Deriving complex verbs using Merge

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Abstract

This thesis aims to develop a means of deriving inflected verbs that does not rely on the head movement (HM) operation. Guided by the Strong Minimalist Thesis, I argue that HM is problematic for empirical and theoretical reasons. Accordingly, I put forward an alternative means of deriving complex verbs which uses only theoretical gadgets needed for external reasons, e.g. Merge, a workspace, copying, Agree and labelling. Combining these five elements allows complex verbs to be derived outside of the clausal spine in the same way as internal and external arguments. The verb is built in the workspace using external Merge and then each element of the verb is copied. Copying is facilitated by assuming that Merge is untriggered; that the workspace can contain multiple structures, and finally that constituents can be Merged from one structure into another, an operation referred to as *parallel Merge* in the literature (e.g. Citko 2005). Once the complex verb is built, each element of the verb is copied using parallel Merge which allows the clausal spine to be generated. With this system there is no correlation between a verb's position and its level of inflection since it is built before being attached to the clausal spine. Once the new system has been developed, it is applied to a set of so called multiple copy Spell-Out constructions and found to have benefits that HM is lacking. The data includes predicate cleft constructions, verbal repetition constructions and finally, heavily inflected verbs from Kiowa. The parallel Merge alternative is particularly beneficial for data where two copies of an element are pronounced but with different forms, e.g. a tensed verb and an infinitive verb, because each copy is independently generated in the workspace.

Contents

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I could not have done this thesis without the help provided by these people. The first is my supervisor George Tsoulas who listened to all my hair-brained schemes and helped me shape them into something cohesive and usable. Second is Norman Yeo, my TAP member. His comments were invaluable and helped me climb out of many holes that I had managed to dig myself into. Also, it was Norman's first and second year undergraduate syntax seminars that developed my interest in syntax and made me want to pursue the subject. I would also like to thank an audience at a departmental Postgraduate presentation day for feedback and comments, including Peter Sells, Nina Radkevich, Dimitris Michelioudakis, Eytan Zweig and Norman Yeo (again). The Linguistic department at York also deserves a mention, and in particular Dunstan Brown and Peter Sells, for all the teaching work they gave me during my studies. The experience (and money!) were invaluable. Thank you to all the module leaders that I had the pleasure of working for: (in alphabetical order) Nino Grillo, Julia Kolkmann, Caitlin Light, Peter Sells and Ann Taylor. Finally, I would also like to thank the audience at LAGB 2018 for invaluable inputs on what became a significant part of chapter 5. Special thanks here go to David Adger and Andy Murphy. Their feedback shaped the final form of this thesis in a non-trivial way.

Author’s Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References. Parts of chapter 5 were presented in their infancy at the Linguistics Association of Great Britain (LAGB) Annual Meeting 2018 in Sheffield (11^{th} to 14^{th} September 2018).

Chapter 1

Introduction

The *Head Movement* (HM) operation has been a theory internal thorn in modern generative grammars since Minimalism gained traction following its development by Noam Chomsky in the mid 1990s (see Chomsky 1993, 1995 for early instantiations of the Minimalist Program). HM is highlighted as an issue for one reason or another in many different analyses (see for instance, Bobaljik & Brown 1997; Bruening 2017; Carstens, Hornstein, & Seely 2016; Chomsky 2001, 2015; Chomsky, Gallego, & Ott 2019; Epstein, Kitahara, & Seely 2016; Harizanov & Gribanova 2018; Matushansky 2006; Roberts 2011). Significantly, HM was developed in an earlier non-Minimalist framework (see Baker 1988) and it never made a satisfactory theoretical transition from the Principles and Parameters era of generative grammar into Minimalism. Yet if the operation was dropped altogether courtesy of its theoretical shortcomings in Minimalism, then a large body of data would become underivable and need to be reanalysed. In addition, a significant empirical generalisation, the *Mirror Principle* from Baker (1985, 1988), would be lost.[1] Thus there is tension in the literature. On the one hand, some adopt the operation regardless (e.g. Collins & Essizewa 2007; Kandybowicz 2008; Landau 2006) while others try and develop the operation to circumvent the issues, as in Bobaljik and Brown (1997) and Matushansky (2006). Finally, there are analyses which banish HM altogether and develop something new (for instance, Adger, Harbour, & Watkins 2009; Brody 2000; Bruening 2017) but that risk losing some of the empirical power of head movement.

With these considerations in mind, the ultimate aim of this thesis is to develop a means of deriving verbs containing hierarchical structure, dubbed *complex verbs* from now on, without the issues associated with HM. One set of problems is theoretical and can be found in many places in the literature (e.g. Bobaljik & Brown 1997; Chomsky 2001; Matushansky 2006;

[1] The validity of the Mirror Principle does not go unquestioned. See for instance the discussion in Bruening (2017), although it worth pointing out the nothing in Bruening's system can derive the Mirror Principle anyway.

Roberts 2011) while the other is empirical and relates to how HM is used in the literature to derive various types of data where a verb or an element associated with a verb is pronounced twice (see Collins & Essizewa 2007; Kandybowicz 2008; Landau 2006). The analysis will be couched in the Minimalist research program developed by Chomsky (1993, 1995). At this point, it is worth mentioning that, while certain operations and constraints that were proposed in Chomsky's early Minimalist work have been changed and in some cases superseded (see for instance Chomsky 2013 and Chomsky 2015 which develop labelling and projection), the fundamental principles of the program have not changed. These principles are provided in what follows before a brief description of the key operations adopted in this thesis are presented for the sake of clarity.

The aim of the Minimalist Program is to limit the postulation of theoretical gadgetry so that the true nature of the language faculty's computational system can be better understood. In of itself, this is not a new goal since the "program is simply a continuation of efforts from the origins of the generative enterprise to reduce the postulated richness of UG, to discover its actual nature" (Chomsky 2013, 38). This effort is embodied within the *Strong Minimalist Thesis* (SMT) which "holds that language is an optimal solution to interface conditions that FL (faculty of language, *SW*) must satisfy" (Chomsky 2008, 135). Thus a grammar that adhered to the Minimalist Program and specifically the SMT would be *perfect* in the sense that it would contain no theoretical postulations that were not strictly necessary in order to derive an object which satisfied all interface conditions.

Yet even a system that adopts a strict version of the Minimalist Program and SMT must allow a means of combining pieces of syntactic structure. Any discussion of Generative Grammar has to assume that something exists which can be used to build syntactic structure. In the past, Phrase Structure rules built sentences (Chomsky 1957), while in more recent times, X'-bar theory produced a hierarchy in combination with the *Projection Principle* (Haegeman 1994; Sportiche, Koopman, & Stabler 2014). Now the combinatorial device assumed in Minimalism is referred to as *Merge* (see Chomsky 1995), and simply put, it takes two objects α and β and combines them to form $\{\alpha, \beta\}$. The extracts provided in (1a) and (1b) illustrate the necessity of the Merge operation in Minimalist analyses:

(1) Merge in Minimalism

a. "This operation (Merge, *SW*) is a necessary part of any theory of human grammar. It allows us to explain how grammar makes "infinite use of finite means." In other words, given two constituents A and B, there must be some way to combine these into a larger constituent {A, B}." (Collins 2002, 43)

b. "any theory of GG (Generative Grammar, *SW*) must assume the existence of a computational system that constructs hierarchically structured expressions with displacement. The optimal course to follow, we think, is to assume a basic computational operation MERGE, which applies to two objects X and Y, yielding a new one, K = {X,Y}." (Chomsky et al. 2019, 232)

The version of Merge provided above does nothing apart from combine two elements α and β to form $\{\alpha, \beta\}$. In its simplest form, nothing is assumed to follow from the operation apart from the construction of binary syntactic objects. For instance, Merge does not subsume that the newly derived object has a label (Chomsky 2013; Collins 2002; Seely 2006) in contrast to the Merge of Chomsky (1995, 2000). So if V Merged with DP the outcome would not be a VP but {V, DP}. In addition, Merge does not specify an order when two elements are Merged together (Chomsky 2013, 40). The specific order is dealt with separately, possibly using something akin to the *Linear Correspondence Axiom* (LCA) from Kayne (1994, 2018) where linear order corresponds to asymmetric c-command relations inside a tree. Finally, it has also been argued that Merge is not triggered by any selection properties (Chomsky 2015) which ties in with the proposal that it does not specify a label. If neither Merging item has a selection property, then one element is not more significant than the other and should not provide a label. The outcome of this expose is an analysis where Merge just builds binary (and maybe unary, see Adger 2013; Kayne 2008; Tsoulas 2016) hierarchical structures. This basic version of Merge is the only one that can be assumed without motivation given that some operation is required to attach elements together into a hierarchy.

While a Minimalist syntax that functioned using just Merge would be most in-keeping with the SMT, there is evidence to suggest that an additional operation *Agree* (Chomsky 2000, 2001) is required to establish relationships between features on two different syntactic objects. Agree is parasitic on feature valuation between a probe that possess an unvalued uninterpretable feature and a goal on which is found a matching interpretable equivalent. The most common types of feature on which Agree functions are ϕ-features. In this case, the probe possesses an unvalued ϕ feature [uϕ] while on the goal is a [iϕ]. Finally, in order for [uϕ] to Agree with [iϕ], and as such receive a value from [iϕ], [uϕ] must c-command [iϕ].

In concluding this brief description of Minimalism, it is worth noting that there are other components that comprise a Minimalist grammar that will be adopted and used in this thesis (for instance, *phases* and the *Phase Impenetrability Condition*) but these will be introduced and discussed as and when they are needed in the main body of the text.

As the aim of this thesis is to develop a means of generating complex verbs without the problems associated with HM using just operations that are available in a Minimalist grammar, what follows now is a description of Baker's (1988) HM analysis since his work on the topic represents a significant milestone in the development of the operation in the *Principles and Parameters* (P&P) era of generative grammars. As will be seen, modern Minimalism and the P&P framework are not founded on the same set of theoretical assumptions, for instance, the concepts of *Government* and *Barrier* do not carry over into Minimalism. Yet despite the issue of motivating HM in Minimalism, the empirical generalisations that Baker (1988) observes still need to be explained by any new analysis based on Minimalist assumptions. Specifically, Baker (1988) argues that certain processes, e.g. passive, applicative and causative, are a direct result of what he refers to as *incorporation* which involves movement and adjunction of a minimal projection X^0 to another minimal projection Y^0. As head movement is a syntactic process, changes in the morphological composition of a word are a direct result of changes in syntactic structure. This argument is captured by *The Mirror Principle* in (2) from Baker (1985, 375) which ensures that when more than one syntactic operation takes place, they occur in a specific order, e.g. it is possible to passivise an applicative but it is not possible to apply the applicative process to a passivisation.

(2) **The Mirror Principle**

Morphological derivations must directly reflect syntactic derivations (and vice versa).

In addition, Baker argued that the *Head Movement Constraint* (HMC) (Travis 1984, 131) in (3) fell out from the *Empty Category Principle* (ECP) (Baker 1988, 39) in (4), which at the time was stated in terms of *Government* (Baker 1988, 39) in (5):

(3) **The Head Movement Constraint**

An X^0 may only move into the Y^0 that properly governs it.

(4) **The Empty Category Principle**

a. Traces must be PROPERLY GOVERNED.

b. A PROPERLY GOVERNED B iff A governs B, and A and B are coindexed.

(5) **Government**

A governs B iff A c-commands B and there is no category such that C is a barrier between A and B (cf. Chomsky 1986).

Finally, the definition of *Barrier* used by Baker (1988, 56) is provided in (6):

(6) **Barrier**

Let D be the smallest maximal projection containing A. Then C is a BARRIER between A and B if and only if C is a maximal projection that contains B and excludes A, and either:

a. C is not selected, or

b. the head of C is distinct from the head of D and selects some WP equal to or containing B.

The combination of these definitions meant that when a head X moves, it has to move and adjoin to the next highest head Y because otherwise the maximal projection of another head would act as a barrier between X and Y. Thus the HMC, ECP, Government and Barrier all work in tandem to ensure that head movement is successive cyclic since a head X can never move beyond a head Y which immediately dominates it, with *it* referring to X.

We are now in a position to look at an example to tie these concepts together. The clauses provided in (7a) and (7b) contain the same thematic roles. As Baker (1988, 46) uses the *Uniformity of Theta Assignment Hypothesis* (UTAH), two clauses that contain the same thematic roles have to be derived from the same D-structure and related to each other by movement. The examples are from a Bantu language (Chichewa) and demonstrate what Baker refers to as *Causativisation*:

(7) Chichewa

a. Mtsikana a-na- chit-**its**-a kuti mtsuko u-**gw**-e.
girl do-**CAUSE** that waterpot **fall**
'The girl made the waterpot fall.' -

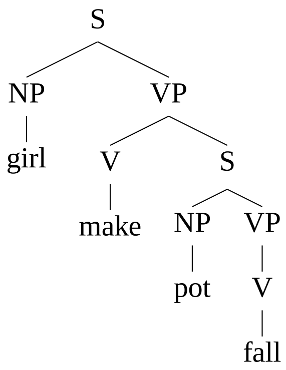
b. Mtsikana a-na- **gw**-**ets**-a mtsuko.
girl **fall**-**CAUSE** waterpot
'The girl made the waterpot fall.'

(Baker 1988, 21)

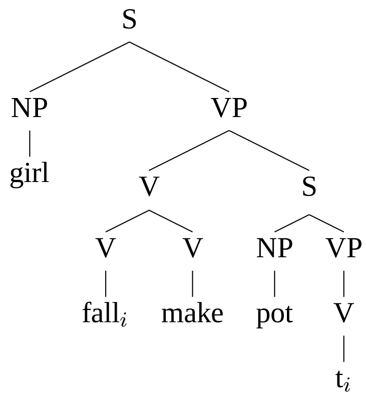
The thematic role assigned to *mtsuko* 'waterpot' is a theme in both sentences. Given UTAH, it must be the case that *mtsuko* originates from the same D-structure position in (7a) and (7b). Baker (1988) derives the key difference between these clauses by HM and argues that the verb *-gw-* 'fall' moves and adjoins to *-its* 'CAUSE'. Consequently, the tree in (8a) represents the D-structure of (7a) and (7b), while the tree in (8b) represents the post-HM structure of (7b):[2]

[2]The presentation of (8a), (8b) has been modified slightly from Baker's (1988) originals.

(8) a.



b.



The trees in (8a) and (8b) illustrate that HM can derive the difference between (7a) and (7b) since the head *gw* 'fall' from the lower VP moves and adjoins to the next highest head in the clause, namely *-its* 'CAUSE'. This movement operation is consistent with the constraints provided in (3)-(6) as the moving verb does not skip *-its* 'CAUSE'. Thus Baker's (1988) formulation of HM derives the data to which it is applied. It is worth nothing that data which seems to be an issue for the Mirror Principle has been presented in the literature, for instance the discussion in Bruening (2017) and Harley (2011), although the latter argues that head movement and a combination of two other operations can derive some problematic data from Cupeño and Navajo. See section 6.4 for more on this topic.

The head movement operation as stated in Baker (1988) is incompatible with Minimalist proposals for two reasons. The first reason relates to (3)-(6) since these constraints have been superseded in Minimalism, at least with regards to how they are stated here. The data that the ECP captures still requires an explanation, but the ECP itself cannot be stated in terms of Government and Barriers. As a consequence, (3)-(6) cannot be used to motivate the HM operation which is an issue especially since the ECP, Government and Barriers were required in the P&P approach for independent reasons which allowed HM to fallout from the system. The second problem relates to how structure is built in Minimalism using the Merge operation. As mentioned above, Merge takes two elements α and β and combines them to form $\{\alpha, \beta\}$. In of itself, nothing inherent in the definition of simplest Merge prevents the operation from embedding one element inside another since Merge just combines α and β without stipulating where each element has to be in relation to its Merge partner. Yet Merge is often paired with an assumption that it can only apply at the root of a tree (see Adger 2003; Chomsky 1995, 2000, 2001, 2005; Collins & Stabler 2016) in order to limit its computational burden. This assumption is formalised as the *Extension Condition* (ES) in earlier papers and by the *No Tampering Condition* (NTC) which, according to Chomsky (2005, 13) entails the ES. If it is assumed that Merge cannot embed, then deriving head adjunction in the syntactic component is not possible because HM requires that embedding takes place. Thus given that the HMC, ECP, Government and Barrier are not contained in the Minimalist toolbox and that Merge is assumed not to embed, HM is not a permissible Minimalist operation because it requires (3)-(6) to hold and for head adjunction to be derivable by Merge. Neither of these requirements are possible in Minimalism.

It is worth mentioning at this point that HM is a recognised problem in the literature and not an issue novel to this thesis. Problematic aspects of the operation extend beyond (3)-(6) being unavailable and Merge applying at the root. For instance, Chomsky (2001) highlights that syntactic HM does not have a significant effect on the interpretation of a clause, e.g. in French verbs raise to T in matrix clauses; in Scandinavian languages the main verb is often found adjoined to C, and in English, the main verb is argued not to move out of the verb phrase, i.e. it adjoins to *v* or Voice depending on the analysis. Adopting the Y-model of syntax, it is reasonable to expect that movement in the syntactic component should have an effect on the interpretation of a clause once it is transferred to LF, especially given the effect of syntactic phrasal movement at the interface. Yet Chomsky argues that this expectation is not realised in the data as there is no fundamental difference between the interpretation of English, French and Scandinavian matrix clauses even though their main verbs appear in different positions.

This issue cannot be taken as conclusive evidence that the effects of HM should not be derived in the syntactic component, but rather that some HM operations do not have an interpretative effect. Kandybowicz (2008), Collins and Essizewa (2007) and Landau (2006) all adopt the operation and use it to derive structures within which an effect is noticeable. More on this in later chapters. Also, others argue that HM can affect scope relations, e.g. Lechner (2006) and Roberts (2010). Thus proposing that HM should be moved to PF on the strength of the French, German and English main verb data misses a significant amount of evidence which suggests that HM is syntactic. In addition, while it may be the case that verb position between languages does not make a difference to interpretation, there is a significant difference when, for instance, an auxiliary verb in English is realised in the C position. Consequently, contrary to Chomsky's claim, head movement has to be involved in processes which effect the meaning of a clause.

Furthermore, Chomsky (2001, 37-8) discusses problems with the mechanism that is argued to trigger head movement. For instance, if T has a strong D feature and a strong V feature, it was assumed that the D feature is satisfied by moving a DP into the specifier of TP, i.e. EPP movement, and that the strong V feature is satisfied by adjoining the verb to T. Yet in principle, there is no reason why the strong V could not be satisfied by moving the VP into the specifier of T, or indeed, adjoining the entire VP to T. In a similar vein, it should also be possible to satisfy the strong D feature by HM of D to T rather than moving the entire phrase. The same problem holds when the specifier of CP is filled with a wh-phrase: why does the phrase fill the specifier and not adjoin to C? Also, when T-C movement takes place, why does T not end up in the specifier of CP and is instead adjoined to C? Chomsky (2001, 38) suggests that these issues can be avoided by assuming that HM is a phonological operation which would allow feature driven movement to always target a specifier in the syntax.

The final problem mentioned by Chomsky (2001) relates to the way that HM is roll-up in the sense that *excorporation* (to use Baker's (1988) terminology) is not possible. The effect is that the entire complex head has to move rather than just the element attracted by the strong feature. The difference can be illustrated by comparing the outcome of wh-movement and HM. When a phrase appears in the specifier of matrix CP *What did John say that Mary ate?*, it has to move through four phases which results in there being multiple occurrences of *what* within both clauses. Crucially, and in contrast to HM, the wh-phrase is not incorporated into anything and each feature that triggers movement of the wh-phrase just attracts the XP that is required. The same is not true for HM in general as excorporation is for the most part not possible.

The head movement operation is also an issue for new labelling systems where Merge is assumed to not provide a label when two elements are combined. Specifically, Chomsky (2013, 2015) proposes that Merge does not subsume a label and that it is the task of an independent *labelling algorithm* (LA) to supply labels to syntactic trees. There are three different scenarios that can occur when LA is applied to a tree and these are shown in (9):

(9) **Labelling Algorithm**

a. When labelling a {X, YP} structure, the labelling algorithm locates the head X via minimal search and labelling is trivial. X labels.

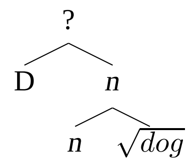
b. When labelling a {XP, YP} structure, the label is ambiguous between X and Y, so either the syntactic object is modified so only one head is visible to LA or LA locates a feature shared by X and Y to provide the label.

c. When labelling a {X, Y} one of the labelling elements is stipulated to be too "weak" to label (Chomsky 2015, 47). Thus in a {$\surd$, *v*} structure, $\surd$ does not label while *v* does.

As the purpose of this thesis is to examine head-head constructions and to propose an alternative to head movement, the problem relates to (9c) since {X, Y} are labelled via a stipulation. In a system that adopted successive cyclic movement, the problem would be even more of an issue because each occurrence of movement would need to be labelled. For instance, in a V2 language where a main verb moves from its position in *v*P (or Voice depending on the analysis), there would be {X, Y} constructions in the *v*, T and C positions at least, and more if Kratzer's (1996) Voice head is adopted. Thus a significant portion of a tree containing successive cyclic head movement has to be labelled via a stipulation. True Chomsky (2015) suggests that V2 phenomena may be moved to externalisation, but even so, V-fronting constructions where the displaced verb has an effect on interpretation must be derived in the syntactic component. Consequently, if Chomsky's (2013) LA was applied to these analyses, there would be many instances of {H, H} labelling and those involving a $\sqrt{}$ and *v* would have to be dealt with via a stipulation. Furthermore, Chomsky does not mention how an {X, Y} construction would be labelled which involved two heads where neither is a root, e.g. something akin to {Voice, *v*}. A structure like this could materialise in a tree where the *v*+$\sqrt{}$ complex is head adjoined to Voice via cyclic head movement. As $\sqrt{}$ is too weak to label, it would be ignored by LA which allows Voice and *v* to compete. It is not obvious which head the LA would choose.

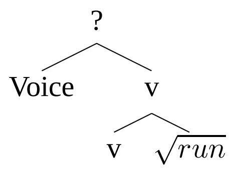
The discussion surrounding the labelling algorithm and {X, Y} constructions–whether they are derived by head movement or first Merge–illustrates that the dynamic between heads and phrases has changed. For instance, when trees were labelled using *Bare Phrase Structure* (BPS) a distinction was not drawn between a phrase and its head because the same label was used in both cases, e.g. the label of a verb phrase changed from $\{_{\text{VP}}$ jump} to $\{_{\text{jump}}$ jump}. Yet in the new labelling literature, LA relies on being able to distinguish heads from phrases as each behaves differently when a label is being assigned. The specific issue is that a head can be a single or multi-headed element in the same way as a phrase can be a single or multiple headed element. For instance, when C Merges with TP (or $<\phi\phi>$ using the LA derived label), C is unambiguously the closest label. On the other hand, take a phrase such as *the dog*, which is composed of a $\sqrt{}$, *n* and D. It should be the case that the phrase is labelled D since at first glance D is the closest head. In reality however, *n* and D should fight for the right to label the phrase. The tree in (10) illustrates why this is the case:

(10)



Adopting the proposals from Chomsky (2013) and Chomsky (2015), $\sqrt{dog}$ is too weak to project which allows *n* to label the *n*+$\sqrt{dog}$ complex. D is then Merged with *n* which in turn means that the D+*n* constituent needs a label. The issue here is that D and *n* are equidistant from the top of the tree, meaning that they should compete for a label, which is of course not the right result since D should be the one to project in isolation. The significant aspect of this problem is that it also holds for complex verbs as demonstrated by the tree shown in (11):

(11)



The root $\sqrt{run}$ is stipulated not to project while *v* does, which should mean that Voice and *v* fight to label the '?' in (11) as both elements are equidistant from the unlabelled node. The labelling issue did not occur in previous implementations because the target of the movement operation always projected. So for instance, if (11) was to be derived by HM, $\{_{v}\ v\ \sqrt{}\}$ would move from its Merge position and adjoin to Voice, but Voice would project being the target of the operation. Yet using the labelling algorithm is a problem because labels are assigned by the closest head which, as illustrated by (11), is not possible since *v* and Voice compete.

In certain systems (e.g. Adger 2003), the similarities between verbs and determiner phrase arguments extend to the fact that both enter Agree relations with other elements of the clausal spine. For instance, the external argument Agrees with T and values an uninterpretable [uϕ] feature representing subject-verb agreement. The subject-verb agreement is encoded on the verb by an Agree operation: a [uInfl:] is valued with the appropriate ϕ-features and tense value. Thus the subject and verb Agree with T and have to Agree with T so that the ϕ-features on the subject are represented by the inflection assigned to the verb during vocabulary insertion.

Furthermore, and as mentioned above, one of the issues that scholars have used to criticise head movement relates to the effects that the operation has on the interpretation of the clause (see Chomsky 2001; Roberts 2011 for discussion). If displacement alters the interpretation of a clause and if HM, at least for the most part, does not generate the same interpretative effects as other types of movement, then it follows that movement may not be the right operation for deriving inflected verbs. As a consequence, a similarity can be drawn between building a complex verb and building an external argument (EA), since first Merge of the EA does not alter the interpretation of a clause much like verb movement is argued not to affect interpretation at least much of the time.

Given the issues noted for head movement and the similarities between complex verbs and argumental DPs, the central proposal of this thesis aims to unify the way in which both phenomena are constructed. To this end, I propose that complex verbs, like argumental DPs, are derived outside the clausal spine in the workspace before they are attached to the main tree in full. In a nutshell, the lexical items that form a clause are selected from the lexicon and placed in the workspace. In a language like English which has a limited verbal morphology, a verb consists of a root $\sqrt{}$, a categoriser *v*, a Voice head and a T head. These elements are Merged together. The internal and external arguments are then built by the same process in the usual fashion. At this point, the workspace (W) for a transitive clause *the woman jumped the fence* would contain four constituents: the subject, the object, the inflected verb and a C head. A representation is provided in (12) for reference:

(12) **Workspace**

{$_{W}$ C, {the, {*n*, $\sqrt{woman}$}}, {the, {*n*, $\sqrt{fence}$}}, {{{$\sqrt{jump}$, *v*}, Voice}, T}}

As the hierarchy of the clausal spine matches the complex verb in many cases, I propose that each element within the complex verb is copied and used to build the clausal spine. The copy operation is facilitated by Merge and does not require any additional assumptions other than those that are used already in many analyses. For instance, I assume that at the point of application, Merge is not triggered by selection requirements; Merge does not provide a label; Merge generates binary syntactic objects, and finally, that Merge cannot embed as per the Extension Condition which is shown in (13) for reference:

(13) **Extension Condition**

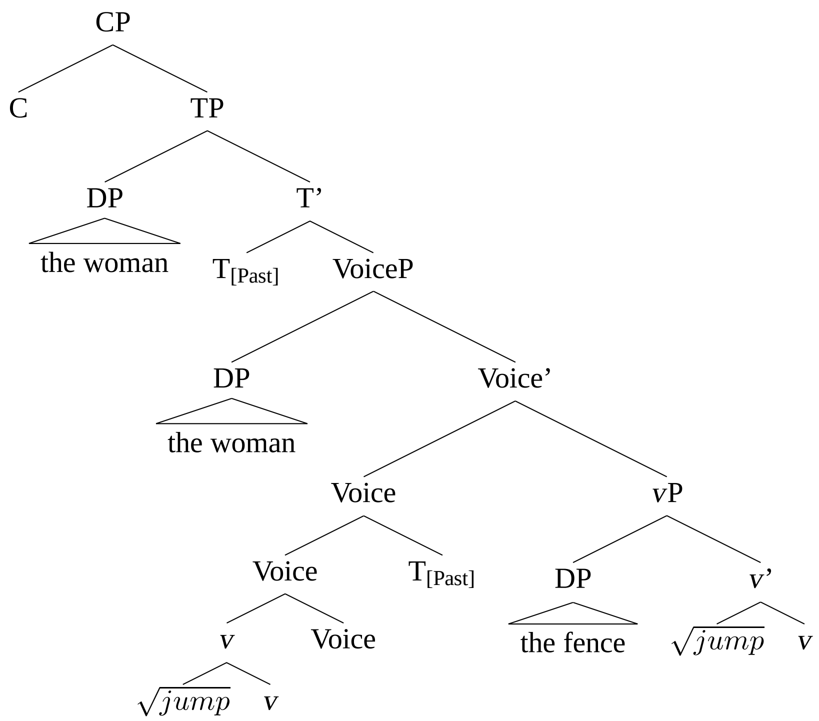
Merge applies at the root only.

(Chomsky 1995, 248)

In addition, I assume that the Merge operation can build multiple objects in the workspace at any one time and that constituents can be Merged from one tree into another. The first assumption is a necessity in many systems to allow arguments and other items to be held while the clausal spine is built. The second is also not a novel idea to this thesis and is found in the literature under the name of *parallel Merge* (Citko 2005), with other versions being called *external remerge* (de Vries 2009) and interaboreal operations (Bobaljik & Brown 1997). Adopting these assumptions along with untriggered Merge allows the lexical items from inside the complex verb to be duplicated. The duplicates can then be used to generate the clausal spine. For instance, say that the subject, object and verb have been assembled as per (12). The clausal spine has to be built from the bottom up to avoid an extension condition violation so the first items copied from the verb are $\sqrt{jump}$ and the categoriser *v*. These items are selected and combined as a separate tree in the workspace. The direct object is then Merged with the

{$\sqrt{jump}$, *v*} amalgam to form the *v*P. Then the verb and *v*P are selected and combined to form the Voice' before the subject is added to complete the VoiceP. Finally, T is selected from inside the verb and Merged with the VoiceP to form T'. The subject internally Merges into the specifier of TP before C is added to complete the derivation. The process of generating structure highlighted above for the workspace in (12) would produce the tree in (14):

(14)



Building (14) utilizes untriggered internal Merge, external Merge and parallel Merge to generate structure. The subject, object and verb are built first before a new tree is produced in parallel to represent the clausal spine. As the clausal spine is built, each constituent is attached to the tree in the appropriate position, i.e. the object is in spec-*v*P, the verb is in the Voice position while the subject is in spec-VoiceP. At no point in (14) was head movement used to build structure and affix hopping (or a similar operation) was not needed to provide the verb with a tense inflection. Since HM is not used to build syntactic structure, there is no association between the position of a verb in the clause and the number of inflections it possesses, e.g. in contrast to Harizanov and Gribanova's (2018) *size-height correlation* which correlates the height of a verb with its level of inflection as head movement is upward and cyclic.

Despite that the new analysis has benefits that HM does not, e.g. inflections do not correspond with the height of a verb in the clausal spine, it also generates a number of questions which need answering and which will be answered during this thesis. First, how are the heads within complex verbs matched with those that comprise the clausal spine? In the derivation, I illustrated that this can be done using Merge (internal, external and parallel), although another alternative would be for the lexicon to be accessed each time. Yet using Merge is more efficient in this regard because the operation is only applying to elements that are contained in the workspace.

Second, what triggers Merge of the complex verb with the clausal spine? The simplest answer to this question is “nothing” if current Minimalist analyses are correct in assuming that Merge is not triggered, e.g. as in Chomsky et al. (2019). Yet even if Merge is not triggered, something still needs to ensure that the verb is Merged with the clausal spine in the right place. Accordingly, I explore a labelling option which applies at the phase level and not at the point when Merge occurs.

Third, why do the heads in the clausal spine select arguments while the ones in the complex heads do not? If Merge is free, then this is an issue for the output conditions to determine. More will be said on this topic later. A point connected to question number three, relates to distinctness in the sense that if *v* inside the complex verb and clausal spine *v* are viewed as indistinct, then it is feasible that a derivation could converge when only one *v* is in an argument relation with a DP seen as the theta requirements of *v* are satisfied at some point during a derivation.

Fourth, how does projection work inside the complex verb and how does the complex verb interact with the labels inside the clausal spine. In the derivation of (14) above, I have assumed that Voice projects through the verb with the result that the constituent is realised as a Voice category. I shall explore the possibility that projection can be used as a means of ensuring that a verb is Merged in the right place in the clausal spine in chapter 2.

While the impetus of the new system is theoretical in nature, it offers a number of empirical benefits when compared to traditional head movement. As mentioned above, complex verbs are built before the clausal spine and Merge is used to duplicate elements from the verb into the workspace. The copies are then Merged together to form the clausal spine. As HM does not build the complex verb, it can be Merged with the clausal spine in any position (within reason), e.g. a verb could be Merged in the *v*, Voice, T, C positions, or as seen later, into a specifier. The fallout of this freedom is that a verb can be found in a low position without needing to posit that affix hopping provides a verb with its inflection. Yet if verbs were derived using head movement only, then it would be expected for verbs in a high position to be more inflected than verbs in a low position.

In addition, deriving complex verbs in the workspace before copying them using Merge ensures that a version of the *Mirror Principle* (Baker 1985, 1988) holds because the hierarchy of the verb has to at least partially match the structure of the clausal spine. For instance, in

(14) *v* is Merged with $\sqrt{jump}$ when the verb is assembled in the workspace. Voice and T are attached to complete the constituent. If the clausal spine was derived by copying the verb from the top down, T and Voice would be copied first and Merged together. Then, when it came time to copy the *v* and $\sqrt{}$ and attach them to the clausal spine, Merge would need to embed *v* and $\sqrt{}$ inside the T/Voice amalgam which would violate the extension condition. Thus the complex verb has to be copied from the bottom up and the clausal spine has to be built the same way in order for Merge to avoid embedding. Since the clausal spine and complex verb are built from the bottom up and contain the same heads, a version of the Mirror Principle is ensured because both structures need to be hierarchically comparable.

Testing the validity of the proposal that complex verbs and clausal spines are related in the way indicated above is at first glance problematic because it requires data within which verbal suffixes are pronounced in conjunction with corresponding free standing particles. In a language like English where verbs are inflected with minimal information, the proposal can be argued to hold but only trivially. Yet Adger et al. (2009) analyse a language, Kiowa, where so called *pre-verbal particles* must appear alongside verbal suffixes. An example of Kiowa from Adger et al. (2009, 75) is provided in (15) for reference:

(15) **Háyátto hɔ́** ∅– dę̰i- hę́í-**mɔ̂ɔ-t!ɔɔ**
probably NEG 3s–sleep-die-NEG-MOD
'Probably he won't fall asleep.'

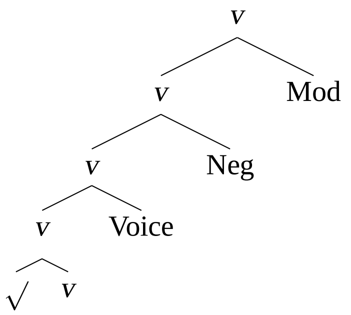
In (15) there are two pre-verbal selective particles, *Háyátto* 'probably' and *hɔ́* 'NEG'. These particles occur alongside two verbal suffixes *mɔ̂ɔ* 'NEG' and *t!ɔɔ* 'MOD' (the particles and suffixes are in bold font). As will be shown in chapter 3, Kiowa speakers have access to four different pre-verbal selective particles and corresponding suffixes. The particles have to occur with a suffix but the suffixes can occur in isolation. Once a broad dataset has been analysed it is evident that the particles and suffixes appear in a strict order. These orders are provided in (16) and (17):

(16) **Order of pre-verbal particles**
Evidentiality Modality Negation Aspect

(17) **Order of suffixes**
Aspect Negation Modality Evidentiality

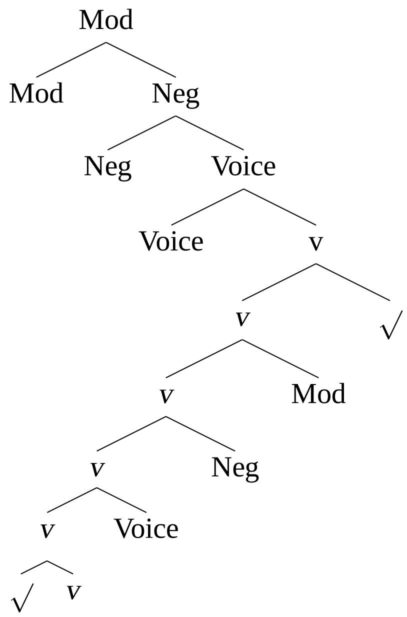
The Merge system can derive the data in (15) and the orders in (16) and (17) without an issue. For instance, if a verb is composed of a $\sqrt{}$, *v*, Voice, Negation and Modality morphemes, then these elements are taken from the lexicon and Merged together to form the verb in (18):

(18)



The hierarchy of the clause is then built using Merge and parallel Merge in the same way as (14). Ignoring the position of the verbal arguments and the verbal agreement prefixes, the root inside the verb is selected first. In Kiowa verbs are realised in a low position so I shall assume for now at least that they occupy the *v* position. Thus √ is selected along with complex verb itself and they are Merged together to form a *v* projection as a separate tree in the workspace. The Voice head is selected next and it is Merged with the output of the previous step. Neg and Mod are then copied using the same process. A representation showing this partial derivation is provided in (19):

(19)



The tree built using Merge in (19) corresponds with the Kiowa particle and suffix order provided in (16) and (17). In addition, the <Part$_{MOD}$, Part$_{NEG}$, verb-suffix$_{NEG}$-suffix$_{MOD}$> order derived in (19) is also exemplified by the sentence (15). This property of Kiowa is dubbed the *Clausal Mirror* by Adger et al. (2009, 74) and their generalisation is provided in (20):

(20) **Clausal Mirror**

Selective particles occur in an order inverse to their associated suffixes.

The Clausal Mirror falls out from the system because the hierarchy of the clausal spine is modelled on the complex verb using internal Merge, external Merge and parallel Merge. It is worth noting at this point that exceptions to this type of strict ordering have been noted in the literature, see for instance Harley (2009, 2011) and Bruening (2017). Yet the issues noted in these papers are specifically directed at analyses which derive the Mirror Principle using head movement which entails that inflection correlates with a verb's height unless an additional operation such as affix hopping is adopted. Using Merge in this way has the benefit that the height of an element does not correlate with its level of inflection. Thus for a verb to be negated, it does not have to be adjoined to a negative head because the entire verb is generated in the workspace before the clausal spine is built and then Merged where it is required. More will be said on how the verb is attached to the clausal spine in chapter 5.

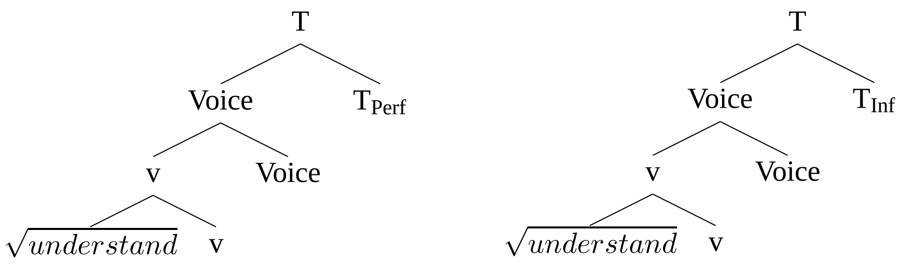
The process of building complex verbs in the workspace is also beneficial for cases of verbal repetition where two copies of the same verb are pronounced simultaneously in a single clause. In particular, generating this data without using head movement is especially beneficial for cases where the two verbal copies are marginally different. For instance, in Kabiye it is possible for two copies of the verb to be externalised in certain contexts. When this occurs the highest is inflected as normal while the lower one is realised as an infinitive. An example of verbal repetition from Collins and Essizewa (2007, 192) is provided in (21) to illustrate this fact:

(21) mɩŋ-kɔm-á kʊ́ kɔm tɔ
1SG-arrive-PERF KI arrive-INF PRT
'I have just arrived.'

In (21), the highest occurrence of the verb *kɔm* "arrive" is inflected with a perfective morpheme while the lowest is realised as an infinitive. If both occurrences of the verb are derived by a HM operation producing a multi-element chain, which Collins and Essizewa (2007) argue is the case, and if HM is captured under the copy theory of movement umbrella, the system cannot explain in a satisfactory manner why in (21) both copies of the verb are different. The system that Collins and Essizewa (2007) propose is reliant on the assumption that the lower copy of *kɔm* is marked as an infinitive because an infinitival marking is the default. However, many argue that the feature content of infinitives is different from that of their finite equivalents, e.g. infinitives contain a [-Tense] feature in contrast to finite clauses which are [+Tense] (see Chomsky 1981; Haegeman 1994; Sportiche et al. 2014; Stowell 1981, 1982 who all argue that infinitives are differentiable from finite clauses by a feature or feature value). If the lower copy of the verb possesses a [-Tense] feature, then given the copy theory of movement the higher copy should possess one as well. Yet since the higher copy is inflected with a perfective aspect marker *á*, it cannot be that it contains a [-Tense] feature or value. Thus the copy theory of movement has to generate two non-identical copies of the verb during a Kabiye verbal repetition derivation.

The benefit of assuming Merge and parallel Merge extends to (21) because both copies of the verb can be built separately in the workspace and then Merged with the clausal spine in an appropriate position. I have not placed a restriction on the number of items that can be built in the workspace before the clausal spine is produced. Thus I propose that the verbal duplicates in Kabiye verbal repetition constructions can be derived using the same mechanisms as the Kiowa example in (19). Consequently, all the lexical items needed to derive (21) are taken from the lexicon and placed in the workspace before the clausal spine is built. If the Kabiye verbal duplicates consist of a root, verbaliser, Voice and a T morpheme denoting tense (or an absence of tense), then these lexical items are Merged together starting with the roots and categories. The example in (21) indicates that the highest verbal repetition is inflected with a perfective morpheme while the lowest is an infinitive. Thus the difference between each of the verbs is reducible to whether the tense marker head is an infinitival or a perfective morpheme. Once external Merge has derived both complex verbs, the workspace contains two trees: a complex verb containing a perfective marker and a second verb with an infinitival marker. A representation of the workspace is provided in (22) for reference:

(22)



Once both complex verbs are built, the clausal spine is derived using Merge in the same way as the tree in (19). The infinitival verb is Merged low, while the perfective verb is attached to the clausal spine in a higher position. More will be said on how Kabiye verbal repetition is derived in chapter 6, although for now it is sufficient to observe that the problems mentioned above vanish when using the Merge analysis because the verbal repetitions are not related by the copy theory of movement.

With the preliminaries in place, the structure of the thesis is as follows. In chapter 2, a description is provided of the Minimalist operations central to this thesis. These include untriggered Merge, the workspace, copying, Agree and projection. The importance of assuming that the workspace is an unordered set is explored in more detail in this chapter since it requires that copies can be formed using parallel Merge. In addition, the ramifications of producing copies in this way are explored in more detail here.

The purpose of chapter 3 is to provide more detail regarding how head movement is used in the literature to derive multiple copy Spell-Out data which includes predicate cleft constructions, verbal repetition constructions and clauses multiple verbal suffixes and corresponding pre-verbal particles. The discussion will conclude that head movement is too restrictive to derive examples such as (21) and the Clausal Mirror data from example (15). The predicate cleft constructions in Nupe from Kandybowicz (2008) are problematic when analysed in detail because the highest copy of the verb is nominalised. In addition, predicate clefts in Hebrew from Landau (2006) highlight a similar problem since the fronted verbal element is realised as an infinitive. With regards to verbal repetition constructions, similar issues are evident as exemplified (21). Finally, the pre-verbal particle and suffix data highlights why head movement cannot be used to produce verbal suffixes across the board. The reason is that upward movement of a verb results in the verb being in the wrong position in relation to other sentence elements, e.g. the pre-verbal particles in (15).

Combining the Minimalist discussion in chapter 2 and the HM examination in chapter 3, chapter 4 discusses whether head movement can be thought of as a valid Minimalist operation. The final outcome of this discussion is that HM cannot be used if the Strong Minimalist Thesis is adopted. Consequently, the second substantive section of this chapter provides two analyses which aim to develop Minimalist versions of the head movement operation. I shall argue that both systems fall short.

The purpose of chapter 5 is to provide the central thrust of this thesis: that complex verbs are derived in the workspace in the same way as internal and external arguments and that the clausal spine is produced using internal Merge, external Merge and parallel Merge. The remainder of the chapter then illustrates two of the immediate consequences of the new analysis. I argue first that it provides a straightforward means of deriving modal and auxiliary verbs since deriving inflected elements is not constrained by head movement. Second, I illustrate that building verbs in the workspace allows the differences between V2, V-in-T, VO and OV to be produced in a straightforward manner. Since the verb is assembled outside the clausal spine, it can be attached in the *v*, Voice, T or C positions. The distinction between Merging the complex verb into these position is enough to derive each word order.

With the details of the new system in place, chapter 6 aims to show how the Merge system can generate the data explored in chapter 3 without the problems noted for head movement. First, predicate clefts are produced along with each of the idiosyncrasies highlighted in chapter 3, e.g. basic V-fronting, A'-characteristics and the difference between pied-piping and non-pied-piping predicate clefts. Second, Nupe and Kabiye verbal repetition constructions are derived using Merge, before finally, the system is applied to pre-verbal particle data of the sort presented in example (15).

The final chapter provides a conclusion and a list of further research questions to show where this system can be, and needs to be developed in the future.

Chapter 2

The mechanics of Minimalism

This chapter provides the theoretical backdrop of the thesis by describing and evaluating the central operations and assumptions typically assumed in a Minimalist grammar. These operations will be critical for the novel proposal developed in this thesis, and for the most part, they are not unusual in nature, meaning that they appear in many other analyses. As a consequence, any divergence or non-standard interpretation will be noted explicitly. The first section 2.1 covers Merge and is perhaps overly discursive, but I think justifiably so, since the discussion here is significant later in the thesis when a Minimalist microscope is applied to the head movement operation. The second section 2.2 discusses the *Workspace* which is an important artefact for the analysis proposed in chapter 5; the third section 2.3 explores a consequence of assuming that the workspace is an unordered set; the fourth section 2.4 evaluates *Agree*, and finally, the fifth section 2.5 discusses *Projection*, another key artefact for later in the thesis.

