensive restructuring. A ban on rightward head movement could therefore facilitate the parsing process.

Loes Koring (p.c.) suggests that a similar functional explanation might hold of the Case-First Constraint. The idea is as follows. As case is licensed by V, a case-marked DP will, when encountered by the parser, initiate a search for a verb. If the DP precedes the verb, the direction of search coincides with the direction of structure building. If the DP follows the verb, however, the search needs to scan the parser's left context, leading to a pause in the structure building process. It is therefore advantageous to minimize the distance between verb and object in VO languages, but object-verb adjacency has no particular benefits in OV languages. This is of course exactly what the Case-First Constraint achieves.

A similar line of reasoning might be given as motivation for the JOIN-First Constraint, if it is the case that the JOIN+AP combination triggers the search for a noun (recall that JOIN+AP attaches only to nominal categories). In noun-final DPs the direction of search coincides with the direction of structure building, but in DPs with N-AP order it does not, leading to the need to pause structure building if noun and adjective are separated. The JOIN-First Constraint would then facilitate parsing in the same way as the Case-First Constraint.

By contrast, hypothetical Case-last and JOIN-last constraints would lack such functional motivation. They are unobjectionable as far as the grammar is concerned, but would bring no processing benefit – in fact, they would be obstacles to efficient parsing.<sup>30</sup>

There is an obvious affinity between these suggestions and work by Hawkins (2014), who was the first to motivate verb-object adjacency on the basis of processing considerations. However, where Hawkins concentrates on the parsing of thematic dependencies, the proposal here refers to morphosyntactic elements. If it is true that linear constraints that affect a syntactic category  $\alpha$  must refer to properties of the top-node of  $\alpha$ , then they cannot be rooted in thematic dependencies, which are inherently relational. This, then, favors Koring's interpretation of the data.

A final point to make is about the nature of ordering patterns in the extended nominal projection. Ordering preferences amongst attributives, of the kind discussed in Sproat and Shih 1988; Truswell 2004, 2009 and Cinque 2010

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<sup>30</sup>Future research is necessary to develop this idea. It seems likely to me that the adjacency effects described are only found when a phrase initiates a search for a head. This may suggest that there is a grammatical limitation on precedence constraints, namely that their anchor is a head.

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are in fact quite weak, as Truswell points out. Some pairs of adjectives do not seem to have a preferred ordering, and even where there is a preference the ordering of a pair of adjectives can easily be reversed where required for scope or information structural purposes. However, the AP adjacency effect described in this chapter is strong: without significant intonational help and the use of an adjectival reduced relative clause, PPs simply cannot precede adjectives in noun-initial languages. This effect is entirely expected if we consider that, once again, adnominals are behaving as a consistent class, but that in AP adjacency we see the effect of an additional constraint. Attribution gives us the ordering effect of adnominal adjectives, via the adjective ordering hierarchy, and the scopal properties of JOIN allow that hierarchy to be violated, an effect which is consistent across all adnominals. However where attributives co-occur with PP modifiers of the noun, the JOIN-First Constraint requires a strict ordering of all JOIN-bearing items to the left of non-JOIN-bearing items in their JOIN domain. This account does not require an additional (relative clause) source for adnominal modification, and thus is a simplification of our theory of attribution.



## Chapter 4

# Verbal bracketing paradoxes and their implications for movement

“He’s a bit of a close talker.”

“A what?”

“You’ll see. . .”

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*Seinfeld*, S5E18 “The Raincoats”

### 4.1 Introduction

This chapter explores another facet of adjective ordering in the extended nominal projection. However, I will argue that this case does not directly involve attribution, although it has been analyzed as attributive previously. I will examine another case of surprisingly rigid adjective ordering requirements in adnominal adjectives (those which are not modifying the noun predicatively), which, as we have seen, generally have fairly weak ordering preferences. I will focus on two constructions in English and Dutch, one exemplified by phrases like *nuclear physicist* and the other phrases like *hard worker*, and argue that

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the requirement that the adjective be adjacent to the noun in these phrases does not disprove the claims of the previous chapters: despite the behaviour of these phrases, we can still maintain that there exists only one source of adnominal modification. These phrases, which I argue to be representative of two different types of bracketing paradox, result from mismatches between different modules of the grammar, and therefore they do not represent straightforward attribution. The reason for the strong ordering effects that are observed in these cases is that it is not the noun that is being modified directly, but a category inside the derived noun. The implementation of this idea is different in the two categories, but the essence is the same. I will explore an analysis that accounts for the mismatch between the modules of the grammar in terms of movement.

Conventionally, the term *bracketing paradox* refers to cases where the morphophonological bracketing of a word conflicts with its semantic bracketing (see e.g. Williams 1981; Pesetsky 1985; Hoeksema 1987). Traditionally, the term has been used to describe cases where the syntactic and semantic bracketings are isomorphic, and the morphophonological bracketing seems to differ from these. In this chapter, I explore a logically possible alternative, where the syntactic structure is isomorphic to the morphophonological structure, and there is a mismatch with the semantics.

I will argue that many modified deverbal nouns (and some adjectives), such as *heavy drinker*, *hard worker* and *beautiful dancer* should be analysed as the second type of bracketing paradox, as has been suggested by Williams (2003) and Ackema and Neeleman (2004). I will present evidence that the *heavy drinker*-type of bracketing paradox (here referred to as *verbal bracket-*

*ing paradoxes*, due to the fact that the examples under consideration are all derived from verbs) has some similarities to the traditional, *nuclear physicist* type, and so is deserving of the title of ‘bracketing paradox’. However, evidence from Dutch underscores key differences between the two classes, leading to the conclusion that they should not be given the same analysis. Assuming a traditional T model of the grammar (Chomsky, 1981), I will argue that an operation of rebracketing at LF can account for the behaviour of the second type of bracketing paradox, and that this operation has implications for our understanding of movement. In particular, I argue that movement *per se* is distinct from chain formation. Movement can proceed without a trace (and without the constraints of chain formation) where it can do so without violating Information Preservation, introduced in section 4.4.2. This constraint is shown to allow the bottom-most two non-heads in a structure to be ‘rebracketed’ to form a constituent—precisely the type of movement that is required to account for verbal bracketing paradoxes. Furthermore, this approach is restrictive enough that it will not allow any other rebracketing of the syntactic structure.

The chapter is laid out as follows. In section 4.2, I discuss traditional bracketing paradoxes and sketch one analysis of the phenomenon. In section 4.3, I present data from English and Dutch to demonstrate that verbal bracketing paradoxes are a similar but separate class. Section 4.4 provides a novel analysis of verbal bracketing paradoxes, which relies on structural reorganisation between syntax and LF to account for the evidence. Section 4.5 discusses some predictions made by the theory presented in the previous section, providing support for it, while section 4.6 concludes.

## 4.2 Traditional bracketing paradoxes

Bracketing paradoxes occur when there is a mismatch between the morpho-phonological and semantic bracketings of a particular word or phrase. In the older literature on traditional bracketing paradoxes (for example Pesetsky 1979, 1985; Williams 1981; Kiparsky 1983; Hoeksema 1987) many of these paradoxes are based on apparent violations of level-ordering, the idea that certain classes of affixes must always attach before certain others, and that all affixation must be done before compounding. The idea of level-ordering has had several rounds of reappraisal, but examples like the following stand as instances of bracketing paradoxes regardless of the validity of that idea:

- (1) a. unhappier  
 b. nuclear physicist  
 c. transformational grammarian

Taking *transformational grammarian* as an example, if the phonological structure were isomorphic to the syntax, *-ian* must attach to *transformational grammar*. However, this would mean that the phonological word *grammarian* is bisected by a phonological phrase boundary, that of *transformational grammar*, a violation of the Strict Layer Hypothesis (Selkirk, 1984) which states that larger phonological entities, such as feet, words and phrases, may only be composed of (entire) smaller entities, like segments and syllables. An entity may never be embedded within a smaller unit, and units may not be split apart. Therefore, even without level-ordering, there is still a mismatch between syntax and PF and these words and phrases are still bracketing paradoxes.

## VERBAL BRACKETING PARADOXES

Bracketing paradoxes are not restricted to English; Dutch also has bracketing paradoxes like these. In ordinary Dutch DPs, prenominal modifiers must appear with a declensional schwa, as in (2).

- (2)
- a. de beroemd\*(-e) gitarist  
the famous(DECL) guitarist
  - b. en productief\*(-e) generativist  
the productive(DECL) generativist  
(Ackema and Neeleman, 2004:168)
  - c. de transformationeel\*(-e) taalkunde  
the transformational(DECL) linguistics<sup>1</sup>
  - d. het financiël\*(-e) advies  
the financial(DECL) advice

The conditions are the same for both intersective and non-intersective attributive adjectives:

- (3)
- a. de enkel\*(-e) gitarist  
the sole(DECL) guitarist
  - b. de zogenaamd\*(-e) winnaar  
the so-called(DECL) winner

However, there are three cases where this schwa does not appear. One such exception is in indefinite, singular, neuter (as opposed to common) gender DPs (neuter gender indicated by (N), common by (C)); see Kester 1996 for a more detailed description of the conditions surrounding this exception to the appearance of the declensional schwa):

- (4)
- a. een klassiek\*(-e) gitaar  
a classical(DECL) guitar(C)

---

<sup>1</sup>Unless otherwise stated, all Dutch examples are from Ad Neeleman, p.c., and have been checked with several other native Dutch speakers.

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- b. een transformationeel\*(-e) taalkunde(C)  
a transformational(DECL) linguistics
- c. een groot(\*-e) huis  
a big(DECL) house(N)

A second class of exceptions is where the item that the adjective modifies is not a noun. In (5a), *Rotterdams* modifies a verb (*klaverjassen*) and in (5b) *transformationeel* modifies an adjective (*generatief*).

- (5) a. Zij wil altijd weer Rotterdams(\*-e) klaverjassen.  
She wants always again Rotterdam-style(-DECL) Klaverjass  
'Again and again she wants to play Klaverjass (a card game) in  
the Rotterdam way.'
- b. Zijn onderzoek is transformationeel(\*-e) generatief  
His research is transformational(-DECL) generative  
georiënteerd.  
oriented

(Ackema and Neeleman, 2004:169)

The third class of exceptions is where a determiner is absent. This case can be difficult to distinguish from null determiners, as can be found in mass nouns and plurals in Dutch (Oosterhof, 2008), but examples of singular count nouns without a determiner do exist:

- (6) a. Klassiek(\*-e) gitaar speelt alleen hij.<sup>2</sup>  
Classical(-DECL) guitar plays only he  
'Only he plays classical guitar' (Ad Neeleman, p.c.)
- b. Hij geeft financieel(\*-e) advies.  
He gives financial advice(-DECL)  
(Ackema and Neeleman, 2004:169)

---

<sup>2</sup>I use a verb second construction here to avoid ambiguity about the constituency of *klassiek gitaar*, which is a DP. This construction comes with certain information structural restrictions, necessitating the use of *alleen*, 'only'.



tives they admit; such compounds are almost exclusively formed on the basis of Germanic adjectives (which are monosyllabic or bisyllabic with a schwa in the second syllable), as discussed in de Haas and Trommelen 1993. This does not characterize the adjective in *klassiek gitaar*, nor in *electrisch gita(a)r(ist)* ‘electric guitar(ist)’, nor Ackema and Neeleman’s (p.167 fn. 20) *hydraulisch gita(a)r(ist)* ‘hydraulic guitar(ist)’. Finally, the nonhead of a compound cannot itself be complex in Dutch, but the nonhead in these examples can be: along the lines of *transformationeel taalkundige*, we could imagine the invention of a new type of linguistics such as the following:

- (8) ethno-historisch\*(-e) taalkunde  
ethno-historical(-DECL) linguistics

Someone who studies this type of linguistics would be called something like the phrase in (9), where the schwa is disallowed.

- (9) de ethno-historisch(\*-e) taalkundige  
the ethno-historical(-DECL) linguist

These facts suggest that examples like those in (7) involve an NP (*klassiek gitar* and *transformationeel taalkund*, respectively) embedded inside a word, as argued for in Ackema and Neeleman 2004. This is because if the adjective in either example were modifying the derived noun (*gitarist* or *taalkundige*), we would expect a schwa, as the adjective would be a prenominal modifier in a definite DP. The schwa is required in such a position, as demonstrated above. If, however, the adjective in (7a) and (7c) were in the NPs *klassiek gita(a)r* and *transformationeel taalkund(e)*, and that in (7b) in the complex AP *transformationeel generati(e)f*, then no schwa would be expected. An analysis of bracketing paradoxes in English should also be able to account for the be-



haviour seen in Dutch, assuming they are two different instances of the same phenomenon.

Well into the 1980s, many syntacticians (for instance, Jackendoff 1975; Aronoff 1976; Di Sciullo and Williams 1987; Baker 1988) argued or assumed that morphosyntax manipulates terminal nodes containing or related to phonological forms. Under such an analysis, bracketing paradoxes could not result from a mismatch of phonological and syntactic forms, because the phonology was to a certain extent built into the syntax. Conversely, Beard (1988) argued for the separationist hypothesis, the idea that phonological forms are in fact absent in the syntax. Phonological spell-out was claimed to be regulated by post-syntactic rules that associate syntactic structures to appropriate phonological forms. This separation of phonological information from syntax is also found in the model of distributed morphology (see for instance Halle and Marantz 1993, 1994).

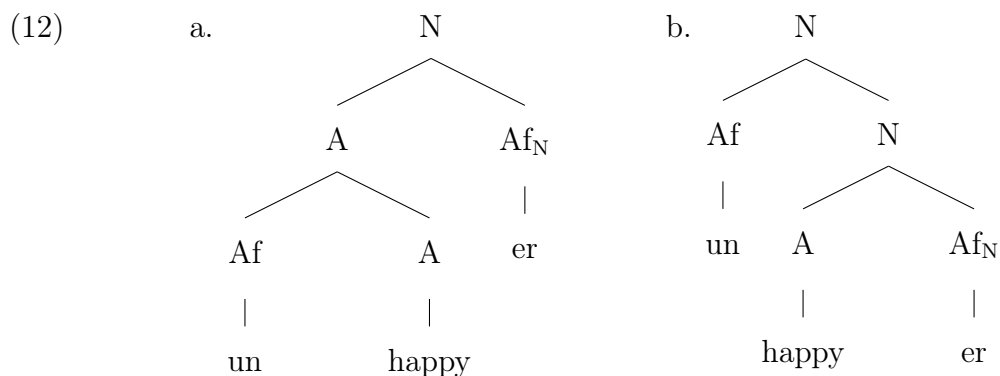
Sproat (1988) takes the separationist theory a step further and argues that the syntactic bracketing and the morphophonological bracketing of a word or phrase may differ from each other. This idea is widely accepted in prosody studies, and can be found in Chomsky and Halle 1968 (p.372), where they note that the syntactic structure of the phrase in (10) (their 124) differs from the prosodic structure, which is a conjunction of the three prosodic phrases, shown in (11).