2.1 Merge

In Minimalist grammars, syntactic structure is derived using the binary combinatorial operation *Merge* (Chomsky 1995) which takes two syntactic objects α and β and combines them to form $\{\alpha, \beta\}$. As highlighted in the previous chapter, Merge is a necessary part of Minimalism since any Generative Grammar needs a device to form syntactic objects. Merge has the benefit of being simple in the sense that it does not specify the order of the Merging elements (Chomsky 2013); it does not provide a label to the objects being combined (Chomsky 2013; Collins 2002; Seely 2006), and finally, Merge is not triggered by a selection property on one of the combining elements (Chomsky 2015).

While a version of Merge is the necessary component of any Minimalist grammar, it is often paired with a number of conditions to limit its application, since on its own, anything in reach can be Merged with anything else in reach. These conditions are the *No Tampering Condition* (NTC), the *Extension Condition* (EC) and the *Inclusiveness Condition* (IC). Descriptions of each are provided in (23):

(23) Conditions on Merge:

a. **No Tampering Condition**

A natural requirement for efficient computation is a "no-tampering condition" (NTC): Merge of X and Y leaves the two SOs unchanged. If so, then Merge of X and Y can be taken to yield the set {X, Y}, the simplest possibility worth considering. Merge cannot break up X or Y, or add new features to them.

(Chomsky 2008, 138)

b. **Extension Condition**

Merge applies at the root only.

(Chomsky 1995, 248)

c. **Inclusiveness Condition**

Inclusiveness "bars introduction of new elements (features) in the course of the computation: indices, traces, syntactic categories or bar levels, and so on."

(Chomsky 2001, 2-3)

The NTC in (23a) prevents a syntactic object from being modified by Merge while the EC in (23b) constrains Merge so that the operation cannot embed.[1] Finally, the IC in (23c) disallows all syntactic artefacts that are not already part of the two Merging syntactic objects, e.g. traces and the bar-levels assumed in X'-theory. The three conditions in (23) are important in the discussion that follows, especially with regards to whether head movement should be considered within a Minimalist framework. More will be said on this topic in chapter 4.

As mentioned above, Merge is not triggered by a selection property in recent Minimalist analyses but is instead free to apply without being triggered (cf Abels 2003; Adger 2003; Chomsky 2000, 2001; Collins 1997, 2002; Watanabe 1996; Wurmbrand 2014). So for instance, in Adger (2003) and Chomsky (2000, 2001), Merge applied in every case to satisfy an uninterpretable feature, represented by Adger (2003) as a [uF]. The purpose of [uF] features was to ensure that the element bearing the feature was Merged with an appropriate sister, e.g. if

[1] Collins and Stabler (2016) argue that the ES and the NTC are two separate conditions which can be violated in isolation. The EC states that Merge always applies at the root while the NTC states that Merge cannot "tamper" with an already built syntactic object (see (Collins & Stabler 2016, 60) for an example which violates the EC but not the NTC).

a preposition P was Merging with a determiner phrase DP, P possesses a [uD] that can only be satisfied in a sisterhood relation with a DP. Similarly, movement, i.e. internal Merge, was triggered by a strong feature, a [uF*] where the "*" denotes strength, which has to be satisfied in a local relationship (sisterhood) with an element bearing a matching interpretable equivalent, an [iF]. Thus T was said to possess a [uD*], an EPP feature, which triggered movement of a DP into the specifier of TP.

Selection driven Merge is convenient because it limits the number of possible derivations that can occur with any given set of lexical items. Also, it is the case that some lexical items must be Merged with a category of a particular type, for instance, prepositions in English are combined with DPs while complementisers select TPs and so on. Since these relations have to hold and be satisfied at some point during a derivation, selection features might be considered as good a representation as any. In addition, if selection is satisfied by features in the syntactic component then the process of interpretation at the interfaces is simpler as there does not need to be a means of checking whether the derivation has satisfied all selection requirements appropriately. If a derivation reaches the point of externalisation then all selection features must have been appropriately satisfied in the syntax.

However, despite the positives that selection features bring to a syntactic analysis, there are others (Chomsky et al. 2019; Collins 2014) who argue that Merge should not be triggered so that the operation can be reduced to its simplest form, which is sometimes called *Simplest Merge*. An extract from Chomsky et al. (2019, 237-8) describing why Merge should not be triggered is provided in (24) for reference:

(24) "A widely-held but, we believe, unjustified assumption is that MERGE is a "Last Resort" operation, licensed by featural requirements of the MERGE-mates (cf. Chomsky (2000) and most current literature, e.g. Pesetksy and Torrego's (2006) Vehicle Requirement on Merge). Note that a trigger condition cannot be restricted to either EM or IM: the operation MERGE(X,Y) is the same in both cases, the only difference being that one of X, Y is a term of the other in one case, while X and Y are distinct in the other. Simplest MERGE is not triggered; featurally-constrained structure-building requires a distinct, more complicated operation (defined as Triggered Merge in Collins & Stabler 2016; see Collins 2017 for additional discussion). The features invoked in the technical literature to license applications of MERGE are typically *ad hoc* and without independent justification, "EPP-features" and equivalent devices being only the most obvious case. The same holds for selectional and discourse-related features; the latter in addition violate IC, as noted above (cf. Fanselow 2006). Featural

> diacritics typically amount to no more than a statement that "displacement happens"; they are thus dispensable without empirical loss and with theoretical gain, in that Triggered Merge or equivalent complications become unnecessary (cf. Chomsky 2001, 32, 2008, 151; Richards 2016; Ott 2017)."

In this extract, Chomsky et al. (2019) are persuasive in their condemnation of selection driven Merge. The argument that Merge should not be able to distinguish between a feature that triggers internal Merge (IM) and one that triggers external Merge (EM) is valid since IM and EM are the same operation, Merge. It is also true that triggered Merge is a more complicated operation than non-triggered Merge since the former requires a checking and deletion component to occur with each application of Merge. Finally, it is also the case that there are many *ad hoc* features proposed in the literature, with an obvious case to me being Wells (2015). In addition, not mentioned by Chomsky et al. (2019) is the fact that selection features amount to a lookahead problem since their purpose is to ensure that a syntactic object is licit when it is externalised.

The theoretical positives for a system where Merge is not triggered are in equilibrium with a number of problems with the proposal. For instance, if Merge is free, then it should be the case that anything can Merge with anything in the syntax. Also, if there is no numeration as suggested by Chomsky et al. (2019), Merge applies to lexical items directly from the lexicon which multiplies the number of elements that can be combined using Merge. Finally, if Merge generates copies via the copy theory of movement, the problem increases further since there is nothing in the syntactic component to restrict the number of times a particular element can be duplicated. The result of a system without selection is a syntactic component where infinite generation of gibberish is a theoretical possibility and as such a problem. Yet one could argue that the job of the interfaces is to root out the licit structures from the gibberish. This type of system would be akin to the well known *infinite monkey theory* where a thousand monkeys at a thousand typewriters could generate the works of Shakespeare given infinity. Adopting selection features would banish the comparison between Merge and the infinite monkey theory but at the expense of losing simplest Merge.

Given that one aim of this thesis is to adhere to the Strong Minimalist Thesis as close as possible, I assume that the arguments given in (24) are on the right track and as such adopt the version of simplest Merge discussed in Chomsky et al. (2019). Thus Merge is not triggered by a selection property and the output of the operation is unordered and unlabelled. The effect of assuming this version of Merge is a simplified syntactic component at the expense of a more complex relation between the output of the syntax and the interfaces.

In Chomsky et al. (2019) it is argued that a derivation produces representations that are accessible by the *conceptual-interpretative* (C-I) and *sensorimotor* (SM) systems. These representations are dubbed SEM and PHON respectively. The process of generating SEM and PHON is dubbed *Transfer* for the former and *Externalisation* (EXT) for the latter. As this thesis adopts simplest Merge (which entails a version of the thousand monkey theory), the theoretical burden placed on Transfer and EXT is increased as nothing in the syntax ensures that Merge is building an interpretable syntactic object. Consequently, Chomsky et al. (2019) argue that once the output of a derivation is converted into SEM and PHON, C-I and SM ensure that the result is a licit object by way of constraints. An extract from Chomsky et al. (2019, 242) is shown in (25), highlighting this stance:

(25) The interpretive and perceptual/articulatory systems accessing PHON and SEM impose constraints on the expressions freely constructed by MERGE that map onto these representations. For instance, the C-I system imposes a general requirement of *Full Interpretation*: all terms of a syntactic object must be interpreted, none can be ignored.

The example in (25) indicates that C-I and SM are tasked with determining whether the syntactic component has generated an interpretable syntactic object. Consequently, there is a sharp divide in the system as the syntax builds an object via Merge, while C-I and SM determine whether the object is licit via constraints such as full interpretation. So nothing in the syntax can pre-empt what C-I and SM will find interpretable since selection and scope/discourse features are not assumed in this analysis.

Despite that constraints are needed to analyse SEM and PHON at C-I and SM, the system is simple because there is no overlap between the syntax, C-I and SM: the syntax builds and the interpretive systems interpret. Therefore, untriggered Merge and constraints at C-I and SM are adopted in this thesis. The result is that a derivation represents one of many ways in which a set of lexical items could be combined. Specifically, derivations highlight the order in which Merge applies to reach a specific interpretation at C-I and SM. Furthermore, and in-line with the SMT, I assume that Merge is the only structure building operation available in the syntax. As will be shown in section 4, the effect of this assumption is such that head movement is not a permissible syntactic operation since HM is not a sub-type of Merge and the effects of head movement cannot be derived using Merge as embedding is impossible given the Extension Condition. With this characterisation of Merge in hand, the reminder of the chapter examines and evaluates a number of Minimalist artefacts required to derive inflected verbs without using head movement.

2.2 Workspace

The aim of this subsection is to provide a description and evaluation of the artefact known as the *Workspace* (W) since the proposal introduced and developed in chapter 5 is reliant on a specific representation of W. In a nutshell, W is the place where syntactic objects are built. So lexical items are transferred from the lexicon to the workspace and Merge applies to elements of W to form syntactic objects. This description of the workspace is simple and other versions of W are described in a similar way. For instance, in Bruening (2017), the concept of a workspace does not go beyond it being the place where syntactic objects are built whereas Adger (2017) develops a workspace which aims to disallow parallel Merge. As will be seen later in the thesis, the system proposed in this thesis is reliant on parallel Merge being possible, meaning that, even though Adger's (2017) paper provides a version of the workspace which is more developed than others, it cannot be adopted in this thesis for it prevents a subtype of Merge which is critical for the analysis proposed in chapter 5.

The workspace used in this thesis is reminiscent of the one proposed in Chomsky et al. (2019, 245), an extract of which is provided in (26) for reference:

(26) All syntactic objects in the lexicon and in the workspace WS are *accessible* to MERGE; there is no need for a SELECT operation (as in, e.g., Chomsky 1995). WS represents the stage of the derivation at any given point. The basic property of recursive generation requires that any object already generated be accessible to further operations. WS can contain multiple objects at a given stage, so as to permit formation of {XP, YP} structures (subject-predicate constructions) by EM.

The version of W adopted in this thesis is close to the one exemplified in (26) in that Merge has access to any element in the workspace. That the workspace can contain multiple syntactic objects will be a significant part of the analysis developed in chapter 5. One aspect of W not mentioned by Chomsky et al. (2019) is the specific form of the workspace. Following Collins and Stabler (2016), I assume that the workspace is an unordered set of syntactic objects, e.g. $\{_{W}\ \alpha,\ \beta,\ \delta,\ \gamma\ \ \kappa\}$. Merge combines the elements of W to form a successively larger syntactic object, represented as a tree, and each application of Merge generates a new workspace, e.g. W_1, W_2, W_3 and so on.

This conception of W is straightforward in that W is an unordered set. The version of untriggered Merge explored in section 2.1 combines elements of W to generate syntactic structures. Yet despite the simplicity of Merge and W, there are two consequences of assuming that

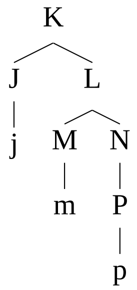
W = $\{_W$ ... $\}$ which need addressing. First, as W and Merge do not specify an order, something needs to be said regarding how order is assigned to structures built in W since externalized syntactic objects are ordered. Second, since W is an unordered set, then {x, x} = {x} applies. This condition entails that it is impossible for one element to have two identical occurrences of itself inside W, e.g. $\{_W$ ..., the, the$\}$ = $\{_W$ ..., the$\}$, which is problematic for clauses containing two determiners like *the dog chased the cat*. The first consequence is dealt with now while the second is discussed in the following section because the solution is more complex and needs more space.

In this thesis, I assume that the process of linearisation is handled by a version of the *Linear Correspondence Axiom* (LCA) from Kayne (1994) where relations of precedence are determined by asymmetric c-command relations found in a tree. To be more specific, in Kayne (1994) for X to precede Y, a non-terminal node dominating X has to c-command a non-terminal node dominating Y. Kayne captured this proposal in (27), where *d* represents the non-terminal node to terminal node relation and T represents a phrase marker. The variable *A* stands for the set of ordered pairs of non-terminal nodes $<X_j, Y_j>$, where X_j asymmetrically c-commands Y_j:

(27) **Linear Correspondence Axiom (LCA)**
d(A) is a linear ordering of T

The definition in (27) states that the linear ordering of T, a phrase marker, is determined by applying the non-terminal to terminal relations *d* to the set of all ordered pairs of non-terminal nodes $<X_j, Y_j>$ where X_j asymmetrically commands Y_j. The fallout of this idea is that if a non-terminal node X asymmetrically c-commands a non-terminal node Y, and if we assume that X immediately dominates *x* and likewise for Y and *y*, and that *x* and *y* are terminal nodes, then it follows that *x* precedes *y*. As an illustration, Kayne (1994, 7) provides the following example:

(28) a.



b. <J, M>, <J, N>, <J, P>, <M, P>

Since the workspace is an unordered set, i.e. $\{_W ... \}$, a linearisation system is required which only makes use of the hierarchy that Merge builds. The tree in (28a) illustrates that J asymmetrically c-commands M, N and P while M asymmetrically c-commands P. Given that the terminal nodes are dominated by J, M, N and P, then it follows that a linear order of <j, m, p> is produced using nothing more that then the hierarchy produced by Merge and the LCA.

Before moving on, if Kayne's (1994) system is to be fully adopted in this thesis, it cannot be that the asymmetric c-command relations hold between non-terminal nodes since post-minimalist analyses eschew vacuous nodes in favour of more minimal representations such as Chomsky's (1995) *bare phrase structure* (BPS). Yet adapting the LCA to a BPS system or derivative seems straightforward because the c-command relations can hold between the terminal nodes themselves, which seems to be the assumption made in Kayne (2008). For instance, in the set {X, {Y, {Z}}} X asymmetrically c-commands Y and Z, while Y asymmetrically c-commands Z. Since asymmetric c-command relations hold between X, Y and Z, the LCA is still applicable to these minimal representations.

Finally, since vacuous nodes are dropped in BPS, a problem materialises for the LCA when two terminal nodes are Merged together, e.g. {X, Y} configurations where X might be a categoriser and Y a $\sqrt{}$. As neither X nor Y asymmetrically c-commands the other, the LCA fails to generate an order for this type of configuration. Yet Guimarães (2000) developed a work-around which helped to nullify this issue to a large extent by proposing that if either X or Y was allowed to Merge with itself, known as *self-Merge* in the literature, then the symmetry between X and Y would be broken. For instance, rather than generating {X, Y}, were Y to self-Merge producing {Y}, before being Merged with X, the effect would be {X, {Y}}. From this example, it is evident that X asymmetrically c-commands Y as Y is contained inside a singleton set. There is nothing preventing self-Merge from occurring in this thesis since Merge is free. Moreover, given that the syntax keeps generating structure until it produces something that satisfies the interfaces (more on this later), it does not seem unreasonable to assume that the interfaces are satisfied when either X or Y self-Merges. For concreteness, I assume that an LCA based linearisation system is on the right track, but do not represent the self-Merge of Guimarães (2000) in the structures that follow to keep the trees as compact as possible. Thus, Merge generates structure in an unordered workspace. The LCA applies post-syntactically in the Phonetic Form wing of the grammar, possibly after the morphological component, and generates a linear order so that unordered syntactic objects can be reinterpreted as ordered sequences.[2]

[2]Another option would to assume that the LCA occurred after the morphological component and as such, following morphological operations such as *fusion* from the Distributed Morphological framework of Halle and Marantz

What follows in section 2.3 is a discussion of a consequence of representing the workspace as an unordered set, namely that multiple membership in an unordered set is not possible.

2.3 Copying and Copies

As mentioned above, the second consequence of assuming that the workspace is an unordered set relates to the issue of multiple membership being impossible, i.e. in set theoretic terms {x, x} = {x}. The outcome is that a sentence such as *the dog chased the dog* is at first glance hard to derive because the workspace can only contain one occurrence of *the*, *n* and $\sqrt{dog}$ when two of each are required, e.g. both the subject and object share an internal structure {the, {*n*, $\sqrt{dog}$}}. When all the lexical items are placed in the workspace prior to the clause being built, only a single determiner, categoriser *n* and $\sqrt{dog}$ can appear. The example sentence and a workspace are provided in (29a) and (29b) to illustrate this point:

(29) a. The dog chased the dog.

b. {$_{W}$ C, T, Voice, *v*, $\sqrt{chase}$, the, *n*, $\sqrt{dog}$}

The system as it stands does not allow for there to be more one occurrence of any lexical item in the workspace which is inherently problematic for cases where two copies of the same lexical item are needed to build a clause, e.g. as in (29a). When Merge assembles the object *the dog* in (29b), the categoriser, determiner and $\sqrt{dog}$ are no longer elements of W and as such cannot be used to derive the subject *the dog*.

The issue of multiple membership can be tackled by adopting a pair of assumptions. First, it is possible for the Merge operation to build more than one object in the workspace at once, which in of itself is a necessity to allow, e.g. a direct object to be built alongside the clausal spine. Second, it is possible for lexical items to be Merged from one tree into another. The latter assumption is also not a novel idea and is referred to in the literature as *parallel Merge* (Citko 2005), with versions of the operation existing under the guises of *external remerge* (de Vries 2009) and as *interaboreal operations* (Bobaljik & Brown 1997). Combining these assumptions allows one set of lexical items to be placed in the workspace as in (29b) but for them to be used in both the subject and object.

When the option of parallel Merge is combined with the workspace in (29b), it becomes

(1993). If {X, Y} is understood as a root and categorizer (or a tense morpheme and a verb for instance), then it may be feasible to assume that both heads will undergo fusion and as such be interpreted as a single node for the purposes of vocabulary insertion. If the LCA applied to a structure after fusion then the issue of X and Y being in a symmetric c-command relation would be irrelevant because the problematic structure would be reduced to a single node.

possible to duplicate *the*, *n* and $\sqrt{dog}$ using nothing more than Merge. A derivation would proceed in the following way. First $\sqrt{dog}$, *n* and *the* are Merged together to form one of the arguments, say the internal argument. Second, as the clausal spine is built the internal argument is Merged in the specifier of *v*P which removes it from the workspace. Since the internal argument is out of the workspace, the external argument can now be built using parallel Merge which avoids the issue of multiple membership completely. So $\sqrt{dog}$ and *n* are selected from inside the external argument and Merged together to form {*n*, $\sqrt{dog}$} as a separate tree in the workspace. The determiner $\sqrt{the}$ is then selected and attached to the second tree in the workspace finishing the external argument. The EA is able to be Merged with the clausal spine to complete the VoiceP. A schematic of the sequence of events needed to derive the VoiceP from the workspace in (29b) is provided in (30). Only the relevant parts of each workspace are provided to save space across the page width:

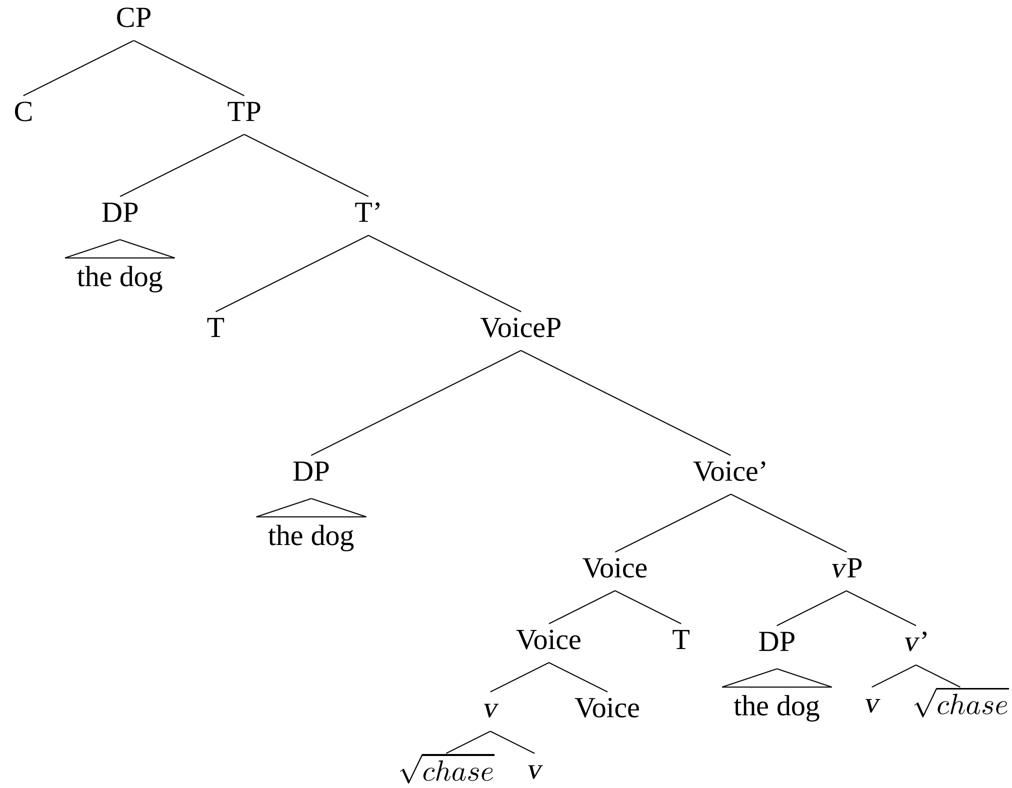
(30) a. Build IA *the dog* = {$_{W}$ ... {the, {*n*, $\sqrt{dog}$}}}
b. Build the *v*P = {$_{W}$ ... {$_{vP}$ {the, {*n*, $\sqrt{dog}$}}, {*v*, $\sqrt{chase}$}}}
c. Parallel Merge $\sqrt{dog}$ and *n* = {$_{W}$ ... {*n*, $\sqrt{dog}$}}
d. Parallel Merge *the* and {*n*, $\sqrt{dog}$} = {$_{W}$ ... {the, {*n*, $\sqrt{dog}$}}}

The process of events exemplified by (30) allows the direct object and *v*P to be built from (29b). Once the DO is embedded inside the clausal *v*P, the subject can then be assembled in the workspace using parallel Merge without {x, x} = {x} causing a problem. The subject can then be added into the specifier of VoiceP and the rest of the clausal spine can be built (more on this in chapter 5).

Throughout this thesis and the derivations that use parallel Merge, I assume that the operation is no different from internal and external Merge in that, like internal Merge, parallel Merge adheres to the copy theory of movement. So when an element is duplicated like in (30), the original item copied is not modified by the parallel Merge operation in any. The same is true when an external argument internally Merges from its base position into the specifier of TP, for instance. Consequently, I assume that the only difference between all the Merge subtypes is related to from where the Merging elements are selected. For example, if α is embedded inside β, and α is selected and Merged with β, internal Merge has taken place. If α and β are selected and Merged together, and neither is embedded in the other, external Merge has taken place. Finally, if α and β are selected and one is embedded inside the other, and the effect of the Merge operation either extends or generates a separate tree in the workspace, then parallel Merge has taken place.

The analysis as it stands does not and indeed cannot distinguish the subject and the object in (30) which is a benefit since the same lexical items can be used to build both constituents. Yet once the tree is complete and transfers, there has to be a means of distinguishing the internal and external arguments and any copies derived by internal Merge. For instance, once (29a) has been built, the structure would need to contain three copies of *the dog.* A representation is provided in (31) to illustrate:[3]

(31)



In (31), there are two copies of the subject and a copy of the object. These constituents are indistinguishable in the syntax which is beneficial since parallel Merge is then able to duplicate elements of the object *the dog* to generate the subject. Yet as mentioned above, there needs to be a means of differentiating the object from the subject and its copy.

To this end, I follow one of the possibilities presented in Chomsky et al. (2019, 246-7) and suppose that the system is able to reconstruct how often a constituent has been displaced via Merge. They suggest that two identical items, e.g. in my case *the dog* and *the dog,* may be calculated as distinct during transfer using phase-level memory. Thus the derivation is able to remember, for a time at least, how a pair of constituents were added to a tree. So in *the dog chased the dog* there are three copies of *the dog* according to the structure in (31). Two subject copies and the object. Phase level memory would be able to determine that the object

[3]More information will be provided in chapter 5 regarding how the verb is built and how it relates to the clausal spine.

and lowest copy of the subject were added to the tree via external Merge whereas the highest copy of *the dog* was generated by internal Merge. Significantly, for this particular example, the direct object would transfer on its own in the domain of the Voice phase head while both copies of the subject would transfer inside the CP phase. Since transfer is able to keep track of how a constituent is added to the tree via phasal memory, distinguishing distinct elements such as those found in *Sue saw Sue* with copies as in *John arrived* <*John*> becomes straightforward (for a critical evaluation of this approach see Collins and Groat 2018).

Moreover, when a constituent moves beyond the phase in which it is externally Merged, it must be the case that phase level memory can track a constituent through the edge of a phase to account for long distance movement such as *what did John say that Mary saw* <*what*>. Conversely, if the wh-phrase moved from DO position of the embedded clause to the spec-CP position of the main clause in one go, then the route of the wh-phrase would not be trackable through the tree phase by phase, and as such, the interfaces would not be be able to match the displaced wh-phrase with its copy in the embedded clause. Yet it is worth noting at this point that long distance wh-movement of the "in one go" kind is not possible using a grammar informed by phase theory since the wh-phrase in its Merge position would be inaccessible before matrix spec-CP is generated. Thus the only way for an embedded wh-phrase to move into a matrix clause is for it to hop through phase edges until it reaches its target destination, with the result that it is trackable all the way via phase level memory.

To summarise, this section has argued that the issue of {x, x} = {x} highlighted at the end of section 2.2 can be mitigated by assuming that more than one element can be built in the workspace at once and that elements in one tree can be Merged with another (parellel Merge). Thus in (29b) the direct object is built and hung on the clausal spine whereupon the determiner, categoriser and $\sqrt{dog}$ are parellel Merged forming the subject. The subject can then be Merged in the specifier of VoiceP in the usual fashion. Finally, in order to identify copies and truly different elements, e.g. *John arrived* <*John*> and *Sue saw Sue*, I adopted one of the possibilities provided in Chomsky et al. (2019), namely that phase level memory is able to identify whether a constituent is a copy or a distinct item.

2.4 Agree

The Minimalist artefacts in subsections 2.1 and 2.2 are a necessity of any generative grammar in the sense that there needs to be an operation that builds syntactic structure (Merge) and there needs to be a place where the structure can be built (Workspace). There is also evidence that Agree needs to be part of the Minimalist toolkit (Chomsky et al. 2019). The operation was formalised in Chomsky (2001) and its purpose is to establish relations between features inside syntactic objects. The essence of the proposal is that for an object to be available for syntactic operations it needs to possess an unvalued uninterpretable feature. If it does not, then the syntactic object is not able to move and is frozen in place. A summary of Chomsky's system is provided in (32):

(32) **Probe/goal relations**

...probe and goal match if features have values for the goal but not for the probe: if ϕ-features were valued for the probe, it would be inactive and could drive no operation; if they were unvalued for the goal, they would receive no values from the (unvalued) matching features of the probe.

(Chomsky 2001, 6)

Thus an unvalued probe receives a value from the goal of the operation. If valuation cannot occur, i.e. the probe has already been valued, then the operation does not take place since the probe cannot be valued by the Agree relation between it and the goal.

A concrete example is subject verb agreement in English. Here the probe is T and it possesses an unvalued uninterpretable ϕ-feature which looks down the tree to find a set of features with which it can receive a value. The closest feature set is contained inside the subject which, when T is Merged, can be found in its Merge position in the specifier of *v*P or VoiceP. Since T has an unvalued ϕ-feature and the external argument contains a valued set of ϕ-features, a probe/goal relation is established between both syntactic objects.

Agree is an important mechanism available in Minimalist grammars so it deserves mentioning in this section. Yet it will not play a large role in the analysis that follows when compared to Merge, the workspace and the topic of the next subsection, projection.

2.5 Projection

The purpose if this section is to provide an overview of the way in which syntactic structures are labelled since labelling will play a small but significant role in the analysis proposed in chapter 5. The system of labelling adopted in this thesis is based on the proposal put forward in Chomsky (2008) and developed in Chomsky (2013) which does not assume that labels are an inherent part of the Merge operation. Instead, labels are supplied to a syntactic structure via a labelling algorithm which targets heads in the first instance and shared features when two heads compete for a label. Yet despite the influence of Chomsky (2013) on the labelling analysis adopted in this thesis, there is a significant difference between the two regarding whether labelling triggers internal Merge: in Chomsky (2013) labelling requirements are proposed to result in movement, while in this thesis they do not. More will be said on this difference later once Chomsky (2013) has been outlined.

As highlighted in subsection 2.1, Merge does not subsume a label when two elements are combined. The lack of a label is in contrast to X'-theory, where the head is the element that projects. When the head requires a specifier, the head projects to a bar level, otherwise, the head projects to a maximal category. The distinction between head, bar level and phrase was inherent within X'-bar theory (Sportiche et al. 2014) and as such the difference between Xs and XPs was a fundamental part of the system. In addition, other than X'-theory itself, nothing additional was required to ensure that heads behaved as heads and phrases behaved as phrases. Yet as explained in section 2.1, Minimalism brought with it the *Inclusiveness Condition* which prohibited bar levels and resulted in the system of *Bare Phrase Structure* (Chomsky 1995) which does not suppose a distinction between heads and phrases. The consequence is that, e.g. verb phrases are not labelled as $\{_{\text{VP}}$ hit DP} but rather $\{_{\text{hit}}$ hit DP} when V is Merged with the direct object.

However, the preference for a simpler version of Merge prompted Chomsky (2013) to argue that the output of Merge generates an unordered set. This idea is not new in of itself and has appeared in Collins (2002) among others, but unlike Collins, Chomsky (2013) assumes that labels are required for a syntactic object to be interpreted at the interfaces. Chomsky (2013) does not say why a syntactic object needs to be labelled for interpretation at the interfaces, but just assumes that it does. More on this later. As the output of Merge is unlabelled, and labels are required for Transfer and Externalisation, Chomsky (2013) proposes a *Labelling Algorithm* which applies at the phase level. The algorithm is summarised in (33):

(33) **Labelling Algorithm**

a. When labelling a {X, YP} structure, the labelling algorithm locates the head X via minimal search and labelling is trivial. X labels.

b. When labelling a {XP, YP} structure, the label is ambiguous between X and Y, so either the syntactic object is modified so only one head is visible to LA or LA locates a feature shared by X and Y to provide the label.

Chomsky shows how the LA provides labels for {XP, YP} structures by deriving the predicate internal subject hypothesis. An {XP, YP} is generated when the external argument (EA) is

Merged in the specifier of *v**P.[4] An example from Chomsky (2013, 44) is provided in (34):

(34) T [$_{\beta}$ (EA) [*v** [V IA]]]

The example in (34) represents the point when EA has been Merged into the specifier of *v*P but prior to it undergoing EPP movement. As β is an {XP, YP} structure, it cannot be labelled in its current form. The labelling algorithm finds the head of EA (EA(H)) and *v** and does not provide a label because EA(H) and *v** do not share a feature. In order for β to be labelled, Chomsky argues that EA must raise to the specifier of TP so that *v** can label β when combined with the added stipulation that copies are invisible to LA.

When EA moves from its Merge position to the specifier of TP, a second {XP, YP} structure is generated. Again the labelling algorithm finds two competing heads, EA(H) and T, but unlike in the previous example, T and EA(H) share prominent features. The ϕ-features on EA(H) value the uninterpretable ϕ-feature on T as soon as T is Merged. As a consequence, when the labelling algorithm finds a symmetric {XP, YP}, LA searches both heads and finds matching ϕ-features. These features then provide a $\phi\phi$ label as exemplified in (35):

(35) [$_{\phi\phi}$ EA$_{[\phi]}$ [T$_{[\sout{u\phi}]}$ [$_{v*}$ <EA> [*v** ...]]]]

As the copy of EA is invisible, *v** labels β and since EA(H) and T share ϕ-features, the second {XP, YP} structure can be labelled as $\phi\phi$. The labelling system of Chomsky (2013) is developed in Chomsky (2015) where it is applied to more data. The mechanics of the system remain essentially the same with one notable exception regarding the requirement that labelling can break an {XP, YP} configuration by movement. Specifically, Chomsky (2015) requires movement to occur before labelling in order to avoid countercyclic EPP movement. In the literature, EPP movement occurs after feature inheritance (Chomsky (2008) even suggests tentatively that inheritance may involve transfer of an EPP feature) which is countercyclic since T inherits features from C after C has been Merged. One way to avoid this issue is to use the assumption that Merge is not triggered and say that the subject moves into the specifier of TP cyclically before C is Merged. This point is developed in Chomsky et al. (2019) where it is stated that movement is not instigated by labelling requirements because Merge is not triggered, but that a labelling violation would occur if the movement did not happen.

In Chomsky (2013), it is said that labels are required for interpretation despite that no reason is given for why this is the case. Yet as Merge is untriggered and could produce a random

[4]The "*" represents the difference between a strong and weak phase. Phasal effects are restricted to strong phases which are marked by the "*".

hierarchy of lexical items (the thousand monkey theory), I argue that the process of labelling provides a means of determining whether a structure is interpretable at C-I and SM. In this case, labelling is carrying some of the weight dropped by assuming that Merge is not triggered by selection features. The literature suggests that labelling occurs at the phase level meaning that objects are labelled just before or during Transfer/Externalisation. Also, the stipulation that copies are invisible to the labelling algorithm cannot be maintained if an element needs to provide a label in order for it to be interpreted given the constraint of full interpretation. If a copy of an argument is not interpreted, then reconstruction effects (e.g. Legate 2003) would not be derivable since the lower copy would be invisible to the labelling algorithm and as such uninterpretable.

The considerations in the previous paragraph suggest a system where copies cannot be invisible given that they can have a significant interpretative effect at C-I. In Chomsky's (2013) system, movement is triggered by the need to label an unlabelable {XP, YP} structure, meaning that movement occurs once the labelling algorithm has identified a point of symmetry. Copies have to be invisible by stipulation in Chomsky (2013) so that displacement is able to break the symmetry of an {XP, YP} configuration. Yet using the version of untriggered Merge presented in subsection 2.1 mitigates the need to stipulate that copies are invisible because movement occurs before labels are generated. For instance, when the external argument is positioned in the specifier of TP, movement occurs as soon as T is attached to the tree. The structure is then labelled at the phase level.

Given that the labelling algorithm does not need to trigger movement, I argue that the "freeness" of Merge also extends to the way in which syntactic objects are labelled. Thus a tree can be labelled one of many different ways using an algorithm in the same way that Merge can combine anything with anything, but that crucially, only one set of labels will yield an appropriate interpretation.[5] The example in (36) provides the algorithm that will be used in this thesis to generate labels:

(36) **Labelling Algorithm 2**

In a configuration $\{\alpha, \beta\}$ either:

a. α or β projects, or

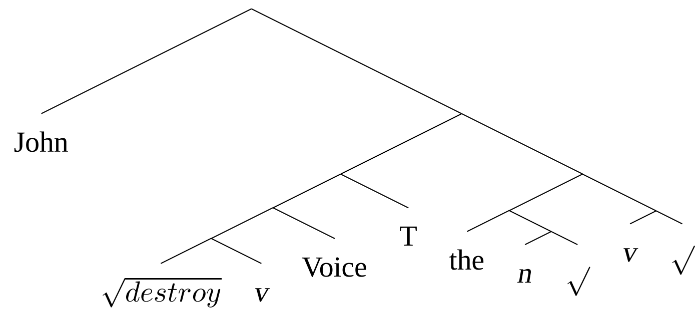
b. a feature shared by α and β projects, or

c. distinct features in α and β project.

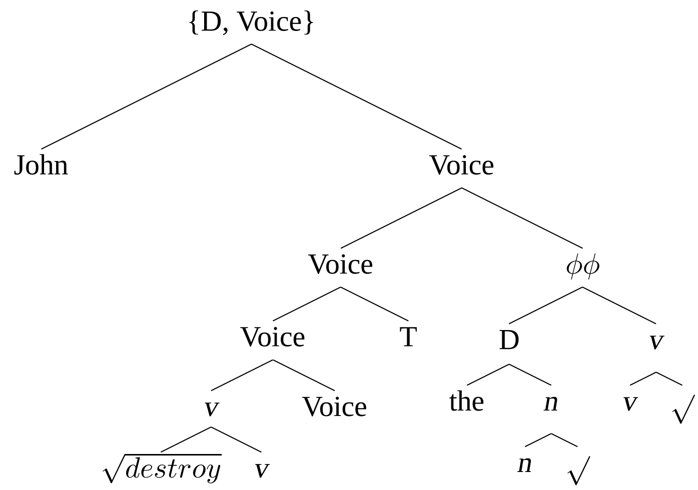
[5]A similar idea is provided in Chomsky (2008, 145), e.g. "the labeling algorithms apply freely, sometimes producing deviant expressions. The outcome will satisfy the empirical conditions on I-language if these are the interpretations actually assigned."

The labelling algorithm in (36) is similar to Chomsky (2013) in broad strokes since (36a) selects α or β as the label while (36b) targets features shared between α and β. Yet there are two novel aspects of this algorithm. First, there is an extra condition in (36c) which applies to cases involving copies, such as the specifier of VoiceP. Second, (36a) is applicable in {X, Y}, {X, YP} and {XP, YP} environments. Nothing constrains it to just apply in configurations involving {X, YP} configurations. I argue that this is a positive since {X, YP} and {XP, YP} structures are difficult to define prior to labels being assigned. In addition, labelling, like Merge, operates freely in the sense that nothing constrains which type of label in (36) is generated. Thus when a complete derivation is provided in this thesis, it indicates how labels have to be assigned to produce a specific interpretation, but nothing dictates that the algorithm has to generate that set of labels. Consequently, the thousand monkey theory applies for labelling as well in the sense that labels are generated repeatedly until an interpretable object is produced. Finally, in order to illustrate how (36) functions, an unlabelled VoiceP for the sentence *John destroyed the wall* is provided in (37) with a labelled equivalent following in (38).[6] A description of how (36) applies follows the trees:[7]

(37)



(38)



The lowest node in the tree, *v*' using X'-theory, is labelled using (36a) with *v* projecting.

[6]Labelling would take place later in the derivation, but for the sake of convenience, I have chosen to represent the VoiceP only.

[7]More will be said regarding how this tree is built in chapter 4.

Clausal spine *v* Agrees with the direct object which allows (36b) to label *v*P using the shared ϕ-features. The direct object *n* and D labels are derived using (36a). The complex verb is labelled using (36a) exclusively as is Voice'. Finally, VoiceP is labelled using (36c) which provides a label of {D, Voice}. The rest of the derivation would follow a similar pattern, e.g. T would label with (36a) while TP would be labelled $\phi\phi$ using (36b). Lastly, C would then project using (36a).

The labelling algorithm in (36) produces structures that support Chomsky's (2013) proposal that labels are required for interpretation. For instance, Full Interpretation dictates that a tree needs interpreting in its entirety. Yet in Chomsky's (2013) system, despite that labels are needed for interpretation, copies are ignored by the labelling algorithm. This creates a dichotomy since copies should provide a label but are stipulated to not so that symmetric {XP, YP} structures can be labelled. The labelling algorithm in (36) avoids this problem as copies label using the condition (36c) which targets a feature of the external argument D and a feature of the clausal spine Voice. These elements then project, which satisfies full interpretation as an element of the external argument is projected as part of the VoiceP label.

While full interpretation requires that each part of a tree is interpreted, the constraint of *headedness* requires every phrase to have a head, and that a property of that head has to determine the type of phrase (a version of *headedness* appears in Adger 2003 but is defined in different terms since Merge is triggered in that analysis). In previous versions of generative syntax, headedness was ensured by X'-theory since the head projects to an intermediate and then a maximal projection (Sportiche et al. 2014). Similarly, in grammars that adopt *bare phrase structure* the head is determined by the element that possesses a selection feature (Chomsky 2001). In the grammar adopted and developed in this thesis, I argue that headedness ensures syntactic objects built by Merge and labelled using (36) are licit in that all the phrases have a head. So for instance, if the inflected verb in (38) was labelled with T instead of Voice, headedness would be violated since Voice would not be headed by an appropriate element. Taken together, full interpretation and headedness are representative of constraints imposed by C-I and SM to ensure that the syntax builds licit objects. Finally, when labels are assigned at the phase level, the labelling algorithm does not care whether the labels it assigns are interpretable. Like Merge, (36) keeps generating until a structure is produced which satisfies full interpretation and headedness.

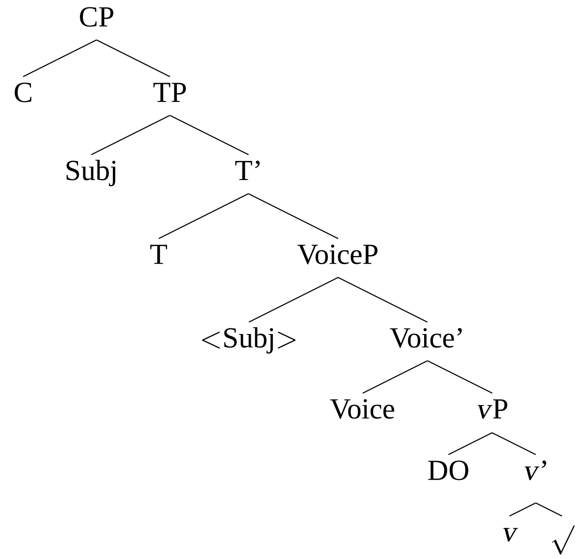
Finally, while I argue that having a free labelling algorithm is a positive because the operation follows the same principle as free Merge, it suffers an empirical loss when compared to Chomsky's (2013) system (but not the systems found in Chomsky 2015 and Chomsky et al.

2019). The issue has been mentioned in the main body of the labelling discussion but will be addressed in more detail here. Chomsky (2013) proposes that the need to label an unlabelable {XP, YP} triggers movement of a constituent into a higher specifier position in order for the unlabelable structure to be broken. Chomsky (2015) and Chomsky et al. (2019) lose this generalisation on the assumption that Merge builds structure before labelling takes place in order to avoid the counter-cyclic movement which would occur if labelling at the phase level triggered movement. To use EPP movement as an example, if movement of an external argument into the specifier of TP took place at the phase level, then the movement would violate the extension condition. For this reason, Chomsky (2015) and Chomsky et al. (2019) drop the proposal that labelling requirements cause movement and instead rely on untriggered Merge.

Given the assumptions adopted in the thesis regarding Merge (see section 2.1), I also adopt the proposal that movement, i.e. internal Merge, occurs before labelling and is not triggered by anything. As Merge isn't triggered nothing can force movement to occur in the syntax which is not problematic given that Merge is comparable to the thousand monkey theory in that all permutations are realised including structures where movement occurs and ones where it does not. Yet since internal Merge and external Merge are free, I assume that movement is restricted post-syntactically by parameters. To use EPP movement and English as an example, those structures that Merge derives which contain movement of an element into the specifier of TP (either the external argument for active clauses or internal argument for passive clauses) are interpretable post-syntactically. So if Merge built either of the trees in (39a) and (39b) then then the EPP movement parameter would be satisfied, whereas the tree in (40) would cause a crash since the specifier of TP is not filled with a constituent. The trees are represented using X'-bar labels for convenience and <> show copies left by internal Merge:[8]

[8]I've assumed that active clauses and passive clauses are distinguished by a distinct Voice head and a passive auxiliary. For thorough passive analyses, see for instance Collins (2005) or Jaeggli (1986).

(39) a.