(10) This is [the cat that caught [the rat that stole [the cheese]]]

(11) This is the cat — that caught the rat — that stole the cheese.

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Syntactically, the structure involves embedded clauses, but prosodically the phrases are all sisters. Sproat (1988) uses the same principle, but on the level of words. For Sproat, the differences between the syntactic and phonological structure are constrained by a Mapping Principle, which relies on the notions of sisterhood and precedence to translate syntactic structures to phonological ones by ensuring that only adjacent syntactic items may be considered PF sisters. Sproat's insight is that bracketing paradoxes are only paradoxes if we believe that words have a single structure; by assuming that their structure is bipartite, with different representations at different levels of the grammar, the paradox disappears. He argues that, as syntax and phonology deal with different aspects of word and sentence structure, they should not be expected to atomize their subjects in the same way. The following trees represent the structure of the word *unhappier* in the syntax (a) and at PF (b), according to Sproat's separationist account.<sup>4</sup>



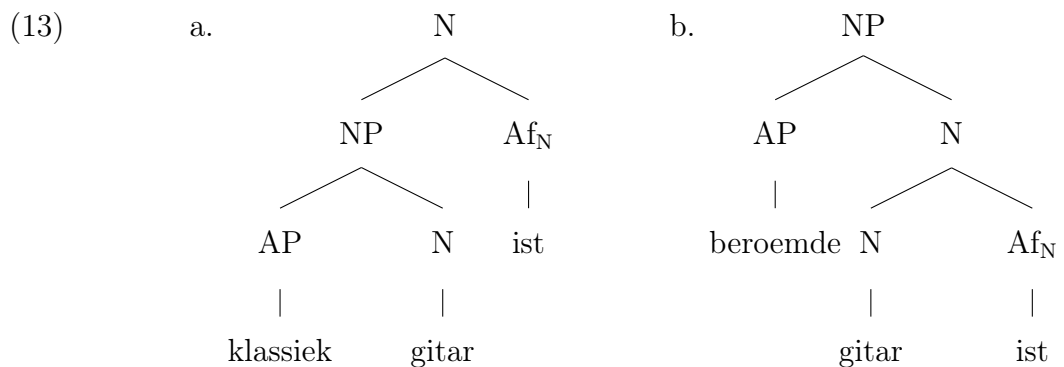
Sproat concludes that phonological and syntactic structures may differ to the extent that they can be reconciled using the Mapping Principle. Words may

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<sup>4</sup>The tree in (12a) does not satisfy the SLH. However, the SLH was proposed as a PF restriction, not an LF one (Selkirk, 1984). If (12a) represents the LF structure, as I will argue in section 5.2, it does not pose a problem for the SLH.

thus have two different representations in the syntax and at PF, and the paradox disappears.

Returning to the Dutch data seen in (2)-(7), we can see that they fall out from an analysis like that sketched above. Recall that traditional bracketing paradoxes in Dutch cannot appear with the declensional schwa that is required on a normal adjective in a definite DP. Ackema and Neeleman (2004) propose that this is precisely because the *-ist* affix is attaching to the phrase in the bracketing paradoxes in (7). The declensional schwa cannot occur inside the phrase *klassiek gitaar* or *transformationeel generatief*, as shown in (5), because it is an NP and not a DP, and this fact is not changed by the addition of the affix. If the affix were actually attaching to *gitaar* or *generatief* before combining with the modifier, as in (10b), we would predict the appearance of the declensional schwa, contrary to fact. The following trees show the syntactic structure of a bracketing paradox (a), as motivated by the discussion of the declensional schwa above, compared to a noun phrase within a DP modified by an intersective adjective (b).<sup>5</sup>



<sup>5</sup>For more justification of the affixing rule  $NP + Af \rightarrow N$ , see Ackema and Neeleman (2004, pp.166–172). This rule is also supported by the observations presented earlier in this section on why phrases like *klassiek gitaar* are not compounds.

These observations provide convincing evidence that the underlying structure of examples like (7) is not the same as the PF form, and also that these bracketing paradoxes have a different structure to truly non-intersective adjectives.

### 4.3 Motivating a second variety of bracketing paradox

Deverbal nouns in *-er*, as well as (at least some) other nominals derived from verbs, show similar, unexpected behaviour when combined with an adjective. In the resulting adjective-noun pairing, the adjective can optionally receive an adverbial reading and modify the verb within the noun. Some examples are in (16).<sup>6,7</sup>

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<sup>6</sup>Cinque (2010) makes use of examples like *poor typist* and Italian *buon attaccante* (*good soccer/football forward*), as well as German *groß* (*big*), which may at first glance appear to be verbal bracketing paradoxes. However, adjectives of this type can be separated from the noun and retain their meaning (as shown in (14)) and may also modify monomorphemic nouns (15). This leads me to believe that they are not in fact bracketing paradoxes of any type. I will leave them aside here.

- (14) a. This singer is very good.  
 b. That chef is terrible!  
 c. The DJ was excellent.
- (15) a. (i) a soft singer  
 (ii) ??a soft chorister  
 b. (i) a good singer  
 (ii) a good chorister

The status of French *le gros fumeur* ‘the heavy smoker’ is less clear, as pointed out by Rob Truswell, p.c. *Gros* cannot be separated from the noun in this case (*\*le fumeur est gros*) without an accompanying change in meaning Kahane (2001). However, it differs from the verbal bracketing paradoxes under discussion in that the adverb is not available to modify the verb: “*il fume gros*” returns only 62 results on Google, many of which are irrelevant.

<sup>7</sup>I will focus in this chapter on agentive nouns in *-er*. In theory, a similar analysis could be applied to other deverbal items, including those in *-ance* (e.g. *strong performance* and *-y* (e.g. the *quick assembly* of a piece of Ikea furniture).

## VERBAL BRACKETING PARADOXES

- (16)
- a. heavy drinker
  - b. hard worker
  - c. beautiful dancer
  - d. close talker (as in Seinfeld S05E18–19)
  - e. high singer

These adjective-noun pairings can all be paraphrased with a combination of verb and adverb, as in (17).

- (17)
- a. one who drinks heavily
  - b. one who works hard
  - c. one who dances beautifully
  - d. one who talks closely (i.e. close to their interlocutor)
  - e. one who sings high (i.e. in a high voice)

For similar reasons as Williams (2003) and Ackema and Neeleman (2004), I argue that the examples in (16) are in fact bracketing paradoxes. These phrases are ambiguous: *heavy drinker*, for example, can mean either someone who drinks heavily or someone who is heavy and is a drinker. However, both meanings of these phrases are straightforwardly compositional, *pace* Larson (1995). *Heavy drinker*, would be bracketed as [[heavy drink] er] under the first reading

---

However, *-er* seems to be much more transparent in both its syntax and its semantics than many other derivational suffixes. As an example take *-ist*, as in a *clumsy cellist*, who could be graceful in other aspects of life (they could even be a beautiful dancer, in addition to a clumsy cellist). Given the meaning of agentives in *-ist* and the fact that the suffix almost always attaches to a noun, it is tempting to break *-ist* down, semantically and syntactically, into a null verb and agentive *-er*. This approach would explain the meaning of words derived using this affix, because a verb and an agentive ending would both be present syntactically. It would also explain why *-ist* rarely attaches to verbs (Dressman, 1985; Panther and Thornburg, 2002): under normal circumstances, there is no need for it to do so, as agentive *-er* is able to attach directly to verbs, and the result would be synonymy between the two suffixes. Given the additional complexity of this and similar examples, I will disregard derivational suffixes other than *-er* for the remainder of this chapter.

and [heavy [drink-er]] under the second, and the meaning of each bracketing can be computed as usual from the constituent parts. This fact is reminiscent of the two different bracketings of traditional bracketing paradoxes. The morphophonological structure of each phrase is nonetheless invariant, meaning that at least one reading is not isomorphic with this structure. I will argue below that, in examples like those in (16), the PF structure is isomorphic with the syntax and that both are represented by the [heavy [drink-er]] bracketing. In the paradoxical reading, the semantics allows an additional reading, represented by the [[heavy drink] er] bracketing. For now, it is sufficient to state that, due to the fact that at least one reading has a bracketing that does not correspond to the morphophonological bracketing, the label of “bracketing paradox” is justified.

There is another similarity between the examples in (16) and traditional bracketing paradoxes. Both types of bracketing paradox require adjacency between the adjective and the noun. Any intervener<sup>8</sup> renders the paradoxical reading inaccessible, as Cinque (2010) discusses in relation to some of the examples in (16), and as is shown in the following examples.

- (18) a. nuclear physicist  
 b. hard worker  
 c. poor typist  
 d. heavy drinker

---

<sup>8</sup>With one exception, to be discussed in section 4.5.

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- (19) a. \*the nuclear experimental physicist  
 b. \*a hard office worker  
 c. \*this poor unemployed typist (on relevant reading)  
 d. \*that heavy bald drinker (on relevant reading)
- (20) a. \*The physicist is nuclear.  
 b. \*The worker is hard.  
 c. \*The typist is poor. (on relevant reading)  
 d. \*The drinker is heavy. (on relevant reading)

Verbal bracketing paradoxes allow modifiers of the adjective to intervene between A and N (21a), indicating that adjacency holds between the AP and the noun, rather than the two heads. It is difficult to test whether the adjacency requirement is identical in traditional bracketing paradoxes, as these usually involve non-scalar adjectives, and so do not allow modifiers of the A (cf. *\*nuclear enough physicist*). There appears to be a correlation between traditional bracketing paradoxes using non-scalar adjectives (like *nuclear* above) and verbal bracketing paradoxes using scalar adjectives. This fact may explain why traditional bracketing paradoxes resist the kind of modification shown in (21). A deeper analysis of this correlation is beyond the scope of this chapter.

- (21) a. \*a nuclear enough physicist<sup>9</sup>  
 b. a hard enough worker  
 c. a poor enough typist  
 d. a heavy enough drinker

---

<sup>9</sup>This example is grammatical if *nuclear* is used as a scalar adjective:  
 A: We're really looking for a nuclear physicist, not an astrophysicist.  
 B: Well Smith is a nuclear enough physicist for me!

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There is evidence that the morphosyntactic structure is relevant in these cases. Crucially, the paradoxical readings found in examples like (16) are not seen in similar pairings of adjectives and nouns that do not contain a verb (with the relevant readings indicated in parentheses):

- (22) a. \*heavy drunk (one who is heavily drunk)  
b. \*hard clerk (one who works hard as a clerk)  
c. \*beautiful ballerina (one who dances ballet beautifully)  
d. \*close gossip (one who gossips while talking close to their interlocutor)  
e. \*high chorister (one who sings high in a choir)

This indicates that the presence of a syntactic verb is relevant, rather than, for instance, an agentive meaning. We will see that this is consistent with the idea that the examples in (16) are indeed bracketing paradoxes.

Cinque (2010) groups these cases with traditional bracketing paradoxes under the heading “Direct Modification Adjectives”, which he claims explains their non-intersective reading. Larson (1995) also discusses examples like those in (16) (and especially (16a)) as cases of ambiguity in a class with the examples in (23).

- (23) a. diligent president  
b. old friend  
c. intelligent student (Larson, 1995:1)

However, if we attempt to paraphrase these examples as we did in (16) - (17), we quickly hit a stumbling block:



- (24) a. \*one who presides diligently ( $\neq$  diligent president)  
 b. \*one who friends oldly  
 c. \*one who studies intelligently ( $\neq$  intelligent student)

In other words, rebracketing the examples in (24) as we did with *heavy drinker* does not result in the correct meaning. Using the well-formedness of the paraphrases as a test for inclusion into the class of verbal bracketing paradoxes, we can see that Larson's examples in (24) do not belong in this class.<sup>10</sup>

Examples like those in (16) do not seem to be cases of traditional bracketing paradoxes either. Aside from the fact that traditional bracketing paradoxes may be word-internal while the examples of interest to this chapter are largely of the shape A-N-suffix, the Dutch inflectional schwa provides a further distinction between the two. Dutch appears to have a small number of verbal bracketing paradoxes, as well as a larger number of traditional bracketing paradoxes, but the two types behave differently. In section 4.2, I showed that traditional bracketing paradoxes lack an inflectional schwa which normal adjectives require in definite noun phrases. This behaviour is consistent with a rebracketing analysis along the lines of Sproat (1988) and Ackema and Neeleman (2004). Verbal bracketing paradoxes, on the other hand, do require the inflectional schwa in the appropriate contexts:

- (25) a. de mooi\*(-e)            danser  
           the beautiful(-DECL) dancer

---

<sup>10</sup>In fact, these examples do not seem to be bracketing paradoxes of either type. The (a) and (b) examples may be subsecutive adjectives, with a reading similar to that seen with *good*, i.e. “diligent for/as a president” and “old as a friend”. It is not clear to me that *intelligent student* is non-intersective (that is, I do not think someone who is intelligent as a student would differ much from someone who is intelligent and a student), but this appears to be either an intersective or a subsecutive reading, rather than a bracketing paradox of any kind. None of these examples appears to be truly non-intersective either.

(Ackema and Neeleman, 2004:170)

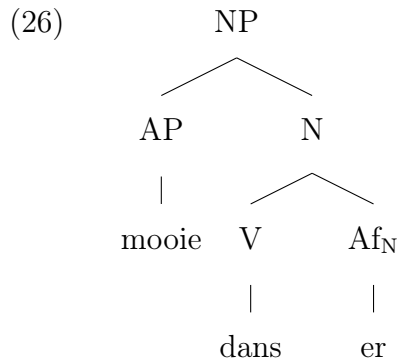
- b. de hard\*(-e) werker  
 the hard(-DECL) worker

This shows that the affix here is in fact attached to the verb, rather than the phrase as in traditional bracketing paradoxes, and that the adjective modifies that derived noun. This is because the modifier behaves like any other prenominal modifier in a definite DP. In other words, the appearance of the schwa shows that the appropriate PF bracketing is the same as any other prenominal adjective + noun combination. Importantly, the appearance of the schwa cannot be explained by the modifier in (25) being an adverb, as the schwa is disallowed in adverbials, as seen in (5a). This behaviour is the opposite of traditional bracketing paradoxes, showing that the two cannot be of the same kind, and therefore should not receive the same analysis.