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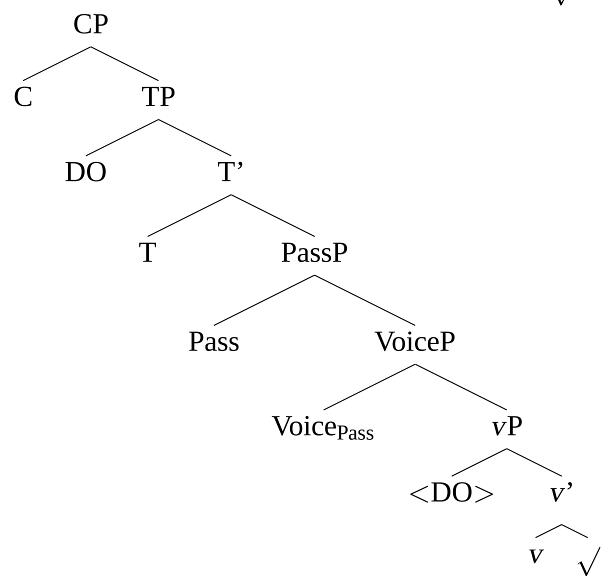
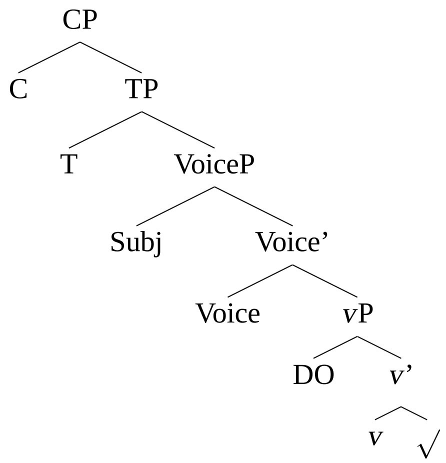


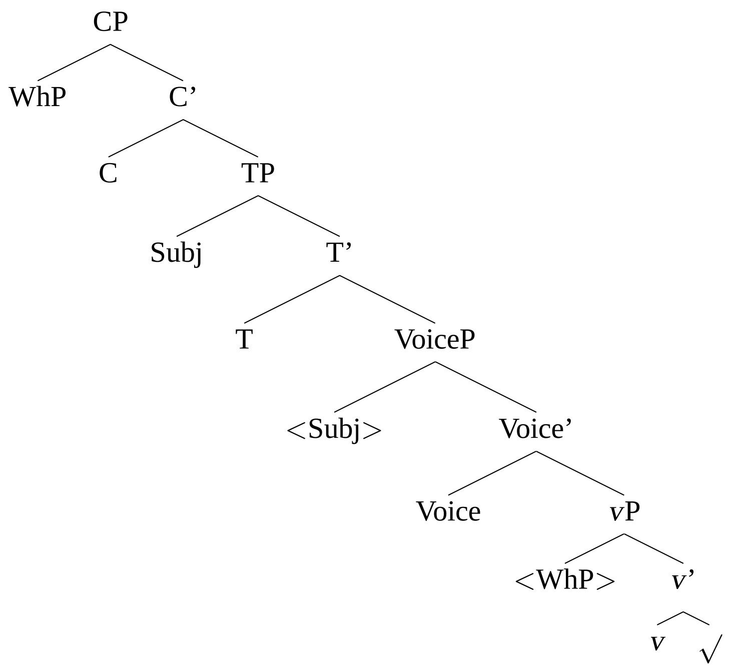
(40)



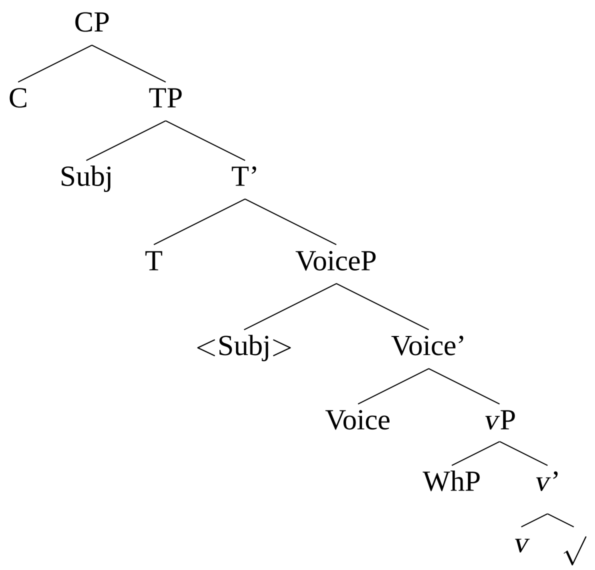
For English, the trees in (39) satisfy the way in which the EPP parameter is set since both trees contain movement into the specifier of TP. For instance, (39a) shows the external argument moving into the specifier of TP while (39b) shows a passive clause with the internal argument in spec-TP. In contrast, (40) represents a violation of the EPP parameter because the specifier of

TP is not full. The same type of mechanism can also be applied to other types of movement, e.g. wh-movement, which I assume is governed by its own parameter. For instance, depending on the language, the wh-movement parameter could be set one of three ways: requiring movement, requiring no movement, or allowing both. So in English for example, the parameter would be set to require movement whereas a wh-in-situ language would have a parameter preventing wh-movement structures from being externalised.[9] Two trees are provided in (41) which exemplify the wh-movement example further:

(41) a.



b.



In English, the wh-parameter is set to require wh-movement to take place. Consequently, the tree in (41a) represents a structure that is interpretable by the wh-movement parameter

[9] Although, it is worth noting that if arguments in Reintges, LeSourd, and Chung (2006) are on the right track, then there will need to be a distinction between a movement parameter and a parameter governing where a displaced constituent is Spelled-Out.

whereas (41b) is not. Since Merge is free, nothing in the syntactic component can constrain the operation apart from the extension condition, no tampering and inclusiveness. Therefore, something is required to ensure that structures built by Merge are interpretable. Seen as the solution has to be post-syntactic, it does not seem unreasonable in my mind to suppose that movement occurs (or not) in the syntax for free and that parameters determine whether the structure built by Merge is licit during transfer and externalisation. For the purposes of this thesis, I assume that these ideas are on the right track.

To conclude the discussion on labels and projection, untriggered Merge makes it difficult to formulate labelling in traditional terms because neither Merging element possesses a selection feature. Thus the element bearing the feature cannot just project. Then Chomsky's (2013) labelling algorithm was explored and found to be problematic when paired with untriggered Merge since breaking an unlabelable structure cannot cause movement because, by the time an object is labelled, movement will have already occurred, as per the latter stages of Chomsky (2015). Thus I argued that projection should follow the general principle of free-Merge in that it is not triggered or constrained to only apply in a specific configuration. With this in mind, an alternative labelling algorithm was proposed in (36) which contrasts with Chomsky's (2013) analysis in not making reference to specific structures, i.e. {X, YP} and {XP, YP}. Instead, (36) uses variables α and β which can apply in any binary structure generated by Merge and nothing constrains whether (36a), (36b) and (36c) applies or whether α or β projects in (36a). The labelling algorithm keeps producing labels until it generates a licit labelled object that satisfies full interpretation and headedness, in the same way that Merge keeps building until a valid syntactic structure is produced. Finally, as labels are assigned freely once movement has taken place, the proposal that movement occurs for labelling purposes is lost. Thus I proposed that movement occurs for free in the syntax and that post-syntactic parameters weed out structures that are interpretable in a given language.

2.6 Summary

The evaluation of Minimalist operations provided in this chapter has accomplished two things. First, it has provided an indication of what gadgets need to be available in Minimalism which is beneficial when determining whether head movement can be adopted as a Minimalist operation. Second, it can be viewed as the groundwork for the alternative to head movement developed in chapter 5.

Chapter 3

Multiple realisation of heads and head movement

The aim of this chapter is to evaluate three analyses and corresponding datasets to show how head movement is viewed in the literature when applied to multiple copy Spell-Out data. Specifically, these systems aim to produce predicate cleft constructions, verbal repetition constructions and clauses containing pre-verbal particles and corresponding verbal suffixes. Section 3.1 is devoted to predicate clefts from Kandybowicz (2008) and Landau (2006) who both adopt the head movement operation. Section 3.2 provides Kandybowicz's (2008) verbal repetition system along with that of Collins and Essizewa (2007) who again both use HM to derive their examples. Finally, section 3.3 examines Adger et al. (2009) where it is argued that HM cannot deal with clauses containing free standing pre-verbal particles and matching verbal suffixes.

3.1 Predicate cleft constructions and head movement

The aim of this section is to examine the *predicate cleft construction* (PCC) since head movement is a significant operation in analyses which derive this type of phenomenon. Much of the data is drawn from Kandybowicz (2008) while a smaller number of examples are taken from Landau (2006) to show how PCCs can differ across languages. Once the data has been provided, the discussion turns to the way in which PCCs are assembled in Kandybowicz (2008) and Landau (2006), and specifically to the issues that materialise when building PCCs using head movement.

Before providing the PCC data and highlighting their characteristics, Kandybowicz first shows how PCCs are different from other cases of constituent focus found in Nupe, since it is also possible to focus the subject, the object, and adjuncts. Examples of each are provided in (42b)-(42e) and a neutral sentence is also shown in (42a) for completeness. All the data is from Kandybowicz (2008, 83):

(42) a. Neutral sentence

Musa à ba nakàn sasi èsun làzì yin.
Musa FUT cut meat some tomorrow morning PRT

'Musa will cut some meat tomorrow morning.'

b. Subject focus

Musa __ à ba nakàn sasi èsun làzì yin o.
Musa FUT cut meat some tomorrow morning PRT FOC

'MUSA will cut some meat tomorrow morning.'

c. Object focus

Nakàn sasi Musa à ba __ èsun làzì yin o.
meat some Musa FUT cut tomorrow morning PRT FOC

'Musa will cut SOME MEAT tomorrow morning.'

d. Modifier focus

Èsun làzì Musa à ba nakàn sasi __ yin o.
tomorrow morning Musa FUT cut meat some PRT FOC

'As for believing, he believes in miracles.'

e. Predicate focus

Bi-ba Musa à *(ba) nakàn sasi èsun làzì yin o.
RED-cut Musa FUT cut meat some tomorrow morning PRT FOC

'It is CUTTING that Musa will do to some meat tomorrow morning.'

Starting with the similarities, each focused element is moved to the left periphery as one would expect. Yet in all cases apart from (42e), the fronted element is not pronounced twice. Also, in (42b) to (42d) the fronted material is phrasal (both the subject and object are DPs and the adjunct is an AdvP) while the verb in (42e) is not as the direct object remains in-situ. In fact, unlike wh-movement which can involve a full phrase, the focused element in predicate cleft constructions is just a reduplicated root and cannot be fronted with any other material, i.e. pied-piping is not possible. Examples from Kandybowicz (2008, 86-7) illustrating this requirement are provided in (43):

(43) Piped-Piping is impossible in PCCs

a. *[Du-du cènkafa] Musa á du cènkafa o.
RED-cook rice Musa FUT cook rice FOC
'It is COOKING RICE that Musa will do.'

b. *[Cènkafa Du-du] Musa á du cènkafa o.
rice RED-cook Musa FUT cook rice FOC
'It is COOKING RICE that Musa will do.'

c. *[(à) du-du (à)] Musa á du cènkafa o.
FUT RED-cook FUT Musa FUT cook rice FOC
'It is COOKING that Musa will do to the rice.'

d. *[(à) du-du (à)] Musa á du cènkafa o.
PERF RED-cook PERF Musa PERF cook rice FOC
'It is COOKING that Musa has done to the rice.'

e. *[(Dàdà) du-du (sanyín)] Musa à du cènkafa o.
quickly RED-cook quickly Musa FUT cook rice FOC
'It is QUICK/QUIET COOKING that Musa will do to the rice.'

f. *[Wu-wu gútá] Gana wu Musa o.
RED-hit three Gana hit Musa FOC
'It was HITTING THREE TIMES that Gana did to Musa.'

g. *[Wu-wu wangi] Gana wu Musa o.
RED-hit good Gana hit Musa FOC
'It was A GOOD HITTING that Gana gave to Musa.'

Each example in (43) indicates that the only element to move in a PCC is the focused predicate which must be represented as some type of root. If the fronted element was any larger, then more material would need to appear with the root when it is focused which, as exemplified by (43), is not possible.

Kandybowicz (2008) argues that Nupe PCCs behave in the same way as wh-movement with respect to certain phenomena. This suggests that like wh-movement, PCCs involve movement of an element to an A'-position. The data from Kandybowicz (2008, 84-5) which prompts this type of analysis is provided in (44):

(44) a. Sentential embedding under bridge verbs

Musa gàn gànán Nànǎ kpe gànán Gana si eci.
Musa say COMP Nana know COMP Gana buy yam
'Musa said that Nana know that Gana bought a yam.'

b. ✓Extraction across the clausal complement of bridge verbs

Si-si Musa gàn gànán Nànǎ kpe gànán Gana **si** eci o.
RED-buy Musa say COMP Nana know COMP Gana buy yam FOC
'It was BUYING that Musa said that Nana knows that Gana did to a yam.'

c. Sentential embedding under a non-bridge verb

U: tán Musa gànán mi: si doko.
3rd.SG pain Musa comp 1st.SG buy horse

'It pained Musa that I bought a horse.'

d. *Extraction across clausal complement of a non-bridge verb

***Si-si** u: tán Musa gànán mi: **si** doko o.
RED-buy 3rd.SG pain Musa COMP 1st.SG buy horse FOC

'It pained Musa that I BOUGHT a horse.'

e. Wh-island

***Si-si** Musa gbíngàn [ké Gana **si** o] o.
RED-buy Musa ask what Gana buy FOC FOC

'Musa asked what Gana BOUGHT.'

f. Complex NP island

***Gi-gi** Musa si [bise na **gi** eyì na] o.
RED-eat Musa buy hen COMP eat corn PRT FOC

'Musa bought the hen that ATE the corn.'

g. Subject island

***Si-si** [gànán etsu **si** doko] tán Musa o.
RED-buy COMP chief buy horse pain Musa FOC

'That the chief BOUGHT a horse pained Musa.'

h. Adjunct island

***Bi-ba** [Musa gá è **ba** nakàn] o, Gana à pa eci.
RED-cut Musa COND PRS cut meat FOC Gana FUT pound yam

'If Musa is CUTTING the meat, then Gana will pound a yam.'

i. Musa gá è ba nakàn, **pi-pa** Gana à **pa** eci o.
Musa COND PRS cut meat, RED-pound Gana FUT pound yam FOC
'If Musa is cutting the meat, then it is POUNDING that Gana will do to a yam.'

j. Coordinate islands

***Bi-ba** [Musa$_i$ à **ba** nakàn] u:$_i$ ma à du cènkafa o.
RED-cut Musa FUT cut meat 3rd.SG and FUT cook rice FOC

'It is CUTTING that Musa$_i$ will do to the meat and he$_i$ will cook the rice.'

k. ***Du-du** Musa$_i$ à ba nakàn [u:$_i$ ma à **du** cènkafa] o.
RED-cook Musa FUT cut meat 3rd.SG and FUT cook rice FOC
'Musa$_i$ will cut the meat and it is COOKING that he$_i$ will do to the rice.'

The data in (44) indicates that bridge verbs constrain the movement of the predicate in the same way as they constrain wh-phrases. Movement across a clausal boundary is only possible when the clause is introduced by a bridge verb. The fronted predicate also behaves in the same way as a wh-phrase with regards to island constraints.

The similarities between wh-movement and PCCs also extend to the fact that either a wh-phrase or a predicate can appear in the left periphery. Therefore, both types of phrase are in complementary distribution since only one is available in a leftward position at any given time. This characteristic is illustrated in (45) using examples from Kandybowicz (2008, 85):

(45) a. *Ké **bi-ba** Musa **ba** o?
what RED-cut Musa cut FOC
'What did Musa CUT?'

b. ***Bi-ba** ké Musa **ba** o?
RED-cut what Musa cut FOC

In (45), the doubled predicate and the wh-phrase appear to fight for a similar position which, when taken with the data in (44) suggests that PCCs and constituent questions can be derived in the same way. For example, if movement into the left periphery is triggered by a feature on C, then C will possess an EPP feature that either targets wh-phrases or focused constituents.

Despite the similarities between wh-movement and PCC movement, they also differ in several ways. For instance, a PCC contains two occurrences of the displaced element while only one is typically pronounced in a wh-question. If predicate clefts are derived by movement then both copies of the verb should be identical given the way that the copy theory of movement works. Yet as highlighted later in the section, the fronted predicate in Nupe appears nominalised which makes it look as though predicate clefts are realised twice because the two copies of the predicate are distinct. This aspect of the PCC data provides a means of differentiating wh-movement and PCC movement. Even cases of wh-movement where a wh-phrase moves but is pronounced in-situ are different because the highest position of the wh-phrase is marked by a relative tense morpheme that appears on C (see for instance Reintges et al. 2006). So the wh-phrase moves and establishes a relation with C but is pronounced in-situ presumably because the moved element and the copy left behind are identical which allows one to be deleted for reasons of economy. In more general terms, the issue in a Minimalist research program which adopts the copy theory of movement no longer relates to how the lower copy is generated rather than a trace, but why the lower copy is pronounced. The copy theory of movement advances that a full copy of a moved element is left in the pre-movement position which enables a system to derive multiple copy Spell-Out with the right constraints.

A further difference between wh-movement and PCCs is that in Nupe nothing can be pied-piped with the focused predicate. Whether an element pied-pipes or not is a point of variation in PCCs across languages. For instance, Hebrew and Russian allow pied-piping while Nupe, Vata and Haitian do not. Consequently, in some languages wh-movement and PCC movement will not be differentiable by this characteristic if pied-piping is allowed in both types of construction. Yet since the amount of material that is allowed to appear with the fronted predicate is source of variation between languages, it represents a characteristic that needs to be derivable in a system that deals with the phenomenon.

The final characteristic of Nupe PCCs to be discussed here before Kandybowicz's (2008) derivation is provided relates to the reduplication of the fronted predicate and the similarities between this property and a type of nominalisation found in the language. As mentioned above, when a predicate is focused in Nupe it appears to move high and be pronounced in reduplicated form. Example (42e) is repeated as (46) to illustrate:

(46) Bi-ba Musa à *(ba) nakàn sasi èsun làzì yin o.
RED-cut Musa FUT cut meat some tomorrow morning PRT FOC
'It is CUTTING that Musa will do to some meat tomorrow morning.

The lower copy *ba* is obligatory and must be pronounced in conjunction with the fronted element in order for the sentence to be grammatical. The morphological shape of the clefted predicate is the same as if it were nominalised using one of the nominalisation strategies available in the language. A number of verbs and their reduplicated forms are provided in Table 3.1. In (47), two examples are provided as evidence that reduplication is a method of nominalisation in Nupe (Table 3.1 and (47) are from Kandybowicz 2008, 88):

yí	'be very small'	yi-yí	'shrinking'
yé	'respond'	yi-yé	'responding'
yà	'give'	yi-yà	'giving'
wo	'be dry'	wu-wo	'drying'
wú	'teach'	wu-wú	'teaching'
wún	'to own'	wũ-wún	'owning'

Table 3.1: Nominalisation via verb reduplication

(47) Reduplicated verbs occur in nominal syntactic environments

a. Musa sundàn [bi-bé nyá Gana].
Musa fear RED-come POSS Gana
'Musa feared Gana's coming.'

b. [Bi-ba na u: ba nakàn na] tan Musa.
RED-cut COMP 3rd.SG cut meat PRT pain Musa
'His cutting the meat pained Musa.'

In (47a) and (47b) the nominalised verb is selected by a D possessor. Typically nominals are found in the complement position of a D which shows that *bi-bé* and *bi-ba* share a distribution with nouns in (47). The form of the verb in (47b) mirrors that of the clefted predicate in (46) which Kandybowicz (2008) takes to mean that the focused verb has acquired nominal properties. Thus the clefting process has to involve a strategy allowing the fronted predicate to acquire nominal properties not found on the lower copy.

To summarise, the combination of properties that have been discussed so far in this section provide a set of data that any analysis of Nupe PCCs needs to explain. The first observation that Kandybowicz (2008) makes is that when an element is focused in the language, only PCCs require that the lower copy is pronounced. The next point made is that pied-piping is impossible when the predicate is focused so the direct object, tense morphemes, aspect morphemes and adjuncts cannot be fronted with the predicate. The inability of extra material to move suggests that PCC movement should be analysed as a de-verbal root that undergoes head movement to a higher specifier position. Yet Kandybowicz (2008) illustrates that PCC movement is constrained in the same way as wh-movement at least some of the time, e.g. the predicate can be extracted from inside the complement of a bridge verb like a wh-phrase, while the same type of movement is not possible when a bridge verb is not present. In addition, wh-phrases and fronted predicates also seem to fight for a similar position because it is impossible to have a predicate and a wh-phrase in the same left periphery. Finally, the form of the fronted predicate is identical to verbs that have been nominalised via reduplication. This suggests that movement of the predicate into the left periphery provides the predicate with nominal properties since nominalised verbs share a distribution with nouns.

Therefore, a means of deriving PCCs is required that can assimilate the similarities that the phenomenon shares with A'-movement with the differences that makes the construction type unique. The next part of this subsection deals with the analysis that Kandybowicz (2008) proposes to account for the set of PCC characteristics noted above. Kandybowicz (2008) proposes that predicate cleft constructions are derived by movement of a non-verbalised root to the specifier of Foc which explains why pied-piping is not available. The A'-restrictions on predicate cleft movement are also explainable since the head targets an A'-position, and thus is a type of A'-movement. While Kandybowicz (2008) acknowledges that moving a head into a specifier is problematic under standard generative assumptions originating from Emonds's (1970) *Structure Preservation* and formalised in Minimalism by Chomsky and Lasnik's (1993) Chain Uniformity Condition, Kandybowicz (2008, 106) dismisses the condition by citing Vicente (2006) and claiming that a) the condition is not viable in a Minimalist grammar, b) its applicability is limited, and c) the effect of the condition falls-out from other parts of the grammar. These assumptions allow Kandybowicz (2008) to propose that a head can target a specifier during a movement operation.

The key to Kandybowicz's (2008) PCC analysis is the idea that the root moves from its Merge position twice resulting in its Merge position being realised as the lowest link in two separate chains. The first chain plots the journey of the root through the verbal extended projection via cyclic head movement to the lower phase head which for Kandybowicz is *v*. The second chain represents the root's movement from its Merge position to the specifier of FocP. Kandybowicz (2008, 107) argues that a low copy of the root moves to the specifier of FocP and not a higher verbal complex head since the fronted predicate appears with nominal features realised by the reduplication. The idea is that the root becomes verbalised when it adjoins to the *v*, so in order for the root to acquire nominal properties, it must be an un-verbalised copy that appears in the specifier of FocP. The nominal features originate from the Foc head *o* which Kandybowicz (2008, 111) proposes is a *clausal determiner* that assigns nominal properties to the fronted predicate. Evidence for the determiner-like nature of the *o* head is provided by the sentences in (48) which seem to show that an item possessing the same form as *o* can appear in environments where it behaves like a determiner. The element in question, i.e. non-left peripheral *o*, does not generate a focus reading and is glossed as LOC in the examples (from Kandybowicz 2008, 111) that follow:

(48) The distribution of D-type *o*

a. Musa le kata o.
Musa sleep room LOC
'Musa slept in the room.'

b. Musa dan kata o.
Musa be in room LOC
'Musa is in the room.'

c. Musa si eci ndondò.
Musa buy yam every
'Musa bought every yam.'

d. Musa kún nakàn sasi.
Musa sell meat some
'Musa sold some meat.'

e. Musa kún eci nana zì.
Musa sell yam this PL
'Musa sold these yams.'

The examples in (48) seem to show that *o* can appear in a position which can also be occupied by a determiner, e.g. *every* in (48c), *some* in (48d) and *this* PL in (48e). If Kandybowicz's (2008) proposal is correct and clausal determiners share a form with elements that appear to behave as Ds, then the nominal features of a predicate cleft could stem from the clausal determiner. He strengthens this proposal further by adopting a generalisation from Lefebvre (1992, 61) which states that there is a correlation between a position in a language for clausal determiners and the ability of the language to produce predicate clefts. The statement provided by Kandybowicz (2008, 112) is shown in (49):

(49) **Lefebvre's generalisation** (Lefebvre 1992)
The availability of predicate cleft within a particular grammar correlates with the existence of a syntactic position for clausal determiners.

The generalisation in (49) states that there is a correlation between predicate clefts being available and the language having a position for clausal determiners. Significantly, (49) does not entail that PCCs and clausal determiners co-occur but Kandybowicz (2008) still adopts the generalisation and argues that the focus head in Nupe PCCs is the clausal determiner. The outcome is that the focus head in PCCs has two jobs: being a clausal determiner and being the head of the focus phrase. Kandybowicz's (2008) analysis creates a significant point since it necessitates that the language needs two heads to derive focus constructions. The first is one that does not provide nominal features and targets non-predicate constituents while the second does provide nominal features and moves predicates.

As Kandybowicz (2008) analyses the nominalising focus head as a clausal determiner, then one question to ask is whether predicate clefts can occur without clausal determiners since an affirmative answer would require three focus heads cross linguistically: one to derive constituent focus, one to derive predicate clefts, and finally one to derive predicate clefts with nominalisation. It is not difficult to find data which shows that predicate clefts can be built without a clausal determiner. The relevant examples can be found in Landau (2006) who examines predicate clefts in Hebrew. One significant difference between Landau's predicate clefts and the ones in Nupe is that in Hebrew, an inflected copy of the verb is pronounced in T while the fronted copy is realised in its infinitive form. An example from Landau (2006, 37) is shown in (50) to illustrate:

(50) lirkod, Gil lo yirkod ba-xayim.
to-dance Gil not will-dance in-the-life
'As for dancing, Gil will never dance.'

In addition, and unlike in Nupe, pied-piping of an internal argument is possible in Hebrew, but not obligatory as (51b) and (52b) indicate:

(51) a. liknot et ha-praxim, hi kanta.
to-buy ACC the-flowers she bought
'As for buying the flowers, she bought.'

b. liknot, hi kanta et ha-praxim.
to-buy she bought ACC the-flowers
'As for buying, she bought the flowers.'

(52) a. le'ha'amin be-nisim, hu ma'amin.
to-believe in-miracles he believes
'As for believing in miracles, he believes.'

b. le'ha'amin, hu ma'amin be-nisim.
to-believe he believes in-miracles
'As for believing, he believes in miracles.'

Regardless of whether pied-piping occurs or whether movement seems to just involve a head, none of the examples in (51) and (52) contain a morpheme that could correspond to a clausal determiner. Indeed, even Kandybowicz (2008, 112) who adopts the generalisation in (49) states that certain languages allow predicate clefts to occur seemingly without a clausal determiner being present, and uses Hebrew as an example. Therefore, if the FOC *o* head in Nupe is a clausal determiner that triggers predicate clefts and nominalises the fronted element, then three different focus heads are required to account for the focus constructions discussed in this section. This first is one to derive the constituent focus exemplified in (42b), (42c) and (42d) where no nominalisation takes place. The second is a focus head that produces nominalised predicate cleft constructions, e.g. (42e). Finally, the third is needed to build predicate clefts without nominalisation which is required for the Hebrew in (50), (51) and (52).

A second question that materialises from Kandybowicz's (2008) analysis and (49) relates to whether clausal determiners can occur in non-predicate cleft contexts. This is significant because an affirmative answer here would require a fourth head to account for data that contained a clausal determiner that did not trigger a predicate cleft. Lefebvre (2013, 41) provides data illustrating that clausal determiners can occur in simple clauses where they determine the event expressed by the verb as in (53a), while the example in (53b) from Rountree (1992, 26) shows that they appear in temporal adverbial clauses (the clausal determiner is glossed as DEF):

(53) a. Fongbe

É wá ɔ́.
3SG arrive DEF

‘(S)he has arrived.’ (as we knew (s)he would)

b. Saramaccan

Dí mi gó a lío, mi sí í.
DEF I go to river, I see you
‘When I went to the river, I saw you.’

Since predicate clefts can occur without clausal determiners and clausal determiners do not always trigger predicate clefts, there does not seem to be a one to one relation between clausal determiners and predicate cleft constructions which is problematic for Kandybowicz’s (2008) analysis since he incorporates the clausal determiner into the focus head. In addition, since clausal determiners can occur in non-predicate cleft contexts, a fourth head is needed that corresponds to DEF in (53) which functions as a clausal determiner only.[1]

Thus predicate cleft and clausal determiner data taken from Nupe, Hebrew, Fongbe and Saramaccan requires four different heads if the Nupe focus head *o* is to be analysed as a clausal determiner as per Kandybowicz’s (2008) analysis. The first head (for reference FOC) generates constituent focus constructions; the second FOC-PRED builds predicate cleft constructions without nominalisation; the third FOC-DEF derives predicate clefts with nominalisation, and finally the fourth DEF produces examples containing a clausal determiner without deriving a predicate cleft construction. The analysis would be more streamlined if FOC-DEF could be reduced to a combination of FOC and the D or *n* that provides nominal features to the fronted predicate. Yet since Kandybowicz (2008) adopts a movement analysis of predicate clefts where the head moves to the specifier of the focus phrase, the usual mechanics available to a head movement system are not usable. Thus the predicate cannot move and adjoin to a nominal element somewhere inside the FOCP in a way reminiscent of how a verb moves and adjoins to T.

The discussion so far has shown that Kandybowicz’s (2008) analysis struggles when it is applied to examples outside of his Nupe data set. What follows now is an examination of the theory internal ramifications of the system. Specifically, there are four theoretical issues discussed here. The first relates to the way that movement of the bare root into the specifier of the focus head violates Chomsky’s (2001) formulation of probe/goal relations. The second

[1] Hiraiwa (2005, 276) argues that (49) is too strong a generalisation and proposes an alternative provided in (i) which draws a connection between nominalisation and the clausal determiner rather than predicate clefts and clausal determiners:

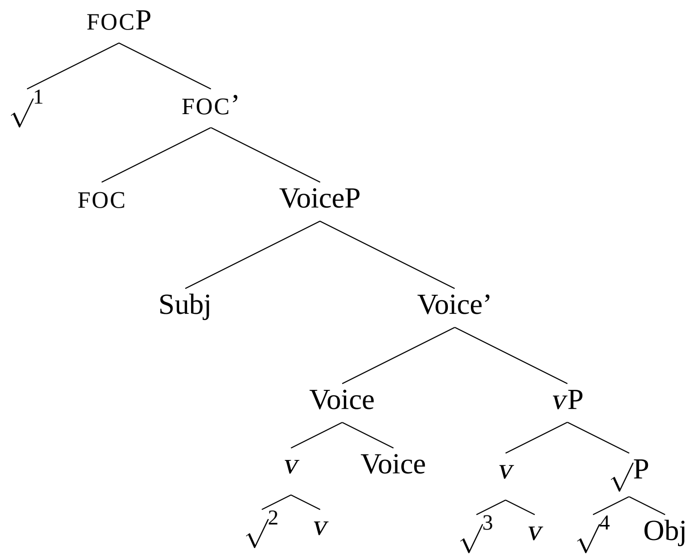
(i) In languages that allow a clausal determiner, focused predicates in PCC (sic) are nominalized.

Yet for the purposes of this thesis, even this moderate version requires a significant number of heads to implement when combined with Kandybowicz’s (2008) proposal that the focus head in a Nupe predicate cleft is a clausal determiner.

and third relate to the consequences of moving a head into the specifier of focus and how this operation interacts with the *Categorization Assumption* from Embick and Noyer (2007, 296) and the labelling algorithm from Chomsky (2013). The final problem relates to the realisation of the fronted predicate in Hebrew as an infinitive.

As the fronted element in Nupe predicate clefts is nominalised, Kandybowicz (2008) argues that the bare root (the copy in its un-verbalised position) moves straight to the specifier of the focus head, whereupon it inherits nominal features from FOC-DEF. The root also moves cyclically though the verbal extended projection via head adjunction until it reaches the position where it is Spelled-Out as a tensed verb. A schematic tree representing each occurrence of movement is provided in (54):

(54)



In (54), there are four occurrences of the root $\sqrt{}$ and each has been marked with a superscript number for reference. There are two chains containing the $\sqrt{}$: one chain is generated by the movement operation which positions a copy of the $\sqrt{}$ into the specifier of focus, e.g. CH = $\sqrt{}^1$, $\sqrt{}^4$; the other chain contains the bare root and the element adjoined to *v*, e.g. CH = $\sqrt{}^3$, $\sqrt{}^4$. In addition, as v adjoins to Voice, four copies of $\sqrt{}$ are generated in (54) which is significant because deriving the $\sqrt{}^1$ copy requires the focus head to target the lowest occurrence the $\sqrt{}$ available.

If the FOC head possesses a feature which attracts the root into its specifier, then that feature will act as a probe and look down into the structure to find an element that it can use to satisfy its requirement. Generally, a probing element always attracts the closest thing that possesses a matching feature. In (54), the problem is immediately obvious. Deriving a predicate cleft where the un-verbalised root is moved into the specifier of FOCP requires that the feature on FOC ignores all intervening copies of $\sqrt{}$ in order for the lowest one ($\sqrt{}^4$) to end up in the specifier of FOCP.

Given the way that Chomsky (2001) formulates probe/goal relations between features, an analysis which necessitates that an un-verbalised root appears in the specifier of FOCP is problematic since it requires an instance of movement that does not operate like other types of syntactic displacement. True, one could follow Chomsky (2001) in proposing that head movement is better analysed as a post-syntactic operation with the result that the movement need not necessarily be driven by a syntactic feature. However in this case, it is not possible to analyse PCC movement as a post-syntactic operation since the effects are visible at LF.

The second and third issues are connected and relate to the *Categorization Assumption* and Chomsky's (2013) labelling algorithm. In Nupe, Kandybowicz (2008) argues that the un-verbalised root moves from its Merge position into the specifier of the focus phrase. Since the moved element is a bare root, it must be the case that the lower copy is categorised during the derivation, which (54) exemplifies since a copy of the root moves from its Merge position and adjoins to a categorising head little *v*. For reference, the *Categorization Assumption* from Embick and Noyer (2007, 296) is provided in (55):

(55) **Categorization Assumption**

Roots cannot appear without being categorized; Roots are categorized by combining with category-defining functional heads.

Since the copy theory of movement generates two copies, moving the predicate in PCCs generates an uncategorised copy of the root which in theory should violate (55). Kandybowicz's (2008) analysis avoids this problem by proposing that nominal features are transferred from the FOC-DEF head. Despite the issue highlighted above regarding the existence of the different types of focus head and clausal determiner, the categorising features that the bare root requires in the specifier of focus are available from FOC-DEF.

Yet this aspect of the analysis has a significant consequence when examined through a lens coloured by the discussion in Chomsky (2013) regarding the labelling algorithm. A brief description of the analysis follows. In an effort to simplify the operation Merge, Chomsky (2013) removes the requirement that the output of an application of Merge has to be endocentric. Previous versions of the operation encoded endocentricity through the fact that the label of a generated syntactic object was always derived from the head. By removing the stipulation that Merge generates a label, Chomsky (2013) proposes that the output of Merge should be an unordered set. This idea is not new in of itself as it has appeared in Collins (2002) among others. But unlike Collins, Chomsky (2013, 43) assumes that labels are required for a syntactic object to be interpreted at the interfaces. Chomsky (2013) does not say why a syntactic object needs to be labelled for it to be interpreted at the interfaces, he just assumes that it does.

As the output of Merge is unlabelled, and labels are required at the interfaces, Chomsky (2013, 43) proposes the following *Labelling Algorithm* which applies at the phase level:

(56) a. When labelling a {X, YP} structure, the labelling algorithm locates the head X via minimal search and labelling is trivial. X labels.

b. When labelling a {XP, YP} structure, the label is ambiguous between X and Y, so either the syntactic object is modified so only one head is visible to LA or LA locates a feature shared by X and Y to provide the label.

In the case of {X, Y} constructions of the sort where X is a root and Y is a categorising head, Chomsky (2013, 2015) supposes that roots are too weak to label which allows the categorising element to determine the label of an {X, Y} structure.

Since Chomsky states that roots are too weak to label on their own and as such need to be associated with a categorising head by adjunction or Merge, $\sqrt{}^4$ cannot label in (54) but the *v* to which $\sqrt{}^3$ is adjoined does. If the amalgamation of a root and a categorising head (or at least the categoriser) can label, then it should be the case that the root in the specifier of the focus phrase provides a label since it acquires categorisation features from FOC-DEF which is of course problematic. On the other hand, if the reduplication of the fronted predicate could be argued to represent something other than nominalisation so the root could be invisible to the labelling algorithm, the Categorisation Assumption in (55) would be violated.

To summarise the labelling problem, if the displaced root is categorised it must provide a label since it is the closest labelling element to the FOCP label, which is the wrong result. Yet if the reduplication could be argued to not provide evidence for nominalisation, the root in the specifier of the focus phrase could remain bare and invisible to the labelling algorithm. The outcome of this proposal however would result in a Categorization Assumption violation since the tree would contain an uncategorised root.

The final problem discussed relates specifically to the fact that in Hebrew, the fronted predicate is realised as an infinitive. Landau (2006) argues that the verb moves into the specifier of FOCP and that it is realised as an infinitive because it has not been provided with any inflection material during the derivation. So the infinitival marking on the verb can be thought of as a default which appears since V is uninflected. The proposal is problematic when viewed in light of languages that use an additional head to mark the infinitive, like English and *to*, e.g. *I want to run*, where run is in the infinitive. In Hebrew, Landau (2006) states that verbs are marked as an infinitive by the addition of a prefix to a specific form. In (50), the infinitival prefix is *li-* which according to Landau's analysis is not a separate head but part of the [v+$\surd$] complex. While this analysis may work for Hebrew, it is inherently problematic for English since a negative element can intervene between the infinitival marker and the verb, e.g. *I want to not run the race*. In addition, since Hebrew has a set of infinitival markers of which *il-* is one (the others are *le-* and *la-* and differ depending on the verb) it does not seem appropriate to analyse the fronted verbs as just a root and a verbaliser. Yet since Landau (2006) moves a [v+$\surd$] into the specifier of FOCP there is no way for these verbs to be derived with a separate T head.

In summary, the purpose of this section was to provide a description of the so called Predicate Cleft Construction in order to determine whether its idiosyncrasies can be derived using a type of head movement. At a glance, the operation can derive cases where only a head occurs in the left periphery but struggles when other material is pied-piped with the predicate. This suggests that some types of predicate cleft data involve head movement while others require phrasal movement.

Additionally, Kandybowicz's (2008) system of deriving PCCs with head movement requires four heads to account for the data examined in this section. There needs to be a head that derives constituent focus, e.g. a FOC. Then there needs to be a head that derives predicate clefts without nominalisation FOC-PRED. A third head FOC-DEF is required to generate nominalised predicate clefts, and finally, a fourth DEF is required to build examples containing a clausal determiner but that are not predicate cleft constructions. A more streamlined approach would be one which used a head to derive focus constructions and a separate head to derive the nominalisation.

Furthermore, Kandybowicz's (2008) analysis was shown to be problematic with regards to the Categorization Assumption from Embick and Noyer (2007) and the labelling algorithm of Chomsky (2013). A root has to be categorised according to the former but categorised roots label according to the latter. Thus a root in the specifier of focus either violates the Categorisation Principle or provides a label inappropriate to the focus phrase.

Another problem was highlighted using the Hebrew data from Landau (2006) since the fronted predicate is realised as an infinitive because it is uninflected for tense. Yet it does not seem appropriate to propose that an infinitive is the form given to a verb when it is bare because in other languages, infinitives are marked using an additional morpheme, e.g. *to run*, *to hide*, *to speak* and so on. Like the nominalisation property acquired by Nupe fronted predicates, the infinitive marking on Hebrew predicates must come from somewhere. But since the predicate is moved straight to the specifier of FOCP, it cannot even be said that it adjoins to a head in the left periphery which functions as an infinitive marker (like English *to*). As a consequence, the way that the verb acquires its infinitival morpheme in the specifier of the focus phrase is a mystery which requires a solution.

3.2 Verbal repetition constructions and head movement

The aim of this section is to examine verbal repetition constructions since they involve multiple copy Spell-Out of verbal elements, but unlike predicate clefts where one element moves to the specifier of a left peripheral head, the verbs in verbal repetition constructions are pronounced in a clause medial position. While verbal repetition can be used to convey a number of different meanings, the derivations proposed in the literature share a common element in that both occurrences of the verb are generated by the copy theory of movement using either head movement or movement where a verbal element targets the specifier of a focus phrase. At first glance, movement derives the correct results since each application of the operation provides an additional copy capable of being pronounced. Yet it will be shown that movement analyses of verbal repetition are problematic when one occurrence of the verb differs from the other in form, i.e. one is inflected with [$\pm$past] while the other is realised as an infinitive especially given that infinitives are argued by many to possess a [$\pm$Tense] feature (Chomsky 1981; Haegeman 1994; Sportiche et al. 2014; Stowell 1981, 1982) which cannot appear on the verbal copy out of nowhere. Since the copy theory of movement produces two elements that are identical, or at least produces two elements that are identical until the higher one Agrees with another head (e.g. the highest occurrence of a verb derived by successive cyclic movement would Agree with T), it should be impossible for the lower copy to possess a feature that is not contained in the higher one (see for instance Pérez 2018).

The structure of this section is as follows. An examination of Kandybowicz's (2008) Nupe verbal repetition data is provided to illustrate how the phenomenon distributes in the language. Second, an illustration of Kandybowicz's (2008) analysis is included to highlight how he uses movement to derive the Nupe data. The third part of this section examines more verbal repetition data, this time from Collins and Essizewa (2007), where one copy of the verb is inflected differently from the other. This part of the discussion also illustrates why deriving the phenomenon with movement is problematic. The final part of the section summarises the findings and underlines the key characteristics that any verbal repetition analysis needs to generate.

As mentioned above, the first set of data to be examined is from Kandybowicz (2008) who provides an analysis of *bare root verbal repetition constructions* (BRVRCs) which are a subtype of verbal repetitions. These constructions are a representative case of verbal repetition phenomena and are derived using the head movement operation.

The overt pronunciation of the lower copy is triggered by a constraint that does not allow an unsupported phonological tone to be Spelled-Out without a syntactic object to which it can attach. Kandybowicz (2008) also argues that the higher copy of the verb is Spelled-Out due to morphological considerations since the element to which the moved root attaches, the little *v*, is an affix and failure to pronounce this copy would result in a Stray Affix filter violation (Lasnik 1981, 1995). Two BRVRCs from Kandybowicz (2008, 51) are provided in (57) to illustrate how the data patterns and to show that pronouncing two copies is possible in both positive and negative contexts:

(57) a. A: Musa (') pa eci à.
Musa FT pound yam NEG
'Musa didn't pound a yam.'

B: Ebà, Musa pa eci pa.
yes Musa pound yam pound
'Yes, Musa DID IN FACT pound a yam.'

b. A: Musa pa eci.
Musa pound yam
'Musa pounded a yam.'

B: Hahà, Musa (') pa eci pa à.
no Musa FT pound yam pound NEG
'No, Musa DID NOT IN FACT pound a yam.'

In Nupe, to use terms Kandybowicz (2008, 50), BRVRCs are "emphatic declaratives that assert the truth-value of a proposition or presupposition that contrasts with the hypothesised truth-value of a discourse-salient assertion". Thus BRVRCs are always said in response to another utterance in order to create a distinction with the truth-value of the previous statement. This type of contrast is provided in (57) where the BRVRCs in the B sentences are used to contradict the assertions created by the A sentences.

It is worth mentioning now that a second construction in Nupe resembles the BRVRCs provided in (57). These are dubbed *Serial Verb Constructions* (SVCs), and like BRVRCs, they contain multiple verbal elements. Kandybowicz (2008) illustrates that the key difference between SVCs and BRVRCs relates to the verbs in the former being distinct elements selected from the lexicon individually while the verbs in the latter are derived by movement and Spelling Out multiple members of the subsequent chain. Examples from Kandybowicz (2008, 52-3) of the different types of SVCs are provided in (58)-(60) for reference:

(58) Consequential Serial Verb Constructions (CSVCs)

a. Musa à **wan** bise **zún** **gí**.
Musa FUT catch hen slaughter eat
'Musa will catch a hen, slaughter it and (then) sell it.'

b. Musa à **du** eci **kún**
Musa FUT cook yam sell
'Musa will cook a yam and (then) sell it.'

(59) Resultative SVCs (RSVCs)

a. Musa è **fo** èwò **li**.
Musa PRS wash garment be clean
'Musa is washing a garment clean.'

b. Elúgi **nikin tsu**.
bird fall die
'The bird fell to its death.'

(60) Purposive SVCs (PSVCs)

a. Musa à **si** eyi **dzò**.
Musa FUT buy corn plant
'Musa will buy corn in order to plant it.'

b. Musa à **lá** ebi **ba** nakàn.
Musa FUT take knife cut meat
'Musa will take the knife in order to cut the meat.'

SVCs and BRVRCs appear similar on the surface in that each construction contains multiple verbs which are not linked with coordination. In addition, not all the verbal arguments are pronounced (only one direct object is externalised in (57)-(60) despite that multiple verbs are present which presumably all possess a selection property). Yet both differ in a number of ways that are too significant to reconcile if both constructions are derived using the same mechanism and each will be explored in turn. The first is that the second verb in a SVC cannot be unergative while the second verb in a BRVRC can. The contrast is exemplified by the data from Kandybowicz (2008, 54) provided in (57):

(61) a. V2 cannot be unergative in Nupe RSVC

*Elúgi nikìn fu.
bird fall fly
'The bird fell, thereby causing it to fly.'

b. V2 may be unergative in a Nupe BRVRC

Elúgi fu fu.
bird fly fly
'The bird DID IN FACT fly.'

Since unergative verbs are one place predicates that combine with a subject, it is impossible for *fu* "fly" to be the final verb in (61a), which suggests that SVCs do not contain more than one subject-introducing little *v* head. In contrast, an unergative verb can appear last in a BRVRC as illustrated in (61). While a movement and multiple Spell-Out analysis does not seem workable for the SVC data since the verbs are different lexical items, the BRVRC appear derivable by movement since the verbs are identical and there is only one occurrence of the subject . If the first and second *fu* "fly" verbs were independently generated, than something would be needed to explain why one of the subjects is suppressed.

The second contrast between a BRVRC and a SVC is that V1 may be repeated in a serial verb construction while neither verb can repeat in a BRVRC. Examples from Kandybowicz (2008, 54-5) proving this claim are shown in (62) to (65):

(62) Only V1 may repeat in a Nupe CSVC

a. Musa **du** eci **du** kún.
Musa cook yam cook sell
'Musa DID IN FACT cook a yam and (then) sell it.'

b. *Musa du eci **kún kún.**
Musa cook yam sell sell

(63) Only V1 may repeat in a Nupe RSVC

a. Musa è **fo** èwò **fo** li.
Musa PRS wash garment was be clean
'Musa IS IN FACT washing the garment clean.'

b. *Musa è fo èwò **li** **li**.
Musa PRS wash garment be clean be clean

(64) Only V1 may be repeated in PSVC

a. Musa à **si** eyì **si** dzò
Musa FUT buy corn buy plant
'Musa WILL IN FACT buy corn in order to plant it.'

b. *Musa à si eyì **dzò** **dzò**.
Musa FUT buy corn plant plant

(65) Neither verb in a BRVRC may undergo further repetition

a. *Musa è gí bise gí **gí**.
Musa PRS eat hen eat eat

b. *Elúgi fu fu **fu**.
bird fly fly fly

When the first verb is repeated in (62a), (63a) and (64a) the result is acceptable while repetition of the second verb generates an ungrammatical sentence. If focus constructions are derived by establishing a relation between a verb in this case and a focus head, then the grammaticality judgements presented in (62), (63) and (64) are expected since the second verb is further from the focus head than the first verb. As a consequence, a relation between the focus head and the second verb will skip the first verb and should trigger a minimality violation. Again the BRVRC in (65) patterns differently in that neither the first or second verb can be repeated. This is also expected if BRVRCs involve a relationship between the focus head and another element within the clause since doubling one of the already duplicated verbs would require a second chain to be established with the focus head.