The existence of two different types of bracketing paradox supports the traditional T model of the grammar. Importantly, it suggests that at least three levels of representation are required, which I assume are syntax, PF and LF. With only one level of representation, it is clearly not possible to have mismatches in structure. With two levels of representation, it is only possible to have one type of mismatch between the structures generated at each layer: the two structures generated are simply not the same. Only with three levels of representation is it possible to have the two kinds of mismatch described here: in the first case Level A and B match with each other but mismatch with Level C, and in the second Level A and C match with each other but mismatch with Level B. A third option is theoretically possible, where Levels B and C match with each other and mismatch with Level A, but such a situation would be ruled out as it applies to our current understanding of the grammar: if the

first and second options represent PF and LF bracketing paradoxes, then this third option would mean that LF and PF match each other but they both mismatch with syntax. This situation could only arise through a conspiracy, such that the mismatch between syntax and LF and the mismatch between syntax and PF coincidentally generate the same structure at LF and PF. We would therefore not expect this case to exist as a systematic option in the grammar, because the mappings between syntax and PF on the one hand and syntax and LF on the other are independent from each other.

The evidence from Dutch suggests that verbal bracketing paradoxes are more similar in syntactic (or possibly PF) structure to adjective + noun combinations than they are to traditional bracketing paradoxes. Compare the tree below to those in (13).



Here, the structure resembles that of (12b), the NP modified by an attributive adjective, rather than (12a), which is a traditional bracketing paradox.

Verbal bracketing paradoxes seem to differ from traditional bracketing paradoxes in the behaviour of the inflectional schwa in Dutch. At the same time, they do not seem to be a standard case of non-intersective modification. The paradoxical reading only occurs when the noun is derived, and it is unavailable

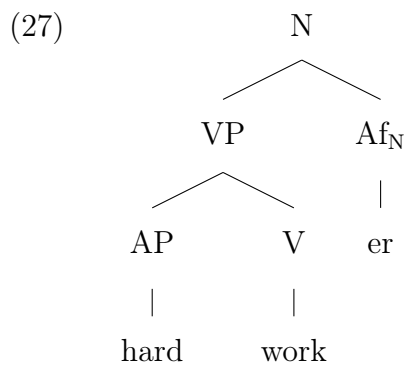
with semantically related but underived nouns, as shown in (22). Additionally, the meaning is predictable in a way that Cinque (2010) argues direct modification is not. In fact, the meaning can be derived from a reanalysis of the relationships between the morphemes in a phrase (we will see what such a reanalysis might look like in section 4.4). The facts presented in this section seem to indicate that the relevant examples are in fact bracketing paradoxes rather than unpredictable direct modification, but not bracketing paradoxes of the traditional kind. In the next section, I present a possible analysis of verbal bracketing paradoxes.

#### 4.4 Rebracketing the verbal paradoxes

We have seen that verbal bracketing paradoxes have behaviour which both mirrors and differs from that of traditional bracketing paradoxes. Given the differences between the two types of bracketing paradox, it is clear that they should not receive the same analysis. In this section, I will discuss two possible ways of analysing verbal paradoxes: as a mismatch between the syntax and PF, similarly to how Sproat analyzes traditional bracketing paradoxes, or as a mismatch between the syntax and LF. In the first of these cases, the meaning of a given word will represent the syntax, while in the second it is the morphophonological representation that will most closely resemble the underlying form. In other words, for Sproat (1988), the syntax and LF are isomorphic, but it is also conceivable that the syntax and PF will be in verbal bracketing paradoxes. I will show that a Sproat-style analysis is impossible for verbal bracketing paradoxes, and will instead adopt an approach in which the syntax is transformed at LF.

#### 4.4.1 PF rebracketing

An approach to verbal bracketing paradoxes along the lines of a syntax/PF mismatch would essentially mirror Sproat's. The adverb and verb would be sisters in the syntax, with *-er* combining with the verb phrase they form, as shown in (27).



This structure is related via a Mapping Principle to a structure in which the verb and the affix form a constituent (a word) and the modifier sits outside of it. However, here we hit a pitfall. In order to ensure that the adjective linearly precedes the verb (or the noun derived from it) at spell-out, we need a principle requiring adjectives to precede their nouns in English. This is unproblematic, as it is the usual case. The problem is that in the syntactic structure, the “adjective” is actually an adverb, as it modifies the verb. Adverbs may follow their verb in English. In fact, in all of the verbal bracketing paradoxes seen so far, the adverb *must* follow its verb:

- (28) a. Mary works hard.  
 b. \*Mary hard works.

- (29) a. Sam drinks heavily.  
 b. \*Sam heavily drinks.

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- (30) a. Martin sings high.  
b. \*Martin high sings.
- (31) a. Alex dances beautifully.  
b. \*Alex beautifully dances.

Affixes tend to attach to the head of the category that the affix combines with (see e.g. Williams 1981; Sadock 1991; Ackema and Neeleman 2004), but in these verb phrases the head is not the last element in the phrase. Affixing to a non-head-final structure is problematic. For example, synthetic compounds based on verb-particle combinations are notoriously problematic in English (Yip, 1978; Ackema and Neeleman, 2004). This leads to variation in agentive forms, like the following (Ackema and Neeleman's (56)).

- (32) a. passer by  
b. come outer  
c. cleaner upper (Ackema and Neeleman, 2004:161)

The same variation is not seen in complex words consisting of a prepositional prefix and a verb (see Ackema and Neeleman 2004, p.160 for arguments against a compounding analysis of these prefixed verbs):

- (33) a. overactor  
b. \*over-er act  
c. \*over-er actor

These examples show that it is not easy to attach suffixes to non-head-final structures, but that head-final structures are unproblematic. In the case of the

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bracketing paradoxes, if the affix is attaching to the head-initial verb phrase, we might expect to see forms like the following:

- (34) a. \*work harder  
b. \*worker hard  
c. \*worker harder

These forms are clearly unacceptable under the intended reading. It could be argued that the modifier appears to the left of the verb as a kind of rescue manoeuvre: a reordering based on necessity. However, this behaviour is rarely seen in verb-particle agentive forms:

- (35) a. \*bypasser (meaning someone who passes by, not someone who bypasses)  
b. \*outcomer  
c. \*upcleaner

The approach in (35) also does not seem productive. I agree with Rob Truswell (p.c.) who feels that many of the few examples there are (e.g. *bystander*, *outlier*, *onlooker*, *inswinger*) have a ‘frozen’ feel and have no verbal counterpart (*\*outlie/\*lie out*, *\*bystand/\*stand by*, in the relevant sense, *\*inswing/\*swing in*). These facts suggest that reordering is not a productive escape mechanism, or at least that there is some cost associated with it. We are therefore led to the conclusion that PF simply cannot take a structure like [[work hard]er] as an input from the syntax, and that verbal bracketing paradoxes cannot be the result of PF rebracketing, as traditional bracketing paradoxes are, according to Sproat (1988).

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Aside from the ordering problems at PF, there are differences between the traditional bracketing paradoxes described by Sproat and the verbal ones discussed above. If we were to use such a similar approach for the two cases, we would need to explain why and how the differences arise. The data from Dutch show that the two different types behave very differently with respect to the declensional schwa, as shown in (2), (7) and (25). These differences cannot be explained if the two types of bracketing paradox are given the same explanation, as would be the case under an analysis like Cinque's (2010) or Sproat's (1988) syntax-PF mismatch, but are expected if the mechanism behind each paradox is different. In other words, these differences would be expected if traditional bracketing paradoxes are mismatches between syntax and PF, while verbal bracketing paradoxes are mismatches between syntax and LF. This is the option I will argue for in the next subsection.

A third type of analysis would involve head movement. Under such an approach, the adverb might be understood to incorporate into the verb, rendering a bracketing such as  $[[v \text{ heavy drink}] \text{ er}]$ . However, this analysis is unsatisfactory for three reasons. Firstly, as seen in section 4.3, Dutch verbal bracketing paradoxes look like they are syntactically composed of an adjective and a noun, because the modifier appears with adjectival morphology. However, if the modifier is an adverb that incorporates into the verb, we would not expect to see the declensional schwa. The head movement approach therefore makes the wrong prediction about the Dutch schwa. Secondly, there is no independent evidence of adverb incorporation in English, unlike in Greek (Rivero, 1992). In Greek, examples like the following are found:



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- (36) a. O Yánis mu thímise ksaná tin istoría tu.  
The John me reminded again the story his  
'John reminded me again of his story.'
- b. O Yánis mu ksanathímise tin istoría tu.  
The John me again.reminded the story his  
'John reminded me again of his story.'
- (lit. John again-reminded me of his story.) (Rivero, 1992:308)
- (37) a. I María férete kaká stin adelfí tis.  
The Mary behaves badly to.the sister hers  
'Mary behaves badly to her sister.'
- b. I María kakoférete stin adelfí tis.  
The Mary badly.behaves to.the sister hers  
'Mary behaves badly to her sister.'
- (lit. Mary badly-behaves to her sister.) (Rivero, 1992:298–299)

However, English examples of adverb incorporation parallel to the bracketing paradoxes seen above are ungrammatical:

- (38) a. \*He heavy drinks  
b. \*He hard works  
...

Furthermore, the class of adverbs that undergo incorporation in Greek (and in Nahuatl, a language also discussed in Rivero 1992) is a superset of the adverbs that participate in English verbal bracketing paradoxes. In Greek and Nahuatl, a class of adverbs that Rivero calls *Aktionsart* adverbs, which include examples like *again*, *often*, and *twice*, may undergo incorporation, as shown in (36), but they cannot appear in verbal bracketing paradoxes:<sup>11</sup>

<sup>11</sup>It is worth noting that these adverbs do not have direct adjectival counterparts, which may bear on why they are disallowed in verbal bracketing paradoxes. However, an adverb incorporating into the verb would not ordinarily be expected to appear as an adjective, as the Greek examples show.

- (39) a. \*John is an again worker.  
 b. \*Mary is an often drinker.  
 c. \*Alex is a twice dancer.

Finally, as I will discuss further in section 4.5, verbal bracketing paradoxes only appear to occur with certain classes of (low) adverbs. A head movement analysis would not straightforwardly account for this restriction.

Overall, an analysis based on a syntax-PF mismatch does not appear to be an attractive option. In the next subsection, I will argue that an approach involving rebracketing the syntactic structure in the semantics, rather than in the phonology, can readily account for all of the relevant data.

#### 4.4.2 LF rebracketing

While Sproat (1988) develops a Mapping Principle to address the structural mismatch between syntactic and PF structures in traditional bracketing paradoxes, another possibility is that, in verbal bracketing paradoxes, there is a mismatch between syntax and LF. This possibility would require a principle to translate the underlying syntactic structure to LF, and which would account for the two different meanings of most verbal bracketing paradoxes.

Sproat's (1988) Mapping Principle, for mapping syntactic structures to PF representations, relies on both precedence and sisterhood. However, of these, only the sisterhood relation is generally accepted to be relevant at LF. For this reason, an approach that translates Sproat's Mapping Principle to LF directly is not very theoretically desirable. I will argue that the empirical facts of verbal bracketing paradoxes can be accounted for, and several other predictions made, by means of a rebracketing operation that applies to the syntactic structure at

LF.<sup>12</sup> This operation requires the preservation of certain types of information after rebracketing, and avoids any reference to precedence at LF.

Accounting for verbal bracketing paradoxes through rebracketing at LF has immediate advantages over its PF counterpart. I will show in section 4.2.4 how this analysis predicts the exact behaviours of the Dutch declensional schwa in traditional and verbal bracketing paradoxes. It also explains why the adjacency requirement between the derived noun and its modifying adjective holds of the AP in verbal bracketing paradoxes, and not the adjectival head. It accounts for why adverbs and not adjectives modify derived adjectives, under the assumption that adjectives and adverbs are underlyingly the same category. None of these phenomena is automatically accounted for under a Sproat-style approach to verbal bracketing paradoxes.

I propose that a syntactic tree like (26), where an adjective modifies a derived noun, can be adjusted at LF to produce a tree in which the adjective and verb form a constituent, which is itself sister to the affix. I will refer to this adjustment as “rebracketing”. However, rebracketing could potentially be a very powerful tool, and allowing terminal nodes to freely reassociate with each other at LF is clearly an undesirable outcome. In order to avoid any overgeneration, I propose that certain kinds of information about the syntactic structure must be preserved under LF rebracketing. In particular, information about headedness, selection, and c-command between non-heads<sup>13</sup>

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<sup>12</sup>A PF mismatch could also be explained in terms of PF rebracketing, or in derivational terms in other words. This is not how Sproat sees his Mapping Principle, but the possibility is there.

<sup>13</sup>In what follows, I will use the term *non-head* to refer to anything that is either an adjunct or an argument of the head.

must be maintained. These three ideas are formalized below, as the principle of Information Preservation.

(40) **INFORMATION PRESERVATION**

PRESERVATION OF HEADEDNESS: Do not destroy headedness relations.

PRESERVATION OF SELECTION: Do not destroy selectional relations of the head.<sup>14</sup>

PRESERVATION OF HIERARCHY: Do not destroy c-command relations between non-heads.<sup>15</sup>

The principle of information preservation captures the intuition that rebracketing should not be a free-for-all; the output structure should be identifiably related to the input. Key information about the syntactic structure — that is, headedness, selectional relations, and scope between non-heads — is retained. The principle also has the effect that only the lowest two non-heads can be rebracketed, and that only hierarchically adjacent non-heads may be rebracketed. I will first examine the details of the proposed analysis before demonstrating each of these results in turn.

### The effects of Information Preservation

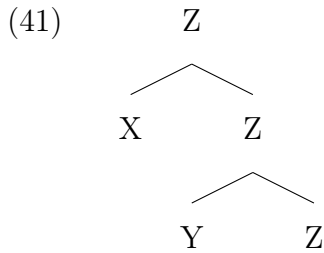
Imagine a tree like that in (41), where Z is the head.

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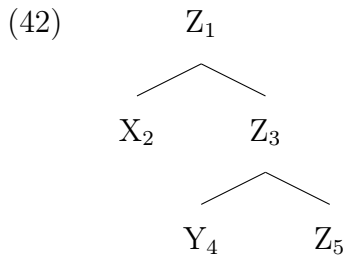
<sup>14</sup>It might be possible to explain the effects of Preservation of Selection in the verbal bracketing paradoxes under consideration by use of the Righthand Head Rule (Williams, 1981). Such an approach would clearly make different predictions about languages without such a rule. As Preservation of Selection seems to me both more restrictive and more natural in this case, it is the option I will adopt in what follows.

<sup>15</sup>I use the ‘first branching node’ definition of c-command (Reinhart, 1976).

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For the sake of clarity, I will give each node in the tree a unique identifier. I will refer to the nodes by their identifiers, although this has no linguistic import.



Preservation of Headedness will ensure that, no matter what transformations or rebracketings this tree undergoes,  $Z_5$  will remain the categorial head of the structure. As will become obvious in later sections, these requirements as applied to bracketing paradoxes mean that I must take the view that (derivational) morphology is at least visible to syntax. As an example, the head of the NP *beautiful dancer* is the noun *dancer*, but *dancer* is itself morphologically complex, being composed of the verb *dance* and the agentive suffix *-er*. It is this agentive suffix that gives the phrase its categorial features, so I will consider it the ultimate head of the NP, and the head that is referred to by Preservation of Headedness as it applies to verbal bracketing paradoxes.

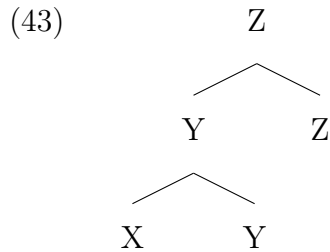
Preservation of Selection requires that the item that the head selects cannot change after rebracketing. In other words, if a head selects a sister  $\alpha$  in the syntax, its sister must still be the same instance of  $\alpha$  after rebracket-

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ing. As applied to the bracketing paradoxes seen above, this means that *-er*, which selects a verbal sister in the syntax, cannot have any item other than (a projection of) the relevant verb as its sister after rebracketing.

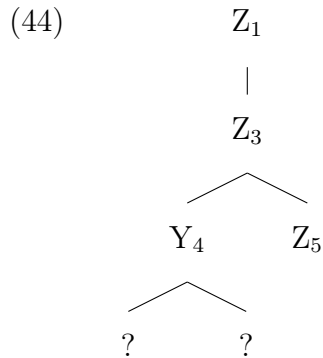
Preservation of Hierarchy means that the c-command relationship between  $X_2$  and  $Y_4$  cannot be destroyed. However, we are free to introduce new c-command relationships between non-heads as long as we do not destroy existing ones. We will see how this aspect relates to verbal bracketing paradoxes below.

Given these requirements, the tree in (43) is a valid rebracketing of (42).

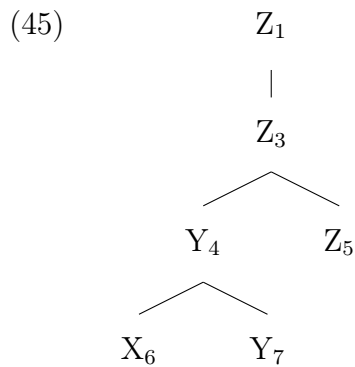


But how do we translate (41) into (43)? Simply, we require that any node that survives the rebracketing must retain its syntactic labelling. The head in (42) is unchanged, due to Preservation of Headedness, so the lower Z (the head of the structure in (43)) must be  $Z_5$ . The sister of the head also survives rebracketing and is still selected by the verb due to Preservation of Selection, so the higher Y must be  $Y_4$ . The mother of the head also survives, so the higher Z is  $Z_3$ :

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Now let us suppose that the rebracketing operation removes the link between  $Z_1$  and  $X_2$  in (42), so  $X_2$  is “free” in the sense that it has no mother or sister. A new relationship, that of sisterhood, is created between the two non-heads ( $X_2$  and  $Y_4$ ), which necessitates a new position for  $Y$ , in addition to its location as sister of the head. We can call the new locations of  $X_2$  and  $Y_4$  “ $X_6$ ” and “ $Y_7$ ” respectively, as below.



$Z$  is the head,  $Y$  its dependent non-head and  $X$  the dependent non-head of  $Y$ . The non-head  $X$  still  $c$ -commands the other non-head  $Y$  as in the original structure. No other  $c$ -command relations between non-heads existed, and none have been destroyed, so Preservation of Hierarchy is satisfied.  $Z$  remains the head, so Preservation of Headedness is satisfied. A new  $c$ -command relationship, from  $Y$  to  $X$ , has been created, but neither tenet of Information

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Preservation prevents this. The tree in (45) is therefore a valid rebracketing of that in (41).

Notice that once the link between  $Z_1$  and  $X_2$  is severed, there is a unary branch between  $Z_1$  and  $Z_3$ . If this unary branch is left at the end of the rebracketing, either it can remain or it can be cleaned up through a simple rule.<sup>16</sup> The choice makes no difference to the analysis presented here, so I leave it up to the reader to choose which is preferable to her.

A question remains about how  $X_2$  comes to be below  $Y_4$ , and I am again agnostic as to the answer. Two options exist: position 2 is destroyed completely and the content occupying it is placed under node  $Y_4$  (as  $X_6$ ), or node 2 is delinked from 1 and the same node is relinked to 4 as its daughter. I do not see any way of distinguishing between the two empirically, and so will again leave the choice to the reader.

As can be seen from the preceding material, this LF rebracketing procedure relies only on the three tenets of Information Preservation, those of Preservation of Hierarchy, Preservation of Selection and Preservation of Headedness. After rebracketing, all key information in the tree is retained, with the only exception being the information that is the target of the rebracketing itself.

In the next subsection, I will show that this rebracketing procedure is sufficiently constrained, despite its simplicity.

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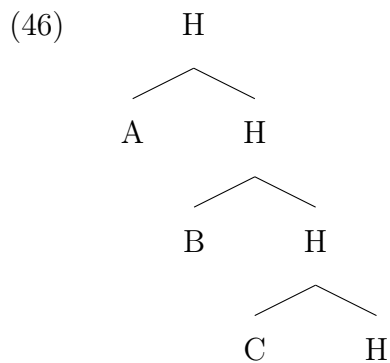
<sup>16</sup>Something along the lines of “if you have a unary branch, unify the two nodes at either end of it” would do.



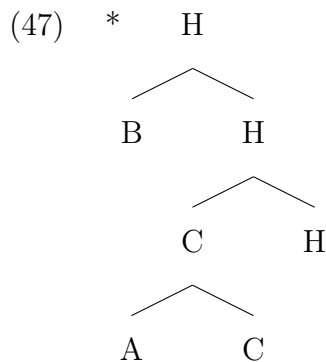
**Further implications of Information Preservation**

The rebracketing procedure proposed above has the result that only two hierarchically adjacent non-heads may be rebracketed, and that only the bottom two non-heads can be rebracketed.

Consider the tree in (46), where H is the head and A-C non-heads.

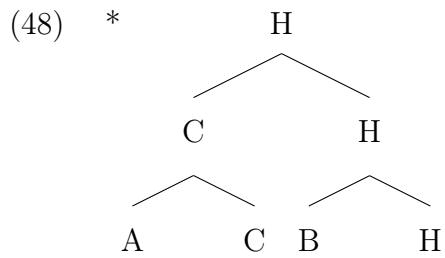


A c-commands B and C, B c-commands C and C does not c-command any other non-head. Any attempt to rebracket this tree so that A and C are sisters will fail. For instance, (47) is not a possible rebracketing of (46) because, while H remains the head, A no longer c-commands B, which is a violation of Preservation of Hierarchy:

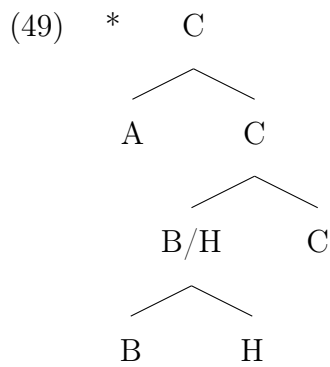


Similarly, in the following tree, B no longer c-commands C.

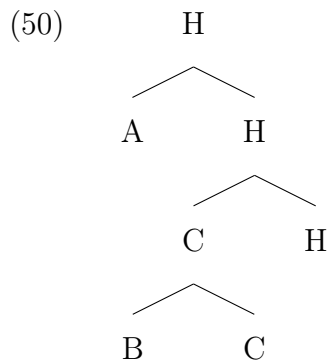
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In (49), Preservation of Headedness is violated, no matter which of B or H is the head of that constituent. Preservation of Selection is also violated.



The only option for rebracketing the tree in (46) is to make two adjacent non-heads sisters (in particular, for reasons to be discussed below, the lowest two, B and C):

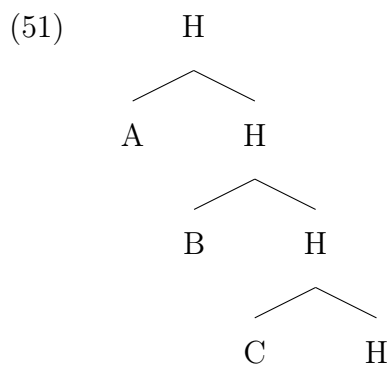


VERBAL BRACKETING PARADOXES

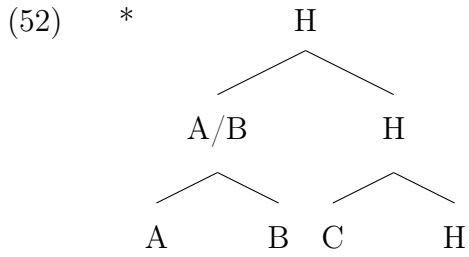
In this structure, H is still the head, it selects a projection of C, A c-commands both B and C, B c-commands C and a new c-command relationship, between C and B has been created.

Preservation of Selection means that rebracketing is impossible where the head selects two items, as in double object constructions. In a tree like (46), if both B and C are selected by the head then even if (50) is the result of rebracketing (as it satisfies both Preservation of Headedness and Preservation of Hierarchy), Preservation of Selection will be violated, because one of H's selectional relations has been destroyed. This appears to be a desirable consequence.

Information Preservation also has the result that only the lowest two non-heads can be rebracketed with respect to each other. Taking the same structure as in (46), repeated in (51), as our starting point, any attempt to create a sisterhood relationship between A and B will fail.

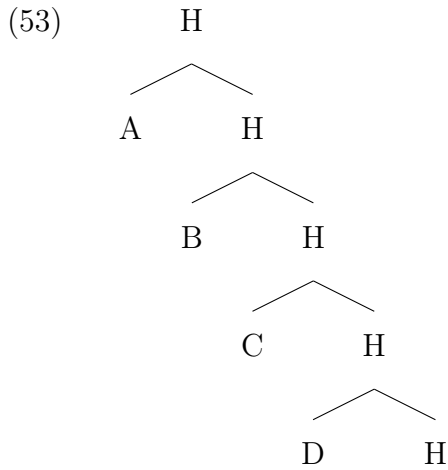


In the resulting structure, either A or B will no longer c-command C, depending on which is the head.



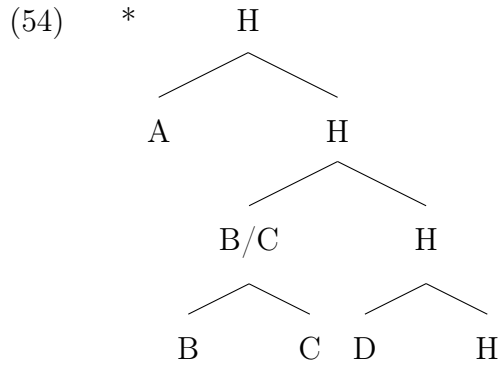
Preservation of Hierarchy is therefore violated. Again, only the structure in (50) is a viable rebracketing.

This fact is not a peculiarity of trees with three non-heads. When trying to rebracket the non-heads of any larger structure, for example that in (53), we find the same result.

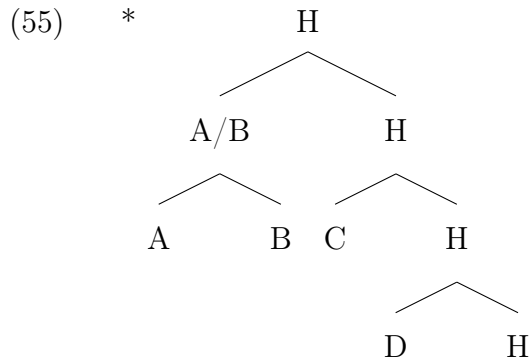


We know from (52) that rebracketing B and C as sisters will violate Preservation of Hierarchy, because either B or C will no longer c-command D, depending on which is head of their constituent:

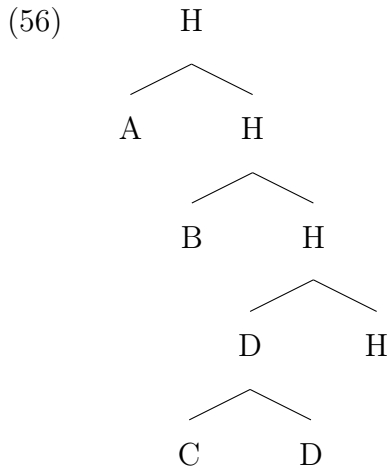
VERBAL BRACKETING PARADOXES



Similarly, rebracketing A and B as sisters will not succeed either, for the same reason.



Finally, rebracketing A and C as sisters is ruled out for the reasons discussed in (48)–(52). The only option that satisfies all three tenets of Information Preservation is to rebracket C and D as sisters, with D the head of that constituent:

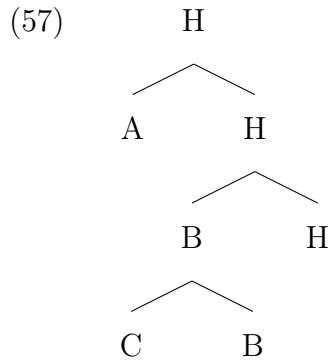


Here the head remains unchanged, as does its complement; A c-commands B, C and D; B c-commands C and D; C c-commands D and D newly c-commands C. This result obtains with this and any larger structure: irrespective of the number of non-heads, only the bottom-most two may be rebracketed together without destroying c-command relations and violating Preservation of Hierarchy.

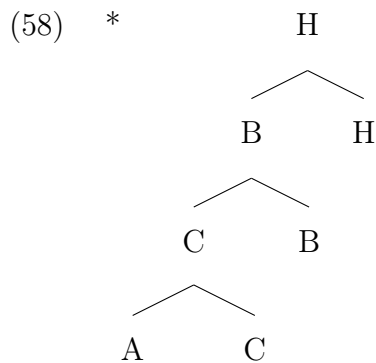
The result that only the bottom-most two non-heads may become sisters after rebracketing means that the process rules out creating a non-constituent with an interpretation as though it were a constituent. This is a desirable consequence, as such an innovation would seriously undermine compositionality. It also appears that examples of a non-constituent being interpreted as a constituent do not exist, except in cases like the verbal bracketing paradoxes under consideration.

Rebracketing must also be shallow; it cannot be infinitely deeply embedded. Take the tree in (57).