Kandybowicz (2008, 56) exemplifies a third difference between Nupe SVCs and BRVRCs. It is possible to extract a subject or object from a SVC but not a BRVRC in order to generate either subject or object focus. The examples in (66) contain CSVCs; (67) contains RSVCs; (68) contains PSVCs, while (69) contains BRVRCs where subject and object movement is not possible:

(66) Extraction from CSVCs is possible

a. Musa __ du eci kún o.
Musa cook yam sell FOC
'MUSA cooked a yam and (then) sold it.'

b. Eci Musa du __ kún o.
yam Musa cook sell FOC
'Musa cooked A YAM and (then) sold it.'

(67) Extraction from RSVCs is possible

a. Musa __ è fo èwò li o.
Musa PRS wash garment be clean FOC
'MUSA is washing the garment clean.'

b. Èwò Musa è fo __ li o.
garment Musa PRS wash be clean FOC
'Musa is washing THE GARMENT clean.'

(68) Extraction from PSVCs is possible

a. Musa __ à si eyì dzò o.
Musa FUT buy corn plant FOC
'MUSA will buy corn in order to plant it.'

b. Eyì Musa à si __ dzò o.
corn Musa FUT buy plant FOC
'Musa will buy CORN in order to plant it.'

(69) Extraction from BRVRCs is blocked

a. *Musa __ du eci du o.
Musa cook yam cook FOC
'MUSA DID IN FACT cook a yam.'

b. *Eci Musa du __ cook FOC
yam Musa cook cook FOC
'Musa DID IN FACT cook A YAM.'

Subject and object extraction is possible in all the SVCs provided in (66), (67) and (68). Assuming that subject and object focus involves movement into the specifier of a focus phrase, nothing prevents either constituent from satisfying a feature on the focus head which also suggests that nothing else is in a relationship with FOC. The BRVRCs provided in (69) pattern differently since subject and object movement is prohibited. Since BRVRCs are focus constructions already, i.e. they focus the truth value of a proposition, it is expected that focusing the subject and object will lead to an ungrammatical sentence since the focus head is already in use.

Kandybowicz (2008) takes the collection of data in (58) to (69) as evidence that unlike SVCs, BRVRCs are not derived independently but are instead derived by movement, specifically head movement. This being the case, it allows an analysis to be proposed where both copies of the verb are members of a single chain and are pronounced for independent reasons. Accordingly, it is now time to provide the syntactic characteristics of BRVRCs to determine whether movement is the best way to derive the data or whether an alternative needs to be proposed. The discussion suggests that the Nupe data is derivable with head movement despite the inherent problems that afflict the operation.

In Nupe, BRVRCs are a type of Focus construction where the focused element is a null headed affirmative phrase which Kandybowicz (2008, 60) labels as ΣP. The ΣP is moved into the specifier of a Focus head, also null. This accounts for the data provided in (70) which indicates that moving an element from inside a BRVRC to the left periphery is impossible, which is to be expected if Focus already contains a null headed phrase in its specifier:

(70) Movement to the left periphery is impossible in a BRVRC

a. *Musa __ du eci du o.
Musa cook yam cook FOC
'Musa DID IN FACT cook a yam.'

b. *Zě __ du eci du o?
who cook yam cook FOC
'Who DID IN FACT cook a yam?'

c. *Eci Musa du __ du o.
yam Musa cook cook FOC
'Musa DID IN FACT cook A YAM.'

d. *Ké Musa du __ du o?
what Musa cook cook FOC
'What DID IN FACT Musa cook?'

e. *Kánci Musa du eci du __ o?
when Musa cook yam cook FOC
'When DID IN FACT Musa cook a yam?'

Example (70a) shows that the subject cannot be focused in a BRVRC while (70b) indicates that the subject cannot be moved to the left periphery via wh-movement within a BRVRC which suggest that the left periphery is already filled by a null morpheme. The direct object follows the same pattern since the object cannot be focused (70c) or undergo wh-movement (70d). The final example in (70e) illustrates that a temporal adjunct cannot be moved in a BRVRC.

So far in this section, two types of focus have been used to exemplify how BRVRCs pattern. The first is the BRVRC itself while the second is introduced by the *o* FOC morpheme and used for cases of constituent focus. Examples of these are provided in (71a) (Kandybowicz 2008, 59) and (71b) (Kandybowicz 2008, 60) respectively. Nupe can also derive a third type of focus constituent introduced by NI, which at first glance seems to do the same job as a BRVRC in the sense that it also focuses the polarity of the proposition, although this time without verbal repetition. For reference, one is provided in (71c) (Kandybowicz 2008, 60).

(71) a. Musa du eci du.
Musa cook yam cook
'Musa DID IN FACT cook a yam.' (NOT: 'Musa COOKED a yam.')

b. Musa du eci o.
Musa cook yam FOC
'MUSA cooked a yam.'

c. Musa du eci ni:.
Musa cook yam FOC
'Musa actually cooked a yam.'

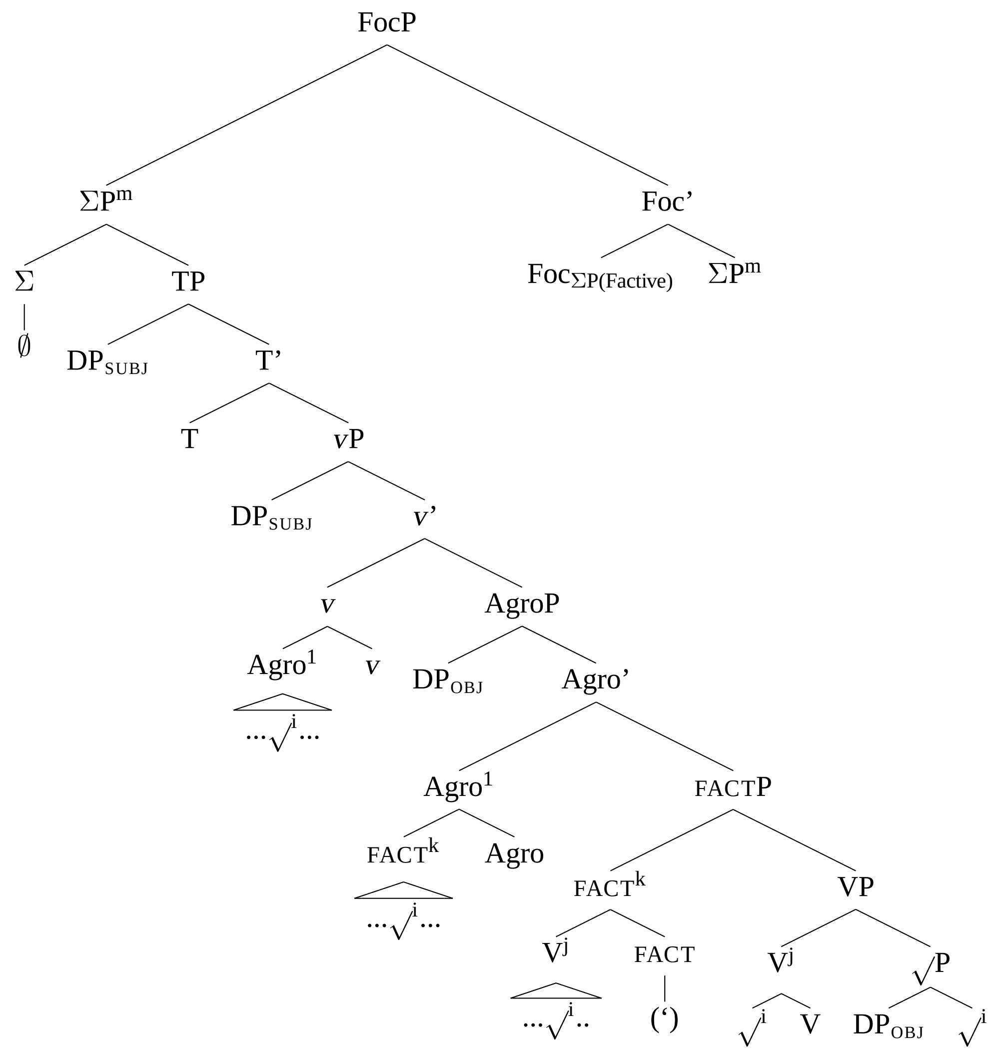
When comparing the examples in (71), one can ask why Nupe has two methods for focusing the polarity of a clause, i.e. why can polarity be focused using the *ni* FOC head when it can also be done using BRVRCs? Given that two constructions exist that do the same job, there seems to be a reduplication of efforts which at first glance seems inefficient. Kandybowicz (2008) examines each in more detail and it appears that while both constructions focus the polarity, the effect is pragmatically different in each case. The difference between *ni* and BRVRCs is related to the speaker and the proposition being emphasised. For instance, in a BRVRC the proposition is stated as a fact whereas in the *ni* case, it is an asserted proposition that may be false. To illustrate, Kandybowicz (2008, 61-2) provides alternative translations of (71a) and (71c) which draw this contrast out further. These are shown in (72a) and (72b) respectively:

(72) Alternative translations of (71a) and (71c) respectively

a. 'For all anyone knows, Musa DID IN FACT cook a yam.'
b. 'For all I know, Musa actually cooked a yam.'

Kandybowicz proposes that the factive difference between (72a) and (72b) necessitates that BRVRCs contain a Fact head that encodes the additional meaning in (72a). Kandybowicz (2008, 63-4) diagnoses the position of the additional element using a prosodic difference between each copy of the verb in BRVRCs. Tracking the pitch within a BRVRC illustrates that the second copy of the verb (V_2) consistently corresponds with a low tone. In contrast, when pitch is tracked in non-BRVRCs containing two distinct verbs, e.g. an SV_1OV_2 construction, the second verb (V_2) is realised with a high tone. Thus the low tone associated with V_2 in a BRVRC seems idiosyncratic to that construction and provides a location for the factive head, e.g. somewhere below the position of the final landing site of the direct object but above the VP. The structure proposed by Kandybowicz (2008, 67) is provided in (73). The ΣP immediately dominates the TP:

(73)



The derivation would proceed in the following way. The lowest occurrence of the root is Merged with the direct object DP to form the √P. The V then Merges with the √P before √ moves and adjoins to V. The next step is to Merge the FACT head to the VP which results in subsequent head movement generating two copies of V_j. Agro is then attached to the FACTP. Head movement of FACT follows along with movement of the object into the specifier of AgroP. The little *v* is Merged with AgroP. Head movement of Agro follows and the subject is Merged with *v*' to form the *v*P. T is then attached to the tree before the subject moves into its specifier. The null Σ head is then attached followed by Foc. ΣP is then moved into the specifier of Foc to generate the required polarity focus reading that is indicative of the BRVRC.

Since the FACT head is argued to be the source of the low tone associated with BRVRCs, Kandybowicz (2008) argues that pronunciation of the lower copy of the verb is triggered by a need to not have an unsupported floating tone when the derived structure is externalised. This constraint is captured by Kandybowicz (2008, 71) in (74):

(74) **Tonal reinforcement condition (ToRC)**

Prosodically unsupported tonal content is uninterpretable.

To make sure that there is no unsupported prosodic material, the constraint in (74) forces a lower copy to be pronounced so that a floating tone is not externalised. With regards to which copy is pronounced, Kandybowicz (2008) argues that the floating tone is realised on material that is left adjacent to the FACT head. The result is that the pronounced lower copy could correspond to the root inside the material adjoined to the FACT head or the Agro head. According to Kandybowicz (2008, 73), as Agro does not correspond to any Spelled-Out material, there is no way identify which root corresponds to the floating tone.

To summarise Kandybowicz's (2008) discussion, the phenomenon of bare root verb repetition is argued to the fall-out from a "repair strategy" occurring at PF to prohibit unsupported floating tones from being externalised. One attractive aspect of this analysis is that it does not make use of any dubious structure building operations with the exception of head movement. The tree derived in (73) is similar to a transitive clause up to the TP, at which point the ΣP phrase and FocP provide the focused polarity reading. Inside the TP, the factive head is the only structural difference between a transitive and a BRVRC. However, once a larger dataset is analysed, it becomes apparent that this analysis struggles when the lower copy contains an overt morpheme not found in the higher copy. The reason relates to the copy theory of movement because by definition, where two copies are produced, they have to be identical. Consequently, anything contained in the lower copy has to also be an element of the higher copy.

With this issue in mind, data from Kabiye is analysed next since it exemplifies a problematic case of verbal repetition where the lower copy contains a feature or head not found in the higher copy. The examples are from Collins and Essizewa (2007) who analyse a particular dialect of Kabiye where an infinitival verbal copy appears at the end of the clause after a particle *kí*. This construction generates two different meanings. One relates to time and is provided in (75) while the other is shown in (76) and gives a contrastive verbal focus interpretation.

(75)	mɪŋ-kɔm-á	kʊ́	kɔm	tɔ
	1SG-arrive-PERF	KI	arrive-INF	PRT
	'I have just arrived.'			

(76)	ma-ní-ʊ	kabiyɛ	kí	ní-ʊ	ma-a	yɔɔd-ʊ	kʊ́
	1SG-understand-IMPF	Kabiye	KI	understand-INF	1SG-NEG	speak-IMPF	it
	'I only understand Kabiye. I don't speak it.'						

The interpretation in (76) will be the focus of this discussion. It is is worth noting at this point however that there is a significant difference between the meaning generated by verbal repetition in Kabiye and Nupe. In Nupe, the proposition is focused, while in Kabiye, it is the event denoted by the verb. Consequently, the interpretation of Kabiye verbal repetition has more in common with Nupe predicate clefts which assert that one event will take place rather than another, i.e. *It is POUNDING that Musa will do to a yam (as opposed to say, boiling.).*

Before providing a detailed description and examination of Collins and Essizewa's (2007) analysis, what follows is a brief description of Kabiye to give the discussion a context. The basic order of Kabiye is Subject-Verb-Object (SVO) with auxiliary verbs appearing in between the subject and V, i.e. SAuxVO order. Collins and Essizewa (2007, 192) provide a basic transitive as a starting point:

(77) ma-ní-ʊ kabiyɛ
1SG-understand-IMPF Kabiye
'I understand Kabiye.'

In Kabiye, verbal repetition is significant for a head movement analysis because the lower verbal copy appears as an infinitive and is marked with [-ʊ]. This is exemplified in (76) where the second occurrence of *ní* "understand" has a [-ʊ] suffix.[2] An additional example from Collins and Essizewa (2007, 192) is provided in (78) for reference:[3]

(78) ɛsɔ́ yá-kɪ kɛ́kɛ́sɪ kí yáb-ʊ
Esso buy-IMPF bean cakes KI buy-INF
'Eso [sic, SW] is just buying bean cakes.'

The data from Kabiye seems to lend itself to a movement analysis because the first and second occurrence of the verb have to correspond to the same lexical item. The examples in (79), (80) and (81) from Collins and Essizewa (2007, 192-3) illustrate this fact:

(79) a. ɛsɔ́ yɔ́ɔd-ʊ kí yɔ́ɔd-ʊ́
Esso speak-IMPF KI speak-INF
'Esso is just speaking.'

b. *ɛsɔ́ yɔ́ɔd-ʊ kí kál-ʊ
Esso speak-IMPF KI yell-INF

c. *ɛsɔ́ yɔ́ɔd-ʊ kí hóŋ-u
Esso speak-IMPF KI laugh-INF

(80) a. cíca mab-á ɛsɔ́ kí máb-ʊ (* kí lú-u)
teacher hit-PERF Esso KI hit-INF KI hit-INF
'The teacher only hit Esso.'

[2]It is also worth pointing out that the suffix denoting the imperfective is also [-ʊ].

[3]Collins and Essizewa (2007) state that the *kɪ* "IMPF" suffix appearing at the end of the first verbal occurrence is an allomorph of the imperfective morpheme. Its appearance is due to the fact that the verb is of the form CVb.

b. cíca lú ɛsɔ́ kí lú-u (* kí máb-ʊ
teacher hit-PERF Esso KI hit-INF KI hit-INF
'The teacher only hit Esso.'

(81) a. ɛsɔ́ cɛ́t-ʊ kí cɛ́t-ʊ (* kí fɛ́b-ʊ)
Esso lie-IMPF KI lie-INF KI lie-INF
'He is just telling a lie.'

b. ɛsɔ́ fɛ-kɪ kí fɛ́b-ʊ (* kí cɛ́t-ʊ)
Esso lie-IMPF KI lie-INF KI lie-INF
'He is just telling a lie.'

The sentences in (79), (80) and (81) illustrate that the imperfective verb and the infinitive have to be derived from the same lexical item. To use (81) as an example, the stem *fɛ* "lie" has to be used for both verb copies. If the infinitival copy is substituted for a synonym, the result is unacceptable as the parentheses indicate in (81a) and (81b). The inability of the verbal copies to be derived from different stems is taken by Collins and Essizewa (2007) to point towards a movement analysis because they argue that a copy operation needs to generate one of the verbs. In addition, the authors also suggest that the infinitive marking appears because "it is impossible (outside of the imperative) to have a bare verb in Kabiye" (Collins & Essizewa 2007, 193). Yet as discussed in section 3.1, the morpheme [-ʊ] has to correspond to a syntactic head since languages exist where the infinitive is marked by an element which is in complementary distribution with other types of T, e.g. English *to*.

Before providing a derivation for verb focus constructions, Collins and Essizewa (2007) show how subject and object focus are generated in Kabiye. Starting with the object, there are two options. The first is for the object to be clause initial, while the second is for it to appear in a position following the verb. The examples in (82) and (83) are from Collins and Essizewa (2007, 194):

(82) a. ma-ní-ʊ kabyiyɛ (ɖeké) na
1SG-understand-IMPF Kabiye only FOC
'I understand (only) Kabiye.'

b. kabiyɛ-ɛ (*na) má-nɪ'-ʊ
Kabiye-FOC FOC 1SG-understand-IMPF
'I understand Kabiye.'

(reply to: 'What language do you understand?')

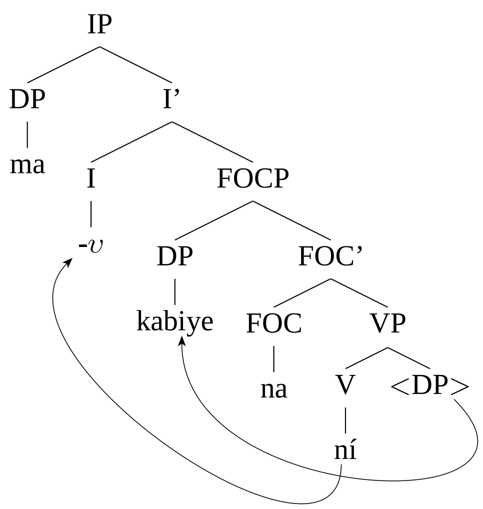
(83) a. mɔ-ɲɔʊ sʊlʊm
1SG-drink beverage (alcoholic)
'I am drinking (an alcoholic beverage).'

b. sʊlʊm-m mɔ-ɲɔʊ
beverage (alcoholic)-FOC 1SG-drink
’I am drinking (an alcoholic beverage).’

(reply to: ‘What are you drinking?’)

The data in (82) and (83) highlights that when the object is focused in the clause initial position, the *na* FOC head is unavailable. Instead, the final element of the fronted constituent is lengthened, e.g. in (82b) the final ɛ in *kabiyɛ* is lengthened to *kabiyɛ-ɛ* while the final *m* in *sʊlʊm* is lengthened to *sʊlʊm-m* in example (83b). Collins and Essizewa (2007) propose that the lengthening is due to a focus head which appears adjacent to the fronted constituent. Given this analysis, the fronted object appears to move into the specifier of a clause initial focus phrase. Yet when the object is focused in a lower position, Collins and Essizewa (2007) analyse *na* as the head of a low focus phrase which is Merged to the VP. A slightly modified structure from Collins and Essizewa (2007, 194) of (82a) is provided in (84):

(84)



The focus construction in (84) is derived by moving the direct object *kabiye* into the specifier of the low focus phrase. The verb then moves and adjoins to I where the -ʊ morpheme appears as a suffix. Since the verb and direct object move, the *na* head appears in the final position of the clause, as exemplified by (82a).

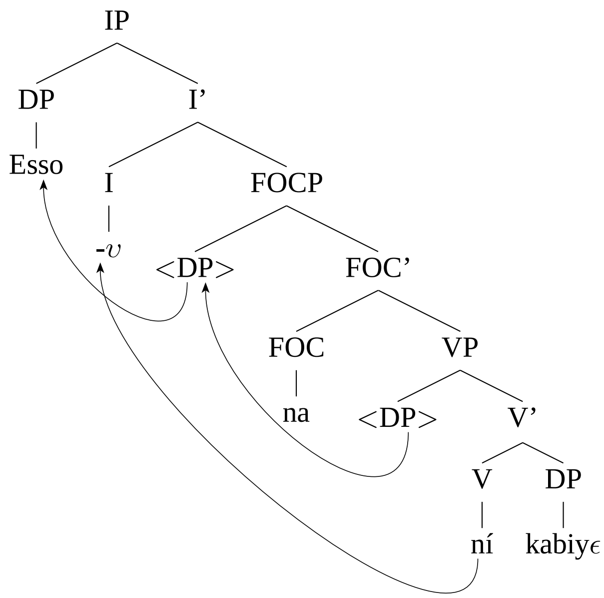
The derivation that Collins and Essizewa (2007) provide for subject focus is similar to the object focus in that it uses a clause internal focus head. The verb also moves from its base position to the I head meaning that it again appears before *na*. Two examples of subject focus are provided in (85) before a tree is shown in (86). Both examples and the tree (slightly modified) are from Collins and Essizewa (2007, 194-5):

(85) a. ɛsɔ́ ní-ʊ na kabiyɛ
Esso understand-IMPF FOC Kabiye
'Esso understands Kabiye.'

(reply to: 'Who understands Kabiye?')

b. ɛsɔ́ ɖeké ní-ʊ na kabiyɛ
Esso only understand-IMPF FOC Kabiye
'Only Esso understands Kabiye.'

(86)



The example in (85a) is derived by moving the subject from its base position to the specifier of the internal focus phrase, before it then moves to the specifier of IP. As with the tree in (84), the verb *ní* moves from inside the VP and adjoins to I so that the verb precedes the *na* focus head. As a final note, it is not possible for the subject to be focused by moving it into the specifier of a clause initial focus position. The example in (87) illustrating this tendency is from Collins and Essizewa (2007, 195):

(87) *ɛsɔ́ɔ́ ní-ʊ (na) kabiyɛ
Esso understand-IMPF FOC Kabiye

As it is not possible to lengthen the last vowel of the subject (with or without the *na* head), Collins and Essizewa (2007) take this to mean that the subject cannot move to a clause initial focus head.

With the analyses for subject and object focus in mind, the discussion can now turn to verbal focus. The data patterns more like subject focus than object focus because it is impossible for a focused verb to appear in the specifier of a clause initial focus phrase. Data from Collins and Essizewa (2007, 195-6) demonstrating this fact is provided in (88) and (89):

(88) a. *kí ní-ʊ ma-ní-ʊ kabiyɛ
KI understand-INF 1SG-understand-IMPF Kabiye
‘I only speak Kabiye.’

b. *ní-ʊ ma-ní-ʊ kabiyɛ
understand-INF 1SG-understand-IMPF Kabiye

(89) a. *kí yɔɔd-ʊ́ ɛsɔ́ yɔɔd-ʊ́
KI speak-INF Esso speak-IMPF

b. *yɔɔd-ʊ́ ɛsɔ́ yɔɔd-ʊ́
speak-INF Esso speak-IMPF

The examples in (88) and (89) indicate that the verbal copy cannot occur in the clause initial position much like the subject focus example provided in (87). In addition, the authors provide evidence which indicates that the focus head *na* can appear in verbal focus contexts. Note that the grammaticality judgement of (90a) becomes degraded when the *na* head is added while the judgement in (90b) is acceptable with or without *na*:

(90) a. ma-ní-ʊ kabiyɛ kí ní-ʊ (?na)
1SG-understand-IMPF Kabiye KI understand-INF FOC
‘I only understand Kabiye.’

b. píya ééy-u kí leey-ú (na)
children play-IMPF KI play-INF FOC
‘The children are only playing.’

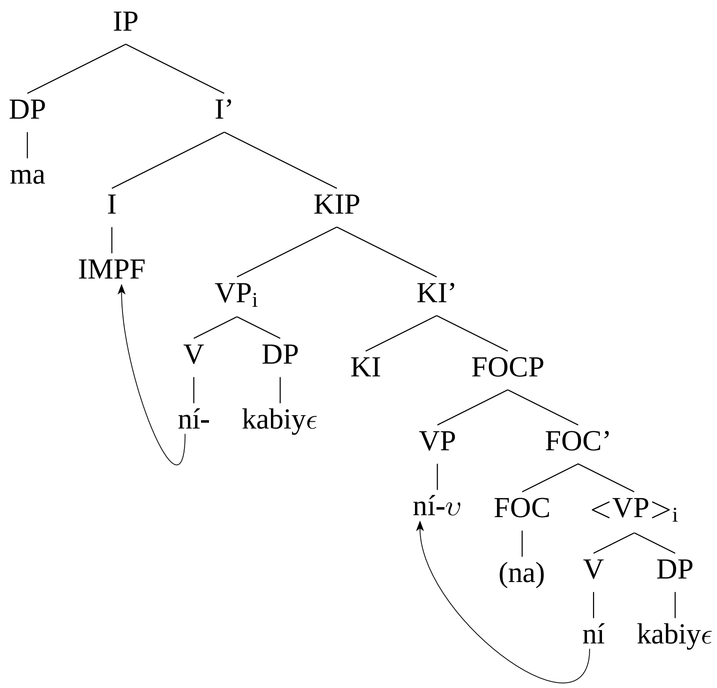
Given that *na* is possible and that the infinitival copy of the verb cannot appear in the clause initial position, Collins and Essizewa (2007) propose that the verb moves from its base position to the specifier of the internal focus phrase.

Finally, we turn to the function of the *kí* “KI” head. Collins and Essizewa (2007, 197) use it to avoid a syntactic problem that materialises because the verb moves from its base position to the specifier of focus and is realised as an infinitive before moving to I. The authors provide the diagram in (91) to illustrate the issue:

(91) INFL lee-ú (na) leey-
play-INF FOC play

If the lower copy of leey- “play” were to move and adjoin to the INFL head, Relativized Minimality would be violated because the closest occurrence of the verb is the one found in the specifier of focus. Collins and Essizewa (2007) avoid this problem by proposing that the lower VP moves into the specifier of *kí* “KI”. Once the VP has moved, the verb closest to INFL becomes the uninflected copy inside the moved VP, which can then move and adjoin to INFL without causing a Relativized Minimality violation. To illustrate how all these components fit together to produce an occurrence of verbal focus, Collins and Essizewa (2007, 198) provide a tree, of which a slightly modified version is shown in (92). The movement of the VP into the specifier of the KI phrase is represented by angled brackets and an index:

(92)



In (92), the focus head is realised optionally as *na* and the verb *ní* "understand" moves into its specifier to produce the verbal focus reading. The verb in the specifier of focus is pronounced as an infinitive but Collins and Essizewa (2007) do not say where the infinitival morphology comes from other than that Kabiye disallows uninflected verbs to be pronounced, with the exception of imperatives. A mechanism is not provided to explain how the infinitival morpheme -ʊ materialises on the verb or whether -ʊ corresponds to a second head. Once the verb movement has taken place, KI is attached to the FOCP which allows the VP to move into the specifier of KIP. The INFL head is Merged with KIP and the verbal copy inside the specifier of KIP is adjoined to INFL. The subject is then internally Merged to the I' from its base position (not represented in the tree).

Despite that Collins and Essizewa's (2007) can derive their data, they cannot provide a satisfactory explanation of how the infinitival morpheme appears on the copy of the verb. To reiterate, the authors claim that verbs, with the exception of imperatives, cannot be uninflected in Kabiye but nothing is said about the head to which the infinitival morpheme must presumably correspond. In the derivation of (92), one copy of the verb is internally Merged with the specifier of the focus phrase where it is turned into an infinitive. The infinitival verb blocks T from seeing the lower copy of the verb. In order to get around this problem, Collins and Essizewa

(2007) proposed that the verb is *smuggled* (to use Collins's (2005) term) past the infinitival copy to a position where it can be targeted by Infl. This smuggling movement also ensures that the direct object is in an appropriate position between the tensed verb and infinitive.

Yet this analysis is problematic. The issue relates to the smuggling movement being triggered by the stipulation that the copy of the verb in the specifier of the lower focus phrase is turned into an infinitive as soon as it lands in its post-movement position. As the infinitive intervenes between Infl and the lowest copy of the verb, the VP has to move into the specifier of KIP. However, there is no reason (other than the stipulation) why the uninflected verb in the specifier of the focus phrase should not be permitted to move to Infl. The reason it becomes an infinitive in the first place is connected to the fact that Kabiye does not allow uninflected verbs to be externalised. Given that Infl requires an uninflected verb to which it can provide tense, and that the uninflected verb in the specifier of focus is the closest potential target, the only thing that bars the movement of that element to Infl is the stipulation that it acquires an infinitival marking from somewhere. If the infinitival marking is assigned as default to prevent a derivation crash, then it would make more sense for the verb to acquire the marking during Spell-Out as a last resort to allow as much time as possible for it to be assigned tense by other means. This in turn would require the copy of the verb in the specifier of focus to move and adjoin to Infl. If the infinitive did adjoin to Infl, then nothing could ensure that the direct object appears in an appropriate place since the VP would no longer need to move to KIP. Thus this aspect of the analysis is built on the stipulation that the infinitive marking on the verb is acquired during or immediately after movement.

If the infinitive marker is acquired via a stipulation during or immediately after movement, then Collins and Essizewa's (2007) analysis would seem to contradict other systems where infinitives possess a [$\pm$Tense] feature, which in the case of finite clauses is set [+Tense] while infinitives are set to [-Tense]. For example, in Chomsky (1981), infinitives possess a [-Tense] feature but no ϕ-features. This position is also adopted by Stowell (1981, 1982) who posits that infinitives are [$\pm$Tense] but are not [$\pm$past]. Furthermore, Haegeman (1994) and Sportiche et al. (2014) state infinitives are [-Tense]. Finally, Bresnan (1972, 86) proposes that the complements of *for* complementisers "may describe something hypothetical or unrealised" which Stowell (1982, 562) argues corresponds to a "possible future" and can be interpreted as a type of tense.

Given these arguments, it does not seem appropriate for an infinitival morpheme to be acquired through a movement operation because the meanings and features associated with an infinitive need to be located on a head. In English, the infinitival features are located on Infl (or

T in newer systems) and are collectively Spelled-Out as *to*. As the [-Tense] feature in an infinitive should correspond to a head, the infinitive in Kabiye verb doubling constructions should contain a head to host the feature. Since Collins and Essizewa's (2007) analysis is reliant on the verbal copy in the low focus phrase acquiring an infinitival inflection, it must be the case that the verb possesses a [-Tense] feature. If there were no evidence of a [-Tense] feature, then their system would be less problematic, but as an infinitival marking [-ʊ] is attached to the verb, one does not have to look far to find a suitable host for the feature. Therefore, I argue that their analysis is built on a stipulation that a [-Tense] infinitival head is attached to the copy of the verb that moves into the specifier of the low focus phrase. Acquiring a head during a movement operation is problematic because it violates the inclusiveness condition, the extension condition and the copy theory of movement. This last violation is due to the moving element being different from and the copy left in the pre-movement position.

To summarise the discussion, the verbal repetition data from Kandybowicz (2008) was analysed and the accompanying derivation was presented. The copy theory of movement is invoked to deal with the multiple occurrences of the verb required in a verbal repetition construction. While this proposal is applicable to the Nupe examples, movement cannot deal with data from Collins and Essizewa (2007) where the higher copy is inflected for tense and the lower copy is realised as an infinitive given arguments in the literature that infinitives contain a [-Tense] feature. As movement requires that the lower element is a subset of the higher element, the only way for Collins and Essizewa (2007) to explain the presence of the infinitive morpheme is to stipulate that the verb is put into the infinitive once it moves to the specifier of the lower focus phrase.

As Kandybowicz's (2008) and Collins and Essizewa's (2007) analyses are problematic, an alternative is required that allows the Nupe and Kabiye data to be derived without any unreasonable stipulations required to build examples where both verbal copies are distinct. In (93), a summary is provided of the verbal repetition characteristics that any system needs to derive:

(93) Generating verbal repetition constructions requires:

- a. A means of deriving multiple copies of the same verb,
  - (i) where all copies are identical,
  - (ii) and the cases where each is distinct.
- b. A way to build the "emphatic declaratives" in Nupe,
- c. and the verbal focus of Kabiye.
- d. A way of ensuring that all copies of the verb are derived from the same lexical

item.

e. An explanation of how the verbal copy is inside a low focus specifier in Kabiye,

f. but remains attached to a verbal projection in Nupe.

g. A means of explaining the differences between constituent focus and verbal focus in Kabiye and Nupe.

If all the characteristics shown in (93) can be addressed satisfactorily without adopting a dubious movement operation, then a significant step will be taken towards having a unified analysis that can account for two different types of verbal copying. The next step in the dissertation is to show how pre-verbal particles and verbal suffixes fit into the picture.

3.3 Pre-verbal particles and verbal suffixes

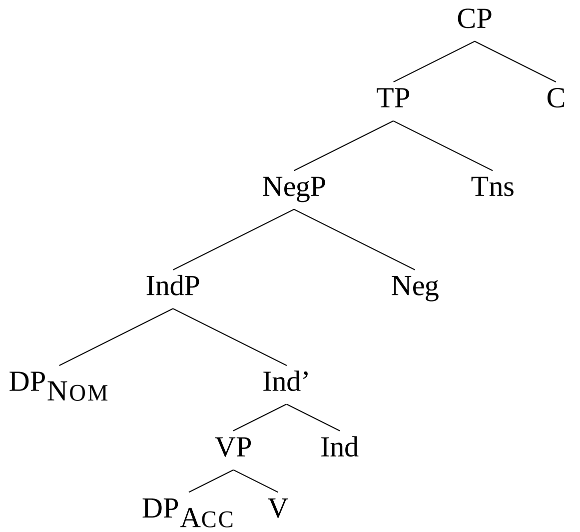
The purpose of this section is to examine cases of Multiple Spell-Out where a pre-verbal particle appears alongside a verbal suffix. Using negation to illustrate, when a morpheme appears on a verb, the most obvious way to derive the data is by head movement since a verb can start low and adjoin to each head cyclically in the clausal spine. Yet when a free standing negative element is also present in the clause, the position of the negative suffix can become a problem since a head movement analysis requires that inflections on a verb are derived by adjoining the verb to the target of the movement operation. The target of the movement operation, in this case a clausal negation head, then becomes an affix on the moved element. If a clause contains only one negative suffix, then head movement is able to derive the data as long as the suffix appears on the verb in an appropriate place relative to the hierarchy of the clause. In addition, if a clause contains a free standing negative morpheme without an affix on the verb, then it can be argued that the verb does not move to the free standing head but instead remains low. Problems materialise when a clause contains a free standing negative element and a negative suffix because head movement requires that the target of the movement operation becomes an affix.

To set the scene for the discussion of pre-verbal particles and verbal suffixes, data is provided from Halle and Marantz (1993) who derive complex verbs in Potawatomi using head movement where the verb starts low and moves up, successively adjoining to each head within the verbal spine. Then examples are provided from Passamaquoddy and Kiowa which contain pre-verbal particles and suffixes to highlight why generating affixes using head movement is problematic.

Halle and Marantz (1993) provide a head movement analysis of complex verbs in the Algonquian language of Potawatomi. They derive that data using the head movement operation in conjunction with a number of Distributed Morphology theoretical assumptions which will be introduced during the discussion. Yet before examining the position of the verb and the way it receives its inflection, a more general description of the clause is required to place the discussion of Potawatomi's verbal characteristics in a proper context.

Beginning in broad terms, a tree from Halle and Marantz (1993, 144) is shown in (94) to illustrate how an independent order clause[4] is structured in Potawatomi without syntactic head movement:

(94)



The distribution of DPs in Potawatomi is complex and summarised by Halle and Marantz (1993, 144) in (95):

(95) "...all the DPs in argument positions in Potawatomi are pronominals, consisting solely of features on the head D. Full DPs "doubling" these pronominal arguments will be adjoined to the CP when they occur, [–obv] Ds—1st, 2nd, and some third person Ds—are true pronominals and will cliticize to the front of CP at MS. Other Ds—[+obv] 3rd person Ds and Ds unmarked for [obv]—must be small pro's."

To reiterate, the subject and object positions are occupied by Ds. When these Ds are [–obv] they are adjoined to CP, yet when they are [+obv], the Ds remain in-situ and are analysed as small pro's. Finally, all complex DPs which double the Ds in argument positions are adjoined to CP. In (94), the NOM argument represents the subject and is found in the specifier IndP (synonymous with Voice for me) while the object ACC is sister to V. If one of these arguments

[4]The distinction between *independent* and *conjunct* orders relates to a difference in inflection, with independent usually being used to mark main clauses and conjunct being applied to subordinate clauses (see Halle & Marantz 1993 for more details).

(or both) were [–obv], it would end up adjoined to CP at the level of morphology, whereas a [+obv] argument is a pro and stays put.

Now that the basic structure of an independent order clause has been highlighted, the method that Halle and Marantz (1993) develop to derive complex verbs can be explored. To start proceedings, an example from Halle and Marantz (1993, 140) of a Potawatomi complex verb is provided in (96a). An alternative gloss is also provided in (96b):

(96) Potawatomi

a. k- wapm -a -s'i -m -wapunin -uk
Cl V Agr Neg Agr Tns Agr

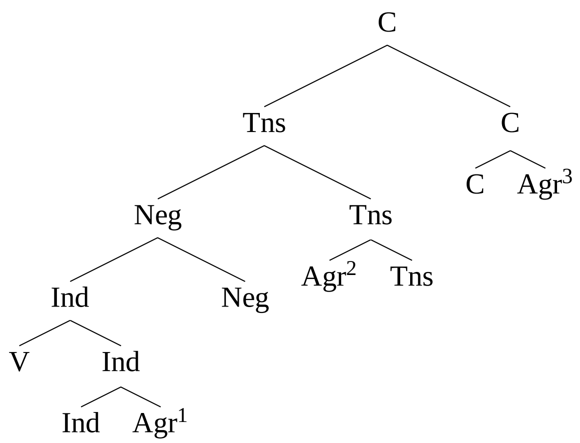
'you (pl) didn't see them.'

b. k- wapm -a -s'i -m -wapunin -uk
2 see 3ACC 2pl Neg preterit 3pl

'you (pl) didn't see them.'

In order to form the complex verb in (96a), V raises through each of the clausal heads in (94) cyclically via head adjunction until it reaches C. Then agreement Agr heads are attached to Ind, Tns and C post-syntactically at the level of Morphological Structure (MS). As a result, the agreement morphemes are not part of the syntax but appear later in the derivational process. A tree form Halle and Marantz (1993, 145) representing an independent order verb which has moved to C is provided in (97):

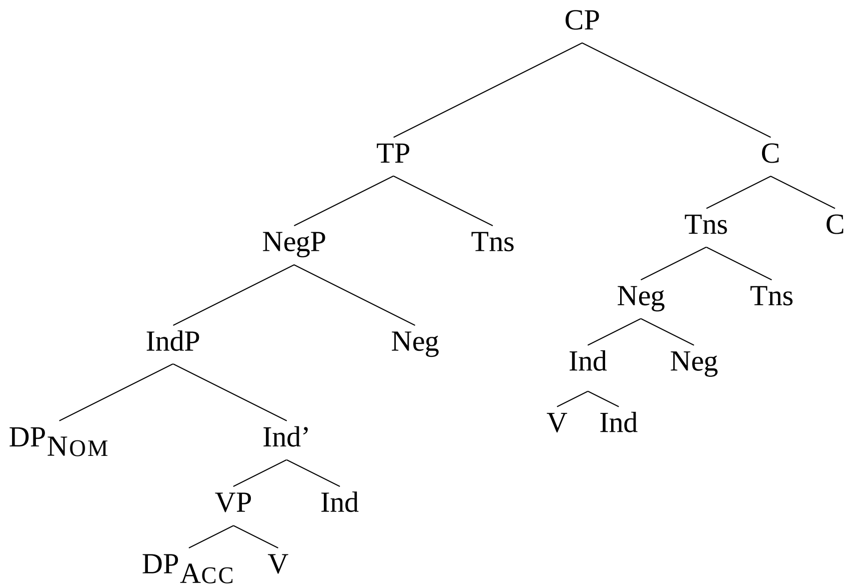
(97)



As the agreement markers in (97) are inserted after the tree has been sent to Morphological Structure, the three Agr heads will not be visible or usable in the syntax.

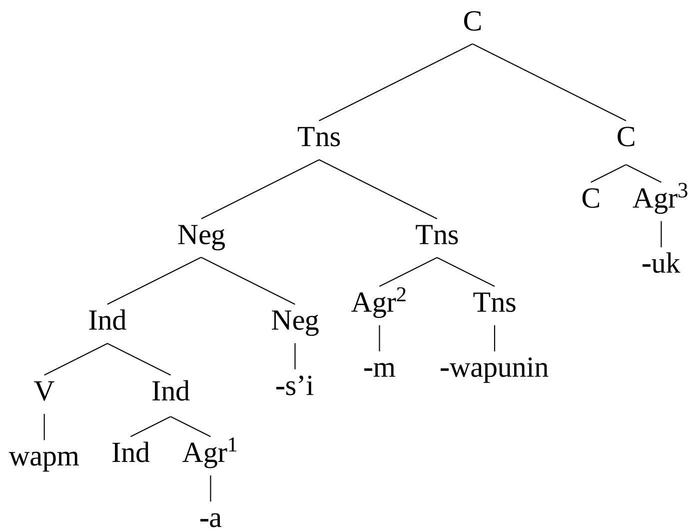
Now that a brief summary of Halle and Marantz's (1993) analysis has been provided, what follows is an overview of how their system would derive the example in (96a). First, V Merges with the direct object which must be either a [+obv] or unmarked since it does not appear adjoined to CP at Morphological Structure. Second, the head Ind Merges with VP to form an Ind'. Now V undergoes head movement and adjoins to Ind. Third, the subject argument is Merged which forms the IndP. Fourth, Neg is attached to IndP which triggers movement of the V+Ind complex to Neg. Fifth, Tns is then Merged with NegP and, according to Halle and Marantz (1993, 145), the subject may move into the specifier of TP if need be (the final order of the clause is not reliant on it). The Neg complex head moves and adjoins to Tns. Finally, C is attached to TP which again triggers syntactic head movement. A tree is provided in (98) which shows the final syntactic output of (96a) before it gets sent to the morphological component. As vocabulary insertion is a morphological operation, the tree in (98) does not contain any Agr morphemes or vocabulary items:

(98)



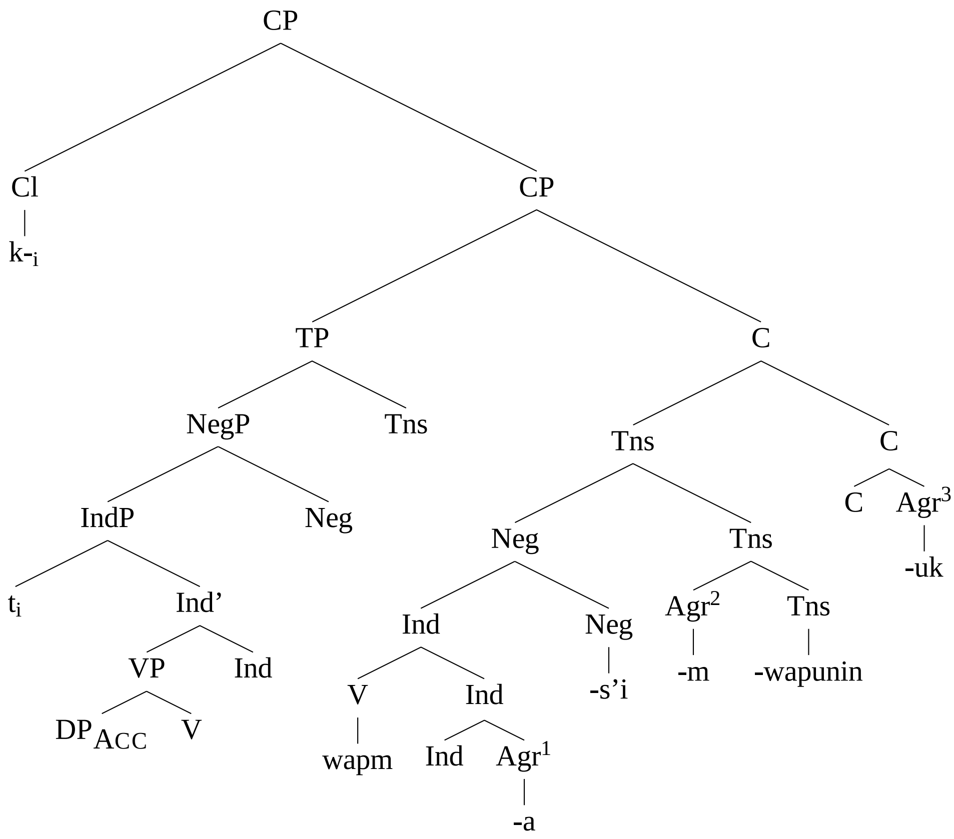
When the tree passes to MS, vocabulary items are matched to the relevant terminal nodes. The effect for the complex verb is represented by the tree in (99):

(99)



As the subject pronominal is marked [–obv] by being in the second person, it is adjoined to CP during Morphological Structure. This movement operation is shown by the tree in (100):

(100)



To summarise the derivation of (100), the complex verb is built in the syntactic component via successive applications of head movement (the intermediate copies are not represented for ease of exposition). Then in the morphological component, vocabulary items are assigned once the Agr heads have been added while the subject clitic is adjoined to CP by dint of being a 2nd person pronoun, i.e. [–obv].