VERBAL BRACKETING PARADOXES

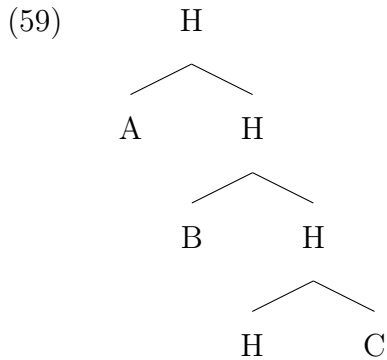


Here, H is the head and A–C non-heads. Any attempt to rebracket A with either B or C will fail, because Preservation of Hierarchy will be violated. As an example, we will try to rebracket the tree so that A and C are sisters:

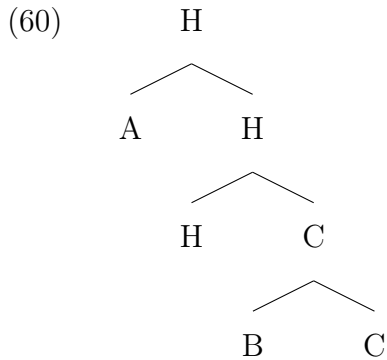


The result is that A no longer c-commands B, a violation of Preservation of Hierarchy, and the structure is not a valid rebracketing of (57). This result means that any reordering of elements in the structure is actually very shallow, and rebracketing is only possible between two structurally adjacent constituents.

One additional question is what occurs when non-head material surrounds the head, as in (59). How does rebracketing proceed here?



As we have seen above, only the lowest two non-heads may rebracket when they are both on the same side of the head (see (52), (54)). We therefore expect B and C to be able to rebracket, and this structure does not violate the tenets of Information Preservation.



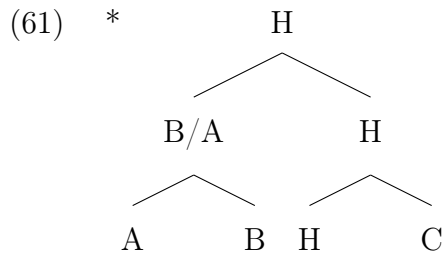
However, I am currently unaware of how to test this crucial prediction. For the time being, I will have to proceed under the assumption that this is a licit rebracketing.

The structure in (59) raises a further question - can A and B rebracket to form a constituent? From the evidence seen so far, it would be possible that there is a linear constraint on rebracketing rather than a structural one. However, in order not to violate Information Preservation, A and B should not be able to rebracket, as either B or A would no longer c-command C,



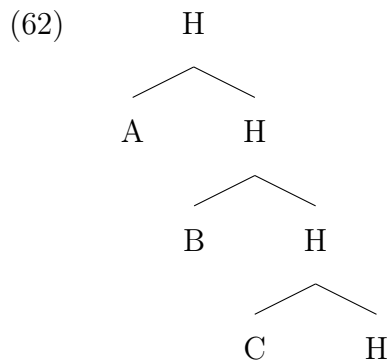
VERBAL BRACKETING PARADOXES

depending on which became the head of their constituent (cf. (50) and the trees in the previous subsection):

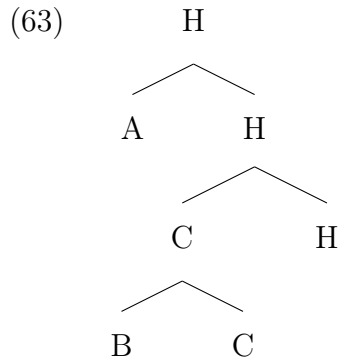


The theory therefore predicts that, where a head takes a complement to its right and two modifiers to its left, the two modifiers should not be able to rebracket to form a constituent. However, where a head only takes two modifiers to its left (and nothing on its right) those modifiers should be able to restructure. If this prediction, which I must leave to future research, is borne out then a structural, rather than linear, approach to LF rebracketing would prevail.

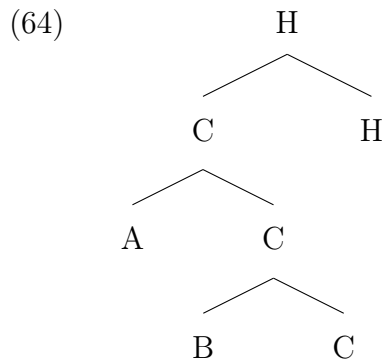
The final case to discuss is the possibility of applying rebracketing cyclically. This operation would take a structure like (62):



And rebracket B with C, as in (63). A still c-commands B and C, B c-commands C and H is still the head, selecting C, so Information Preservation is not violated.



Rebracketing could then apply again, to render A and the higher instance of C sisters:



Here A still c-commands B and C, as it did in both previous structures, B still c-commands C and H is still the head selecting C. Again, Information Preservation is not violated.

The question then is whether this is a desirable outcome. Cyclic rebracketing seems to involve both inputs and outputs that are problematic. Cases where two adverbs of the relevant type can modify the same verb seem to be vanishingly rare, if they exist at all, so it is difficult to construct inputs

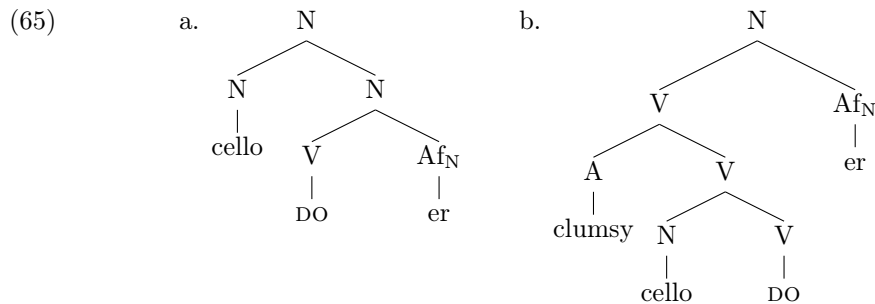
of an appropriate type. Additionally, verbal compounding does not seem to be recursive in English, but the output of cyclic rebracketing would be very similar to a recursive verbal compound. It therefore seems feasible to rule out the cyclic application of rebracketing, perhaps by stipulating that rebracketing can only manipulate terminal nodes.

However, it is also possible that cyclic rebracketing does exist, but is seen only rarely. This possibility does not seem too far-fetched — rebracketing itself does not seem to be a particularly widespread phenomenon, so one would expect cyclic rebracketing to be even less common. Concrete examples of cyclic rebracketing seem difficult to come by, but not beyond the realm of possibility.<sup>17</sup> For this reason, I leave the question of its existence to future research.

### Rebracketing as movement

I have described a process whereby a syntactic structure can be rebracketed at LF to change the original structure’s constituency and therefore adjust the meaning of the phrase. One may wonder if this rebracketing is a new tool to be added to the grammar, or whether it is something that already exists. The

<sup>17</sup>I believe agentive *-ist* is a possible case of cyclic rebracketing. If *-ist* is the spell out of a null verb and *-er*, as mentioned in footnote 4.3, and if those two items form a syntactic constituent, then the structure in (ia) could be rebracketed cyclically to produce (ib), as described above.



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answer is that rebracketing is an instance of movement, but movement without a trace. Under this analysis, the picture that emerges is the following: Information Preservation is a condition on movement. Where movement according to these conditions is ruled out (in particular, where a category must move beyond a *c*-commanding non-head), a trace may be used, subject to requirements on chain formation. I will unpack this story below.

Ordinarily, movement leaves a trace which must be a link in a well-formed chain. The requirements for chain formation as described in Rizzi, 2001 are below.

(66)  $(A_1, \dots, A_n)$  is a chain iff, for  $1 \leq i \leq n$

(i)  $A_i = A_{i+1}$

(ii)  $A_i$  *c*-commands  $A_{i+1}$

(iii)  $A_{i+1}$  is in a Minimal Configuration with  $A_i$

(67)  $Y$  is in a Minimal Configuration with  $X$  iff there is no  $Z$  such that

(i)  $Z$  is of the same structural type as  $X$ , and

(ii)  $Z$  intervenes between  $X$  and  $Y$

In order for a chain to be well formed, the moved category must *c*-command and be in a Minimal Configuration with its trace (or copy).<sup>18</sup> This ensures that the restrictions in (40) are followed, under the assumption that the trace can satisfy them: the base position of the moved category still exists, and is occupied by a trace which is identical to the moved item, so no *c*-command, selectional or headedness relations are destroyed.

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<sup>18</sup>Whether movement leaves behind a trace of the moved category or a copy of it is orthogonal to this discussion. I use the term trace for convenience.

That the base position and the surface positions of movement are syntactically related is widely accepted, but it is not clear why this should be so. I would argue that it is Preservation of Information that requires this relationship, in the form of a trace. If Preservation of Information is a requirement on all movement, then the leaving of a trace is what allows movements other than the kinds discussed in the preceding sections. Without a trace, at least Preservation of Hierarchy would be violated, but if the trace can satisfy that condition then the movement is licit. Information Preservation may in fact explain why traces are necessary in most movement operations.

This idea would mean that movement is not a unified operation, but rather comes in two parts: the procedure of movement, and regulation of the connection between the moved category and the trace (cf. Nunes 2001). However, rather than the movement operation itself being completely unconstrained (as in Nunes 2001; Hornstein 2001), I suggest that all movement must at least adhere to the principles of Information Preservation as in (40), and that Information Preservation is therefore a requirement on the movement operation rather than the relationship between the moved category and the trace. This will ensure that, even without a trace, movement is sufficiently constrained, while having little effect on any movement that leaves a trace.

I have discussed at length the types of movement allowed and disallowed by rebracketing, or, in other words, the types of downward movement that can occur without a trace. This downward movement must obey the principles of Preservation of Headedness, Preservation of Selection and Preservation of Hierarchy, which means that only the lowest two non-heads may rebracket to become sisters. Put differently, Information Preservation requires that, without a

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trace, downward movement is allowed only where the second-lowest non-head moves to become the sister of the lowest non-head. This type of movement also results in a change of interpretation, because the original position of the moved category no longer exists.

Downward movement with a trace is disallowed due to the requirements of chain formation, namely c-command.

Any upward movement that crosses a constituent and does not leave a trace will necessarily violate Preservation of Hierarchy, because the crossed constituent will no longer c-command the moved item, and that c-command relation will be destroyed. Upward movement that crosses any constituent must therefore leave a trace, and the requirements of Information Preservation will automatically be fulfilled because of this.

The final case, that of upward movement that does not cross a constituent, does not seem problematic. This type of movement would require that the moved category be moved directly above itself, which would not generate any new structural relationships. If this type of movement exists at all, it would presumably not violate Information Preservation, but I do not see how this could be tested, as it would be impossible to differentiate from structures where no movement has taken place.

The proposal outlined above has certain similarities to Pesetsky 1985 and Nunes 2001. Pesetsky (1985) also deals with bracketing paradoxes, and makes use of LF movement to explain how the structure of the paradoxes can differ at S-structure and D-structure. However, the present proposal does not run into the pitfalls of Pesetsky's, as outlined in Hoeksema 1987, in that it does not rely on treating affixes as operators akin to quantifiers, it does not require

that resulting phrases be ambiguous,<sup>19</sup> and it does not require that operations at LF are sensitive to precedence, as Pesektsky's (1985) proposal does.

There are also similarities with early restructuring or reanalysis work on verb clusters (Rizzi, 1978, 1982; Manzini, 1983; Haegeman and van Riemsdijk, 1986), as well as to Williams' 2003 idea of shape preservation. However, a discussion on how these ideas might relate to the behaviour of clitics and verb clusters would take me too far afield, and the scope of Representation Theory is much wider than that of this chapter. I will leave an in-depth comparison of Information Preservation with either of these themes to future research.

As mentioned above, Nunes 2001 also splits Move into several independent operations, just as I argue for separating movement from requirements on traces. However, Nunes (2001) does not constrain the movement operation in any way in order to allow sideward movement. I propose that the tenets of Information Preservation are restrictions on the movement operation (separate from requirements on trace binding), and that they restrict when movement can take place without leaving a trace. In this way, my proposal allows for downward movement without a trace, also described as rebracketing, without opening a Pandora's box of possible movement configurations.

While the idea of downward movement may at first blush seem undesirable, I have shown that, as long as that movement adheres to the tenets of Information Preservation, downward movement can be sufficiently constrained. By splitting the operation that binds traces from a movement operation restricted by Information Preservation, downward movement will be permitted in all and

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<sup>19</sup>Indeed, if either the rebracketed or the non-rebracketed structure is ruled out for independent reasons, I predict that the resulting phrase should be unambiguous.

only the structures required to explain verbal bracketing paradoxes in terms of LF-rebracketing, and upward movement will not be affected.

### Verbal bracketing paradoxes and Information Preservation

I have shown that with only the assumptions that the head of a structure must not be changed and that the c-command relationships between non-heads must not be destroyed, a viable rebracketing process between syntax and LF appears. This process allows only rebracketing of hierarchically adjacent non-heads, and only of the bottom-most two non-heads. This process is sufficiently constrained so as not to overgenerate new sisterhood relations, and captures the intuition that rebracketing must preserve as much information as possible.

This process would be able to explain all of the examples in (16).

- (68) a. [heavy [drinker]]  $\implies$  [[heavy drink]er]  
 b. [hard [worker]]  $\implies$  [[hard work]er]  
 c. [beautiful [dancer]]  $\implies$  [[beautiful dance]er]  
 d. [close [talker]]  $\implies$  [[close talk]er]  
 e. [high [singer]]  $\implies$  [[high sing]er]

The LF rebracketing has a number of advantages over its PF counterpart applied to the same data. Firstly, notice that this analysis does not run into the ordering problems encountered under PF rebracketing, under the assumption that adjectives and adverbs are underlyingly the same category (an assumption to which I return shortly).



Furthermore, the adjacency requirement discussed in section 4.3 between the adjective and agentive noun would be explained. Given a string like (69a), the only possible rebracketing would be (69b). Similarly (70a) and (70b) .

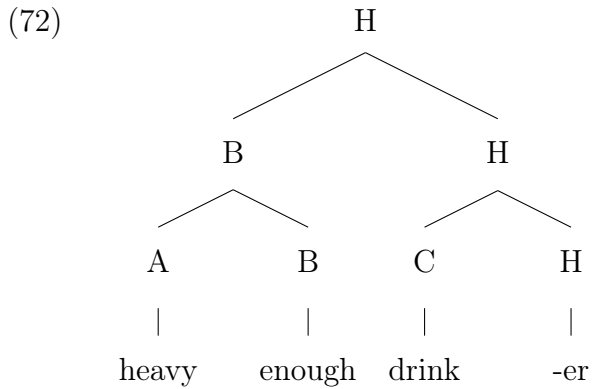
- (69) a. [bald [heavy [drinker]]]  $\implies$   
       b. [bald [[heavy drink]er]
- (70) a. [heavy [bald [drinker]]]  $\implies$   
       b. [heavy [bald drink] er]

As demonstrated above, the first and second adjectives may not be reordered with respect to each other in the process of rebracketing because such reordering would destroy the c-command relation between the first non-head (*bald* in (69)) and the second (*heavy* in (69)). Therefore, after rebracketing, the verb may form a constituent only with the second adjective and not with the first. So we see in (69) that, because *heavy* is adjacent to the verb, after rebracketing it forms a constituent with that verb and may modify it. The same is true of (70), but modifying *drink* with *bald(ly)* results in a meaningless output, so no change in meaning is observed here.