The tree in (100) demonstrates that the head movement operation is applicable in this context because the target of the movement operation always becomes a verbal affix. Yet this type of analysis becomes problematic when a free standing negative element is pronounced alongside the inflection on the verb.

The first examples provided to highlight the weaknesses of a head movement analysis are from Bruening (2001) while the corresponding argument regarding why the data is problematic can be found in Bruening (2017). The issue relates specifically to the position of the negative element inside the complex verb in relation to the position of the verb in the clause relative to the free-standing negative element which dominates the verb. The example in (101a) is originally from Bruening (2001, 146) and is taken from Passamaquoddy-Maliseet which is also an Algonquian language like Potawatomi:

(101) Passamaquoddy-Maliseet

a. Tama ma=te wen wikuwaci-toli-hpi-w?
where Neg=Emph someone enjoy-there-eat.3-Neg
'Where does no one like to eat?'

b. Kat=op keq kt-ol-essi-w.
Neg=would something 2-thus-happen.to-Neg
'Nothing shall happen to you.'

The issue here is the position of the verb relative to the free standing negative element. Bruening assumes that the wh-phrase is in the specifier of CP. This suggests that the subject *wen* in (101a) (the subject) is either in the specifier of TP or in-situ. If the subject has raised to spec-TP, then *ma-te* could be in the C position. On the other hand, if the subject is in-situ, then *ma-te* could be in C, T or a separate Neg projection above the position of the subject. Regardless of the position of *ma-te*, the example in (101a) appears to show that there is always an intervener between the *ma-te* and the verb regardless of the position of the subject. The same is also true with (101b) as the subject again intervenes between the negative element *Kat=op* and the verb.

Consequently, (101a) and (101b) show that verbal inflection cannot be a result of head movement in all cases. Head movement produces head-adjunction structures where the target of the operation becomes an affix which attaches to the moved element. By a head movement analysis, the verbs in (101) are predicted to have moved to Neg since a Neg morpheme appears as an affix. Yet as the free-standing negative element is located much higher up the clause, the movement analysis is problematic since a displaced verb should form a constituent with the target of the operation. In a nutshell, the verb cannot move high enough to adjoin to Neg since the subject intervenes between Neg and the verb.

In order to further highlight the problem of head movement and the position of negation, Bruening (2017, 23) provides more data where a verb containing a negative element is in the wrong position relative to a free standing negative marker higher up the clause. The example in (102a) illustrates the position of the Neg morpheme inside the verb relative to the stem, while (102b) and (102c) show the position of the free-standing Neg in relation to the other tense morphemes found on the verb:

(102) Passamaquoddy-Maliseet

a. '-tokom-a-**wi**-wa-s-opon-il
3-hit-Dir-Neg-3P-Dubitative-Preterit-Obv
'they (proximate) may have hit him/her (obviative)'

b. **Ma**=te n-**koti**-nomiy-a-wi-k kehceyawi-c–ik weyossis-ok.
Neg 1-want-see-Dir-Neg-3P IC.be.many-3Conj-Part3P animal-3P

'I don't want to see a lot of animals.'

c. **Ma**=te wen '-**kisi**-tomh-a-wiy-il Piyel-ol.
Neg=Emph someone 3-perf-beat-Dir-Neg-Obv P.-Obv
'No one beat Peter.'

In (102a), Bruening (2017, 23) presumes that the Dubitative and Preterite morphemes correspond to Modal and Tense categories respectively which means that Neg needs to appear under Mod and T in the clausal hierarchy if this verb were to be derived by head movement. In of itself, this does not seem to be a problem, but in (102b) and (102c), the position of the free-standing negative head does not match the position of the negative element in the clause. The problem for a head movement analysis is that negation is higher than the perfective head and *koti* which Bruening states can be analysed as a future marker or as *want*. As negation is free standing, the verb cannot have raised to Neg which means that the Neg head is higher than tense, aspect and mood. Yet the negative morpheme inside the verb is closer to the stem than the other elements which is a fundamental problem for any proposal which links verbal composition with head movement because in this case, the position of the negative morpheme does not correspond with the position of the clausal negation head.

What follows now is an examination of another language, Kiowa, that uses free standing particles in conjunction with corresponding suffixes on the verb. The language was originally based in the Black Hills of Montana but usage has declined to a limited number of speakers (Adger et al. 2009). Kiowa is significant for the purpose of this thesis because it exhibits tendencies characteristic of non-configurational languages such as extensive pro-drop, free argument order and constituent splitting, which appear in combination with configurational properties connected to the composition of the verb and a requirement that certain pre-verbal particles must occur with certain verbal suffixes. The situation therefore is similar to the Passamaquoddy-Maliseet examples since a pre-verbal element occurs in conjunction with a verbal suffix. In addition, and like Passamaquoddy-Maliseet, it is shown that the head movement operation cannot generate complex verbs in Kiowa because, were the verb to move, it would end up in the wrong position relative to the other sentence elements. Furthermore, it is also argued that these examples cannot be derived using Agree in the style of Adger (2003) where a clausal head values an uninterpretable feature on the verb since the verb would need to contain multiple uninterpretable features which would then need to be ordered once the agreement operations had taken place. In this case, an assumption, or worst still a stipulation, is needed to ensure that the morphemes corresponding to the valued features in the verb's feature bundle are attached to the verb in the correct order as the verbal suffixes in Kiowa are rigidly ordered.

However, before analysing the data from Kiowa, a brief description is provided of what it means to be a non-configurational language. This part of the discussion focuses on Warlpiri and the way in which Hale (1983) derives the characteristics of the language that are now associated with being non-configurational, i.e. pro-drop (which Hale refers to as using *null anaphora*), free word order and the ability to split constituents. Once these properties have been exemplified, an examination of Kiowa can begin.

Hale (1983) captures the non-configurational aspects of Warlpiri by proposing that, to use his terminology, the lexical structure of a clause is hierarchical in contrast to the phrase structure which is flat and ordered only in a very limited sense. The significant phrase structure rules that Hale (1983, 7) proposes for Warlpiri are provided in (103):

(103) Warlpiri phrase structure rules

a. $\bar{X} \rightarrow \bar{X}* X$

b. $\bar{V} \rightarrow AUX \bar{X}* V \bar{X}*$

Both (103a) and (103b) are rules which provide the structure of a constituent labelled with a phrase marker. The first is representative of nominals and infinitives since such phrases are head final. The "*" is interpreted as a number of phrases equal to or greater than zero which allows a head final phrase to consist of just a head or any number of other phrase markers. The rule in (103b) specifies that finite clauses have an auxiliary which is initial. Any number of phrases can follow the auxiliary before the verb appears. The verb can then be followed by any number of phrases. A point worth noting is that the auxiliary can move to the second position in certain circumstance and must move in others. To illustrate the freedom with which Warlpiri is ordered, a single sentence from Hale (1983, 6) is provided in (104) followed by all the possible orders within which its constituents can be realised (the final three orders in (104) are from Adger et al. (2009, 27)):

(104) a. Ngarrka-ngku ka wawirri panti-rni.
man ERG AUX kangaroo spear NON-PAST
'The man is spearing the kangaroo.'

b. Wawirri ka pantirni ngarrkangku.

c. Pantirni ka ngarrkangku wawirri.

d. Ngarrkangku ka pantirni wawirri.

e. Pantirni ka wawirri ngarrkangku.

f. Wawirri ka ngarrkangku pantirni.

The example in (104) demonstrates that there is no restriction on the order of constituents inside a transitive sentence. The exception is the auxiliary *ka* which has to be in the second position despite how the other constituents are ordered. It is this level of freedom which prompts Hale (1983) to propose that the phrase structure of non-configurational languages is flat.

The characterisation of non-configurational languages in Hale (1983) also extends to the use of discontinuous constituents, i.e. constituents that have been separated by other sentence material, and allowing arguments to be unpronounced and represented by "null anaphora" in Hale's (1983) terms. The use of discontinuous constituents is exemplified by (105a) and (105b), both of which are from Hale (1983, 6):

(105) a. **Wawirri** kapi-rna panti-rni **yalumpu**.
kangaroo AUX spear NON-PAST that
'I will spear that kangaroo.'

b. Wawirri yalumpu kapi-rna panti-rni.
kangaroo that AUX spear NON-PAST

In (105a) *wawirri* and *yalumpa* are both interpreted as a single constituent, i.e. *that kangaroo* even though both elements are not continuous. The interpretation of *wawirri* and *yalumpa* is the same in (105b) which means that the distance between the demonstrative and NP does not affect the interpretation. The use of null anaphora is exemplified by the examples in (106) from Hale (1983, 7) where both the subject and direct object can be unpronounced without affecting the acceptability of the sentences:

(106) a. Ngarrka-ngku ka panti-rni.
man ERG AUX spear NON-PAST
'The man is spearing him/her/it.'

b. Wawirri ka panti-rni.
kangaroo AUX spear NON-PAST
'He/she is spearing the kangaroo.'

c. Panti-rni ka.
spear NON-PAST AUX
'He/she is spearing /him/her/it.'

In (106a), the direct object is unpronounced which, using Hale's (1983) terms, means that it has been replaced by a null element. The same is also true in (106b), but instead of the object being dropped, it is the subject which is unpronounced. Finally, the example in (106c) illustrates that the subject and object can be dropped at the same time which just leaves a tensed verb and an auxiliary.

Armed with this brief description of non-configurationality, the next language to be examined is Kiowa which exhibits the properties exemplified above, i.e. free word order, discontinuous elements and null anaphora alongside other rigid configurational properties. Given the purpose of this section and thesis in general, the most significant of these relates to how the order of pre-verbal particles is mirrored by verbal suffixes. In addition, it will be shown below that the relationship between the particle and suffix cannot be established by head movement. What follows now are illustrations of the non-configurational aspects of Kiowa's grammar to set the scene for a discussion of the language's configurational characteristics later in the section.

Even though Kiowa exhibits the non-configurational characteristics described above, i.e. pro-drop, free word order and split constituents, and as such relies heavily on inflection, an unmarked basic word order becomes apparent upon examination. The example in (107a) from Adger et al. (2009, 5) provides a schematic of the order while (107b) and (107c) illustrate (107a) using sentences from Kiowa:

(107) a. Particles ⇒ Agent ⇒ Indirect Object ⇒ Direct Object ⇒ Verb

b. Hɔ́n Paithalíí P!ɔ́ɔ́thɔ́pdek!ii áádɔ ɔ́– thêm- ɔ̨ɔ̨mɔɔ
NEG Vincent Daniel stick.I 3S:3S:3I–break-make.NEG
'Vincent didn't make Daniel break the stick.' (Harbour 2007, 14)

c. Hét [nɔ́ɔ́ gɔ ám] xégun thɔ̨́ɔ̨́se bédêi– ɔ̨ɔ̨
HORT 1 CONJ 2 dog bomes 1IN.D:3S:D–give.IMP
'Let's you and I give two bones to the dog.' (Adger et al. 2009, 5)

In (107b) and (107c) the particles *Hɔ́n* "NEG" and *Hét* "HORT" precede the subjects *Paithalíí* "Vincent" and *nɔ́ɔ́ gɔ ám* "you and I" respectively. The subjects are then followed by the indirect objects *P!ɔ́ɔ́thɔ́pdek!ii* "Daniel" and *xégun* "the dog" before the direct objects *áádɔ* "the stick" and *thɔ̨́ɔ̨́se* "two bones" provide the last argument position. The last elements in (107b) and (107c) are the verbs *ɔ́–thêm-ɔ̨ɔ̨mɔɔ* "make/break" and *bédêi–ɔ̨ɔ̨* "give" respectively.

As seen in Warlpiri and Hale (1983), Kiowa allows DPs to be unpronounced. The examples provided in (108) from Adger et al. (2009, 5) use the same verbs as (107b) and (107c) but do not contain any arguments:[5]

(108) a. Hɔ́n ɔ́– thêm- ɔ̨ɔ̨mɔɔ
NEG 3S:3S:3I–break-make.NEG
'He didn't make him break it.'

b. Hét bédêi– ɔ̨ɔ̨
HORT 1IN.D:3S:3D–give.IMP
'Let's give them to it.'

[5]This is referenced to Watkins (1990) in Adger et al. (2009) but no page number is provided.

As Kiowa can drop DP arguments, the examples in (107b) and (107c) are rare when compared to the clauses in (108). Since pro-drop is possible, the person and number of the absent arguments is read off the verbal prefix which Adger et al. (2009) separate from the root using an en-dash (–). The structure and glossing of the prefix is explained in Table 3.2 (Adger et al. 2009, 16). A clause containing an unaccusative verb is provided in (109) to further illustrate the system:

(109) Thalyóp nɔ́– xán
boy.I :1S:3I–arrive.PF
'The boys came to me.'

Prefix type	Argument type
x:y:z-	x = agent of (ditransitive) verb
	y = indirect object / applicative of (di)transitive
	z = direct object of (di)transitive
x:z-	x = agent of transitive
	z = direct object of transitive
:y:z-	y = applicative of unaccusative
	z = subject of unaccusative
z-	z = subject of unaccusative

Table 3.2: Glossing system for Kiowa agreement prefixes

In (109) the indirect argument has been pro-dropped and is only visible as an inflection on the verb. Thus *:1S:* refers to the first person singular indirect object while *:3I* corresponds to the verbal subject, i.e. *the boys.*

The final aspect of Kiowa grammar that needs highlighting before analysing the composition of the verb relates to the manoeuvrability of DPs and other constituents to the left and right edges of the clause. To exemplify this property, three examples from Adger et al. (2009, 5) are shown in (110):

(110) a. Hɔ́n máthɔn ∅– xą́ą́nɔ̂ɔ
NEG girl 3S–arrive.NEG
'The girl didn't arrive.'

b. Máthɔn hɔ́n ∅– xą́ą́nɔ̂ɔ
girl NEG 3S–arrive.NEG
'The girl didn't arrive.'

c. Hɔ́n ∅– xą́ą́nɔ̂ɔ Máthɔn
NEG 3S–arrive.NEG girl
'The girl didn't arrive.'

In (110a) *máthɔn* "girl" appears in the canonical subject position specified by (107a) as right-adjacent to the particle, in this case NEG. In (110b), *máthɔn* is in a left-peripheral position while in (110c) the constituent appears in the rightmost position. Each position is associated with a different interpretation for the constituent. The left peripheral dislocation is associated with topic and focus while the rightward position is associated with old information. This aspect of Kiowa grammar will be mentioned in more detail as and when it is necessary.

Now that an outline of Kiowa's key characteristics has been provided, what follows is a detailed discussion of the way that the pre-verbal particles interact with the suffixes on the verb. There are two types of particle in Kiowa. The first are referred to as *selective particles*, so called because they must co-occur with a suffix on the verb, while the second are dubbed *non-selective particles* as they do not need to appear alongside a verbal suffix (Adger et al. 2009). Non-selective particles will be analysed before selective particles since selective particles are more significant for the analysis presented in chapter 5.

As previously mentioned, the distribution of non-selective particles is relatively free in the sense that they can occur in either pre- or post-verbal positions. In addition, when in a pre-verbal position it is possible for non-selective particles to appear either before or after selective particles. These traits are demonstrated in (111) using examples from Adger et al. (2009, 73) which highlight the manoeuvrability of the inferential non-selective particle **mɔ́n** :

(111) a. Óúde mɔ́n énédáákho-kya édɔ̂ɔ– ǫǫ **mɔ́n**
there INFER Anadarko- LOC 3I:3S:3I–give.PF INFER
'They probably gave it to him there at Anadarko.'

b. Háyá bát– pel- dou- de óíde ɔ̂ǫnya **an mɔ́n**
somehow 1IN.PL:3P–thought-hold-D that differently HAB INFER
gya– pél- dou k!ɔt háyá ∅– ɔ́n- dé-xo gya– k!íík ɔ̂ǫmɔ
3S:3P–thought-hold yet somehow 3S–think-D- instead 3S:3P–determine.IMPF
'Whatever we may have on our minds, he thinks differently and determines things as he thinks.'

c. Gya–mɔɔ́íbé- do **mɔ́n an** e– tǫ́ų́- xó- dɔ́ɔ́
3P– difficult-because INFER HAB 3I–talk-reticent-be
'They are probably reticent to talk [Kiowa] because it is difficult.'

The example in (111a) shows that non-selective particles can occur in a post-verbal position while (111b) and (111c) indicate that non-selective particles are possible pre-verbally, and that when they do occur pre-verbally, they can either be left-adjacent or right-adjacent to the selective particle, which in this case is an aspectual particle *an*. Moreover, the same distribution pattern is shared by the non-selective particle *xɔ̂ɔ* "thus". The examples in (112) from Adger et al. (2009, 73) provide evidence:

(112) a. Poi ∅– thɔ́ttéhel **xɔ̂ɔ**
again 3S:3s–shoot.EVID thus
'Again, he shot at him in that way.'

b. **An xɔ̂ɔ** páá ét– gįį- sɔɔte- tɔɔ
HAB thus some 3I:3P–night-work-AUX
'Some people are wont to work at night.'

c. Hágɔ̂ɔ- al **xɔ̂ɔ an** ét– gįį- sɔɔte- tɔɔ
which.I-also thus HAB 3I:3P–night-work-AUX
'Some of the others also occasionally worked at night.'

Like the examples in (111), (112) illustrates that *xɔ̂ɔ* can occur post-verbally (112a), pre-verbally after selective particles (112b) or pre-verbally preceding selective particles (112c). It is also the case that non-selective particles do not have to be in a specific order with respect to other non-selective particles as exemplified in (113) which is also from Adger et al. (2009, 73):

(113) a. Án– khɔɔ̂n-haigyadɔɔ-do **mɔ́n xɔ̂ɔ** gya– mɔ́ɔ́khɔ́gûu-ɔ̨ɔ̨mei
:3S:3P–pitiful-know- because INFER thus 3S:3P–block- make.PF
'She knows how pitiful they are so she tried to block them.'

b. Gigɔ́ **xɔ̂ɔ** páágûigɔ **mɔ́n** é– xéí
CONJ thus as a whole INFER 3S:3I–place.S/D.PF
'So, she placed it whole into the oven.'

The sentences in (113a) and (113b) indicate that the order of the non-selective particles is unimportant in this instance since both *xɔ̂ɔ* $\rightarrow$ *mɔ́n* and *mɔ́n* $\rightarrow$ *xɔ̂ɔ* are possible. Yet Adger et al. (2009, 74) point out that the order of non-selective particles is not completely irrelevant. The authors use the particle *hétɔ́* "still" and the examples in (114) to illustrate this restricted behaviour:

(114) a. E–syɔ̂n **hétɔ́**
3I–small.P still
'They were still small.'

b. **Hétɔ́ hɔ́n** pai- al ∅– bɔ́ɔ́dɔ̂ɔ
still NEG sun-also 3S–appear.NEG
'The sun wasn't even up yet.'

c. ɔ́ɔ́hɔɔ gya–dɔ̨́ɔ̨́mêi- ęį **hétɔ́ an** ɔ́lhɔ̨́t!ąį é– ɔ̨ɔ̨mɔ
there 3P– IMPF.EVID-LOC still HAB silver 3I:3A:3S–give.IMPF
'At that time they must have still been paying out in silver.'

The example in (114a) illustrates that *hétɔ́* can occur after the verb. The next two sentences in (114b) and (114c) show that when *hétɔ́* occurs in a pre-verbal position, it must precede the selective particles *hɔn* "NEG" and *an* "HAB". In addition, a further restriction on *hétɔ́* is exemplified in (115) which is also from Adger et al. (2009, 74):

(115) (**Hétɔ́**) hɔ́n Laurel ę̌– háígɔ̂ɔ (***hétɔ́**)
still NEG Laurel :1S:3S–know.NEG still
'I don't know Laurel (yet).'

In (115), the non-selective particle is possible in a pre-verbal position with a free-standing negative element *hɔ́n* but is unacceptable in a post-verbal position. Adger et al. (2009) do not cover the restrictive properties of non-selective particles in detail but rather provide the examples in (114) and (115) to indicate that they are not completely free in all contexts

The distribution of non-selective particles shares properties with what has historically been described as adjunction. The ordering freedom of non-selective particles is reminiscent of the way that the DPs representing verbal arguments are ordered. Since the distribution of non-selective particles is similar to the distribution of the DPs, it seems that an adjunction operation would be able to account for much of the non-selective particle data. Admittedly, the distribution of particles like *hétɔ́* "still" remains an issue since they are not totally free, as highlighted in (115). Yet as this thesis is concerned with building complex verbs, the issue of non-selective particles can be sidestepped if the adjunction operation is responsible for their distribution. Thus for clarity, I assume that non-selective particles are attached to a syntactic object using the adjunction operation (which I assume is a subtype of Merge), and as such, will not be derived using the complex verb deriving mechanism proposed in chapter 5.

This assumption is not ideal for two reasons. Firstly, it cannot derive the restrictions on *hétɔ́* even though it does explain why non-selective particles are, at least for the most part, free with regards to their distribution. Secondly, proposing that adjuncts are able to adjoin leftward or rightward with no or few restrictions does not work within a system using Kayne (1994) (contra section 2.2) and the LCA. In a strictly LCA based system, specifiers and adjuncts are indistinguishable and both project leftward as a matter of course, with surface word order variations produced with roll-up movement. Thus in order to claim that adjuncts can adjoin leftward or rightward, a less strict version of the LCA would need to be adopted which is not ideal. Yet since this thesis is concerned with building complex verbs, for clarity's sake, I assume a modified version of the LCA despite the issue of weakening Kayne's (1994) analysis.

Now that the order of non-selective particles has been examined, the discussion turns to selective particles. In terms of importance to the thesis, selective particles are more significant than their non-selective counterparts because a strict relationship is required between the particle and the verb. In more specific terms, selective particles cannot occur in a clause without a corresponding verbal suffix. Also, the selective particles can only occur pre-verbally and in a particular order when more than one appears in a sentence. In addition, the suffixes on the verb have to be similarly ordered since the suffix corresponding to the pre-verbal particle closest to the verb has to be the closest suffix to the verbal root. The generalisation can be represented using a schematic structure such as the one in (116) where the pre-verbal particles and verb are represented using an ordered sequence:

(116) $<$part$_{\alpha}$, part$_{\beta}$, verb-suffix$_{\beta}$-suffix$_{\alpha}$$>$

In (116), particle β corresponds to suffix β and both elements indexed with β are closer to the verb than those indexed with α. Two examples from Kiowa that demonstrate the order provided in (116) are shown in (117). Both examples are from Adger et al. (2009, 61), (but the first was originally in Anquoe (1962)):

(117) a. **Béthɔɔ hɔ́n** yą́– háíg- **ɔ̂ɔ- hel-** do nɔ́ɔ́ de– ɔ́ɔ́gyákhɔnmɔ
MIR NEG :1S:3P–know-NEG-EVID-because 1 1s:REFL–hold back.IMPF
'I was holding back because I didn't know.'

b. ***Hɔ́n béthɔɔ** ám em–dɔ̨́ɔ̨́**-mɔ̂ɔ-hel**
NEG MIR you 2S– be- NEG-EVID
'I didn't realise it wasn't you.'

The pattern exemplified in (116) is evident in (117a) and (117b). Starting with (117a), the closest suffix to the root of the verb *háíg* "know" is NEG while the closest pre-verbal particle is also NEG. The next closest is the evidential suffix *hel* which corresponds to the particle immediately on the left of *hɔn* "NEG". The example in (117b) illustrates that a sentence where the verbal suffixes are ordered NEG-EVID is unacceptable when the pre-verbal negative particle is further from the main verb, in this case *dɔ̨́ɔ̨́* "be", than the mirative particle *béthɔɔ.* Two further examples from Adger et al. (2009, 75) illustrating that the suffixes have to be ordered with respect to the pre-verbal particles are provided in (118):

(118) a. **Béthɔɔ an** ɔ́– bôu- hɔnx!ou- **yii-** t!ɔɔ- **dei**
MIR HAB :3s3ɪ–always-come late-IMPF-MOD-EVID
'I didn't realise he was going to keep coming late.'

b. **Háyátto hɔ́** ∅– dę̨į- hę̨́į́**-mɔ̂ɔ-t!ɔɔ**
probably NEG 3s–sleep-die-NEG-MOD
'Probably he won't fall asleep.'

c. **Bethênde mîn** x!álii á– dɔɔp**-îi- t!ɔɔ**
unlikely about to calf :3s:3s–birth-IMPF-MOD

'The calf is unlikely to be about to be born.'

In (118a) there are two pre-verbal particles, the mirative *Béthɔɔ* and the habitual *an.* The habitual particle corresponds to the imperfective suffix *yii-* while the mirative particle corresponds to the evidential head *dei.* Again the closest particle to the verb corresponds to the closest suffix, and the suffix matched with the next closest particle is further away. The same is true in (118b) where *Háyátto* "probably" corresponds with *t!ɔɔ* "MOD" while *hɔ́* is associated with *mɔ̂ɔ* "NEG". In this instance, the NEG particle is closet to the verb which matches the position of the NEG suffix since it is closer to the verb than the MOD suffix. The final example illustrates the same tendency as *Bethênde* "unlikely" is related to *t!ɔɔ* "MOD" and *mîn* "about to" corresponds to *îi* "IMPF". To summarise which particles correspond to which suffixes, Table 3.3 is taken from Adger et al. (2009, 70) for reference:

Evidential		
bêl	so much for	EVID
bêlhɔ́ndé	so much for	EVID
bêthɔɔ	unbeknown (MIR)	EVID
hɔ́tôm	is it so that (Q.EVID)	EVID
Modal		
bethênde, bothênde	unlikely	MOD
háyátto	probably, likely	MOD
poi	don't (PROH)	MOD
Negation		
hɔ́n	not (NEG)	NEG
hɔ́nhênde	merely	NEG
Aspect		
míí	nearly	PF
sɔ́t	just recently	PF
an	usually (HAB)	IMPF
mín	about to	IMPF

Table 3.3: Selective Particles

The set of particles listed in the left-hand column of Table 3.3 always corresponds to the type of verbal suffix listed in the right-hand column and the order of the particles is always represented on the verb. Yet two questions still remain. First, can the verbal suffixes occur without the selective particles? Second, are the verbal suffixes and associated pre-verbal particles in a strict order?

The answer to the first question is an affirmative since it is possible for the suffix types that correspond with selective particles to occur in isolation without the particles. The answer to the second question is also yes as the suffixes have to be ordered in a particular way with respect to each other. Evidence from Adger et al. (2009, 64-5) for both answers is provided in (119) and (120):

(119) a. hâap- ii- tɔɔ- (dei)
pick up-IMPF-MOD-EVID
'(apparently) will continually pick up'

b. hááp- ɔ̂ɔ- tɔɔ
pick up-NEG-MOD
'will not pick up'

c. hááp- ɔ̂ɔ- hel
pick up-NEG-EVID
'apparently did not pick up'

(120) a. *hâap- tɔɔ- yii- (dei)
pick up-MOD-IMPF-EVID
'(apparently) will continually pick up'

b. *hááp- tɔɔ- guu
pick up-MOD-NEG
'will not pick up'

c. *hááp- hel- ɔ̂ɔ
pick up-EVID-NEG
'apparently did not pick up'

As mentioned above, it is possible for suffixes to occur without selective particles since none of the examples in (119) and (120) contain them. In addition, the order of the suffixes is fixed in the sense that the imperfective suffix has to precede modality which in turn precedes evidentiality. The data also suggests that negation has to precede the modal suffix and the evidential suffix. The examples in (119) and (120) do not provide an order for negation with respect to aspect because in Kiowa the negative suffix and the aspect suffix appear to be in complementary distribution and as such never co-occur (it is aspect which typically goes unpronounced in favour of negation (Adger et al. 2009)). Despite this apparent lack of data, Adger et al. (2009, 65) argue that evidence is available for ordering the aspect suffix before negation. In Kiowa, so called *light verbs* can be combined with non-verbal roots to convey a number of aspectual meanings such as imperfectivity, inceptive perfectivity, and completive perfectivity. Unlike the basic aspectual suffix found in (119), these light verbs can co-occur with negation. Examples from Adger et al. (2009, 65) supporting this claim are provided in (121) where the light verbs are glossed as *act* and *fight* respectively:

(121) a. Hɔ́n em– dɔ́ɔ́- tɔ́ɔ́-gɔ̂ɔ
NEG 3S:REFL-sing-act-NEG

'He isn't/wasn't signing/doesn't sing.'

b. Hɔ́n em– dɔ́ɔ́- p!áíg-ɔ̂ɔ
NEG 3S:REFL-sing-fight- NEG
'He didn't sing.'

In (121), the elements that encode the aspectual properties in (121a) and (121b) are *act* and *fight* and these precede negation. The position of the light verbs suggests that the appropriate place for the aspectual suffix is in a position which also precedes negation. When these considerations are combined with the orders exemplified in (119) and (120) the result is the suffix order from Adger et al. (2009, 64) shown in (122):

(122) **Order of suffixes**
Aspect Negation Modality Evidentiality

In (122), Aspect precedes Negation which in turn is followed by Modality. Finally, the evidential suffix is attached to the verb after the modality suffix. In addition and as seen above during the discussion of the pre-verbal selective particles, the particles themselves occur in a specific order as well. For reference, the relevant sequence is provided in (123):

(123) **Order of pre-verbal particles**
Evidentiality Modality Negation Aspect

The order in which the pre-verbal selective particles appear is a mirror image of the sequence of suffixes summarised in (122). This property of Kiowa is dubbed by Adger et al. (2009, 74) as the *Clausal Mirror* and is presented in (124):

(124) **Clausal Mirror**
Selective particles occur in an order inverse to their associated suffixes.

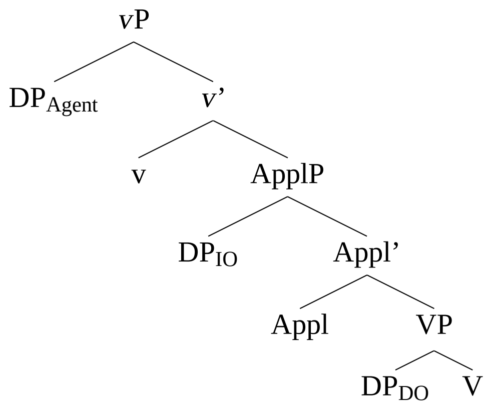
To summarise the discussion on particles and suffixes in Kiowa, it has been shown that a strict relationship exists between selective particles and the corresponding suffixes. Specifically, the pre-verbal selective particles cannot occur without a suffix on the verb. The reverse does not hold since the suffixes can occur without the pre-verbal particles. In addition, this section has also presented evidence indicating that the selective particles and the verbal suffixes are in a strict order, with the sequence of particles being a mirror image of the sequence of suffixes. This generalisation is captured in the Clausal Mirror provided in (124). What follows now is a discussion of whether the Clausal Mirror can be derived using head movement. As with the

Passamaquoddy-Maliseet data used above, it will be shown that head movement is inadequate for Kiowa because it predicts that the verb should appear in the wrong position relative to its arguments.

At first glance, one way in which head movement could derive the Clausal Mirror would be to assume that the pre-verbal particles were heads in the same way as auxiliaries and negative *not* in English, and then argue that the verb is inflected via head movement but is Spelled-Out in its Merge position (in a similar way to Kandybowicz's (2008) verbal repetition analysis). If the sentence in (117a), and repeated below as (125) for convenience, is used as an example along with arguments from Adger et al. (2009) that the basic VP structure of Kiowa contains a *v*P, Applicative and VP depending on the number and types of argument present, a simple *v*P structure for a ditransitive would resemble the one shown in (126):[6]

(125) **Béthɔɔ hɔ́n** yą́– háíg- **ɔ̂ɔ-** **hel-** do nɔ́ɔ́ de– ɔ́ɔ́gyákhɔnmɔ
MIR NEG :1S:3P–know-NEG-EVID-because 1 1s:REFL–hold back.IMPF
'I was holding back because I didn't know.'

(126)

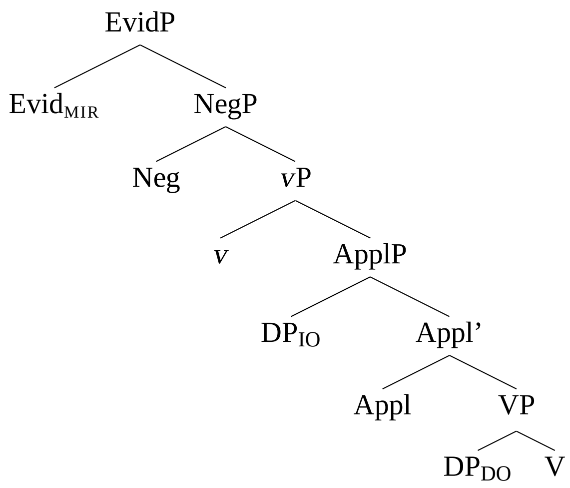


Adger et al. (2009) analyses the matrix verb *know* as an unaccusative, which means that the agreement prefixes correspond to a null unaccusative subject and applicative argument respectively. As mentioned above, if the pre-verbal particles are heads like *not* and auxiliaries in English, which under a head movement system of verbal composition would be required, then a basic clause structure for (126) would resemble the tree in (127):[7]

[6] I have not represented the pre-verbal agreement suffixes in the analysis of (125). More will be said on this topic late in chapter 6 when the head movement alternative is explored.

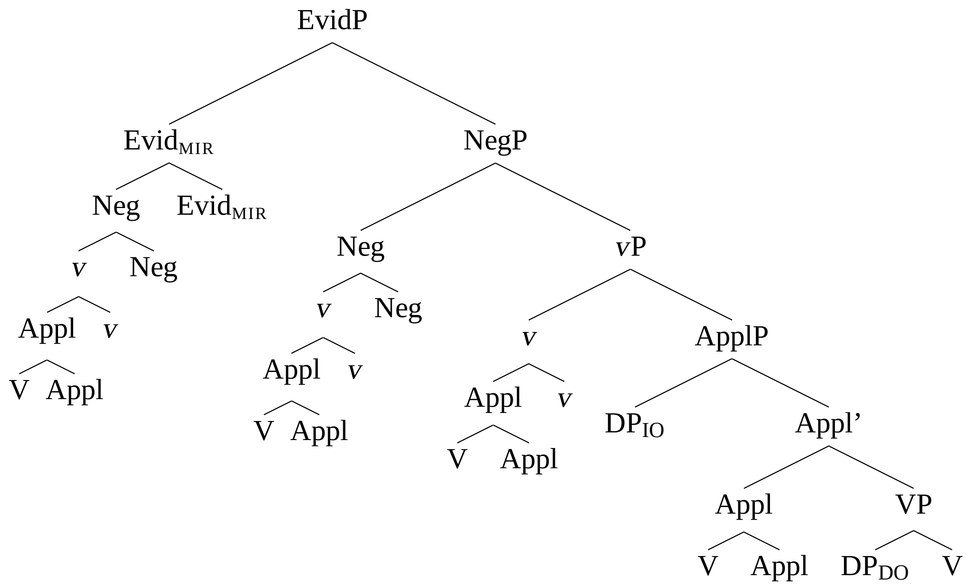
[7] Unlike Adger et al. (2009, 83) who do not include a little *v* in their basic representation of an unaccusative, I assume that unaccusative and unergative clauses contain distinct little *v*s. The unergative *v* introduces an external argument while the unaccusative little *v* does not. In addition, I have treated the *because* clause as an adjunct and have not represented it in (127) to save space.

(127)



A derivation producing the complex verb would proceed as follows. First V Merges with its direct object. Then the VP is Merged with Appl. The first instances of head movement takes place when V moves and adjoins to Appl. The (silent in this case) applicative DP is then Merged into the specifier of ApplP. The next step is to Merge the *v* which again triggers head movement. This time the V-Appl complex is adjoined to the unaccusative little *v* head. Now the first of the pre-verbal selective particles can be added to the structure. Neg is Merged to *v*P while the evidential head is attached to NegP. Both Neg and Evid(ential) trigger head movement of the verb. The outcome is a complex verb with the structure V-Appl-*v*-Neg-Evid. A representation of (127) containing head movement is provided in (128)

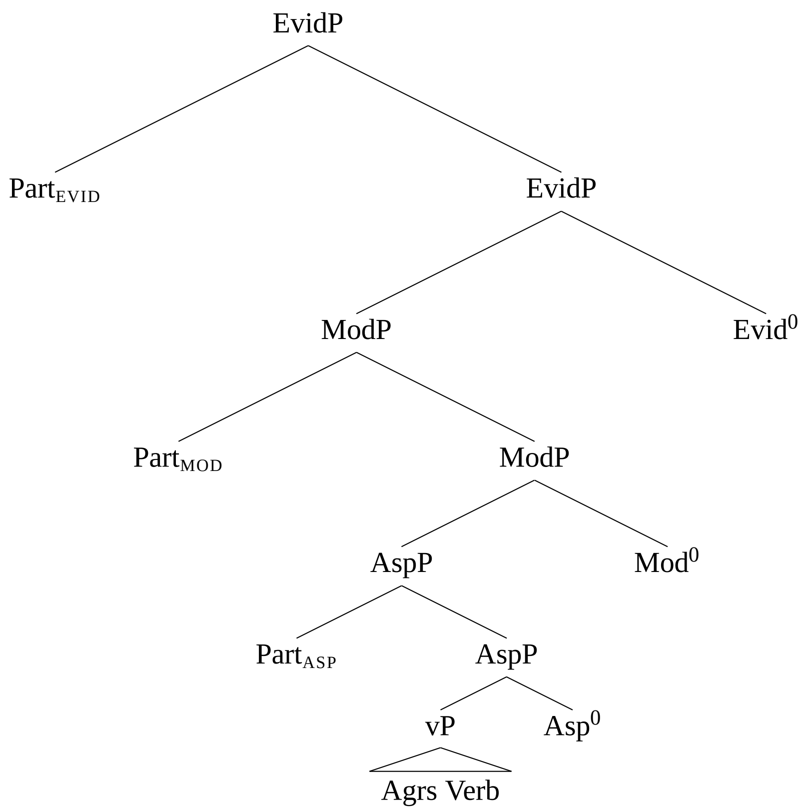
(128)



The structure of the complex head generated by head movement corresponds with the verb in (125) in the sense that the $Evid_{MIR}$ suffix is further from the verbal root than the negation suffix. Yet despite that head movement derives the correct structure for the complex head, it cannot account for the fact that in (125) the pre-verbal suffixes are free-standing and not a part of the verbal complex. This issue is reminiscent of the problem highlighted in Bruening (2017) which concerned the Passamaquoddy-Maliseet data provided in (101) and (102). Once head movement takes place, the free-standing pre-verbal particles are no longer separate from the verb. In addition, it cannot be the case that a lower copy of the verb is pronounced once head movement has taken place because the lower copies are not inflected with the negative and evidential suffixes. Furthermore, as highlighted by (107a), (107b) and (107c) the default position of a verb in Kiowa is after all the arguments. If the verb moves and adjoins to Neg and Evidential as a matter of course, then the sentences where the object or indirect object appear in front of the verb will be impossible to derive without further movement operations.

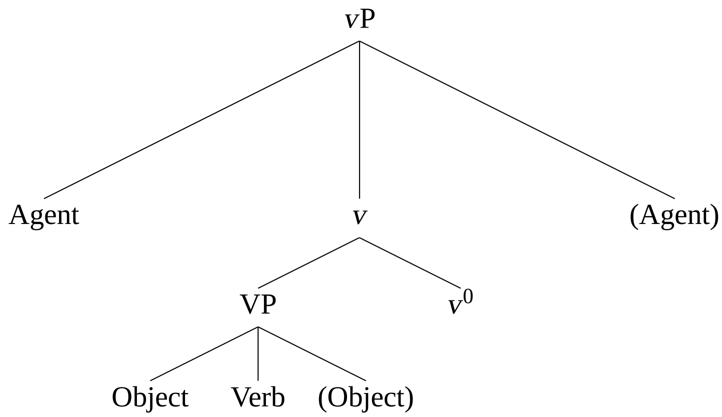
Another possibility for deriving Kiowa complex verbs would be to assume that the clauses are universally head final. This approach is adopted in Adger and Harbour (2007) but is ultimately rejected in Adger et al. (2009) because it predicts that arguments can appear in between the verb and its suffixes. A basic representation of a Kiowa head final clause containing pre-verbal selective particles is provided in (129). The diagram is originally from Adger et al. (2009, 93) but some of the labels have been changed for consistency's sake:

(129)

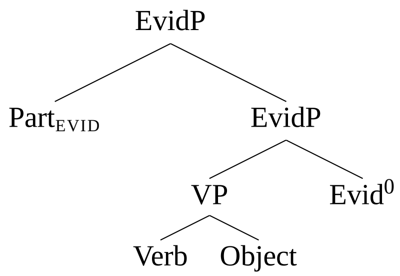


The relationship between the pre-verbal selective particle and the suffixes in (129) is modificational in the sense that the particle modifies the suffix. If the particles are linearised in this position and the heads of EvidP, ModP and AspP are head final, then the tree in (129) captures the Clausal Mirror succinctly because it produces the order <Part$_{EVID}$, Part$_{MOD}$, Part$_{ASP}$, Agrs-Verb-Asp-Mod-Evid>. In addition, as arguments can appear either pre- or post-verbally, one could argue that specifiers containing arguments (*v*, Appl and V by Adger et al.'s (2009) assumptions) can be linearised to the left or the right. However, as highlighted in Adger et al. (2009) this proposal is problematic because it predicts that the direct object could intervene between the verb and the evidential suffix. Two diagrams from Adger et al. (2009, 94) are provided in (130) to demonstrate this issue:

(130) a.



b.



In (130a), the Agent and the Object can be linearised to the right or the left. Yet as illustrated in (130b), when the direct object is linearised to the right, the DP intervenes between the verb and the evidential suffix. To illustrate that this order does not generate acceptable Kiowa sentences, Adger et al. (2009, 95) provide a series of examples which are structurally equivalent to the tree in (130b) where the object DP intervenes between the verb its suffixes. These examples are shown in (131), (132) and (133):

(131) a. ***Hɔ́tôm** ∅– **thǫ́ų́** phítthǫ́ų́-**hêl**?
Q.EVID 3S-drink beer- EVID
'Is it true that he drank the beer?'

b. **Hɔ́tôm** ∅– **thǫ́ų́- hêl** phítthǫ́ų́?
Q.EVID 3S-drink-EVID beer
'Is it true that he drank the beer?'

(132) a. *Hɔ́n ∅– thǫ́ų́ phítthǫ́ų́-mɔ̂ɔ
NEG 3S-drink beer- NEG
'He didn't drank the beer?'

b. Hɔ́n ∅– thǫ́ų́- mɔ̂ɔ́ phítthǫ́ų́?
NEG 3S-drink-NEG beer
'He didn't drink the beer.'

(133) a. *An ∅– thǫ́ų́ phítthǫ́ų́-nmɔ
HAB 3S-drink beer- IMPF
'He usually drinks beer.'

b. An ∅– thó- nmɔ phítthǫ́ų́?
HAB 3S-drink-IMPF beer
'He usually drinks beer.'

The examples in (131), (132) and (133) indicate that it is impossible for the direct object to intervene between the verb and its suffix. The result is the same when different suffixes are used with their corresponding pre-verbal particles. The evidential, negative and aspectual suffixes have to be structurally adjacent to the verb in order for the sentences to be acceptable. Thus like head movement, a head final analysis cannot account for the Kiowa clausal mirror.

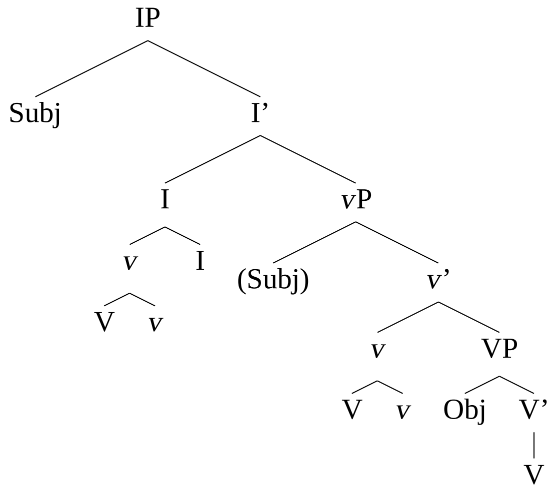
Finally, a description and evaluation is provided of the method that Adger et al. (2009) use to derive the clausal mirror, namely *Mirror Theory* (Brody 2000). The outcome of the system is an analysis where complex verbs are derived without the issue of arguments intervening between a verb and its suffixes. Yet, while mirror theory can derive the clausal mirror, it also faces an issue which in my mind makes its adoption difficult. The theory is reliant on a hypothesis *Mirror* which states that the complementation relation corresponds directly with the morphological structure of a word, in the case of Kiowa and the clausal mirror, the verb. A version of the hypothesis from Brody (2000, 29) is provided in (134):

(134) **Mirror**

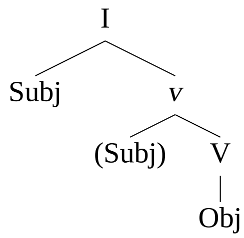
X is the complement of Y only if Y-X form a morphological unit–a word.

The hypothesis in (134) is paired with an assumption dubbed *Telescope* which reduces the projections normally associated with a head, i.e. an X^{min}, X' and X^{max}, to a single node that represents both the minimal and maximal projection. Thus rather than representing the same material at least twice as one would with a head in *Bare Phrase Structure* (Chomsky 1995), i.e. [$_{hit}$ hit John], a telescoped structure cuts down on redundancy because the head, maximal projection and intermediate projection are compressed into a single node. A structure representing X'-theory is provided in (135a) while (135b) hosts the mirror theoretic equivalent. Both trees are from Brody (2000, 30-1) but (135a) has been lightly modified:

(135) a.