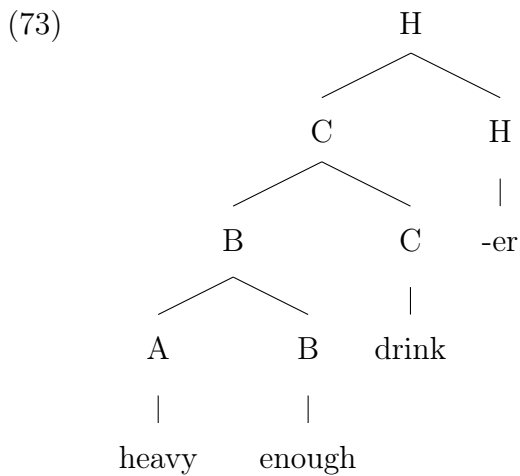
Recall that the adjacency requirement discussed above is not strict linear adjacency between morphemes. It seems that it is the AP that is required to be adjacent to the verb, rather than the adjective itself.

- (71) a. [[heavy enough] [drinker]]  $\implies$   
       b. [[[heavy enough] drink]er]

The proposal above accounts for this as follows.



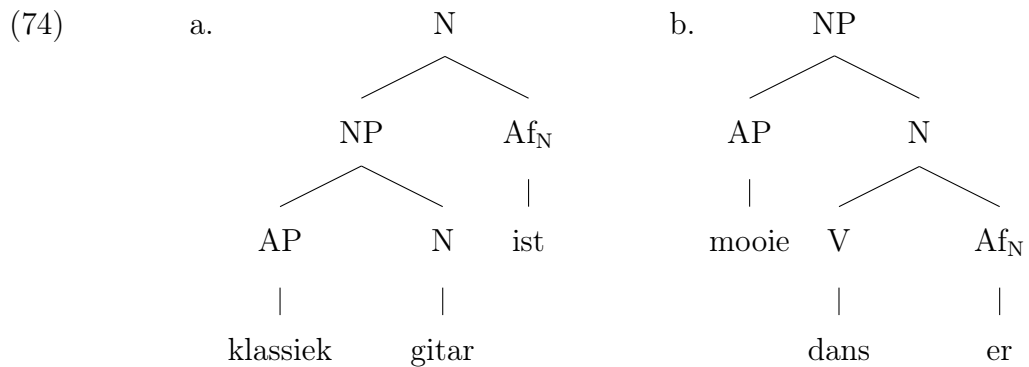
Here, H is the head, which is modified by C and B. B is itself modified by A. Rebracketing B with C will violate neither Preservation of Headedness, because H is still the head, nor Preservation of Hierarchy, because B still c-commands C. Preservation of Selection is also satisfied.



LF rebracketing also explains the behaviour of the declensional schwa in Dutch verbal bracketing paradoxes. We have seen that in traditional bracketing paradoxes in Dutch, the schwa is disallowed due to the fact that in the syntax the adjective and noun combine in an NP before the affix is attached. However, if the analysis of verbal bracketing paradoxes above is correct, the syntactic structure of verbal bracketing paradoxes (in Dutch and English) is one in

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which the affix attaches to the verb, and this derived noun is modified by the adjective. In other words, verbal bracketing paradoxes look like any other adjectivally modified noun in the syntax, and at PF. The syntactic structures of a traditional bracketing paradox (a) and a verbal bracketing paradox (b) are shown in (74).



In the case of traditional bracketing paradoxes, post-syntactic adjustments are made to meet PF well-formedness conditions, but the syntactic structure remains unchanged at LF. However, the syntactic structure of verbal bracketing paradoxes is what is pronounced, as adjustments to the structure are made at LF, accounting for the change in meaning. The different behaviours of the declensional schwa in traditional and verbal bracketing paradoxes are therefore predicted by LF rebracketing.

Given the above analysis, there may in fact be an explanation for both types of bracketing paradox as to why certain phrases undergo PF rebracketing and others undergo LF. We have seen that verbal bracketing paradoxes cannot be analyzed at PF, due to restrictions on the placement of the adverb and affixation to non-heads. This may suggest that LF rebracketing can only occur when PF rebracketing is impossible. In other words, speakers prefer a transparent mapping between syntax and LF over a transparent mapping be-

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tween syntax and PF, if they are forced to choose. It may also be a first step towards determining why certain words (and languages) undergo one type of analysis and not the other. English is subject to the Right-Hand Head Rule (Williams, 1981) and, in the relevant cases, the verb precedes the adverb. We have seen that this combination of attributes means that PF rebracketing is impossible in verbal bracketing paradoxes. Head final languages on the other hand, where the word order of verb and adverb are reversed compared to the English examples above, may be able to rebracket at PF where English cannot. Bracketing paradoxes of the verbal type appear to be vanishingly rare, if they exist at all, in German (Klaus Abels, p.c.), and are restricted to a handful of examples in Dutch (Ad Neeleman, p.c.), so this prediction may be borne out. However, as German appears also to avoid traditional bracketing paradoxes (Williams, 2013, Klaus Abels, p.c.), the validity of this claim remains undetermined. I leave further investigation to future research.

Inherent in the analysis of verbal bracketing paradoxes above has been the idea that adverbs and adjectives are the same category in the syntax. This is not a new idea (see e.g. Lyons 1966; Emonds 1976; Bybee 1985; Baker 2003; Giegerich 2012 for arguments supporting the idea, although see Payne et al. 2010 for arguments against it). It would mean that the *-ly* adverbial marker in English does not carry any semantic or syntactic information, but is licensed in the non-nominal context. In other words, *-ly* does not carry the adverb semantics, but merely indicates it. In some dialects, *-ly* rarely occurs in a post-verbal context. These dialects often use adjectival forms of words like *good*, which have suppletive adverbial forms, rather than the adverbs in the

same context. In all dialects *-ly* is disallowed or unnecessary in certain cases, including some we have seen above. (Here % indicates a dialectal difference.)

- (75) a. Sarah sings high(?-ly).  
 b. Ashley works hard(\*-ly).  
 c. Josh runs quick%(-ly).  
 d. Donna knits well/%good.

Jespersen (1961) and Poutsma (1926) report that that *-ly*-dropped adjectives are preferred by Shakespeare when the adverb modifies an adjective or adverb, compared to when it modifies a verb. (See Tagliamonte and Ito (2002) and references therein for discussion on the factors contributing to adverb form choice.)

Indeed, in Davidsonian semantics, adverbs are treated as predicates of events (see e.g. Davidson 1967; Barbiers 1995; Larson 2004). This insight is maintained in neo-Davidsonian approaches (Parsons, 1990; Schein, 1993). Under this type of analysis, *John left quickly* would be rendered along the lines of (76), ignoring tense (the (a) example represents a classical Davidsonian approach, while the (b) is a neo-Davidsonian formulation).

- (76) a.  $\exists e$  [leave(j) & quick(e, C)]  
 b.  $\exists e$  [leaving(e) & Agent(e, j) & quick(e, C)]  
 (“There is an event of leaving of John and the event is quick (for such an action)”)

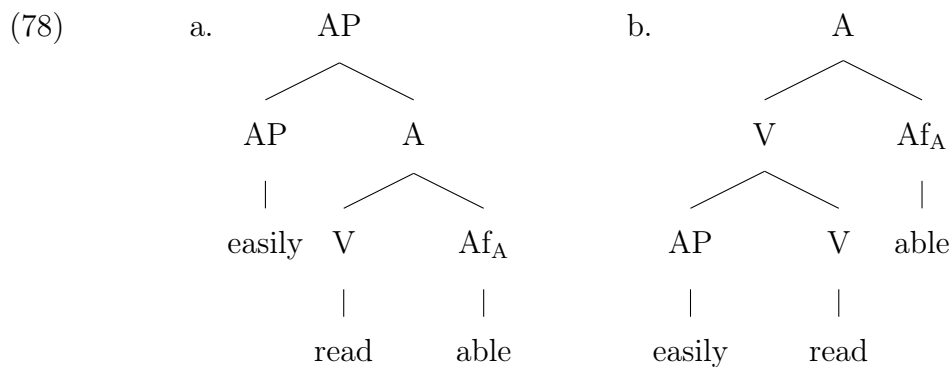
A unified “A” category would also explain why deverbal adjectives, which appear at least in some cases to be subject to the verbal bracketing paradox

phenomenon, are modified by an adverb and not an adjective (the judgments below are for standard English):

- (77) a. easily readable (=something that may be read easily)  
 b. instantly destructive (=something that destroys instantly, like an atomic bomb)  
 c. \*easy readable  
 d. \*instant destructive

Here, the rebracketing would proceed at LF as demonstrated above with *-er*, but A would be spelled out as an adverb, because it is modifying an adjective and therefore must appear in adjectival form. The same reasoning would explain the ungrammaticality of *\*heavily drinker*, because A is here modifying a noun and so must appear as an adjective.

The structure of examples like (77) would be identical to that in (78), as shown below. Again, the (a) example gives the syntactic structure and the (b) example the LF rebracketing.



This analysis is consistent with the idea that inflectional morphology is a reflex of syntactic structure and not of semantics. This is true of the Dutch schwa seen above: when a modifier is syntactically a (prenominal) adjective,

the schwa appears and when it is anything else it does not. Similarly, when an A in English modifies a noun it appears without *-ly* in and when it is associated with anything else it appears with *-ly* (in dialects that include this suffix). Seen under this light, *-ly* is just a marker of being in a non-nominal environment, in the same way that markers of being in a nominal environment exist, such as linkers.

It is important to note that the meaning derived from the rebracketing process is entirely predictable and compositional, and can in fact be used as a kind of test to decide whether the rebracketing has taken place. In every case, a Y X-er is a person or thing that Xes Yly. The meaning is read off the rebracketed structure, while the pronunciation (and especially the fact that Y is spelled out as an adjective and to the left of the noun) is read off the syntactic/morphophonological structure.

It seems that the paradoxical reading only happens when an alternative compositional analysis is available. In other words, where any compositional analysis is available, it is always a possible analysis. In the verbal bracketing paradoxes, there are two possible compositional semantic analyses: one that is isomorphic with the syntactic structure and another involving rebracketing. This principle may be a learning principle: children must be able to analyze the smallest consistencies in the linguistic input, in order to learn patterns like rules with limited productivity and inflectional paradigms. Therefore, once they have analyzed words like *dancer* and *worker* into their constituent parts, they can then rebracket phrases like *hard worker* giving an alternative compositional meaning.

**Verbal bracketing paradoxes and JOIN**

Bracketing paradoxes of both types only occur with attributive adjectives, and we have seen good reasons why this should be so. However, I have not so far discussed how JOIN fits into this analysis. That issue is the focus of this subsection.

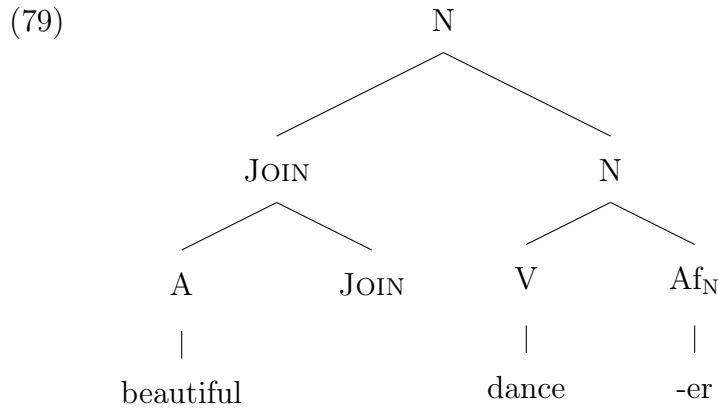
Following Sproat (1988), I have argued that traditional bracketing paradoxes involve rebracketing or mapping of separate structures between syntax and PF. Such a PF phenomenon can be assumed to apply to material that is pronounced, or that has a bearing on pronunciation. JOIN is not pronounced in English (although see chapter 5 for some discussion of possible realizations of JOIN in other languages) and therefore is not directly relevant to this analysis of traditional bracketing paradoxes.

However, Information Preservation, which underpins the proposed analysis of verbal bracketing paradoxes makes no reference to whether material contained within the representation is pronounced or not. We must therefore determine how JOIN might interact with the processes argued for above.

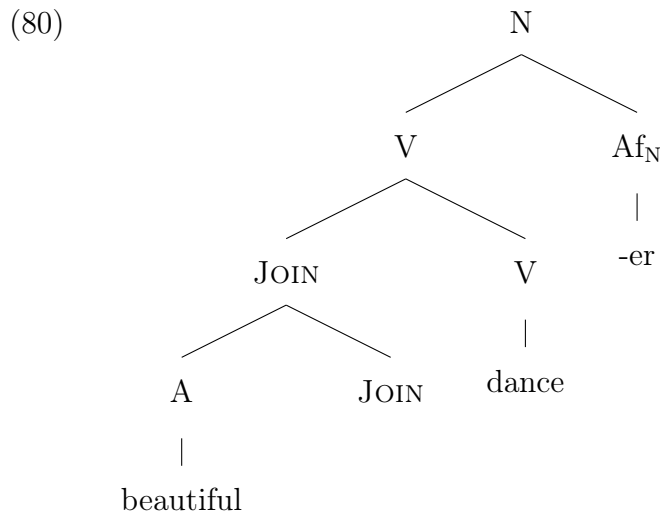
In the trees presented so far in this chapter, I have ignored the presence of JOIN. However, by hypothesis, JOIN is attached to all attributive adjectives and the adjectives appearing in verbal bracketing paradoxes are attributive modifiers in the syntax. Therefore, a more accurate representation of the syntactic structure of a phrase like *beautiful dancer* would be like that in (79).



VERBAL BRACKETING PARADOXES



Here, JOIN ensures that *beautiful* applies to the set of dancers. The question then is whether this tree can undergo rebracketing at LF to give the correct semantic representation of the phrase. One possible rebracketing is in (80).



Preservation of Headedness is obeyed, because no head relations are destroyed. Preservation of Hierarchy is also obeyed: in the first structure, JOINP c-commands V, and this is still true in the second structure. That Preservation of Selection is obeyed is somewhat more difficult to see, but true nonetheless.