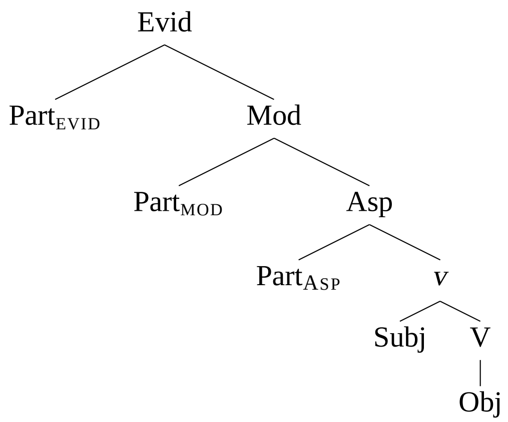


b.



In (135a) the complex verbal head [V-*v*-I] is constructed by head movement. Yet the telescoped tree in (135b) does not represent the complex head by head movement, but it is instead read off the maximal projection I, *v* and V using the Mirror hypothesis. Since *v* is the complement of I and V is the complement of v, by Mirror in (134), V-*v*-I forms a complex verb (which Brody refers to as a *morphological word*). Thus and in a nutshell, the complex verb is read off the maximal projections from the bottom up. This provides a morphological word that is a sealed unit in the sense that an XP cannot intervene between the verb and its suffix. The Kiowa clausal mirror is derived in a straightforward manner using mirror theory because the verbal suffixes are necessarily a mirror image of the order of the clausal spine. An example from Adger et al. (2009, 116) demonstrating the way that the clausal mirror is derivable using mirror theory is shown in (136). Note that this analysis requires that the pre-verbal selective particles are Merged into specifier positions:

(136)



In (136), the pre-verbal selective particles are specifiers of their respective heads. The subject and object are in the specifier positions of *v* and V respectively. As complementation relations correspond to the structure of morphological words, the verb in this example is equivalent to <V-*v*-Asp-Mod-Evid>. To reiterate, according to (134) if X is the complement of Y then Y is a suffix of X in the morphology. V is the complement of *v*, so *v* is a suffix of V and so on until the evidential head. One aspect of mirror theory not discussed relates to the position in which the verb is pronounced. In Kiowa the situation is simple in the sense that the default order is verb final meaning that the verb is pronounced in its lowest position, in this case V. Thus the order of a sentence containing the elements in (136) is represented by the sequence in (137) from Adger et al. (2009, 116):

(137) Part$_{EVID}$ Part$_{MOD}$ Part$_{ASP}$ Subject Object V-*v*-ASP-MOD-PRT[8]

The object is in the specifier of V so V is pronounced after the object. One way structures can differ in mirror theory is related to the position in which the morphological word, in this case the verb is Spelled-Out. As highlighted by Adger et al. (2009) the difference between whether the verb is Spelled-Out in V or *v* is enough to differentiate a VO order from a OV order. The parametric difference between VO and OV in mirror theoretic terms can be formalised using feature strength, e.g. if *v* is a category that possesses a strong feature, then the morphological word corresponding to the verb will be Spelled-Out in that position. Consequently, in English, *v* is strong while in French T is strong and so on.

Despite that mirror theory can derive the clausal mirror, and can be parametrised to account for verbal position in a number of languages, it seems to struggle with the data explored in sections 3.1 and 3.2. Starting with predicate clefts, it is not clear how a predicate could move without also pied-piping the internal argument since the minimal and maximal projections of

[8]The final suffix in (137) is represented as Prt in Adger et al. (2009, 116). I do not know why it is not Evid seen since Evid is the highest head in (136), and as such, should be the outermost suffix attached to the verb.

the verb phrase have been collapsed into a single node. For instance, if the rest of (136) was built and the outcome was a predicate cleft construction, it is not clear how the head of VP could be disentangled from the maximal projection in order for just the head to move into the specifier of CP. The data in section 3.2 is also problematic because it is not clear how two copies of a verb could be pronounced inside the verb phrase since only one head is parametrised with a strong feature. For example, the Nupe data requires that two complex verbal heads are pronounced inside the *v*P. Since only one verbal projection is assigned a strong feature, there is only a single position in which a verb can be pronounced inside the *v*P, with the outcome being that verbal repetitions are underivable.

To summarise this section, it has been shown that head movement cannot derive examples containing a free standing morpheme–or pre-verbal particle to use Adger et al.'s (2009) terminology–and an inflected verb, e.g. a free standing negative element with a negative morpheme of the verb. The reason is that head movement derives inflection by displacement, meaning that the verb has to move and adjoin to the element which in turn becomes a verbal suffix. Yet by dint of a free standing morpheme being free, it cannot be the case that the verb moves as high as the free element. In Kiowa at least, there are two reasons why the verb cannot move. The first is that the free morpheme remains free and is not realised as an affix, while the second relates to the verb's position relative to the other elements in the sentence. If the verb has to move, then it would be impossible for sentences in Kiowa to be verb final in the sense that the verb would have to move to a higher position than the direct object.

One seemingly simple alternative that does not require movement and allows a relationship to be established between the pre-verbal particle and the verb would be to assume that the pre-verbal particle values a feature on the verb via Agree. The verb could then possess an unvalued feature which is valued once the pre-verbal particle is Merged. While this may work for languages like English where the verb only Agrees with one head, in this case T, the analysis would be more problematic in a language such as Kiowa where the verb would need to Agree with multiple pre-verbal elements. The problem stems from the fact that the valued features on the verb would need to be ordered in a specific way once the Agree relation has taken place. Consequently, it is not clear how a feature bundle could be ordered with anything other than a stipulation at this point.

In addition, mirror theory was explored, and while it generated the clausal mirror and could be parametrised to deal with differences in the Spell-Out position of a verb, it could not deal with the displacement of an element smaller than a maximal projection since all the nodes comprising the extended projection of a head are collapsed into single item. This is an issue for deriving predicate cleft constructions where the direct object does not pied-pipe. In addition, mirror theory was also argued to be problematic when applied to the verbal repetition data explored in section 3.2.

Finally, and before concluding this summary, it must also be noted that Kiowa and Passamaquoddy-Maliseet are only representative of cases where verbal particles are used in conjunction with a verbal suffix. As illustrated by Dryer (2013), and using negation as an example, languages can differ with regards to how many negative morphemes they employ and also the position in which those negative morphemes occur. For instance, English has a pre-verbal negative morpheme *not* without a verbal suffix; as shown in this section, Kiowa and Passamaquoddy-Maliseet use a pre-verbal negative element with a verbal suffix (although in Kiowa the suffix can occur in isolation); Salinan uses a free standing negative element in conjunction with a verbal prefix; Ma uses a verbal prefix with a post-verbal free standing morpheme, and finally Limbu negates using a verbal prefix and suffix simultaneously. Examples from these languages are provided in (138) for reference:[9,10]

(138) a. Salinan (Turner 1987, 132)

kára^ʔ ké^ʔ- ešax
NEG NEG-eat

'I did not eat it.'

b. Ma (Tucker, Bryan, & Leslau 1966, 130)

tá- mù-sùbù-lì nɔ́ŋgbɔ́ nyɔ̀
NEG-1S- eat- PAST meat NEG

'I did not eat meat.'

c. Limbu (van Driem 1987, 91)

allɔ nam mɛ- se·k- nɛn.
now sun NEG-shine-NEG

'The sun's not shining now.'

In (138a), the negative element attached to the verb is a prefix while the free standing morpheme is pre-verbal. In contrast, the (138b) illustrates a language that employs a negative verbal prefix along with a particle that occurs after the verb. Finally, (138c) shows a language

[9] According to Dryer (2013) no language exhibits the order (V-Neg)Neg, i.e. a verbal suffix with a post-verbal free-standing element. The significant aspect of this observation is that the (V-Neg)Neg order would be suited to a derivation that used head movement and multiple copy Spell-Out because the verb would need to move higher than the particle in order to derive the particle's post-verbal position. The absence of this order (at least with regard to Dryer's (2013) dataset) can be taken as another problem for analyses deriving complex verbs using the head movement operation.

[10] The formatting and example glosses have been altered to fit with the conventions adopted in this thesis.

where both negative morphemes are affixes to the verb. Taken together with the examples from Potawatomi, Passamaquoddy-Maliseet and Kiowa, the data in this section has illustrated how head movement cannot be the sole mechanism for deriving complex verbs. Thus either head movement is required in combination with one or more additional operations to derive the complex verbs analysed in this section, or an alternative needs to be proposed which can build complex verbs and clauses without relying on multiple operations. What follows now is a summary of this chapter.

3.4 Summary

The aim of this chapter was to highlight that head movement is inadequate when applied to data that requires a single complex verb to be pronounced more than once. In section 3.1, it was shown that predicate cleft constructions could not be produced in a satisfactory manner since head movement could only derive cases where a single head occurred in the left periphery and not examples which involved pied-piping of extra phrasal material. In addition, Kandybowicz's (2008) analysis requires a proliferation of heads (FOC, FOC-PRED, FOC-DEF, DEF) in order to produce constituent focus, predicate clefts without nominalisation, predicate clefts with nominalisation, and finally examples containing a clausal determiner but no predicate cleft. This section also highlighted issues relating the Categorisation Principle (Embick & Noyer 2007) and the labelling algorithm (Chomsky 2013). Finally, a problem was raised with Landau's (2006) proposal that the infinitival marking on predicate clefts in Hebrew is a default inflection when the infinitive in a language like English is derived by the addition of morpheme, e.g. *to run, to hide*.

The discussion moved from predicate clefts to verbal repetition in section 3.2 and it was found that examples of the phenomenon in Nupe can be derived with head movement assuming that the operation generates multiple copies in the same way as other occurrences of the copy theory of movement. Yet it was shown that head movement cannot deal with data from Collins and Essizewa (2007) where the higher copy is inflected for tense while the lower copy is realised as an infinitive given arguments that infinitives possess a [-Tense] feature. Deriving both copies by movement does not explain how the [-Tense] feature appears on the lower copy when the higher copy is not also an infinitive.

Finally, section 3.3 analyses languages where pre-verbal particles and corresponding suffixes are present in a single clause. An analysis from Halle and Marantz (1993) of Potawatomi which makes use of head movement was discussed and it was found that the operation works in this instance because only suffixes are pronounced. However, when a sentence contains a pre-verbal particle and a suffix, head movement fails since the target of the operation becomes an affix on the moved verb. Thus the Passamaquoddy-Maliseet and Kiowa data is problematic for head movement and prompts an analysis where a complex verb can be derived without it having to attach to the free standing element. Lastly, two alternatives were explored, Agree and Mirror Theory, and both were argued to be problematic.

Given that head movement is an issue when used to derive the data presented in this chapter, i.e. predicate clefts, verbal repetition and verbal particles with suffixes, the next chapter explores whether the operation can be and should be incorporated into a Minimalist grammar. The outcome is negative because HM does not comply with the assumptions put forward in chapter 2.

Chapter 4

Can head movement be a Minimalist operation?

The discussion in chapter 2 provided the key components of the Minimalist grammar adopted in this thesis, e.g. Merge, the workspace, the copy operation, Agree and projection. Then in chapter 3 an evaluation of multiple copy Spell-Out analyses was given to show why head movement is used, and not used, in the literature. It was argued here that the operation is problematic when used to derive this dataset. The aim of the current chapter is to indicate why HM is an issue in strict Minimalist systems assuming Merge as the only means of deriving syntactic structure. Specifically, section 4.1 examines the theoretical ramifications of head movement alongside the Minimalist gadgets from chapter 2. In section 4.2, two analyses (Bobaljik & Brown 1997; Matushansky 2006) are discussed in an attempt to see whether the head movement operation can be reconciled with a Minimalist research program. I argue that Bobaljik and Brown (1997) and Matushansky (2006) are problematic for theoretical and/or empirical reasons which paves the way for the novel system developed in chapter 5.

4.1 Head movement and Minimalism

The aim of this section is to determine whether head movement is a licit Minimalist operation given the discussion in subsection 2.1 regarding Merge. The outcome of the argument is that head movement cannot be thought of as Minimalist because it does not function like Merge since the output of the operation is different from the output of Merge. The difference is not attributed to Merge itself, but rather is due to the No Tampering Condition and the Extension Condition which prohibit embedding when building syntactic objects. Since structures built by head movement cannot be derived using Merge, HM is required as an addition to Merge which is problematic given the *Strong Minimalist Thesis* (SMT). Therefore, I argue that head movement is not a viable Minimalist operation.

The conclusion drawn at the end of this section is reliant on the assumption that Merge is the only operation allowed by SMT and that any other operation proposed in addition to Merge has to be rigorously analysed to see whether it is viable. An extract from Chomsky (2015, 4) stating this assumption is provided in (139) for reference:

(139) "In the best case, phenomena would be explained by interaction of the simplest computational operation – Merge, with its two logically possible subcases, Internal Merge IM (automatically yielding "the copy theory off movement") and External Merge EM –interacting with general principles of minimal computation MC. The *Strong Minimalist Thesis* SMT articulates this goal."

According to Chomsky (2015), Merge is combined with principles of minimal computation, which I take to be the *No Tampering Condition* (23a), the *Extension Condition* (23b) and *Inclusiveness* (23c), to derive syntactic structure. The problem of head movement is not related to Merge since Merge just combines two elements to form a new object, which on its own would not prohibit an occurrence of head adjunction from being produced. The issue is connected to the NTC and EC since both of these conditions disallow the head movement operation. A derivation is provided in (140) to illustrate this issue:

(140) a. EM $\sqrt{love}$ with *v* = {*v*, $\sqrt{love}$}
b. HM $\sqrt{love}$ to *v* = {*v*+$\sqrt{love}$, $\sqrt{love}$}
c. EM *Mary* = {Mary, {*v*+$\sqrt{love}$, $\sqrt{love}$}}
d. EM Voice = {Voice, {Mary, {*v*+$\sqrt{love}$, $\sqrt{love}$}}}
e. HM *v*+$\sqrt{love}$ to Voice = {Voice+*v*+$\sqrt{love}$, {Mary, {...
f. EM John = {John, {Voice+*v*+$\sqrt{love}$, {Mary, {...
g. EM T = {T, {John, {Voice+*v*+$\sqrt{love}$, {Mary, {...
h. IM John = {John, {T, {John, {Voice+*v*+$\sqrt{love}$, {...

Whenever External Merge (EM) or Internal Merge (IM) takes place, a new set is derived which is correct given the NTC and EC since each application of Merge should extend the object being built. Yet when HM occurs, e.g. in (140b) and (140e), a head is embedded inside an already built set, for instance, $\sqrt{love}$ is embedded inside {*v*, $\sqrt{love}$} rather than being attached to it. As Merge is the only syntactic structure building operation given for free by the SMT, in an ideal Minimalist system, Merge should be the only procedure by which structure is built. Since head movement does not function like Merge, it has to be viewed as a separate operation which is problematic for the SMT. Finally, it cannot just be argued that head adjunction structures fallout from Merge since Merge cannot embed courtesy of the extension and no tampering conditions.

The conclusion drawn from this section is that head movement and head adjunction structures are not licit Minimalist artefacts when the system is guided by the Strong Minimalist Thesis. As Merge is the only structure building operation allowed by SMT, head movement cannot be assumed alongside Merge because it is an operation in addition to Merge rather than being a sub-case. Also, head adjunction structures cannot be derived by Merge since embedding is not permitted courtesy of the NTC and EC. With this conclusion in mind, the next section provides two proposals (Bobaljik & Brown 1997; Matushansky 2006) which attempt to show how complex heads can be derived by Merge without violating the Extension Condition.

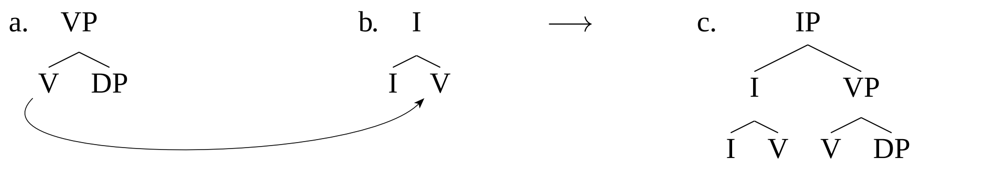
4.2 Two Minimalist head movement accounts

The issues surrounding the head movement operation have prompted some scholars to examine the operation to see if it can be reconciled with a Minimalist research program. In the following subsections, a pair of analyses are evaluated which aim to produce Minimalist versions of the head movement operation which do not violate the extension condition. The first is by Bobaljik and Brown (1997) while the second is by Matushansky (2006). Despite that both analyses can derive complex verbs without the theoretical issues associated with head movement, they cannot generate data where an inflected verb is found low in a tree because both systems are reliant on a different type of upward movement. In addition, Matushansky (2006) is problematic when used alongside a grammar which assumes phases in the sense of Chomsky (2000, 2001). To begin the discussion, section 4.2.1 evaluates Bobaljik and Brown (1997) while section 4.2.2 examines Matushansky's (2006) system.

4.2.1 Bobaljik and Brown (1997)

Bobaljik and Brown (1997) propose that HM can adhere to the extension condition if what the authors call *interarboreal operations*, referred to by others as *sideward Merge* and *external remerge* (de Vries 2012, 148), are permitted within the system. Such operations allow a syntactic object to move to other trees in the workspace. A slightly adapted example of an interaboreal occurrence of HM from Bobaljik and Brown (1997, 346) is provided in (141):

(141)



The derivation would proceed in the following way: a) V would Merge with DP and project to VP, b) V would then move out of VP and Merge with another element in the workspace which in this case is I, c) the complex verb I+V is then Merged with the VP. Crucially V-to-I movement occurs before I has been Merged with VP.

The solution presented in Bobaljik and Brown (1997) capitalises on the often implicit assumption that at least two extended projections have to be built simultaneously in most derivations. For example, whenever a sentence is derived which contains a subject consisting of more than one head, e.g. *the dog chased the cat*, the subject has to be built prior to it being Merged into the specifier of VoiceP. As a consequence, the workspace must also act as a holding ground for pre-built syntactic objects that are waiting to be Merged. Thus the only addition to the system is the requirement that interarboreal movement takes place in order to derive MH without violating the extension condition.

To illustrate Bobaljik and Brown's (1997) analysis with some non-schematic examples, I shall show how their system can be used to derive cyclic HM where V moves to T before the verbal complex V+T moves to C. The first example derived is a constituent question from Old English, although any other V2 clause would work here. Two examples from *A Colloquy on Occupations* by Ælfric are provided in (142) and a final output tree for (142a) is shown in (143):[1]

(142) Old English

a. Hwelċne cræft canst þū?
which craft know you
"Which craft do you know?"

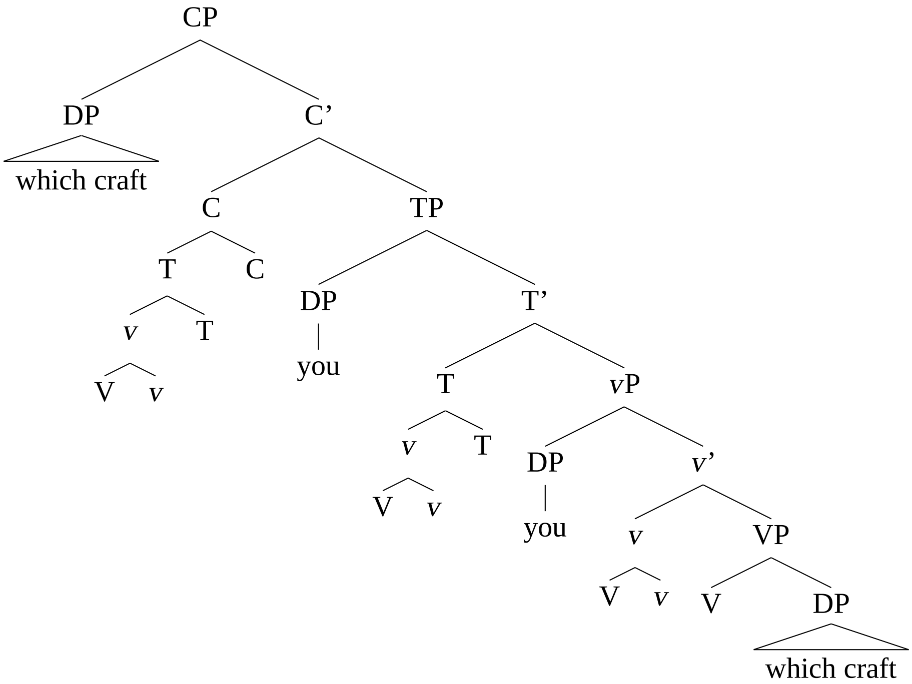
(Mitchell & Robinson 2012, 192)

b. Hwæs hunta eart þū?
Whose hunter are you
"Whose hunter are you?"

(Mitchell & Robinson 2012, 192)

[1] The structure of the tree in (143) is different from the clausal structure used in Bobaljik and Brown (1997). For example, the authors use IP rather then TP and there appears to be no *v*P in their examples. Even though the tree in (143) includes a TP and a *v*P, Bobaljik and Brown's (1997) HM analysis will work in the same way.

(143)



Using Bobaljik and Brown’s (1997) analysis, a derivation for (143) would proceed as follows. First, the direct object (DO) wh-phrase is built using external Merge in the usual way. Then DO is Merged with the V, again with external Merge. The next step in a typical HM analysis would be to Merge the *v* and then adjoin V to *v*, thus completing an instance of HM that violates the extension condition. Bobaljik and Brown’s (1997) system avoids the extension condition by Merging V with *v* while *v* is in the workspace. This step generates a second tree, the V+*v* amalgam, which is then combined with the VP to produce *v*’.

After the subject has been added to form *v*P, another occurrence of interarboreal movement takes place. This time T is selected and placed in workspace. The complex *v* head is Merged with T to form {{V, *v*}, T}. This syntactic object is then Merged to *v*P. The subject undergoes EPP movement which generates the TP. C is selected and the complex T head attaches to C while C is in the workspace. The entire complex C head is then Merged to TP. The final step of the derivation positions the direct object into the specifier of CP.

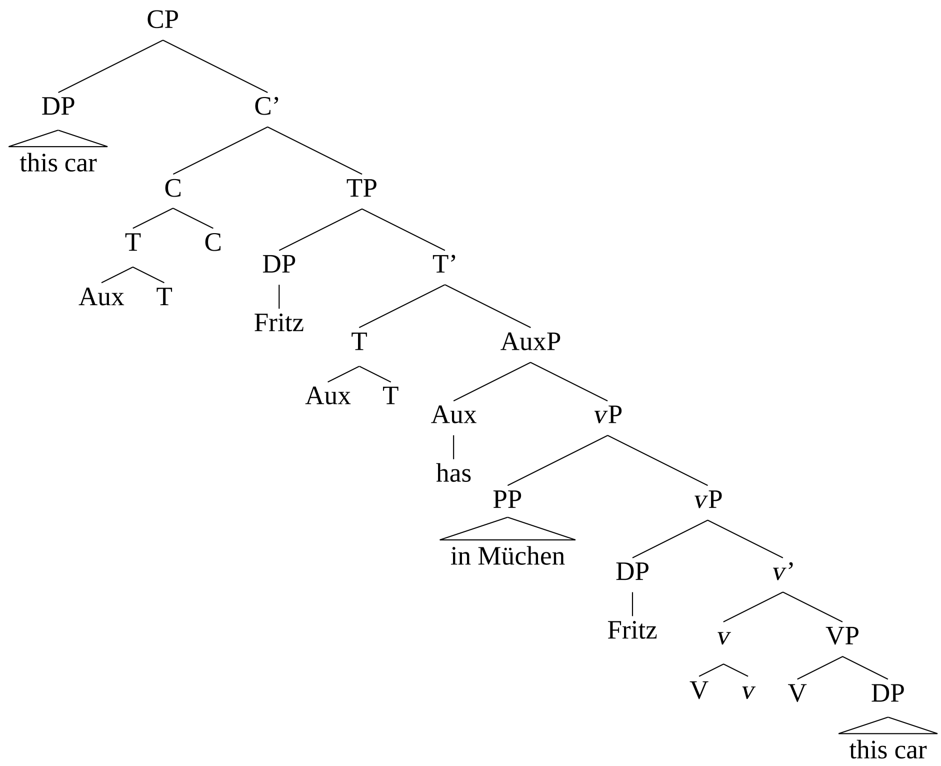
Bobaljik and Brown’s (1997) analysis is now tested with a second example, this time German, where an auxiliary moves from its Merge position inside an AuxP to T, before it then moves from T to C. Like the Old English examples in (142), (144) is a V2 clause:

(144) Dieses Auto hat Fritz in Müchen geklaut.
this car has Fritz in Munich stolen
‘Fritz stole this car in Munich.’

(Harizanov & Gribanova 2018, 6)

In (144) *this car* is in the specifier of CP; *Fritz* is in the specifier of TP; *in Müchen* is adjoined to *v*P, and finally *geklaut* has raised from it Merge position to *v*. A tree is provided in (145):

(145)



The first occurrence of interarboreal movement to take place in (145) is movement of V to *v*. Like in the previous example, the moving element attaches to its host before the host has been Merged with the clausal spine. So in this case, *v* is free in the workspace and V Merges with *v* before the entire syntactic object is attached to VP to form a *v*'. The next occurrence of interarboreal movement takes place when Aux is combined with T while T is still in the workspace. The T' is then generated when T+Aux is Merged with AuxP. Finally, T+Aux Merges with C immediately after C has been selected from the lexicon. When the Merge operation has taken place the complex C head is then attached to the clausal spine.

In summary, Bobaljik and Brown (1997) develop a method of deriving complex heads that works with the requirement that a workspace must exist in order to derive a subject in the specifier of *v*P. The workspace allows Bobaljik and Brown (1997) to argue that a head can move out of the clausal spine and attach to another head contained within the workspace, thus forming a complex head without violating the extension condition. The complex head in its entirety is then attached to the clausal spine to form a X' level. The system proposed by Bobaljik and Brown (1997) does not make use of anything that is problematic for a Minimalist analysis because its key ingredients are Merge and a workspace. As a consequence, the validity of their system becomes an empirical matter and can be shown to fail when it is applied to data where an inflected verb is found low in the verbal spine.

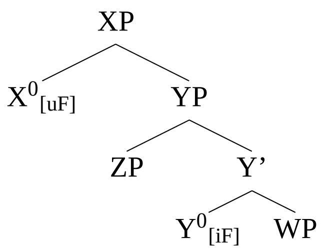
To develop the empirical problems further, interarboreal operations face the same problems as conventional head movement when deriving the Clausal Mirror in Kiowa. Specifically, if verbal suffixes are derived by upward movement whether it be external re-Merge or head adjunction, the consequence is still the same since an inflected verb would need to occur in the same position as the clausal head corresponding to the furthest suffix from the root. Thus in a clause containing a verb possessing suffixes in the order V-NEG-ASP, the V would need to adjoin to the negative head before it attached to aspect. In Kiowa, the aspectual head is higher than the direct object which means that the verb needs to appear in a higher position than the direct object which is bad since Kiowa is a verb final language. Thus even though interarboreal operations are theoretically preferable to those derived by head movement, data with inflected low verbs is still a problem.

4.2.2 Matushansky (2006)

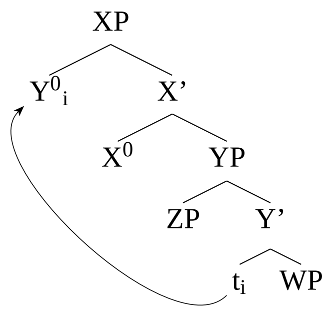
Matushansky (2006) also provides a way of deriving HM without violating the extension condition. Specifically, she derives HM and phrasal movement in the same way using feature checking: phrasal movement and HM are triggered by uninterpretable features. The proposal is that a head (probe) possesses an uninterpretable feature which attracts another head (goal) into the specifier of the first head. The process of moving the head into the specifier is identical to moving a phrase into a specifier, with the only difference being which feature triggers the movement.

After an occurrence of HM, an operation called *m-merger* takes both the probe and goal and re-brackets them into a structure identical to an instance of head adjunction. A schematic example adapted from Matushansky (2006, 81) is provided in (146):

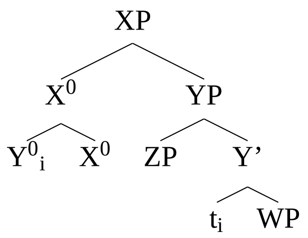
(146)



(147)

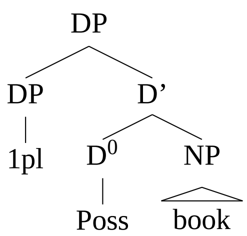


As movement is triggered by uninterpretable features, the [uF] on X^0 attracts a head possessing a matching interpretable feature [iF], in this case Y^0. The head Y^0 moves into the specifier of X^0 in the same way as a phrase undergoing movement. Moving Y^0 into the specifier of X^0 derives the tree in (147). The heads X^0 and Y^0 are now structurally adjacent which allows m-merger to take place. The effect of m-merger on (147) is exemplified by the tree in (148), which is also from Matushansky (2006, 81):

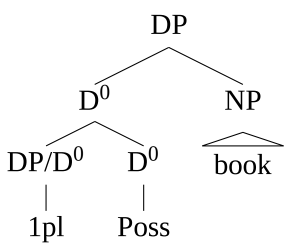
(148)


The system developed by Matushansky (2006) allows HM to be derived like phrasal movement, and as such, in a way that does not violate the extension condition, and adheres to c-command in the sense that, before m-merger, the moved element c-commands its lower copy.

The one addition to the system is m-merger. Matushansky (2006) argues there is evidence to suggest that m-merger should be treated as an independent part of the grammar and not just as a special operation to derive HM. She uses the Saxon genitive as an example and follows Abney (1987) by assuming that a DP with a possessor, e.g. *our book*, contains an NP *book* which is selected by a D -'s. A schematic example slightly adapted from Matushansky (2006, 86) is provided in (149):

(149)


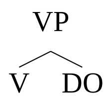
Matushansky asserts that the possessive D head in (149) contains a DP in its specifier which is both a minimal and maximal projection. As the possessive *our* is taken to be the 1pl morpheme in combination with the possessive D head, the local structural adjacency allows the 1pl morpheme and the possessive D to undergo m-merger. The example in (150) provides a second tree from Matushansky (2006, 87) representing how (149) looks after m-merger has taken place:

(150)


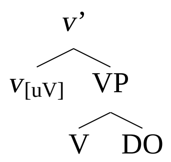
The structure created by m-merger is now ready for the post syntactic process *fusion* from the Distributive Morphology framework of Halle and Marantz (1993) to generate a single node from the 1pl and Poss heads in preparation for vocabulary insertion (Matushansky 2006, 87).[2]

Now, a schematic example of a Germanic V2 clause reminiscent of the ones that were used to test Bobaljik and Brown (1997) is built using Matushansky's (2006) system. If a V2 clause is build-able, than (142) and (144) can also be generated without any problems. The first three steps of the derivation are provided in (151), (152) and (153):

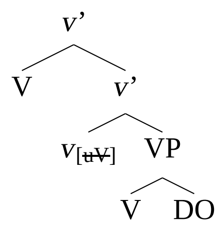
(151)



(152)



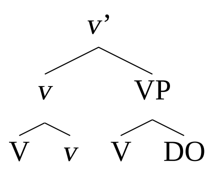
(153)



In (151) the direct object (DO) is Merged with V.[3] Then a little *v* that possesses a uninterpretable selection feature is Merged to VP. The feature triggers movement of V into the specifier of *v*. This final step is represented by the example in (153).

As *v* and V are in a head-specifier relation, the operation m-merger can take place. This is exemplified in (154):

(154)



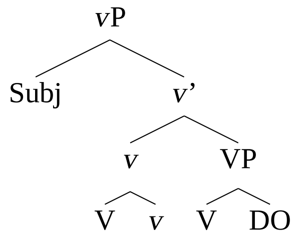
The outcome is that a complex head V+*v* is formed. Recall that at this point in proceedings, m-merger is a syntactic operation as mentioned in footnote 2.

The next steps of the derivation are illustrated in (155) and (156). In (155), the constituent that will become the subject is Merged into the specifier of *v*P, while in (156), T is Merged with *v*P:

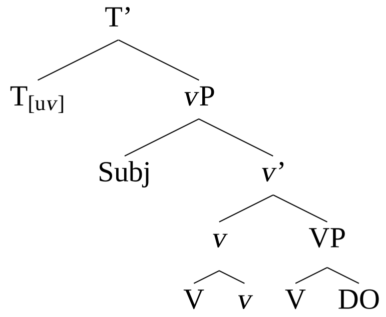
[2]At this point in proceedings, it is worth pointing out that for Matushansky (2006, 89) m-merger occurs immediately after movement of a head into a specifier. If it did not, then there would be time to move the head out of the specifier again which would provide evidence of phenomena that on the surface looked like excorporation. Yet later in the paper, Matushansky (2006, 94-97) provides an argument for why m-merger should be treated as a morphological operation rather than a syntactic one. In my opinion, moving m-merger from the syntactic component does not work and the issues that it causes will be dealt with later in this section. Yet for the examples that follow, the assumption that m-merger is syntactic will suffice.

[3]For the sake of simplicity, I am not representing EPP movement of the direct object or feature inheritance.

(155)

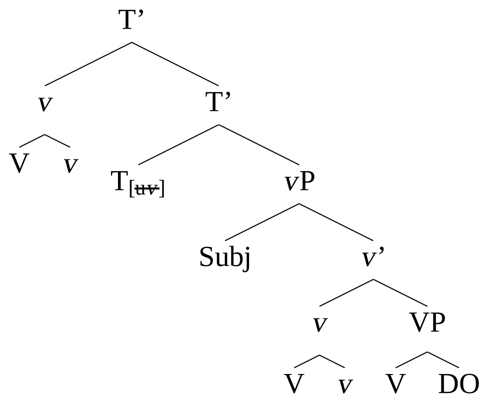


(156)



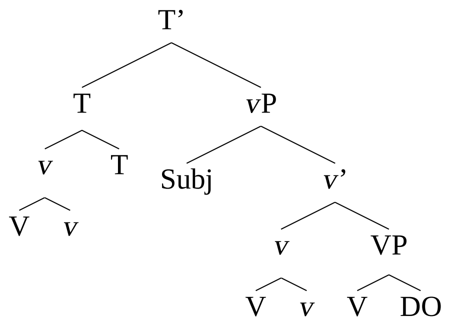
As before, the uninterpretable feature on T triggers movement of the complex *v* head into the specifier of TP. The movement operation is exemplified in (157):

(157)



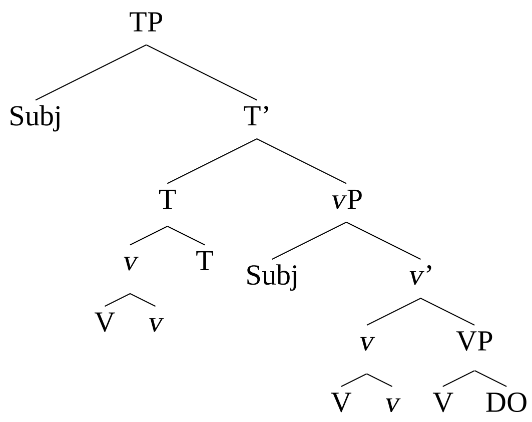
The complex head and T are now structurally adjacent which allows them to undergo m-merger. After the operation has taken place the outcome is a complex T head as seen in (158):

(158)



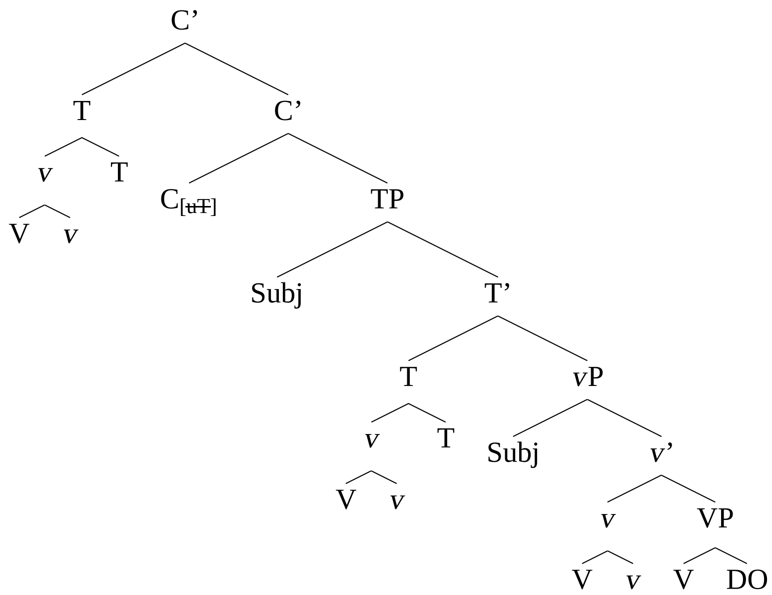
For the next step of the derivation, the constituent representing the subject undergoes EPP movement to form the TP. This operation is provided in (159):

(159)



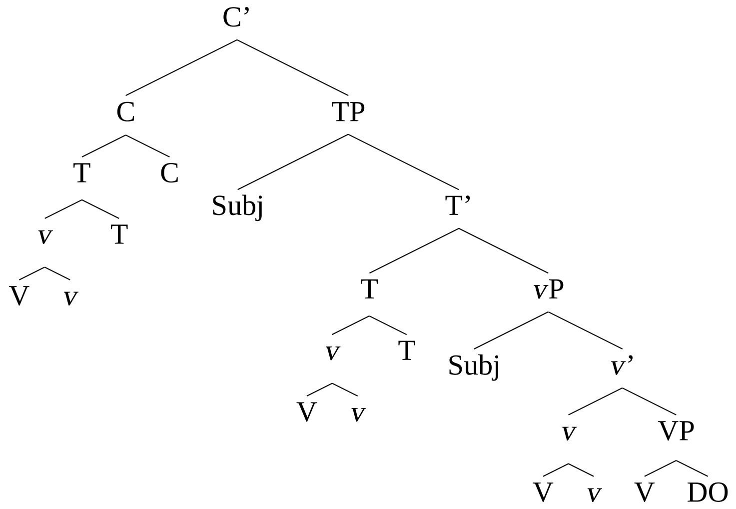
The head C is then Merged with TP to form a C’. As C possesses an uninterpretable T feature, the complex head moves into the specifier C. This stage of the derivation is represented in (160):

(160)



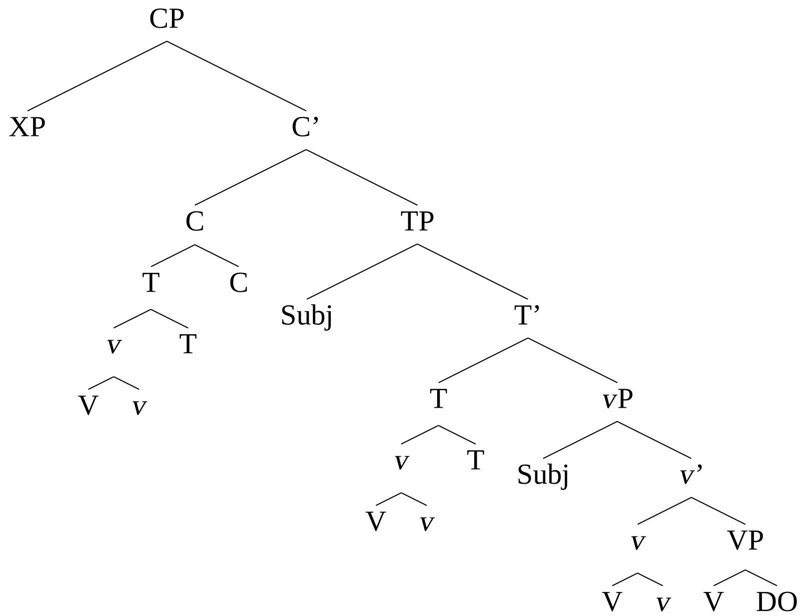
As the complex head is structurally adjacent to C, it and C undergo m-merger to form the last level of complex head. This is shown in (161):

(161)



Finally, a constituent (XP) is Merged into the specifier of CP. Depending on the type of clause, this constituent could be a topic or a wh-phrase. An example is provided in (162):

(162)



Regardless of whether the derivation built a topicalisation structure or a some form of question, the steps would be fundamentally the same from the perspective of Matushansky’s (2006) analysis since the complex verb would still move into the specifier of each head that made up the verbal spine. In each specifier position the attracting head and complex verb would then undergo m-merger so that by the time the complex verb is m-merged to C, it has acquired a copy of all the heads that it needs. The analysis as it stands is applicable to all the data that was used to test Bobaljik and Brown (1997) in section 4.2.1.

Yet Matushansky’s (2006) proposal is problematic. An issue relates to how m-merger is defined and the assumptions needed to make it a viable component of a grammar. There are two main questions that an m-merger analysis needs to answer. The first relates to the fact that it is allegedly impossible to extract a sub-component (feature or head) from inside a complex head. Thus a complex head is opaque to syntactic operations in the sense that it can only be manipulated as a whole. The second question relates to where m-merger occurs in a generative grammar and the consequences of it being a syntactic or morphological operation.

Predictably, the first question is addressed first. The input of the operation m-merger is a pair of heads in a head-specifier relation while the output is a complex verb. Matushansky (2006) aims to derive the fact that excorporation out of a complex head is impossible using m-merger. The first step is to assume Chomsky's (1995) proposal that features cannot be moved in isolation in the syntax. The reason behind this according to Matushansky is that a feature bundle (i.e. a head) is generated in the morphological component or assembled pre-syntactically, with the result that the syntax cannot separate a head into its individual features. As m-merger generates a larger head from two smaller ones, it follows that excorporation is not possible because the syntax cannot manipulate features in isolation without general pied-piping occurring as well.

Matushansky (2006, 95) then states that m-merger must occur with Spell-Out if the complex head is to be treated as impenetrable to syntactic operations. The general idea seems to be that the complex head is un-modifiable once m-merger has taken place given that a Spelled-Out object is inaccessible. At this point it is worth stating explicitly that Matushansky (2006) is assuming that an m-merged complex head is a phase. Thus the system assumes a strong version of Chomsky (2000, 2001) where complex heads are phasal and the contents of the head are subject to the phase impenetrability condition.

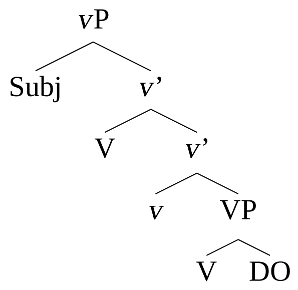
The analysis as it stands generates two points of interest. The first relates to whether it is necessary to include the assumption that features cannot be moved in isolation from Chomsky (1995) and the one supposing that Spelled-Out m-merged heads are inaccessible by being phases. The reason is that both seem to be doing the same job in making a complex head inaccessible. The second is potentially more dubious as problems arise from invoking the phase analysis from Chomsky (2000, 2001). The Spell-Out domain of a phase is inaccessible to syntactic operations, but all phases (CP, *v*P and maybe DP) have an edge where items within the phase can move to if they need to appear in a position further up the tree. One such case would be long distance wh-movement across multiple phases. Given that phases have an edge, it should be the case that a complex head also has an edge. Accordingly, if a complex head has an edge then it should be possible for a head to be extracted in the same way as a constituent from a phase. The result is that excorporation out of a head is a theoretical possibility, which is of course a bad result.

If a complex head is phasal, then it should also be the case that a complex head Spells-Out in the same way as any other phase. However a complex head does not seem to behave like a *v*P or a CP. For instance when a CP is Spelled-Out, the complement of the phase head is sent to the interfaces to be manipulated in the usual ways. Crucially the constituent that represents the phase is already a constituent when it is sent to the interfaces. If m-merger is to be thought of as a morphological operation rather than a syntactic one, it must be the case that a sub-part of the tree is sent to the morphological component so that m-merger can take place. However there does not seem to be a valid constituent that can be sent which does not just include the entire XP because the syntax builds a head-specifier configuration which m-merger turns into a complex head, e.g. like in (147) and (148).

True Matushansky (2006, 95) does say that each Merge operation generates a phase, which would allow the entire XP to be sent to the morphological component, but it must still be the case that the output of m-merger is accessible for further syntactic computation given that the m-merged head can check features in the syntax and move further up the tree. If m-merger occurs in the morphological component which in many analyses is part of the PF wing of the grammar, then it must be the case that the effects of m-merger can feed the syntactic component. This should be impossible assuming a standard Y or T model of grammar. Finally, if each Merge operation did generate a phase (dubbed *Merge and Spell-Out* by Matushansky 2006, 95), then it must also be the case that each phase has an edge through which constituents (complex heads and phrases) can move. Such an analysis would also require that each Merging head possessed some kind of EPP feature to trigger movement of constituents that needed to be displaced further up the tree. I am not sure that a system like this is workable.

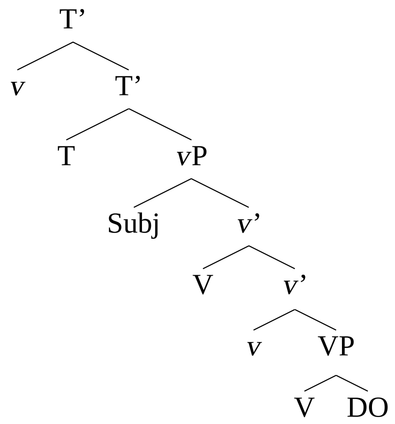
The last issue to be discussed relates specifically to the problem of proposing that m-merger is a morphological operation. If it occurs post-syntactically, then the *Head Movement Constraint* from Travis (1984, 131) no longer falls out from the system. The reason is as follows. Say that a V is Merged with a direct object. Then the *v* is Merged with the VP. As the *v* possesses an uninterpretable V feature, the V moves into the specifier of *v*. It is at this point where the distinction of a syntactic or post-syntactic m-merger is significant. If m-merger is syntactic, then the operation takes place and generates a complex head using V and *v* in the way exemplified by (154) and the derivation proceeds until a tree like (162) is built. However, if m-merger is post-syntactic then presumably nothing will happen when V is internally Merged into the specifier of *v*. Thus the subject is Merged forming a second specifier. An example is provided in (163):

(163)



The problem arises when T is Merged with the tree. As T possesses an uninterpretable *v* feature, the *v* in the specifier has to move into the specifier of T. A tree is shown in (164):

(164)



As (164) indicates, the V has been stranded in the specifier of *v* because m-merger has not taken place and attached *v* and V together. The same problem will materialise when C is Merged since the uninterpretable feature on C will trigger movement of T into the specifier of CP. By the time the derivation concludes, V will be stranded in the specifier of *v*; *v* will be stranded in the specifier of T, and T will be stranded in the specifier of CP. Therefore it does not appear that m-merger can be morphological operation unless it occurs in parallel with the syntactic component which, as mentioned in the previous paragraphs, seems unworkable given the model of grammar assumed here.