I have argued above that adjectives and adverbs are underlyingly the same category. If this is true, then adverbs as well as adjectives must be comple-

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ments to JOIN when they are being used as modifiers rather than predicates. Furthermore, the JOIN that attaches to a modifier of the noun like *beautiful* in (79) must be the same JOIN that is attached to *beautiful* when it modifies the verb in (80), because the modifier and JOIN are the same syntactic entities in each case. In both positions, JOIN relativizes the modifier to the syntactic sister of JOINP: when *beautiful* modifies the noun *dancer*, it selects the subset of the set of individuals who are dancers who are also beautiful; when it modifies *dance* it selects the subset of the set of events of dancing that are also beautiful. JOIN's selectional requirements are met in both structures, and its semantics performs the same task in each case, albeit on different comparison classes.

This analysis relies on the categorial and semantic selectional requirements being satisfied at different points in the derivation. This is because JOINP must be adjoined to a projection of the noun, to avoid allowing phrases such as *\*The bus is big red* or *\*The [big red] bus*. One possible solution to this problem is that the categorial selectional requirements must be satisfied at merger, while semantic selectional restrictions are satisfied later, either at LF or in the semantics proper. In this way the categorial restrictions on JOIN, namely that it be adjoined to a projection of the noun, are satisfied when it is merged but the semantic selectional requirement and interpretation are dealt with later. The presence of JOIN in verbal bracketing paradoxes does pose some challenges for the analysis proposed in this chapter, but I am confident these challenges can be overcome.

In this section I have examined the properties of bracketing paradoxes, and proposed an analysis of verbal bracketing paradoxes involving rebracketing at

LF. In the next section, I discuss two further predictions that this analysis makes.

## 4.5 Some predictions of the theory of LF rebracketing

Given the LF rebracketing analysis detailed above, two further predictions present themselves. In the input to LF, the syntax has built a word consisting of the verb and the suffix, and this is modified by A. At LF, these relationships are rebracketed so that the verb and its modifier are essentially inside a word bounded by the suffix. The traditional assumption (as in Williams 1981) is that functional structure, such as tense and aspect, is disallowed inside a word or compound. Inside the derived noun, we would therefore expect to find no (or very little) functional structure. This would predict that only very low adverbs, those that can combine with a bare V inside the VP, may appear in verbal bracketing paradoxes. This prediction appears to be borne out.

Only very low adverbs are felicitous in bracketing paradoxes (for details on classes of adverbs, see Cinque 1999). Specifically, only manner adverbs appear to exist in this configuration, as seen in all of the examples above. Time and aspect adverbs, among other classes, are absolutely infelicitous:<sup>20, 21</sup>

- (81) a. \*Julie is a usual worker. (intended: Julie usually works.)

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<sup>20</sup>There is one exception I'm aware of, in the title of John le Carré's *The Constant Gardener*. However to my native speaker's ear, this sounds like a deliberate push at the boundary of acceptable interpretation. I will leave it aside here.

<sup>21</sup>This observation is also made in Cinque 2010 (chap.3, n.8), although not in so many words.

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- b. \*Saul is a tomorrow worker. (intended: Saul is working tomorrow, or perhaps less concretely, Saul always claims he will start work tomorrow.)
- c. \*Hattie is an often worker. (intended: Hattie often works.)
- d. \*Thom is a customary worker (intended: Thom customarily works.)

The low adverbs that can appear in bracketing paradoxes seem to be exactly the ones that appear postverbally. If the postverbal adverbial (or A) position can only host manner adverbs, these observations are explained.

Tense, aspect and other functional material cannot appear inside VP, and are disallowed inside a derived word. Adjectives relating to this material cannot take part in bracketing paradoxes, which is consistent with the proposed analysis.

Given that verbal bracketing paradoxes appear to be an LF phenomenon, we might expect certain trademarks of LF to apply to these cases. I will argue that, for some speakers, a kind of very local reconstruction is allowed under certain conditions, in line with this hypothesis.

All speakers accept phrases in which the modifier and derived category are adjacent, as well as those in which the AP and derived category are adjacent, even if a modifier within the AP intervenes between the adjective and derived category.

- (82)
- a. a [<sub>A</sub> beautiful] dancer
  - b. a [<sub>AP</sub> very heavy] drinker
  - c. a [<sub>AP</sub> hard enough] worker

However, a subset of speakers also accepts cases in which maximally one (low<sup>22</sup>) adjective intervenes between the verbal modifier and derived category:

(84) %a very heavy French drug-user<sup>23</sup>

To these speakers, (84) can refer to a French person who uses drugs heavily.

At first sight, these facts call in to question the applicability of a rebracketing approach. How could we form a constituent out of non-adjacent categories? However, all is not lost.

It is crucial to note that the meaning of *very heavy* is exactly what we would expect were it to appear next to the noun. This fact may be explained if the adjective is moved to its surface position rather than being base generated there (for example, for focus reasons), and the meaning is reconstructed at its original position.

There is some evidence that the modifier should be focused in this example. Those speakers who allow phrases like the one in (83), tend to prefer a pronunciation with stress on *very heavy*, with a reading where, out of a set of French drug-users, we are talking about one who uses drugs heavily. This is also in line with well-known examples of exceptions to adjective ordering restrictions. In these cases, the expected order of adjectives,  $A_1 > A_2 > N$  can be reversed if  $A_1$  and  $N$  form a class salient in the discourse, and  $A_2$  is used to pick out a subset of that class. An example of this is in (85).

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<sup>22</sup>According to most adjective hierarchies, nationality or provenance adjectives are the lowest category. Intervention by a higher adjective category is significantly degraded:

(83) ?\*a very heavy bald/happy/round drinker

<sup>23</sup>Modifying *heavy* in examples like this seems to make them significantly more acceptable. For more on this, see below.

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(85) a. Out of all of these big cars, I would buy the YELLOW big car.

Here, just as in (84), stress is placed on the earlier modifier, and the sense of native speakers is that that modifier picks out a subset of individuals identified by the combination of the later modifier and the noun. (84) therefore appears to be an example of a standard exception to adjective ordering restrictions, one that is often argued to involved movement to a focus position.

Focus movement reconstructs for scope. In (86), only narrow scope is present: it is not true that for every professor there is a student who said that John kissed that professor. The same holds true of (87)— quantifier scope is still computed on the base position, not the surface position.

(86) A student said that John kissed every professor. (a > every; \*every > a)

(87) EVERY PROFESSOR a student said that John kissed, not every TA.  
(a > every; \*every > a)

Under focus, *heavy* in (84) receives the same non-intersective reading as when it is adjacent to the noun. This suggests that the adjective has moved to a focus position higher in the phrase, but is interpreted in its base position. If the trace of this focus movement may be involved in the LF rebracketing procedure as described in section 4.4.2, then this phenomenon is accounted for. These facts provide evidence to support the idea that verbal bracketing paradoxes are due to an adjustment of the structure at LF.<sup>24</sup>

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<sup>24</sup>It is not clear how far the adjective involved in rebracketing may move. It is clear that it may cross nationality adjectives, which are generally taken to be the lowest in the hierarchy of adjectives (Sproat and Shih, 1991; Cinque, 2010). Cinque 2010 provides the example in (88), attributed to Megan Rae (p.124, n.11, emphasis mine).

I have argued that sentences like (84) and their associated meanings are the result of reconstruction after focus movement. An obvious question that arises is why such reconstruction does not appear to happen in other cases of adjectival focus movement. As mentioned above, focus movement is the standard analysis of a certain class of exceptions to adjective ordering restrictions. Why then can the examples in (90) refer to different objects?

- (90) a. a fake gold coin  
 b. a gold fake coin

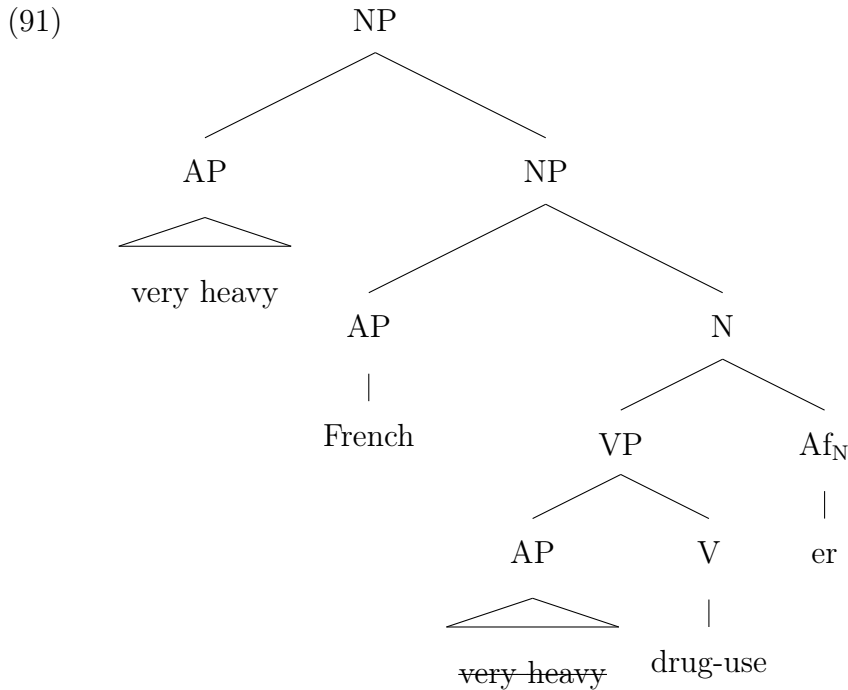
I will argue that the movement on which reconstruction relies is only allowed when there is motivation for both the surface and trace positions. In (90), this motivation is lacking.

In the case of the bracketing paradoxes, the interpretation of the low modifier (*heavy, hard* etc.) requires that modifier to be adjacent to the verb, but its scope requires a high position. That is, in order to get the interpretation in (84) that, out of all the French drug-users, we are referring to the one who uses drugs heavily, *heavy* must be above *French*, while in order to get the *heavy drug-user* reading, *heavy* must be below *French*.

- 
- (88) Speaker A: I'm only an occasional smoker.  
 Speaker B: But you are a *fairly heavy occasional smoker*.

However, moving across two adjectives is markedly degraded:

- (89) \*the very heavy stubborn French drinker (under relevant reading)



In the bracketing paradox, there is a requirement for both positions, meaning that movement takes place and the moved object can reconstruct in the trace position, leading to the reading found in (84). I predict that if there is no rebracketing, there is no motivation for the trace position, and reconstruction should therefore not occur.

Let us turn to the examples in (90). In (90a), it is possible that the coin is not even gold in colour (or material), while in (90b), the coin is in fact gold, but it is nonetheless a fake. However, in the following example, even when *fake* is stressed, or focused, the authenticity of the coin's gold-ness is still doubtful, meaning that *fake* is not reconstructing under *gold*.

(92) a FAKE gold coin

Why is reconstruction not possible here, when it appears to be possible with bracketing paradoxes? In (92), there is a base-generated order for the two



modifiers that directly gives the meaning that would be derived through reconstruction. (90a) has the structure as in (93a), while (90b) has that of (93b).

- (93) a. a [fake [gold [coin]]]  
 b. a [gold [fake [coin]]]

(92), under a movement analysis, would require the structure in (94).

- (94) a [FAKE [gold [~~fake~~ [coin]]]]

If the upper copy in (94) reconstructed in the position of the lower copy, the result would be the same as in (93b). Given that focus can occur in situ, this movement and reconstruction would violate the principle of economy. In other words, in (92), a motivation for the surface position of *fake* exists, which is the scopal relationship between the two modifiers. However, there is no motivation for any lower trace position, given that focus can happen in situ. Therefore, there is no requirement for movement and no possibility for reconstruction to take place. Economy considerations would disallow the expensive, movement- and reconstruction-based derivation for these phrases, unless required by scope considerations, as in cases like (84).

A final difference between examples like (84) and (90), is that the adjective in (84) is modified, and seems to be degraded when it is not. Panayidou (2013) argues that unmodified adjectives are bare As, and appear lower in the tree than modified adjectives, which are full APs. According to Panayidou, full APs have to be higher in the structure than bare As, so it is not possible to have *French* precede *very heavy* in (84). While I agree with the broad observation that modified adjectives appear higher in the structure than unmodified ones, I

do not agree with the base generation mechanism that Panayidou (2013) makes use of. It seems to me that the complexity of a modified adjective (in this case *very heavy*) favours leftward movement, although exactly why syntactically more complex APs are more acceptable to the left of less complex ones is not clear to me or to Panayidou.

Given the preceding discussion, the two predictions discussed in this section seem to support the LF rebracketing analysis of verbal bracketing paradoxes presented in section 4.4.2. This analysis also avoids the pitfalls of a PF rebracketing applied to verbal bracketing paradoxes, such as Sproat’s (1988) Mapping Principle.

## 4.6 Conclusion

I have argued that examples like *heavy drinker* form a class of bracketing paradoxes that is separate to that exemplified by *nuclear physicist*. I call the former “verbal bracketing paradoxes”. Verbal bracketing paradoxes appear similar to traditional bracketing paradoxes in that they give rise to a mismatch between the (morpho)phonology and semantics, under at least one reading. They also share several other characteristics, including a requirement for adjacency between modifier and head. However, the evidence from Dutch shows that the syntactic structure of verbal and traditional bracketing paradoxes is different. For this reason, I propose an analysis for verbal bracketing paradoxes that relies on a very restricted type of downward movement without a trace, governed by the principle of Information Preservation. This analysis makes several predictions, which I have shown to be borne out.

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The analysis also proposes a change in the way in which we view movement. It opens up the possibility of movement without a trace, provided certain types of information are not affected by the movement. While this may seem a radical change, the extent to which it allows new movement types is actually very limited. However, the movement types it does allow capture the specific characteristics of verbal bracketing paradoxes while still retaining a restrictive theory of movement.

A bracketing paradox approach to phrases like *heavy drinker* and *nuclear physicist* is also consistent with the single-source analysis of adnominal adjectives. The unique behaviour of these phrases, both in terms of their unexpectedly strict ordering requirements and their seemingly nonintersective meanings, should not be taken as evidence for a second adnominal source, but bracketing paradoxes represent a separate case from that of straightforward attribution. Both types of bracketing paradox involve modification not of the derived noun, but of a sub-part of the noun, which explains why the paradoxical reading of these phrases requires adjacency between noun and derived adjective. Furthermore, bracketing paradoxes are fully compositional in their meaning, but their meaning is computed over sub-parts of the phrase and not over the adjective and derived noun pair. The difference between the two types of paradox lies in the locus of the mismatch between modules of the grammar, and how that mismatch is regulated. The behaviour of neither type of bracketing paradox should be accounted for by attribution alone.

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John had Great Big Waterproof Boots on;  
John had a Great Big Waterproof Hat;  
John had a Great Big Waterproof Mackintosh—  
And that (said John) is that.

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*Happiness*, A.A. Milne

This thesis began with a discussion of the characteristics of adnominal adjectives (those that are not involved in predication in a given structure) and what those characteristics can tell us about the nature of adjectival modification. I have argued that adnominal adjectives form a unified class with a single source: attribution. A single-source analysis of adnominal adjectives is a simplification over analyses that make use of multiple sources, because problems surrounding the distinction of one class of adjectives from another, the nature and location of each of the two sources, and accounting for how the similarities between the two sources might arise. It also better captures the facts that adnominal adjectives behave alike in a number of syntactic tests, and their behaviour differs systematically from that of full and reduced relative clauses. This approach entails a rethinking of the boundaries between attribution and

other types of modification, and this rethinking leads to a more empirically compelling understanding not just of attribution, but also of AP adjacency and of bracketing paradoxes.

## 5.1 Summary

In chapter 2 I examined the core characteristics of attribution and compared the behaviour of adnominal adjectives to full and reduced relative clauses. While many authors have argued for a derivational relationship between at least some of these three categories (Smith, 1964; Jacobs and Rosenbaum, 1968; Ross, 1972; Stockwell et al., 1973; Sadler and Arnold, 1994; Larson, 2000a; Larson and Takahashi, 2007; Cinque, 2010), I showed that they are best analyzed as derivationally distinct. Full and reduced relatives differ in several aspects of their interpretation, and full relatives allow a wider variety of predicates than reduced relatives. Even fewer predicate types are allowed adnominally, and adnominal adjectives, unlike either type of relative clause, are subject to the Head-Final Filter (Williams, 1982), scope and ordering effects, and require the Dutch declensional schwa, along with several other distinctions.

While these modifiers form three distinct syntactic categories, I have argued that they represent two different relationships to the noun: attribution, hypothesized to result from attachment of JOIN (Baker, 2003; Truswell, 2004, 2005), and predication, which involves Higginbotham's (1985)  $\theta$ -identification. Attribution is characterized by scopal asymmetries, and JOIN allows us to capture this asymmetry. Predication, on the other hand, is symmetric and is therefore well suited to an intersective semantics like  $\theta$ -identification. The distinction between attribution and predication is represented by the following

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examples. In (1), the DP is interpreted differently depending on the order of the adjectives. The same interpretation does not hold when the noun is instead modified by full (2) or reduced relatives (3).

- (1) a. frozen chopped chicken  
a'. chopped frozen chicken  
b. big red ball  
b'. red big ball
  
- (2) a. a chicken breast that was frozen in the Arctic tundra(,) that was chopped by Japanese masterchefs  
a'. a chicken breast that was chopped by Japanese masterchefs(,) that was frozen in the Arctic tundra  
b. a ball that is redder than a tomato(,) that is bigger than a breadbox  
b'. a ball that is bigger than a breadbox, that is redder than a tomato
  
- (3) a. chicken breast frozen in the Arctic tundra(,) chopped by Japanese masterchefs  
a'. chicken breast chopped by Japanese masterchefs(,) frozen in the Arctic tundra  
b. a ball redder than a tomato(,) bigger than a breadbox  
b'. a ball bigger than a breadbox(,) redder than a tomato

This approach means that, while full and reduced relatives are not derivationally related, they relate to the noun in the same way and are related in that sense. Adnominal adjectives relate to the noun through attribution, and are therefore different in this respect. However, all adnominal adjectives have

the same, attributive source. This approach also necessitates a change in the boundaries of what has previously been considered attribution.

As Cinque (2010) demonstrates, adnominal adjectives are a varied class. For this reason, he proposes two separate sources of adnominal adjectives, namely reduced relative clauses and a direct, attributive source. However, I have argued that this approach is both too restrictive and too permissive. The latter parts of this thesis focus on two cases demonstrating this fact.

In chapter 3, I examined AP adjacency. This is the observation that, in languages where an AP and another category (such as a PP or a genitive DP) both modify the same noun, the order of the modifiers is free in languages where the noun comes last in its phrase and fixed in languages where it comes first in its phrase. In other words, XP-AP-N, AP-XP-N and N-AP-XP are all attested cross-linguistically, but \*N-XP-AP is not an attested variant of the N-AP-XP ordering.<sup>1</sup> Furthermore, the scope between the modifiers is observed to vary with c-command in noun-final languages, so that each linear string is unambiguous, but not in noun-initial languages, where the only licit string is ambiguous. I argued that this phenomenon, which might superficially appear to support a dual-source analysis of adnominal adjectives, is actually best understood as resulting from a linear constraint that requires all JOIN-bearing modifiers of the noun (by hypothesis, all attributive adjectives) to precede non-JOIN-bearing modifiers in their JOIN domain.

The JOIN-First Constraint, parallel to Janke and Neeleman's (2012) Case-First Constraint, accounts for the observed freedom in the ordering of modifiers

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<sup>1</sup>Where N-XP-AP is found, as in Spanish, it seems to result from an extraposed reduced relative clauses, as attributive-only adjectives are disallowed in this position. The same is not true of the AP-XP-N order.



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before the noun and fixed ordering after the noun. Pursuing this parallel with the verbal domain, I showed that NP-shells allow for the observed ambiguity in the N-AP-XP string. Both derivations in (4) obey the JOIN-First Constraint, but the c-command relations between A and X are different.

- (4) a. [N [A [t<sub>N</sub> X ]]]  
b. [[N A] X]

The best argument for the existence of a linear constraint is that it is satisfied by the same surface string, regardless of the underlying structure. This is the case with AP adjacency: not only do both structures in (4) satisfy the JOIN-First Constraint, but so do a number of more complicated derivations in Spanish. This is not just an argument for the existence of this particular constraint, but also for the idea that all adnominal adjectives are attributive, because all adjectives are subject to AP adjacency, not merely ones that can appear predicatively.

Chapter 4 argues that an adjectival construction that has previously been taken to be indicative of attribution (e.g. by Larson 1998 and Cinque 2010) is not in fact a direct result of attribution. The ‘nonintersective’ reading of examples like the following, which disappears in predication and when the adjective is separated from the noun, has been argued or assumed to result from a particular, attributive relationship between the adjective and noun:

- (5) a. a nuclear physicist  
b. a hard worker
- (6) a. \*a nuclear experimental physicist  
b. \*a hard steel worker

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- (7) a. \*This physicist is nuclear.  
b. \*This worker is hard.

However, I presented evidence that these examples are in fact bracketing paradoxes, as previously argued by Pesetsky (1979); Williams (1981, 2003) and Ackema and Neeleman (2004). The meanings of the phrases in (5) are not nonintersective or unpredictable. They are entirely systematic and compositional, but the semantic bracketing is not what we would expect given the phonological bracketing. They are therefore bracketing paradoxes: the phonological and semantic bracketings do not match. The difference between *nuclear physicist* and *hard worker* lies in where the mismatch occurs: in the former case, the mismatch appears to be between syntax and PF, so that the semantic and syntactic structures are isomorphic. In the latter case, I have argued that the mismatch is between syntax and LF, so that the phonological and syntactic structures are isomorphic. This approach accounts for the behaviour of the Dutch declensional schwa, which differs in the two cases.

These mismatches need to be regulated, to avoid overgeneration. I argue that an approach like Sproat's (1988) Mapping Principle accounts for the behaviour of PF bracketing paradoxes, and present an analysis predicated on movement for LF bracketing paradoxes. This movement, and indeed all movement, is argued to be constrained by the principles of Information Preservation, ensuring that information about the head of a structure, its selectional relations, and c-command relations between non-heads is preserved after movement.

This analysis avoids the need for a second source of adjectival modification, but it entails that phrases like those in (5) also do not result directly

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from attribution. The exceptional behaviour of the adjectives in bracketing paradoxes, both in terms of their unexpectedly strict ordering requirements and their nonstandard interpretations, is instead due to the availability of mismatches between different modules of the grammar. This means that syntactic structures that do not resemble attribution might superficially appear attributive. These mismatches are only allowed where the linear string is compatible with each of the representations assigned to it, explaining their rigid ordering requirements.

### 5.2 Implications of a single adnominal source

If all adnominal adjectives have the same source, namely attribution, a number of consequences for our understanding of that source follow. Firstly, I have said nothing about the adjective ordering hierarchy or its nature, except for showing that it is not universal and is violable. The approach argued for in this thesis does not explain where the hierarchy comes from or why it is the particular way it is, and the hierarchy does not naturally fall out from a JOIN-based analysis of attribution. It therefore seems that the hierarchy is independent of the actual mechanism introducing attribution, and its properties cannot necessarily be derived from the properties of attribution itself.

Furthermore, the hierarchy itself is not absolute. We have seen that some adjectives, like *former* and *alleged*, are not subject to the hierarchy, and that they take scope over whatever their syntactic sister seems to be. Additionally, even adjectives like *big* and *red*, which are normally subject to ordering restrictions, can have their ordering reversed in the right information structural circumstances, and their interpretation is different under this reordering.

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Cases where the hierarchy does not apply, or where it is violated, therefore have implications for the scope of the adjectives in question.

Note also that I have remained silent on the issue of whether changes in adjective orders must be derived by movement or whether they can be base-generated. The present proposal can in principle accommodate either or both of these options. Indeed, it may be the case that some reversals (such as those concerning adjectives that are not subject to the hierarchy) are base-generated while others (involving focus movement, for example) are the result of movement.

The existence of a single adjectival source also means that the systematic interpretive effects found where an adjective is repeated, or contrasted with its antonym, cannot be due to the existence of a second source of adnominal modification with different properties to the first. I have argued that the fact that the stage-level reading always precedes the individual-level reading in examples like the following can be explained by pragmatic, rather than syntactic factors:

(8) the invisible visible stars (stage > individual; \*individual > stage)

Similarly, the other interpretive effects that Cinque (2010) attributes to two different sources of adnominal modification must be due to some other factor. These include the ambiguity of *different*, *possible* and *unknown* in examples like (9) (for more discussion on the nature of these ambiguities, see Cinque 2010, ch.2).

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- (9) a. Sam and Alex live in different different cities  
(discourse anaphoric > NP-dependent;  
\*NP-dependent > discourse anaphoric)
- b. Mary interviewed every possible possible candidate  
(‘implicit relative’ > modal; \*modal > ‘implicit relative’)
- c. John lives in an unknown unknown village in France  
(epistemic > evaluative; \*evaluative > epistemic)

These examples all seem amenable to an analysis like that proposed in chapter 2 for (8).

However, not all of the differences between Cinque’s two sources of adnominal modification must be given a new analysis under the single-source approach. In particular, Cinque accounts for at least some of the scope effects found between adjectives, because his RRC\*s always scope over direct modification adjectives. While I reject the distinction between RRC\*s and direct modification, I too have accounted for adjectival scope. However, the predictions made by the dual-source and single-source analyses differ, and I have argued that the single-source analysis gives a better account of the data. Furthermore, Cinque recognizes that the adjectival hierarchy is not absolute, although the way in which he allows violations to occur (namely by allowing some adjectives to participate in either RRC\* or attributive modification) is problematic.

A final implication of the research presented here relates to movement. I have shown that verbal bracketing paradoxes can be viewed as a kind of traceless movement that is constrained by the principles of Information Preservation. This approach entails the separation of movement itself from chain

formation and the licensing of traces. However, it also entails that traces are required where the movement operation in question would violate Information Preservation, if traces can serve to satisfy its requirements. In essence, this will require a well-formed chain wherever an item moves past a c-commanding non-head.

### 5.3 Future research

This thesis also leaves several questions unanswered. Perhaps the most obvious is an explanation of the adjective ordering hierarchy and its properties. While the hierarchy is obviously relevant to any discussion of adnominal adjectives, it has only been touched on in this work. A deeper understanding of why it requires the particular order of adjectives it does, exactly which categories of adjective exist, and how it relates to other ordering hierarchies (not least of which is the adverb ordering hierarchy) still proves elusive.

JOIN also requires further study. This morpheme has been proposed as the source of attribution and the anchor for the JOIN-First Constraint, but I have not provided a complete semantics for it. I have provided some description of the type of phenomena it should account for (adjective scope and the requirement for an adjective to take scope when it is not obeying the hierarchy, for example), as well as some it should not (modality, given that not all modals are attributive), and I have discussed some of its general semantic and syntactic properties. However, a more detailed analysis is required. I hope that the data presented in this thesis will go some way towards establishing precisely what the properties of attribution are and how it differs from other nominal modifiers, and therefore what should be accounted for in the semantics of JOIN.

## CONCLUSION

JOIN has been proposed as an abstract morpheme, but if it exists there is no reason to suppose that it is never pronounced. An exploration of potential realizations of JOIN would therefore be a worthwhile pursuit, and may also provide more information on the nature of this morpheme. There are several languages that would be good starting points for this search. Siegel (1976) argues that long form adjectives in Russian are only ever found adnominally, and that short form adjectives only ever predicatively. The long form ending may therefore be a reflex of JOIN. Klaus Abels (p.c.) also suggests that the regular schwa ending found on all and only adnominal adjectives in German could possibly be analyzed as a realization of JOIN. The Ezafe vowel in Persian may also be a candidate. While the Ezafe appears in a number of constructions other than attributive modification (Ghomeshi, 1997), there is some evidence that it may not be a single phenomenon. Holmberg and Odden (2008) investigate Hawrami, a dialect of Kurdish, and conclude that the Ezafe (called Izafe in Hawrami) that is found on adnominal adjectives is a separate phenomenon from the vowel that appears in other contexts. This therefore provides a promising line of inquiry for identifying an overt realization of JOIN.

The theory of movement proposed in chapter 4 to account for verbal bracketing paradoxes will also have implications outside of the nominal domain. If the view of movement as separate from the requirements of chain formation, and subject to the requirements of Information Preservation, is on the right track, then we might expect to find its effects in places other than bracketing paradoxes. As discussed above, movement without a trace will only be seen where the bottom-most two non-heads can be rebracketed to form a con-

stituent. This fact about the effects of Information Preservation should help narrow the search for relevant configurations.

## 5.4 Concluding remarks

While adnominal adjectives exhibit varying behaviour in some respects, their syntactic and semantic similarities are such that they should be considered a unified class with a single underlying source. This thesis has provided evidence that adnominal adjectives form a homogeneous class, and that this class is derivationally and semantically distinct from either reduced or full relative clauses. Such a view of attribution entails a different categorization of certain adjectival phenomena compared to an analysis that utilizes multiple sources of adnominal modification. I have discussed one case of attributive modification that could superficially be seen as evidence for a second source, namely AP adjacency. However, I have argued that instead it is best analyzed as resulting from a constraint requiring a particular linear relationship between attributive modifiers and other modifiers of the noun. On the other hand, bracketing paradoxes, which have previously been seen as diagnostic of attribution, have been argued to result from a mismatch between different modules of the grammar, rather than from attribution directly. A single-source analysis of attribution represents a simplification over multiple-source analyses, and more straightforwardly accounts for the numerous similarities between all adnominal adjectives.



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