Finally, like Bobaljik and Brown (1997), Matushansky’s (2006) system is empirically problematic because the analysis requires that complex heads are built using upward movement. Thus to build a complex verb possessing NEG and ASP suffixes, the verb would need to move into the specifier of ASP in order for it to be m-merged with the aspectual head. As a consequence, in Kiowa the verb is predicted to be in the wrong position relative to the direct object since verb movement derives a VO order rather than the required OV.

4.3 Summary

The aim of this chapter was to determine whether head movement can be assumed in a Minimalist grammar. If the Strong Minimalist Thesis is adopted, then I argue that the short answer is no. In Minimalism, the SMT allows Merge as the only operation that can occur in a grammar for free since all generative grammars need a procedure by which syntactic structure can be built. Merge is the simplest combinatorial operation possible whereas head movement is not. In addition, as highlighted in Chomsky (2015, 4), Merge interacts with "principles of minimal computation" which I take to be the *No Tampering Condition*, *Extension Condition* and *Inclusiveness*, making it impossible for Merge to derive head adjunction structures since these conditions disallow the operation from embedding one head inside an already built object.

The next section 4.2 discussed how the head movement operation has been adapted to fit within a Minimalist grammar. The first analysis is by Bobaljik and Brown (1997) who develop a system which uses the workspace to show how complex heads can be derived without violating the Extension Condition using an operation dubbed by some as *sideward Merge*. The second analysis (Matushansky 2006) suggests that head movement can avoid the theoretical issues associated with head adjunction if heads target specifiers when they move, whereupon the moved head is combined with its target by m-merger, a process which restructures two adjacent heads into a configuration that resembles a head adjunction structure. Yet Bobaljik and Brown (1997) and Matushansky (2006) suffer the same empirical issue since their analyses both use upward movement to derive complex heads. The outcome is that neither system can explain how a complex verb appears in a low position without having to postulate an additional operation such as *affix hopping* (Chomsky 1957). Furthermore, Matushansky (2006) is problematic when combined with a grammar that adopts phase theory.

The head movement issues highlighted above allow for an alternative to be developed in chapter 5 which uses just the mechanisms and operations discussed in chapter 2. Specifically, I propose that complex verbs are derivable using nothing more than Merge, the workspace, the copy operation and the method of labelling developed in subsection 2.5.

Chapter 5

An alternative to head movement

This chapter aims to provide a means of deriving inflected verbs without using the head movement operation. The key to the proposal is that it adheres to the Strong Minimalist Thesis as much as possible. Consequently, the analysis is based on the theoretical operations discussed in chapter 2 and any departures from Merge, the Workspace, copying, Agree and Projection will be brief and only occur when necessary. The structure of the chapter is as follows: section 5.1 provides an outline of the Minimalist operations discussed in chapter 2. Next, section 5.2 combines each of these constructs into a system with the hope of deriving complex verbs without the issues associated with head movement. Section 5.3 explores the consequences of building complex verbs using the new system. Subsection 5.3.1 provides an analysis of modal and auxiliary verbs while subsection 5.3.2 develops a means of using the new system to derive VO, OV, V-in-T and V2 word orders. Finally, section 5.4 summarises the chapter.

5.1 An overview of the model

The model adopted in this chapter is reliant on the Minimalist gadgets discussed in chapter 2. An overview of each operation is provided in this section to set up the development of the new system in section 5.2. Merge begins the discussion.

The binary combinatorial operation *Merge* is used to derive syntactic structure. The version of Merge adopted in this thesis takes two objects α, β and combines them to form $\{\alpha, \beta\}$. As mentioned in section 2.1, Merge does not specify a label (Chomsky 2013; Collins 2002; Seely 2006) or an order (Chomsky 2013, 40), and finally, it is not triggered by selection features (Chomsky 2015, 14). Merge is combined with the No Tampering Condition, Extension Condition and Inclusiveness, which when taken together ensure that Merge only applies at the root, cannot tamper with pre-built syntactic objects and does not add elements such as traces and bar levels. In addition, Merge can be internal (IM) when one Merge element is contained in the other, e.g. α is contained in β, or external (EM) when both Merging elements are separate objects in the workspace.

Merge applies to elements of the workspace, where workspace is understood in this thesis as an unordered set W = $\{_W \emptyset, \alpha, \beta, \gamma$ and so on$\}$ as in Collins and Stabler (2016). Items are extracted from the lexicon and placed directly in the workspace, allowing Merge to combine them to form larger syntactic objects. Each application generates a new workspace, e.g. W_1, W_2, W_3 etc. This conception of the workspace is paired with two additional assumptions. First, the Merge operation can build more than one object in the workspace at any given time which is a necessity to allow constituents to be built prior to the clausal spine. Second, it is possible for lexical items to be Merged from one tree into another. Lastly copying is facilitated by parallel Merge and internal Merge. To illustrate with an example, if β is embedded inside α and β is selected and Merged with α a copy of β is generated via internal Merge. Yet if β was selected along with another element inside α, say γ, and β and γ were Merged together forming a separate constituent in the workspace, then an instance of parallel Merge has taken place. In the derivations to come, parallel Merge and internal Merge are both used to generate copies.

The next operation mentioned is Agree since it will be required for the discussion of labelling in the following paragraph. The version of Agree adopted in this thesis is uncontroversial since it does not differ from any other standard version of Agree proposed in the literature (see for instance Adger 2003; Chomsky 2001). An Agree relation is established between two elements if a high unvalued uninterpretable feature (probe) is valued by a lower valued equivalent (goal). To use an example, a common type of Agree operation is found between an unvalued [uϕ] on T and interpretable [ϕ] features on the subject. The feature on T probes and is valued by the corresponding features on the subject. An unconnected occurrence of internal Merge then positions the subject in the specifier of TP.

The final artefact discussed in section 2.5 is the labelling algorithm from Chomsky (2013). Using a constituent $\{\alpha, \beta\}$ as an example, there are three ways a label can be assigned. First, either α or β provides the label. Second, a feature shared by α and β provides the label. Third, α and β provide the label together. This latter point represents a departure from Chomsky's (2013) labelling algorithm for two reasons. The first is that for Chomsky, movement is triggered when an {XP, YP} configuration cannot be labelled. The symmetry of a such a structure is broken by internal Merge and stipulating that the copy left behind is invisible to the labelling algorithm. Yet I assume that internal Merge is not triggered by anything and occurs as soon as possible which is before labelling takes place. This interpretation is similar to that found in Chomsky (2015) and Chomsky et al. (2019). Second, I do not assume that copies can be ignored by the labelling algorithm. One reason is that it should be impossible to distinguish a lower copy from a higher one given Merge and inclusiveness. Another reason relates to full interpretation. If labels are required for an object to be interpreted, and if copies are ignored by the labelling algorithm, then copies should be ignored at C-I. These issues are avoided by assuming that {XP, YP} structures can be labelled using a shared feature (as in Chomsky's system) or by two categorial features if no shared feature is present. Finally, the labelling algorithm in (36) is free in that nothing constrains how it applies to a structure. Once labelling is complete, constraints such as full interpretation and headedness determine whether the structure is licit. The algorithm in (36) keeps applying until it produces appropriate labels, at which point the tree passes to the interfaces, completing the derivation.

This section has provided a brief summary of the Minimalist mechanisms that were introduced in chapter 2 and will be used in section 5.2 to derive complex verbs. Key to the system are Merge and a workspace since the former builds syntactic structure while the latter is a space where Merge can occur. The operation Agree is assumed in this thesis where necessary, but it does not make a novel contribution unlike labelling which plays a small but significant role in licensing where a complex verb appears within the clausal spine. As these operations have been discussed in detail in chapter 2 and summarised in the current section, it is now time to see how they fit together to derive a complex verb.

5.2 Building verbs in the workspace

The Minimalist operations needed to build an inflected verb in the workspace have been provided in chapter 2 and were summarised in section 5.1. It is now time to compile these operations into a single system which is capable of deriving complex verbs in the workspace. The mechanisms needed to accomplish this goal are Merge (IM, EM and parallel), the workspace, copying, Agree and labelling.

The proposal of this thesis is that complex verbs are built using external Merge in the same way as subject and object DPs. Each element of the complex verb is then copied using Merge. The process begins by accessing the lexicon and placing all the lexical items needed into the workspace. The subject, direct object and inflected verb are built using external Merge. At this point the workspace contains four elements $\{_W$ verb, Subj, DO, C$\}$. Each element of the complex verb is copied using first parallel Merge, and then when the verb is attached to the clausal spine, internal Merge. The copies are attached together to form the clausal spine. As the clausal spine is being built, the direct object and subject are Merged in the appropriate places. The subject moves into the specifier of TP prior to labelling taking place before C is Merged to complete the derivation. The benefit of this system is that complex verbs are not derived using head movement and that nothing is assumed that is not already a necessary part of the syntactic component. The structure is then labelled as per the discussion in subsection 2.5. A more detailed description follows regarding how a transitive clause is generated using this system.

The first step is to place the lexical items needed to build the transitive clause in (165) into the workspace (W). The lexicon is accessed once and all the elements needed are transferred. As mentioned in chapter 2, I do not assume a lexical array or numeration since all the items needed for the clause can be held in W. An example is provided in (166) to illustrate how W looks when it contains all the lexical items needed to derive the sentence in (165):

(165) The boy rode the bike.

(166) **Workspace**

$\{_{\text{W}}$ $\sqrt{ride}$, *v*, Voice, T_{Past}, the, *n*, $\sqrt{boy}$, $\sqrt{bike}$, C$\}$

In (166), W is filled with everything required to produce (165). The subject, object and verb are built first. Beginning with the direct object, $\sqrt{bike}$ and *n* are Merged together to form $\{$*n*, $\sqrt{bike}\}$ and *the* is attached to complete the DP. An updated representation of W is shown in (167):

(167) $\{_{\text{W}}$ $\sqrt{ride}$, *v*, Voice, T_{Past}, $\{$the, $\{$*n*, $\sqrt{bike}\}\}$, $\sqrt{boy}$, C$\}$

As the workspace is an unordered set, it cannot contain more than one occurrence of a lexical item which, at first glance, is an issue since generating (165) requires more than one instance of *the* and *n*. Yet as mentioned in section 2.3, copies of *n* and $\sqrt{bike}$ can be generated using parallel Merge. So once the direct object has been built and the workspace does not contain an occurrence of *the* or *n*, parallel Merge is used to build the subject. For instance, the categoriser inside the direct object is selected along with the $\sqrt{boy}$ in the workspace. These elements are parallel Merged together forming $\{$*n*, $\sqrt{boy}\}$. Then the determiner is selected from inside the object and is parallel Merged with $\{$*n*, $\sqrt{boy}\}$ which completes the subject. A illustration of these steps is provided in (168). Abbreviated workspaces are provided to save space:

(168) a. Merge $\sqrt{boy}$ and *n*

$\{_{\text{W}}$ ... $\{$*n*, $\sqrt{boy}\}$, $\{$the, $\{$*n*, $\sqrt{bike}\}\}$, C$\}$

b. Merge *the* and {*n*, $\sqrt{boy}$}
{$_W$ ... {the, {*n*, $\sqrt{boy}$}}, {the, {*n*, $\sqrt{bike}$}}, C}

Once the subject has been built, the workspace contains two DPs and a selection of lexical items. The complex verb is derived in the same way as the subject and object, e.g. the root $\sqrt{ride}$ is Merged with *v* before Voice is attached to the amalgam of $\sqrt{ride}$ and *v*. Finally T_{Past} completes the verb. The workspace now contains five elements as illustrated by (169):

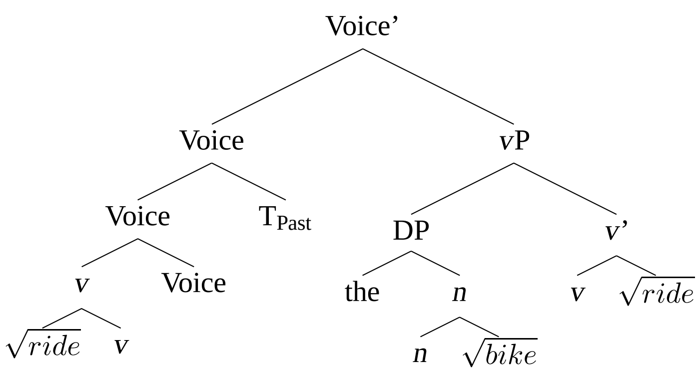
(169) {$_W$ {{{$\sqrt{ride}$, *v*}, Voice}, T_{Past}}, {the, {*n*, $\sqrt{boy}$}}, {the, {*n*, $\sqrt{bike}$}}, C}

The complex verb, subject and object are built and ready for further computations. The clausal spine is derived next. The first steps involve copying. The first steps are similar to the ones used to derive the subject from the object in that elements of the verb are copied using parallel Merge and assembled to form the clausal spine. An example representing how the *v*P is formed is provided in (170). The workspaces are abbreviated to save space:

(170) a. Merge *v* and $\sqrt{ride}$
{$_W$ {$\sqrt{ride}$, *v*}, {{{$\sqrt{ride}$, *v*}, Voice}, T_{Past}}, ... }
b. Merge *the bike* and {*v*, $\sqrt{ride}$}
{$_W$ {{the, {*n*, bike}}, {$\sqrt{ride}$, *v*}}, {{{$\sqrt{ride}$, *v*}, Voice}, T_{Past}}, ... }

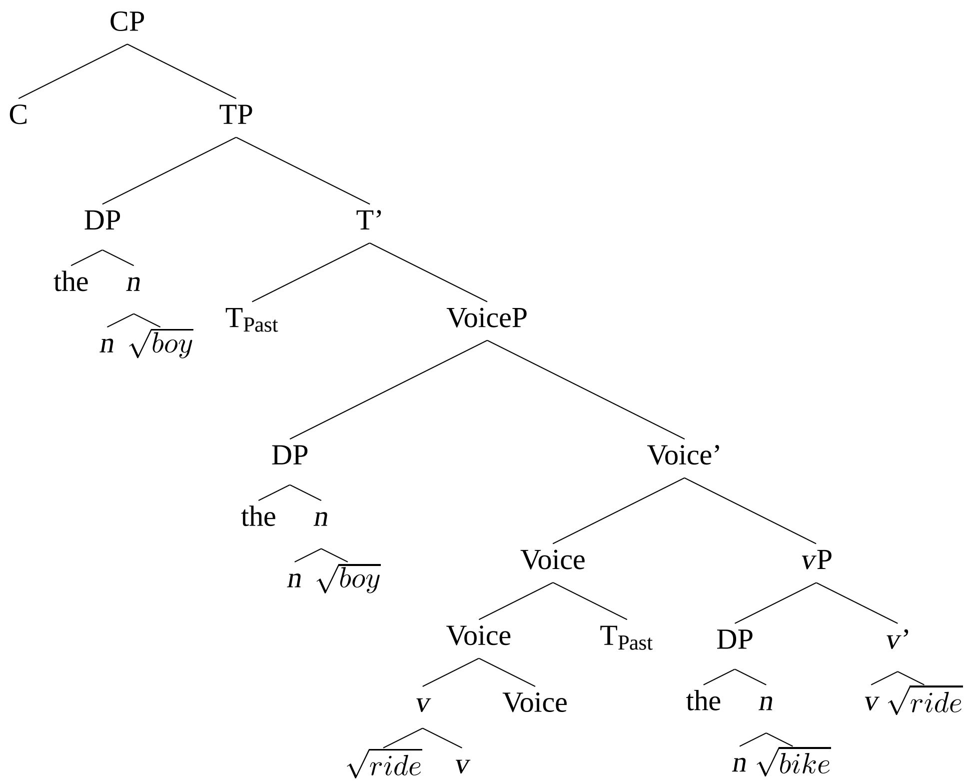
In (170a) *v* and $\sqrt{ride}$ are parallel Merged to form a new constituent in the workspace. These elements combined to form *v*' in X'-bar theoretic terms. The direct object is then Merged in (170b) to form the specifier of *v*P. The complex verb is attached in the Voice position. A tree (rather than brackets, for ease of exposition) is provided in (171) to illustrate the effect of Merging the complex verb with the clausal spine. Note that (171) is represented using X' labels rather than those generated by the labelling algorithm in (36) for ease of reference since labels are not assigned until CP:

(171)



As the tree in (171) has reached the Voice' level, the subject is added to form the VoiceP. The T_{Past} inside the complex verb is then selected and Merged with the VoiceP to produce a copy. The subject is then Merged into the specifier of TP. Finally, C is attached to TP to complete the clause. An output tree is provided in (172):

(172)



To summarise, deriving (172) in the way exemplified above requires a number of assumptions. The first is Merge which is unproblematic given current Minimalist grammars. The second is a workspace which is also not a problem. The third is that the workspace can contain multiple structures at any given time while the fourth is that items can be Merged from one tree into another (parallel Merge). Given the nature of building using these assumptions, the complex verb has to be built before the clausal spine. If the clausal spine was built first and the complex verb was assembled second using Merge and parallel Merge, attaching the verb to the spine would result in an Extension Condition violation because Merge would need to embed the verb in an already assembled syntactic object.

The final aspect of building (165) which needs discussing is the way in which the structure is labelled using the labelling algorithm in (36), repeated in (173) for convenience:

(173) **Labelling Algorithm 2**

In a configuration $\{\alpha, \beta\}$ either:

a. α or β projects, or

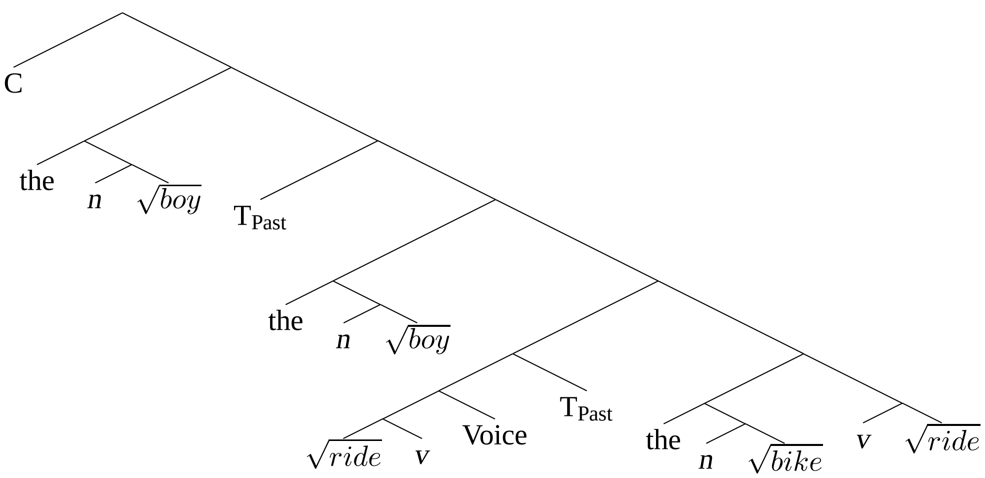
b. a feature shared by α and β projects, or

c. distinct features in α and β project.

As mentioned in subsection 2.5, the labelling algorithm functions in a way similar to the one developed in Chomsky (2013), but with a couple of differences. First, labelling requirements do not trigger movement. In a transitive clause, labelling does not start until after C has been Merged given the PIC II in Chomsky (2001) where the complement of X, X a phase head, transfers at YP, with Y being the next highest phase head. Thus by the time C has been attached to the clause, the external argument has already been copied and moved into the specifier of TP, meaning that labelling cannot trigger movement because there is no movement left in the tree to trigger. Second, copies are not ignored by the labelling algorithm. Labels are required for interpretation (Chomsky 2013) and copies need interpreting at the interface for a variety of reasons, e.g. reconstruction effects and pronouncing copies in situ to name two (see Legate 2003 for the former and Reintges 2007 for the latter). Thus I proposed in subsection 2.5 that when an {XP, YP} is generated where nothing is shared between Merge-mates, an element from α and an element from β is used to label the symmetric projection. For instance, the specifier of VoiceP in a transitive clause is labelled using a feature from the external argument and a comparable one from inside what would be Voice' in X'-theory. This produces a {D, Voice} label.

When these assumptions are combined with the labelling algorithm in (173), the tree in (172) is labelable without an issue. As mentioned above, (172) is represented using labels derived from X'-theory. Yet since labelling follows PIC II, at the point that C is Merged with TP, the tree contains no labels. Consequently, a label-less structure is provided in (174) to better represent the situation at the point which C is attached:

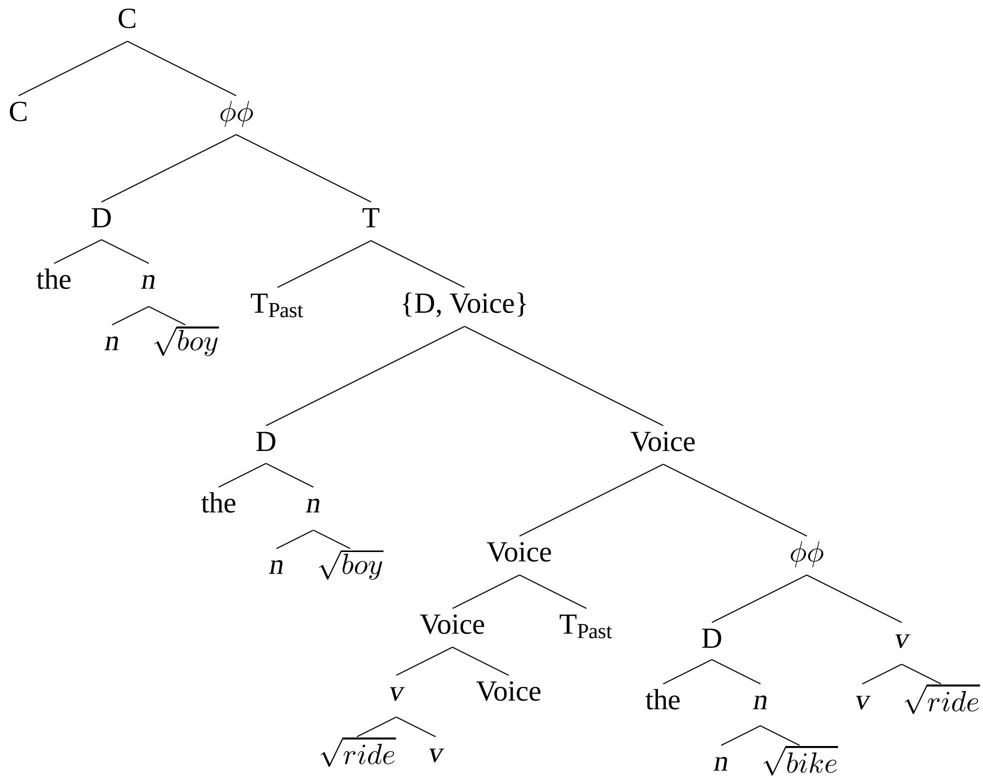
(174)



The labelling algorithm applies from the bottom up and as such begins with *v* and $\sqrt{ride}$

inside the *v*P. The *v*-$\sqrt{ride}$ amalgam is labelled as *v* using (173a). Since the direct object and *v* Agree, (173b) uses a ϕ-feature from each constituent to generate the *v*P label. The inflected verb and direct object are labelled using (173a) exclusively. The condition in (173a) also provides a label for Voice' and all the labels inside the subject. Finally, (173c) generates a label for VoiceP using the D inside the external argument and the Voice inside Voice'. The rest of the tree is labelled in a straightforward manner. (173a) provides a T label to T' while the external argument in the specifier of the TP is labelled with (173b) which generates a $\phi\phi$ before CP is labelled using (173a). A final output tree is provided in (175) for reference:

(175)



The tree in (175) is built using the Minimalist operations explored in chapter 2. (175) also adheres to full interpretation and headedness because each copy provides a label and an element from the head of every phrase labels through its projections. To reiterate, nothing determines how each element is Merged together and which constraint in (173) generates labels. Merge and (173) apply in combination with "principles of minimal computation" (Chomsky 2015, 4), such as the extension condition, no tampering and inclusiveness, until a licit syntactic object is produced which satisfies full interpretation and headedness. Once the syntax has built and labelled an object, it is down to the interfaces to determine whether that object is licit.

To summarise this section, the minimalist operations provided in chapter 2 are combined into a system which is used to derive inflected verbs without the issues associated with head movement. This analysis is reliant on the assumption that Merge is untriggered and that a workspace exists where inflected verbs are built before being attached to the clausal spine. In addition, a development of Chomsky's (2013) analysis provides labels which are used by the interfaces to determine whether a syntactic object satisfies full interpretation (FI) and headedness. Like Merge, labelling is free in that nothing dictates which condition in (173) is used to generate a label but FI and headedness require each node to be labelled appropriately. Thus (173) keeps producing labels until FI and headedness are satisfied.

What follows in section 5.3, is an exploration of two common data types with the hope of illustrating how the Merge system developed in this section can be used to generate different datasets.

5.3 Consequences of the system

The aim of this section is to apply the system developed in section 5.2 to two simple datasets to determine whether Merge and parallel Merge can be applied to other types of verbal construction. Subsection 5.3.1 derives data containing modal and auxiliary verbs while subsection 5.3.2 uses the analysis to produce the differences between OV, VO, V-in-T and V2 word orders.

5.3.1 Modal and auxiliary verbs in English

One immediate consequence of the system presented in section 5.2 is that it provides a means of deriving modal and auxiliary verbs without any additional assumptions or allowances. The thrust of this section is that auxiliary and modal verbs are built prior to the clausal spine in the workspace. The inflected verb is then externally Merged once the clausal spine has been built using the new system. The first part of this section discusses the composition of modal and auxiliary verbs while the second provides an illustration of how the system developed in 5.2 can be applied to this dataset.

Given the way that complex verbs are constructed in this thesis, auxiliaries and modals must consist of at least two elements: a morpheme that provides the core meaning of the auxiliary and a second morpheme indicating how the auxiliary is inflected. So for instance, an English auxiliary, e.g. *had*, is comprised of PERF and T_{Past} morphemes. Similarly a modal verb like *may* is built from MOD and T_{Pres} morphemes. An analysis which attempts to derive auxiliaries should also provide a means of explaining how another element in a clause is inflected by the auxiliary, e.g. the lexical verb in a string such as *have eaten*. The *-en* morpheme is pronounced on the verb in the presence of the auxiliary *have*, meaning that a perfective auxiliary needs building alongside a lexical verb containing a PERF morpheme. A benefit of the analysis developed in this thesis is that it allows a verb inflected with a perfective morpheme to be built in the same way as a verb inflected with for example, a past tense morpheme.

The similarities between a verb inflected for tense and one inflected for aspect allow the derivation of the participle to follow the process illustrated in section 5.2. The sentence being derived is provided in (176) while (177) illustrates how the workspace looks after all the lexical items needed to derive (176) are selected from the lexicon. For simplicities sake, both arguments are pronouns to limit the number of lexical items in the workspace. The modal is represented as MOD while the perfective auxiliary is PERF:

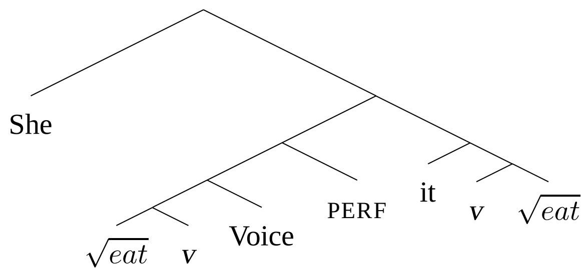
(176) She might have eaten it.

(177) **Workspace**

$\{_{W}$ she, it, MOD, PERF, $\sqrt{eat}$, *v*, Voice, T_{Past}, C$\}$

The first step in deriving (176) is to build the participle by Merging $\sqrt{eat}$ with *v* and then attaching Voice. The perfective morpheme PERF is attached after Voice. If the direct object and external argument were complex elements, then these would be built prior to the clausal spine. Yet it is assumed here that pronouns do not require assembly and that they can be treated as simplex elements which allows the next step to involve the clausal spine. The first elements copied are $\sqrt{eat}$ and *v*. As before copying is facilitated by internal Merge and parallel Merge. Consequently, *v* and $\sqrt{eat}$ are selected from inside the participle and Merged together forming a new element in the workspace. The new constituent is a *v*' in X'-bar theoretic terms, although since labels are only assigned at the phase level in this system using the labelling algorithm in (173), the tree is technically label-less. The internal argument is then Merged to form *v*P. The inflected verb is then attached to produce the Voice' and the external argument is Merged to complete the VoiceP. An accurate, and as such label-less, representation is provided in (178) for reference:

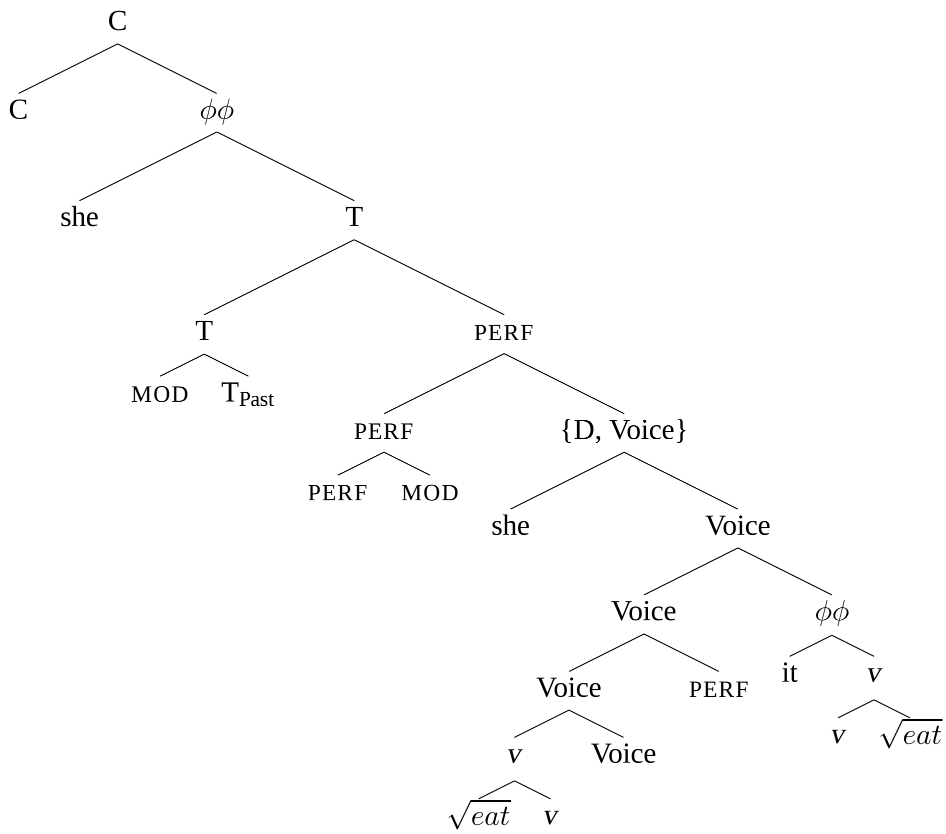
(178)



The VoiceP in (178) does not deviate in structure from the clause derived in section 5.2, meaning that both derivations follow the same pattern. The next step represents the first structural difference between the two since it is now time to build the perfective auxiliary, but again to re-emphasise the point, no new mechanism or operation is required to produce this type of data.

First, the perfective morpheme is copied from inside the lexical verb by being parallel Merged with the MOD morpheme found in the workspace. The perfective auxiliary is then Merged with VoiceP. The modal verb is the next element generated and the process is identical. The MOD morpheme is parallel Merged from inside *have* with the T_{Past} in the workspace before the tensed modal in its entirety is combined with the clausal spine to produce T'. The external argument is Merged with T' to produce TP before C is attached to complete the derivation. As the phase level has been reached, the labelling algorithm applies. The VoiceP is labelled in the same way as the one in section 5.2 and so is glossed over here. Inside the perfective auxiliary, PERF projects through to the maximal projection. Since the modal is Merged in the T position, the derivation that converges is the one in which T projects given headedness. The specifier of TP is labelled using a shared feature of T and the external argument. Finally, C projects. A tree is provided in (179) to illustrate:

(179)



To summarise the building process, the matrix verb is built in the workspace before $\sqrt{eat}$ and *v* are Merged together to begin the process of building the clausal spine. The direct object is Merged in the specifier of *v*P, and the verb appears in the Voice position. The subject is added to form the specifier of VoiceP before PERF is parallel Merged with the MOD in the workspace, which allows the auxiliary verb to be attached to the clausal spine. The same process generates the modal, i.e. MOD is parallel Merged with the T_{Past} head in the workspace. The modal is then combined with the clausal spine in the T position and the subject moves into the specifier of TP. Merging C completes the derivation. Finally, the tree is labelled using (173).

The tree in (179) represents one of many different structures that could have been derived using these lexical items and untriggered Merge. Also, the labelling algorithm in (173) could have generated a different set of labels for (179), but the one shown satisfies full interpretation and headedness since all copies inside (179) are interpretable via a label and each phrase is headed.

Deriving auxiliary and modal verbs in this way allows them to be produced using the same set of operations proposed for lexical verbs. Untriggered Merge builds syntactic objects and these structures are then labelled using (173). No additional assumptions are required to account for this dataset. The next subsection 5.3.2 develops the system further by showing how it can derive OV, V-in-T and V2. The fallout of discussing how verbs are positionable using this Merge based analysis will be significant for what follows in chapter 6.

5.3.2 OV, V-in-T and V2 word orders

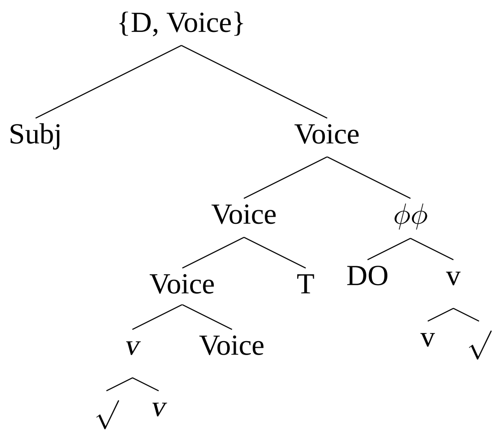
The purpose of this section is to illustrate how the Merge based analysis from section 5.2 can be applied to data where the verb is Merged with the clausal spine in a position other than Voice, e.g. the *v*, T and C positions. The process for building the complex verb is the same in that it is derived in the workspace using external Merge prior to the clausal spine, but as Merge is free, nothing dictates where the verb must appear in the clausal spine. The outcome is that it can be attached in any position just as long as headedness and full interpretation are satisfied. Each of the positions in which a verb could be attached to the clausal spine is associated with a different type of structure. For instance, if the verb were to appear in the *v* position, an OV structure would be produced since the direct object dominates the verb from the specifier of *v*P. The tree in (179) demonstrates a VO example, while Merging the verb in T would generate a V-in-T clause, as found in French. Finally, Merging the verb in the C position produces a V2 structure.

Consequently, the fundamental difference between OV, VO, V-in-T and V2 clauses relates to the position that the complex verb is externally Merged in the tree and the aim of this subsection is to explore in more detail how the system developed in section 5.2 can be applied in OV, VO, V-in-T and V2 contexts.

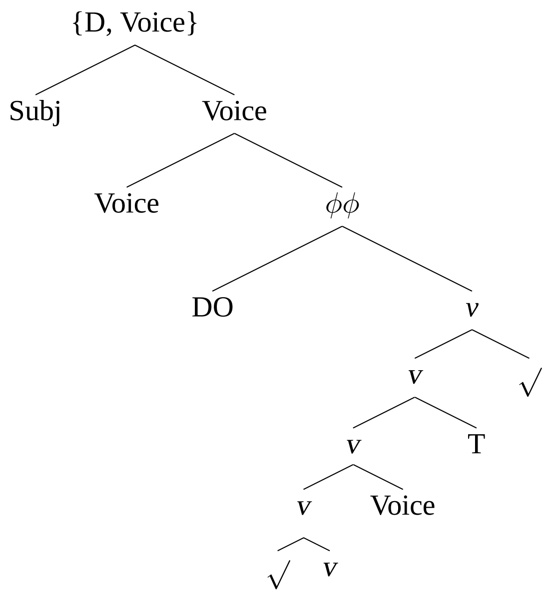
Starting with VO and OV, the only difference between these two orders is connected to the position in which the inflected verb is attached to the clausal spine. So if the verb occupies the Voice position, then a VO order is produced since the verb dominates the direct object

(DO), assuming that DO occupies the specifier of *v*P. Similarly, if the verb is Merged in the *v* position, an OV order will be derived since the verb is dominated by DO. Consequently, if the VoicePs of a VO and OV, clause are compared, it is evident that the only difference between them relates to the position in which the verb is attached. The VoicePs exemplified in (180) and (181) demonstrate this distinction. The trees are labelled using the labelling algorithm provided in (173):

(180)



(181)



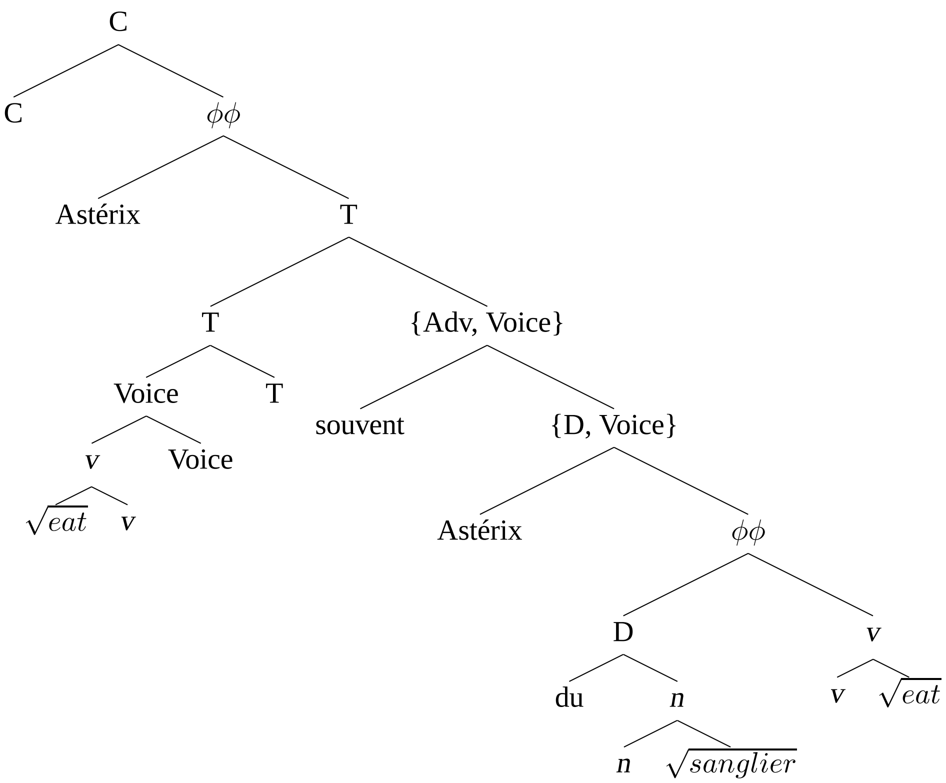
The only difference between (180) and (181) relates to the position where the verb is Merged. In the former, it occupies the Voice position while in the latter, it occupies the *v* position. The labelling algorithm in (173) provides labels that ensure headedness and full interpretation since the VoiceP in (180) and the *v*P in (181) are appropriately headed while a feature from the internal and external arguments is incorporated into the label of VoiceP and *v*P respectively. As in all previous derivations, the trees in (180) and (181) are produced using untriggered Merge and a free labelling algorithm. The result is a system where trees are built and labelled continuously until a structure is derived that satisfies full interpretation and headedness.

The derivation of a V-in-T clause would be the same in all its fundamentals to VO and OV structures, with the only difference being the position that the verb is Merged with the clausal spine. A canonical example of V-in-T data is provided by French since the verb does not appear inside the VoiceP but is instead found in the T position. The clause in (182) from Harley (2013, 113) provides evidence of the verb outside the VoiceP:

(182) Astérix mangeait souvent du sanglier
Asterix eat.3.IMPF often of boar
'Asterix often ate boar.'

In (182), the verb *mangeait* precedes the adverb *souvent.* If adverbs mark the edge of the *v*P or VoiceP (depending on the analysis), then the verb is not pronounced in its domain but is instead higher up the tree. The analysis from section 5.2 provides a straightforward way of deriving the inflected verb in this position. The process does not assume or require any assumptions not already a part of the system and the V-in-T data is derivable in the same way as that shown in (180) and (181). To exemplify, the tree in (183) represents how (182) would look if it were derived using the head movement alternative presented above. Labels are assigned using the algorithm in (173):

(183)



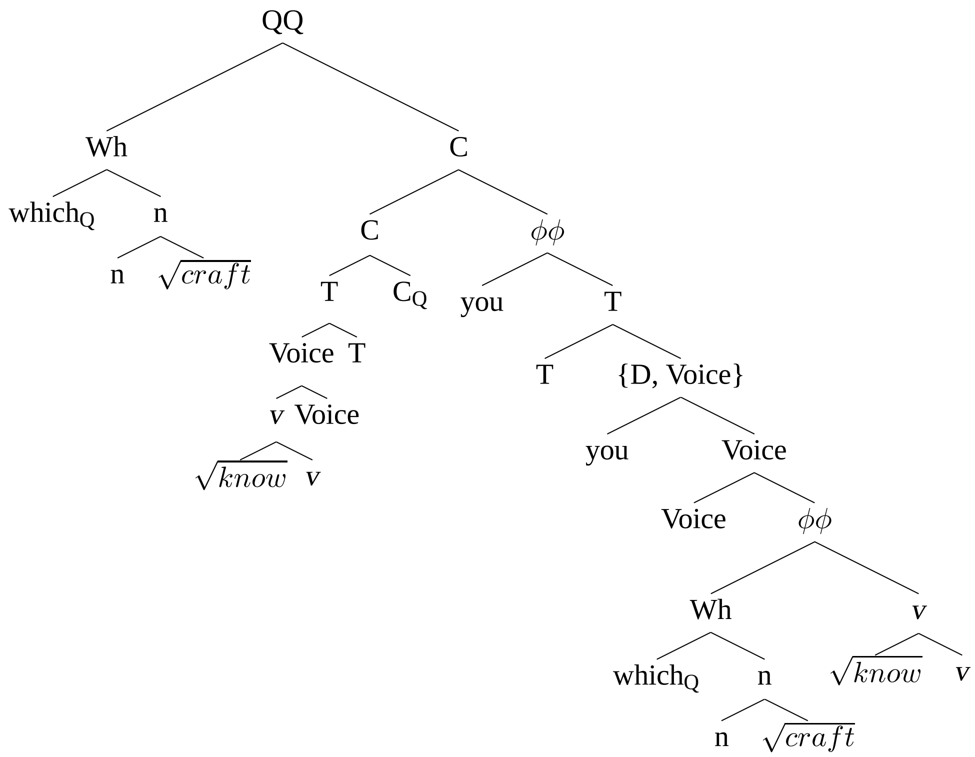
The verb in (183) is built in the workspace prior to the clausal spine along with the subject and object. The clausal spine is then assembled using parallel Merge. The inflected verb is then attached to the clausal spine to form the T' before *Astérix* is internally Merged into the specifier of TP. Finally, C is attached to complete the derivation. The labelling algorithm in (173) generates labels using a combination of its conditions. For instance, the *v*' is labelled using (173a) while *v*P is labelled with (173b) which targets a shared ϕ-feature. The VoiceP labels are assigned using (173c) which uses a separate feature of each constituent. The inflected verb is labelled by (173a) as is the T' node. The label of TP is formed using (173b), while the final label is generated using (173a).

Germanic V2 clauses are the final verb position to be derived in this subsection. When compared with V-in-T clauses, the key difference between them is that the verb appears in the C position and a phrase is Merged into the specifier of CP. A canonical V2 example of Old English from Mitchell and Robinson (2012, 192) is provided in (184) for reference:

(184) Hwelċne cræft canst þū?
which craft know you
"Which craft do you know?"

The clause in (184) can be derived using the same set of assumptions as (182) in that the complex verb is built in the workspace and then used to generate the clausal spine with parallel Merge. A tree representing (184) is provided in (185):

(185)



Once (185) is assembled, labels are assigned in the same way as in all the other trees. The only difference in this case is that the specifier of CP contains a wh-phrase. The wh-phrase and C share a Q feature which provides the label for the final node in the tree. In (185), headedness is satisfied because an element from the head of each phrase is used to label the maximal projection of that phrase. Full interpretation is also satisfied since nothing is ignored by (173) as the copy of each argument supplies a label somewhere within the clausal spine.

To summarise, this section has aimed to show how a Merge based system can derive OV, VO, V-in-T and V2 word orders in a straightforward manner using nothing more than the tools needed to derive simple English declarative clauses. The system provides a level of freedom in the way that the complex verb can be attached to the clausal spine. For instance, the verb can be Merged in the v, Voice, T or C positions with each position being associated with one of the datasets mentioned above. In addition, the labelling algorithm provided in (173) is able to generate a set of labels which can be used to ensure that headedness and full interpretation are satisfied. Finally, and to reiterate, nothing dictates how the lexical items in (180), (181), (183) and (185) are Merged together. The trees represent just one possibility given that Merge is untriggered. The same is true for how the trees are labelled since nothing constrains which condition in (173) is used to label a particular node. As discussed in subsection 2.5, the trees show how labels can be assigned to achieve a particular interpretation that satisfies full interpretation and headedness.

5.4 Summary

This aim of this section was to present a means of deriving complex verbs with the hope of avoiding the theoretical issues associated with the head movement operation. Section 5.1 provided the key Minimalist operations needed for the system. They are Merge, a workspace, copying, Agree and projection. Then section 5.2 put forward an analysis in which complex verbs are assembled in the workspace prior to the clausal spine. Each element of the complex verb is copied using parallel Merge which allows the clausal spine to be built. As the structure is generated, the arguments and verb are attached to the tree using external Merge. Once the tree reaches the appropriate phase level as determined by PIC II (Chomsky 2001), the tree is then labelled using the algorithm provided in (173). While the algorithm is significantly influenced by the one developed in Chomsky (2013), it behaves differently in two areas. First, none of the conditions in (173) are constrained by a structural configuration such as {X, YP} or {XP, YP}. Second, (173c) allows labels to be formed using a feature from each of the Merging elements. The differences are combined with an assumption that labelling is free in the same way as Merge. Consequently, any condition in (173) could apply at any given point during the labelling process. Also, as labelling occurs at the phase level, (173) does not trigger movement since internal Merge occurs during the derivation. The effect of combining untriggered Merge with an unconstrained labelling algorithm is a system that produces trees and labels until something is built that satisfies full interpretation and headedness.

The remainder of the chapter applied the system from section 5.2 to two different datasets. Subsection 5.3.1 found that modal and auxiliary verbs could be derived using parallel Merge in a way comparable to lexical verbs. The second subsection 5.3.2 used the analysis to derive the differences between OV, VO, V-in-T and V2 clauses. The difficulty when using the system is not whether a particular structure can be produced but rather how a structure can be identified as interpretable. This burden falls to full interpretation and headedness since the former requires that everything within a tree is interpretable while the latter ensures that all phrases have heads. The labels assigned by the labelling algorithm are checked against these conditions.

Now that the Merge based system has been introduced and applied to some simple data, the next chapter uses the analysis to generate the multiple copy Spell-Out data from chapter 3. The hope is that parallel Merge can be applied in these contexts without the issues associated with head movement.

Chapter 6

Deriving the effects of head movement with external Merge

The aim of this chapter is to show how the Merge and parallel Merge analysis can be applied to the data examined in chapter 3. In section 6.1, the predicate cleft construction (PCC) examples are presented and produced using the head movement alternative central to the thesis. Each characteristic of this data type highlighted in chapter 3 (V-fronting, A'-characteristics, Pied-piping) is built in turn. Then in section 6.2, verbal repetition constructions from Nupe and Kabiye are generated using the same method. The intention of this section is to highlight how multiple copies of a verb can be derived in non-peripheral positions even when both copies are not identical. Section 6.3 applies the Merge based system to the pre-verbal particle and multiple suffix data explored in chapter 3. Examples without pre-verbal particles from Potawatomi are built first, while Kiowa is representative of languages that use pre-verbal particles. Since this analysis is less strict than head movement regarding where the verb appears in the clausal spine, the system provides a means of deriving the differences between a language like Potawatomi where the verb is high and Kiowa where the verb is low. Then in section 6.4 examples which are supposed to represent violations of the mirror principle are examined. The data in question is from Cupeño and Navajo respectively and Harley (2011) provides an analysis which generates the problematic cases using head movement and two other theoretical assumptions. Yet once Merge and parallel Merge are applied to the data, the analysis becomes more streamlined because one of the assumptions, Merger Under Adjacency (a type of post-syntactic head movement akin to affix hopping) can be removed from the system along with head movement. Finally, section 6.5 summarises the chapter.

6.1 Predicate Cleft Constructions

What follows in this section is a discussion of how Merge and parallel Merge can derive the predicate cleft constructions (PCCs) provided in section 3.1. In order to provide a thorough account, the analysis needs to produce a number of characteristics that are idiosyncratic to the PCC data. Subsection 6.1.1 builds clauses where just a verb is fronted. Subsection 6.1.2 shows how the proposal from chapter 5 can generate the A'-characteristics exhibited by the Nupe and Hebrew predicate clefts. Finally, subsection 6.1.3 uses Merge and parallel Merge to derive the differences between pied-piping and non-pied-piping predicate clefts.

6.1.1 V-fronting

This subsection intends to show how Merge and parallel Merge can be used to derive the displacement property of predicate clefts while at the same time explaining how the fronted element can possess nominal properties in Nupe but be an infinitive in Hebrew. The method proposed in this subsection does not require that the focus head is a clausal determiner which transfers nominal properties to the clefted verb like in Kandybowicz's (2008) analysis and does not claim that the infinitival marking is default because verbs need to be inflected in Hebrew.

The system developed in chapter 5 incorporates untriggered Merge (internal, external and parallel), a workspace, Agree and a free version of the labelling algorithm to produce structures that have to satisfy full interpretation and headedness. These conditions use labels to determine whether a tree is a licit syntactic object. Since Merge and the labelling algorithm in (173) are free, nothing dictates how constituents are generated and how they are labelled. It is the job of the interface conditions to ascertain whether the output of the derivation is interpretable. A positive outcome is a derivation that converges while a negative outcome is one that crashes.

This first subsection shows how predicate clefts can be derived in Nupe and Hebrew when pied-piping does not take place (see section 6.1.3 for a description of how the Hebrew pied-piping data can be derived in this system). The data provided in (186) is representative of non-pied-piping contexts and exemplifies a nominalised predicate cleft from Nupe originally shown in (42e) but repeated in (186a) for convenience, and an infinitival cleft from Landau (2006, 50):

(186) a. Nupe

Bi-ba	Musa	à	*(ba)	nakàn	sasi	èsun	làzì	yin	o.
RED-cut	Musa	FUT	cut	meat	some	tomorrow	morning	PRT	FOC

'It is CUTTING that Musa will do to some meat tomorrow morning.'

b. Hebrew

likro, hu kara et ha-sefer.
to-read he read ACC the-book

'As for reading, he read the book.'

The example in (186) provides two predicate clefts where a verb is fronted. In both examples, *Bi-ba* and *likro* are not inflected in the same way as their in-situ counterparts, which as mentioned in section 3.1, is problematic at first glance for an analysis which derives the fronted verbs by movement. Kandybowicz (2008) generates the reduplication of the Nupe fronted verb by proposing that the focus head *o* is a clausal determiner and that the nominal features on the verb are inherited from *o*. Conversely, Landau (2006) claims that the infinitival morpheme attached to the fronted verb in Hebrew is assigned by default because no other inflection is present on the verb. Since section 3.1 highlighted these proposals as problematic, I aim to show how (186a) and (186b) can be derived using Merge and parallel Merge.

Starting with (186a), the first step is to access the lexicon and place all the items needed to build the clause into the workspace. A representation of the workspace is provided in (187):

(187) **Workspace**
$\{_{W}$ $\sqrt{cut}$, *v*, Voice, T_{Fut}, Musa, some, *n*, $\sqrt{meat}$, Foc$\}$[1]

The first step in building (187) is to derive the lexical verb. Consequently the $\sqrt{cut}$, *v*, Voice and T_{Fut} morphemes are Merged together. In (187), I assume that *Musa* is a simplex element for simplicity's sake (see Longobardi (1994) for arguments suggesting that proper names are complex elements) and so does not require building while the object is generated by Merging *n* and $\sqrt{meat}$ before adding *some* to complete the DP. The last element that requires assembly is the clefted predicate.

As highlighted in section 3.1, the fronted predicate and lexical verb differ in that the fronted predicate shares a form with nominalised Nupe verbs. Consequently, the similarity between the clefted predicate and a nominalised verb prompts Kandybowicz (2008) to argue that the focus head assigns nominal features to the fronted verb, which as highlighted in section 3.1 is a problem.

A benefit of this Merge based system over Kandybowicz's (2008) system is that the verb is generated in the workspace and a nominalisation feature is Merged to the verb during the

[1] Kandybowicz (2008, 83) analyses *yin* as a "temporal adverbial particle". Given that adverbials can be interpreted as adjuncts, I have omitted the particle along with *tomorrow morning* on the assumption that both elements would be adjoined to a maximal projection within the clausal spine if they were present.

building process. Thus $\sqrt{cut}$, *v*, and Voice are copied using parallel Merge. For instance, *v* and $\sqrt{cut}$ and selected from inside the the verb and are Merged together forming a new tree in the workspace. Voice is then combined with the {*v*, $\sqrt{cut}$} amalgam. The nominalisation feature which appears in the fronted predicate is generated by parallel Merging the *n* from inside the direct object with the fronted verb. The workspace is now filled with four constituents and the focus head. An updated version of (187) is provided in (188) for reference:

(188) **Workspace**

{$_W$ {T_{Fut}, {Voice, {*v*, $\sqrt{cut}$}}}, {*n*, {Voice, {*v*, $\sqrt{cut}$}}}, Musa, {some, {*n*, $\sqrt{meat}$}}, Foc}

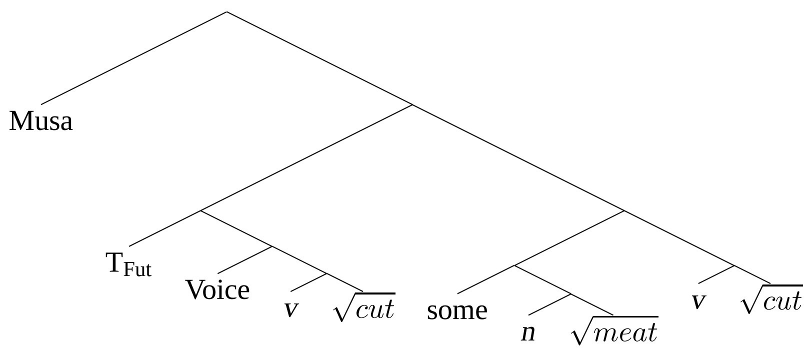
All the structurally complex elements needed to derive (186a) are now contained in (188). The next step is to derive the clausal spine by copying using Merge and parallel Merge. The step needed to start producing the clausal spine is provided below in example (189). The workspace is abbreviated to save space:

(189) Parallel Merge $\sqrt{cut}$ and *v*

{$_W$ {*v*, $\sqrt{cut}$}, {T_{Fut}, {Voice, {*v*, $\sqrt{cut}$}}}, ... }

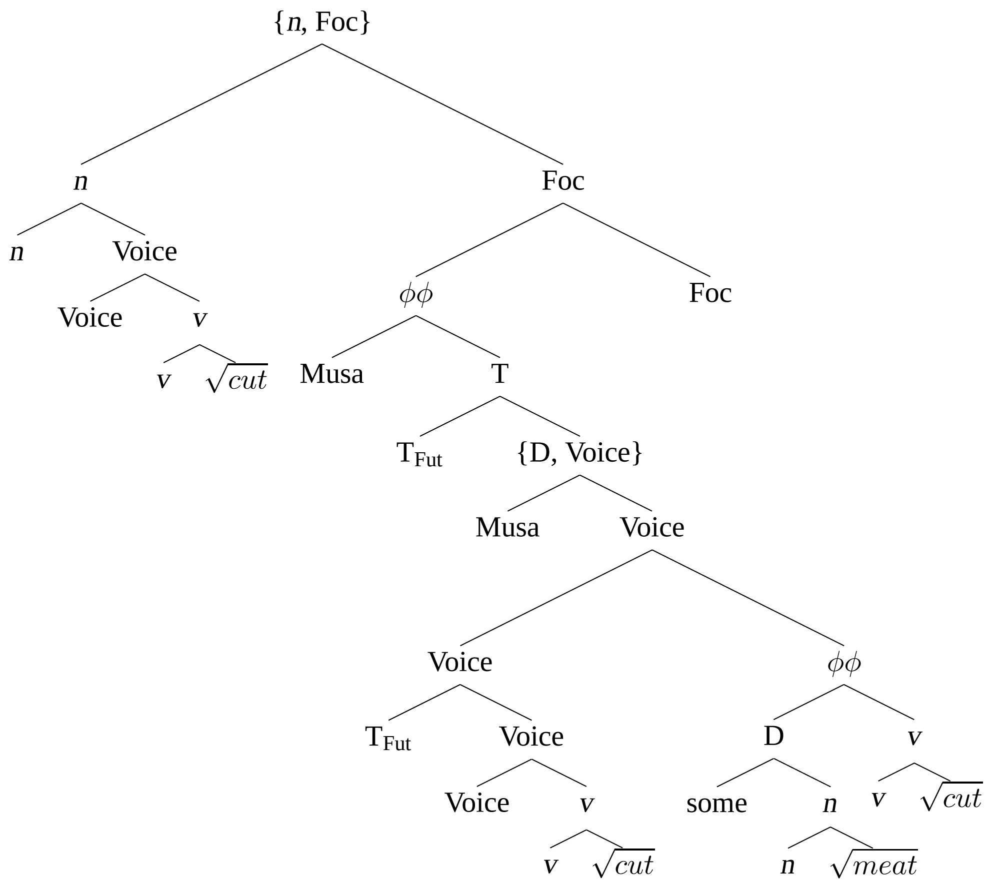
The example in (189) shows the first step needed to begin the clausal spine. Both $\sqrt{cut}$ and *v* are selected from inside the complex verb and are parallel Merged, forming a separate tree in the workspace. The internal argument *some meat* is then attached to complete the *v*P. The lexical verb is then Merged in the Voice position before the external argument is added. A tree is provided in (190) for reference. The tree in (190) is label-less since the labelling algorithm in (173) applies when C is attached:

(190)



Next, the T_{Fut} is selected from inside the verb and Merged with the VoiceP to form the T'. The external argument then moves into the specifier of TP. Finally, the focus head is attached and the fronted predicate is Merged to complete the derivation. Labelling is then triggered. As illustrated in sections 2.5 and 5.2, labelling (like Merge) is free in that it keeps generating labels until a structure is produced which satisfies the interface conditions of full interpretation and headedness. Once the labelling algorithm in (173) has applied to the PCC structure generated by Merge, the derivation is complete. A final output tree is provided in (191) to illustrate:

(191)

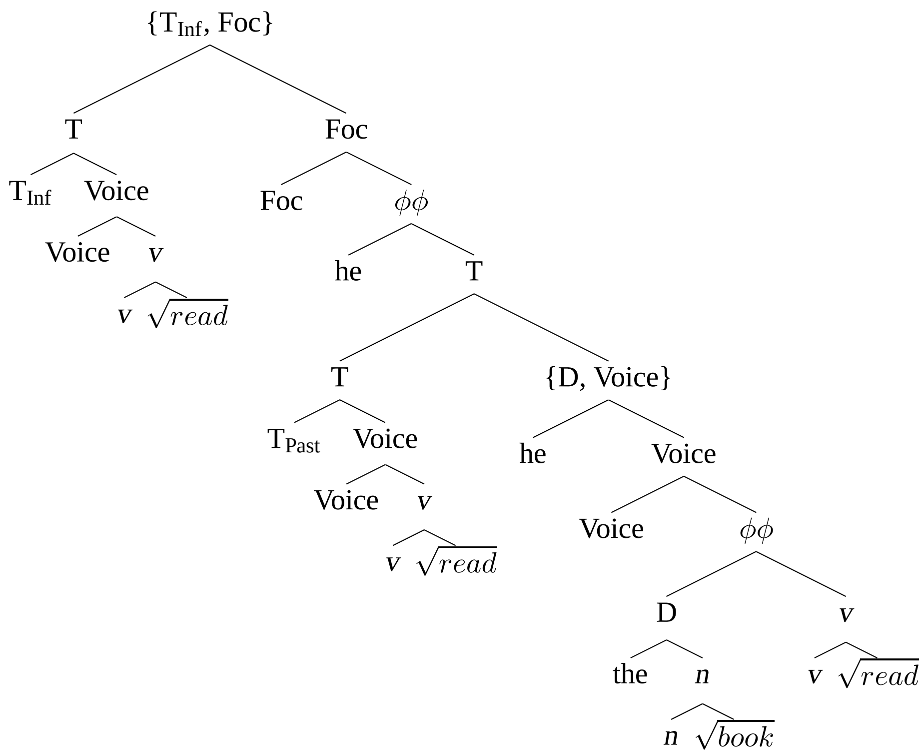


The labels in (191) are in principle no different from any of the other derivations described in chapter 5 and as such are glossed over here. The only exception is the maximal projection of the focus phrase which projects using features from its specifier and the head Foc. If this structure were a constituent question, than CP would be labelled QQ since C_Q and the wh-phrase share a Q label. Yet in this case, it is not clear whether a label is shared between Foc and the fronted verb. The algorithm in (173) provides a means of labelling symmetric structures by using a feature from each competing constituent, which when applied to the focus phrase, allows *n* and Foc to project. The labels are read by the interface conditions headedness and full interpretation, and it is clear that both are satisfied by the {*n*, Foc} label since *n* allows the fronted predicate to be visible for interpretation while Foc ensures that the focus phrase is appropriately headed.

Deriving (186b) follows the same procedure. The difference between (186a) and (186b) is that in (186b) the fronted verb is an infinitive rather than a nominalised verb. Despite its infinitival status, it must be the case that it minimally contains a $\sqrt{}$ and a verbaliser. Moreover, if the discussion in section 3.1 is correct, then the fronted predicate must also contain a morpheme to host the infinitival prefix. As infinitival *to* in English is of category T, it seems reasonable to assume that the Hebrew prefix is also of category T. Also, since T is Merged with Voice in the clausal spine, I assume that the infinitival morpheme in the fronted verb is adjacent to a Voice head. With these assumptions in place, the derivation can begin.

Each element needed to derive (186b) is taken from the lexicon and dropped into the workspace. These elements are then attached together using Merge, and where copies are necessary, heads are duplicated using parallel Merge. The internal argument, lexical verb and fronted predicate are built and then the clausal spine is produced. Each pre-built constituent is attached where required. One difference between Nupe and Hebrew is that the lexical verb appears in T rather than Voice. The external argument is Merged into the specifier of TP before Foc is attached. Finally, the fronted predicate is realised as the specifier of focus to complete the clause. A tree is provided in (192) complete with labels generated by (173):

(192)



The tree in (192) is built in the same way as the Nupe example. The way in which complex verbs are derived in (191) and (192) does not assume any mechanism or operation not required for other purposes since all structure building is facilitated by Merge. Finally, this system benefits from not needing to explain how head movement can on the one hand target a head and result in head adjunction, while on the other, position a head into a specifier position. Since inflected verbs are built in the workspace, Merging a verb into a specifier is no different from Merging the verb into the T position in (192) as both items are built prior to being externally Merged with the tree.

One indirect benefit of the PCC analysis developed in this subsection is that it does not require the focus head to be a clausal determiner in contrast with Kandybowicz's (2008) analysis where the focus head provides nominal features to the fronted predicate. As highlighted in section 3.1, this type of analysis requires a proliferation of heads, all of which are avoided by a Merge based system since the focus head is non-specific, meaning that there is no difference between the head that triggers predicate clefts and the one which is used for other types of constituent focus. This aspect of the system would seem to be a benefit given the specific formulation of Lefebvre's (1992) generalisation which does not require predicate cleft constructions to contain a clausal determiner but which just associates languages that allow PCCs with the availability of a position for clausal determiners.

To summarise, Merge (internal, external and parallel) has been used to derive Nupe and Hebrew predicate clefts. The system allows languages to differ with respect to the position that verbs are externally Merged. Accordingly, verbs in Nupe are attached in the Voice position while their Hebrew counterparts occupy the T position. In addition, it is also possible for multiple copies of a verb to differ in a single clause since each verb is built in isolation in the workspace. This characteristic of the system is helpful when deriving predicate cleft constructions since the fronted predicate in both languages is not identical to the lexical verb.

Since this subsection has provided a derivation for a basic predicate cleft construction, what follows in subsection 6.1.2 is an exploration of how the Merge analysis can derive the A'-characteristics of PCCs.

6.1.2 A'-characteristics

The aim of this section is to develop the analysis provided in section 6.1.1 to the point where it can generate the A'-characteristics of the predicate clefts mentioned in section 3.1. Despite that Merge can derive the predicate cleft data, at first glance nothing in the system can account for the A'-characteristics that PCCs share with wh-movement. This issue appears to be a significant problem since the analyses in Kandybowicz (2008) and Landau (2006) derive PCCs using movement and as such, can readily explain the similarities between predicate clefts and wh-movement constructions. Yet as will be shown later in the section, the constraints that produce A'-restrictions are also applicable in a Merge analysis. Consequently, the first part of this section reiterates the similarities between A'-movement and the distribution of predicate clefts in Nupe. The second part of this section proposes that the new system can be made sensitive to A'-restrictions if copying is sensitive to phase boundaries. The final part of this section explores this proposal by generating a PCC where the predicate moves long distance.

As shown in section 3.1, predicate clefts in Nupe exhibit characteristics which can be attributed to an interaction between phase theory and movement if displacement of the predicate is attributable to internal Merge. The three sets of evidence that Kandybowicz (2008) uses to support this claim are that predicate clefts can be extracted from inside the clausal complement of a bridge verb; predicates cannot be moved out of various types of island, and finally that wh-movement and predicate cleft movement are in complementary distribution. Examples illustrating this behaviour were presented in (44) and (45) but are repeated in (193) and (194) for convenience:

(193) a. Sentential embedding under bridge verbs

Musa gàn gànán Nànǎ kpe gànán Gana si eci.
Musa say COMP Nana know COMP Gana buy yam

'Musa said that Nana know that Gana bought a yam.'

b. ✓Extraction across the clausal complement of bridge verbs

Si-si Musa gàn gànán Nànǎ kpe gànán Gana **si** eci o.
RED-buy Musa say COMP Nana know COMP Gana buy yam FOC

'It was BUYING that Musa said that Nana knows that Gana did to a yam.'

c. Sentential embedding under a non-bridge verb

U: tán Musa gànán mi: si doko.
3rd.SG pain Musa comp 1st.SG buy horse

'It pained Musa that I bought a horse.'

d. *Extraction across clausal complement of a non-bridge verb

***Si-si** u: tán Musa gànán mi: **si** doko o.
red-buy 3rd.SG pain Musa COMP 1st.SG buy horse FOC

'It pained Musa that I BOUGHT a horse.'

e. Wh-island

***Si-si** Musa gbíngàn [ké Gana **si** o] o.
red-buy Musa ask what Gana buy FOC FOC

'Musa asked what Gana BOUGHT.'

f. Complex NP island

***Gi-gi** Musa si [bise na **gi** eyì na] o.
RED-eat Musa buy hen COMP eat corn PRT FOC

'Musa bought the hen that ATE the corn.'

g. Subject island

*__Si-si__ [gànán etsu __si__ doko] tán Musa o.
RED-buy COMP chief buy horse pain Musa FOC

'That the chief BOUGHT a horse pained Musa.'

h. Adjunct island

*__Bi-ba__ [Musa gá è __ba__ nakàn] o, Gana à pa eci.
RED-cut Musa COND PRS cut meat FOC Gana FUT pound yam

'If Musa is CUTTING the meat, then Gana will pound a yam.'

i. Musa gá è ba nakàn, __pi-pa__ Gana à __pa__ eci o.
Musa COND PRS cut meat, RED-pound Gana FUT pound yam FOC
'If Musa is cutting the meat, then it is POUNDING that Gana will do to a yam.'

j. Coordinate islands

*__Bi-ba__ [Musa$_i$ à __ba__ nakàn] u:$_i$ ma à du cènkafa o.
RED-cut Musa FUT cut meat 3rd.SG and FUT cook rice FOC

'It is CUTTING that Musa$_i$ will do to the meat and he$_i$ will cook the rice.'

k. *__Du-du__ Musa$_i$ à ba nakàn [u:$_i$ ma à __du__ cènkafa] o.
RED-cook Musa FUT cut meat 3rd.SG and FUT cook rice FOC
'Musa$_i$ will cut the meat and it is COOKING that he$_i$ will do to the rice.'

(194) a. *Ké __bi-ba__ Musa __ba__ o?
what RED-cut Musa cut FOC
'What did Musa CUT?'

b. *__Bi-ba__ ké Musa __ba__ o?
RED-cut what Musa cut FOC

The distribution of the data in (193) and (194) can be captured using the phase theory proposal developed in Chomsky (2000, 2001). The idea behind phase theory is to limit the amount of structure that needs to be held in derivational memory by sending sub-parts of the tree to the interfaces at specific points which enables the externalised part of the tree to become inaccessible to further syntactic operations. The derivation reaches a point of Spell-Out when a strong phase head (Voice/*v* or C) is Merged. Chomsky (2001, 14) defines the phasal Spell-Out domain by the *Phase Impenetrability Condition II* (PIC) which is provided in (195):

(195) **Phase Impenetrability Condition II (PIC)**
The domain of H is not accessible to operations at ZP; only H and its edge are accessible to such operations.

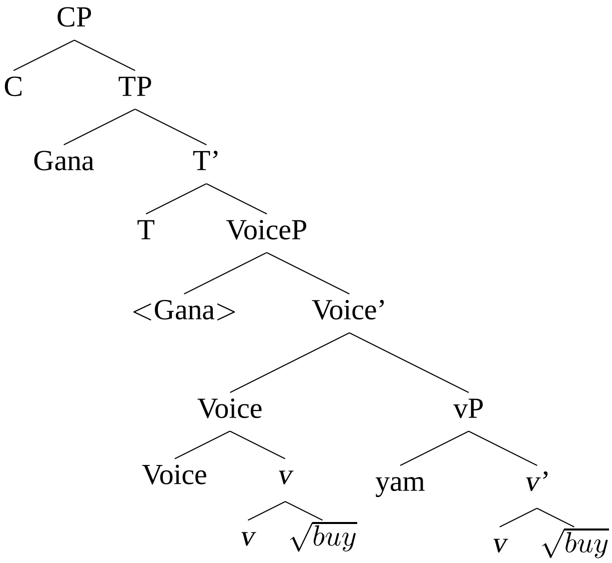
By the PIC in (195), the domain of H, i.e. the complement of H, is inaccessible when the next highest phase projects to a maximal projection. Thus in the schematic $\{_{Z'}$ Z . . . $\{_{HP}$ H $\{_{YP}$

. . . }}}, the domain of H has not been sent to the interface so elements inside YP can still take part in syntactic operations. Yet when Z' is realised as a maximal projection, the domain of H, in this case YP, is sent to the interfaces and as such is not available to syntactic operations triggered outside of ZP. If a syntactic object needs to cross a phase boundary, then it must do so by moving to the phase's edge before the sub-part of the tree in which it is contained gets externalised.

In order to demonstrate how Merge (internal, external and parallel) can derive the A'-characteristics exemplified in (193), and how it differs from a movement analysis, I shall first show how head movement can be used to derive (193b) (ignoring the foibles of the operation for the most part) before providing the Merge based alternative. As (193b) contains three verbs which take a CP clausal complement, the derivation for each CP follows the same pattern. Thus, rather than repeating the same procedure numerous times, the following provides an account of how the first CP is built, which allows only significant moments to be mentioned for the other two CPs. Finally, throughout these derivations I use X'-Theory labels for ease of reference.

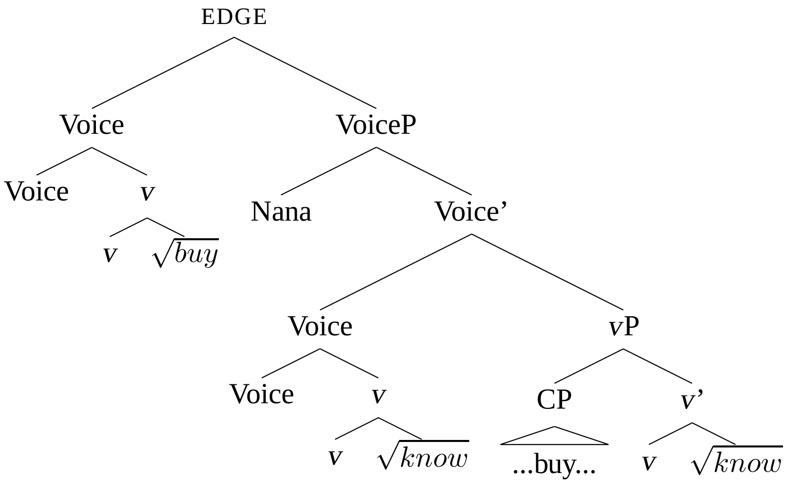
Beginning the derivation, the first part of the tree built is the lower *v*P which involves attaching *v* to $\sqrt{buy}$ and then Merging *yam* to form the specifier of *v*P. Voice is then added which allows the *v*+$\sqrt{buy}$ amalgam to move and adjoin to the Voice head. The VoiceP is completed by Merging *Gana* with Voice'. T is Merged with the VoiceP and *Gana* undergoes EPP movement to the specifier of TP. Finally, the complementiser is attached to form the CP. It is worth pointing out at this stage that the complement of Voice (the lower phase) transfers when the CP projects to a maximal projection. Currently, there is no need for the Voice complex verb to move to the edge of the CP phase because by (195) it has not transferred by dint of being at edge of the VoiceP phase (Voice corresponds to H in (195)). A representation of the derivation so far is provided in (196):

(196)



The VoiceP of the next higher clause proceeds much like the first with the exception that the CP_{buy} is the direct object of *know* and as such appears in the specifier position of vP_{know}.[2] Once the subject of *know* is attached to the tree and the $\text{Voice}_{\text{know}}$ head projects to a maximal projection, $\text{Voice}_{\text{buy}}$ moves to the edge of the $\text{VoiceP}_{\text{know}}$ phase so that it is accessible for further computation. With reference to (195), Chomsky (2001) classifies the edge of a phase as being the specifiers of the phase head (anything sister to Voice') or the elements adjoined to the maximal projection of the phase. For reasons of explicitness, I have chosen to represent a phase's edge as a separate projection labelled EDGE. An illustration of how the $\text{VoiceP}_{\text{know}}$ looks with the *buy* complex verb in the EDGE projection is provided in (197):

(197)

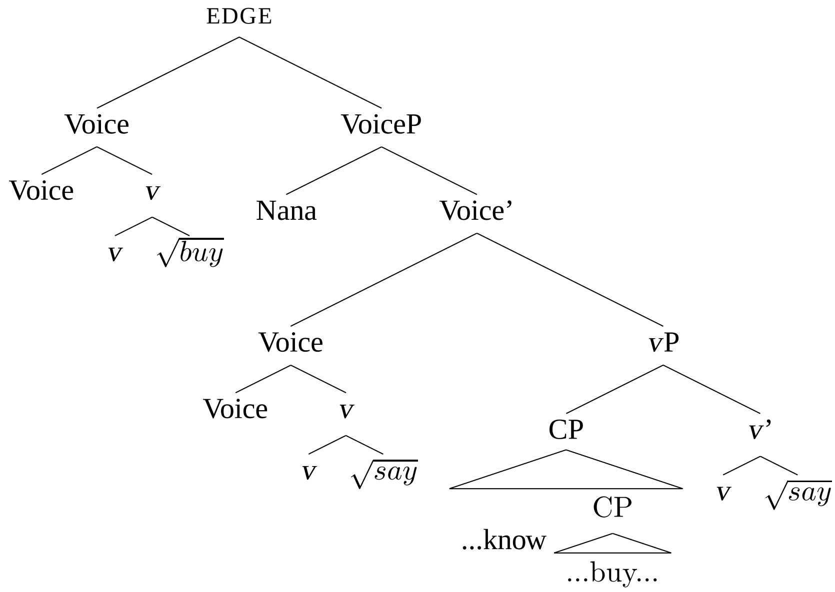


The tree in (197) illustrates how the *buy* complex verb moves to the edge of the $\text{VoiceP}_{\text{know}}$ phase. It also shows the verb *know* being built by head movement. The next step in the

[2]Each CP is labelled according to its matrix verb, e.g. CP_{buy} refers to the lowest complementiser phrase while CP_{know} refers to the next highest CP and so on. Consequently, $\text{VoiceP}_{\text{buy}}$ refers to the VoiceP contained inside CP_{buy}. The same applies for all the other nodes in the tree.

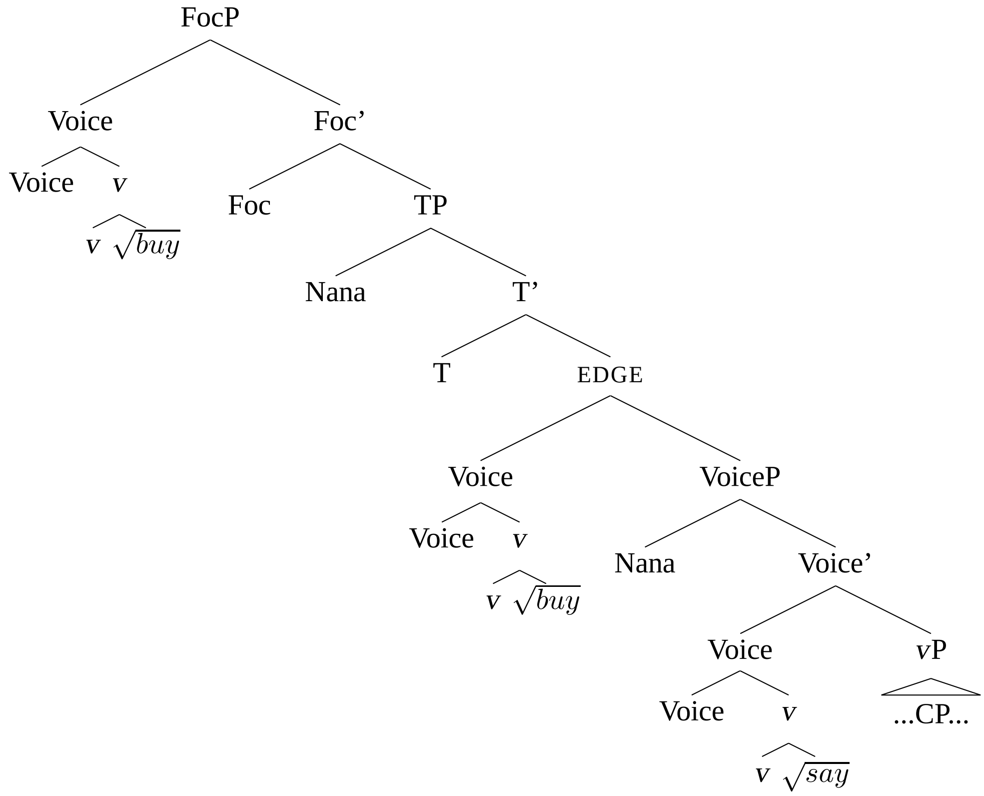
derivation builds the CP$_{\text{know}}$ phase and follows the same procedure as the previous one since Voice$_{\text{buy}}$ remains accessible at the edge of the VoiceP$_{\text{know}}$ phase. T is then attached which triggers EPP movement of *Nana* into the specifier of TP before C is Merged to form the CP. As before, CP$_{\text{know}}$ is the direct object of the next highest verb, in this case Voice$_{\text{say}}$, which means that VoiceP$_{\text{say}}$ is built using the same procedure as the VoiceP$_{\text{know}}$. Thus *v* is Merged with $\sqrt{say}$ before CP$_{\text{know}}$ is attached to form the *v*P. Voice is then added which triggers head movement of the *v*+$\sqrt{say}$ complex. The final subject is then Merged with Voice' before the complex *buy* head is moved to the edge of the VoiceP$_{\text{say}}$ phase. A tree is shown in (198) to illustrate, but note that CP$_{\text{know}}$ and CP$_{\text{buy}}$ are represented using triangles to save space:

(198)



As with the previous CPs, T is Merged next before *Nana* undergoes EPP movement to the specifier of TP. This CP differs from the previous two in that C is a focus head which attracts the *buy* complex verb into its specifier to generate the predicate cleft reading. Since the predicate has moved to the specifier of FocP, it must acquire its nominal features by the assumption that Foc is a clausal determiner and that the nominal features on the fronted predicate are inherited from the focus head in the style of Kandybowicz (2008). A tree illustrating the final stage of the derivation is provided in (199):

(199)



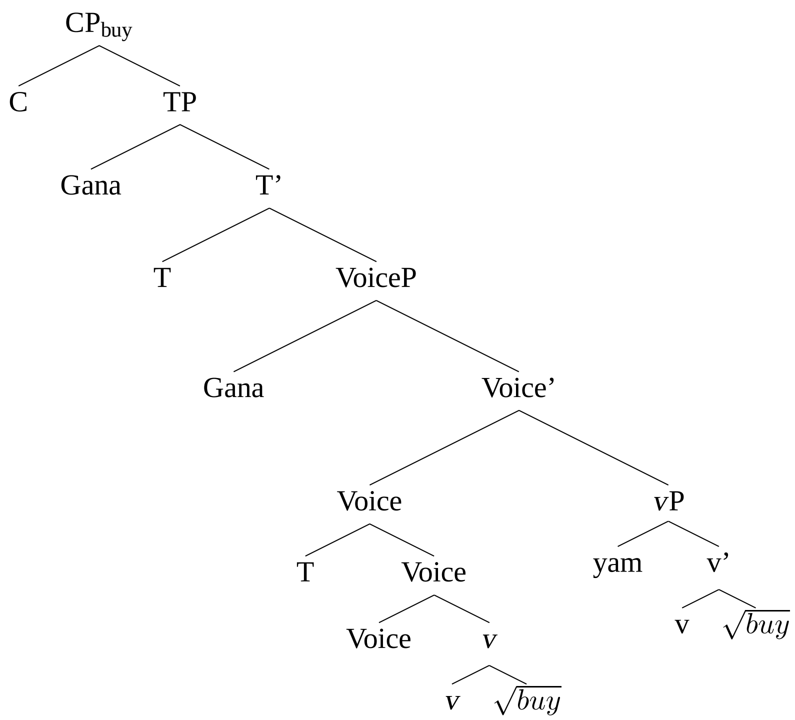
As discussed in section 3.1, a series of issues are evident when evaluating the validity of a predicate cleft construction derived by movement. In brief, these include the way that the nominal features in Nupe and infinitival features in Hebrew are attached to the fronted predicates by dubious assumptions, in conjunction with some theoretical issues inherent in the way Kandybowicz (2008) formulates his analysis.

Despite that the A'-characteristics of Nupe predicate clefts are derivable by movement, such an analysis requires the issues mentioned in sections 3.1 and 4 to be adopted. Yet there is a way to formulate the new analysis to derive the relevant data if copying is assumed to interact with phases in the same way as movement, which is a necessary assumption anyway given that copying is facilitated by Merge. In fact, since Merge is free it would be impossible for IM and EM to be constrained by phases and for the same not to hold for copying. To this end, I propose that copying is only applicable to elements that are visible to syntactic computation by the PIC II in (195). The fallout of this proposal will be that when an inflected verb moves long distance, it is copied and externally Merged at the edge of a phase so that it does not become stranded in a Spelled-Out phase. What follows now is a second derivation of (193b) to indicate how copying via Merge interacts with phase theory.

As with all previous examples, the first step is to build the complex verb of the lowest CP by Merging $\sqrt{say}$ with *v* and attaching Voice then T. The clausal spine is then derived by parallel Merging $\sqrt{say}$ and *v* to form *v*'. Next, the direct object is added by Merging *yam* with *v*'.

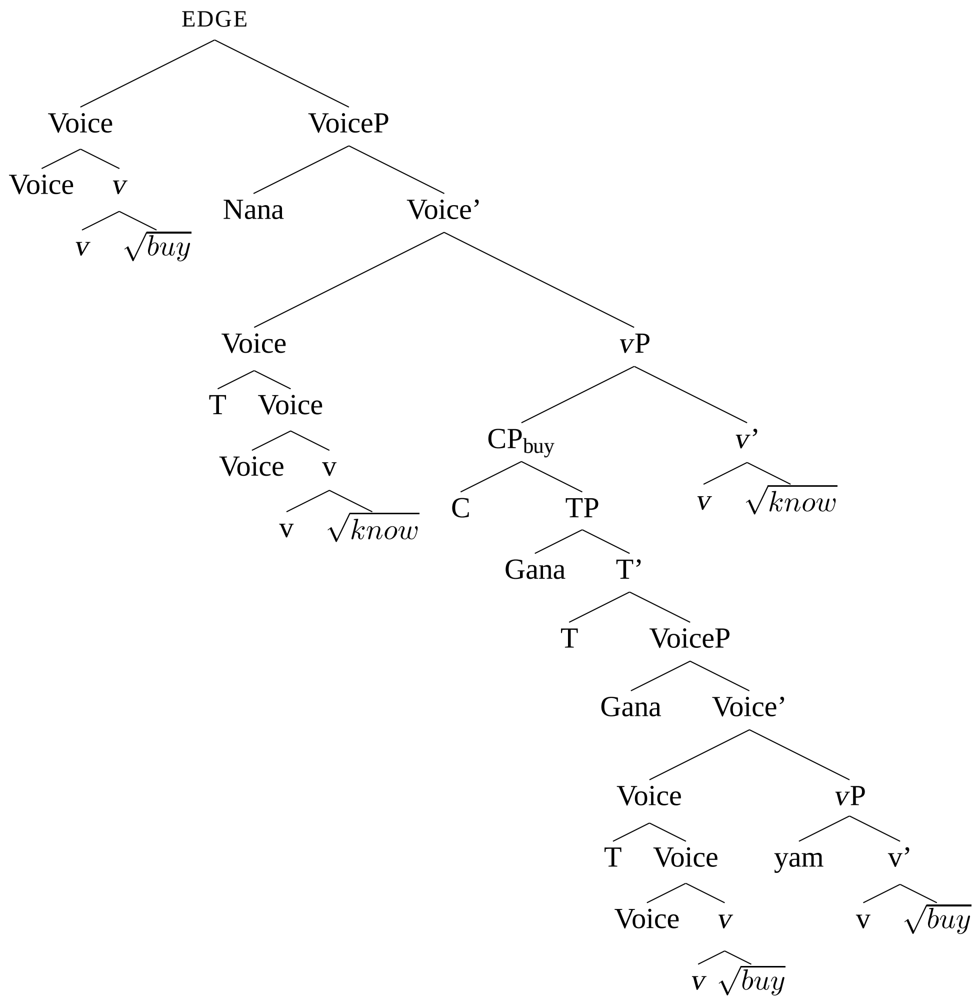
Since the verb occupies the Voice position in Nupe, the complex verb is attached to *v*P which then allows *Gana* to be Merged with Voice' to generate the VoiceP. T is Merged with VoiceP from inside the verb before *Gana* is Merged into the specifier of TP. Finally, C is attached and projects to CP. At this point the complement of the lowest phase head Spells-Out and can no longer take part in syntactic operations. A tree representing the lowest CP (labelled CP_{buy} for reference) is provided in (200):

(200)



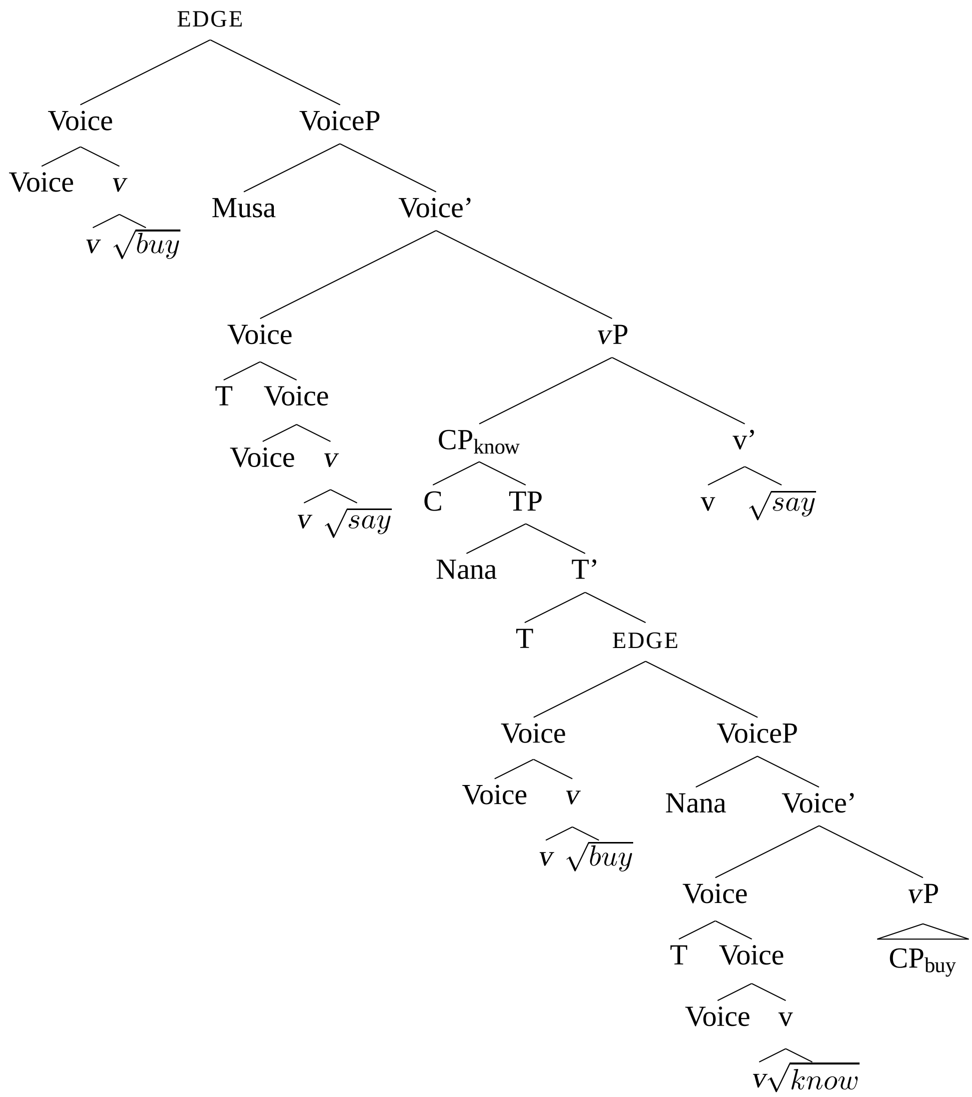
Building CP_{know} starts in the same way since the complex verb *know* is produced first before *v* and $\sqrt{know}$ are parallel Merged to form *v*'. The *v*P is built by Merging CP_{buy} with *v*' and *know* is Merged in the Voice position. *Nana* is then Merged with Voice'. At this point, Merge generates a duplicate of the complex verb *buy* at the edge of the VoiceP phase in order for the verb to be accessible for further computations. So parallel Merge produces a facsimile of *buy* in the workspace which is then attached to the edge of the Voice phase. A representation is shown in (201) to illustrate the effect of these operations taking place:

(201)



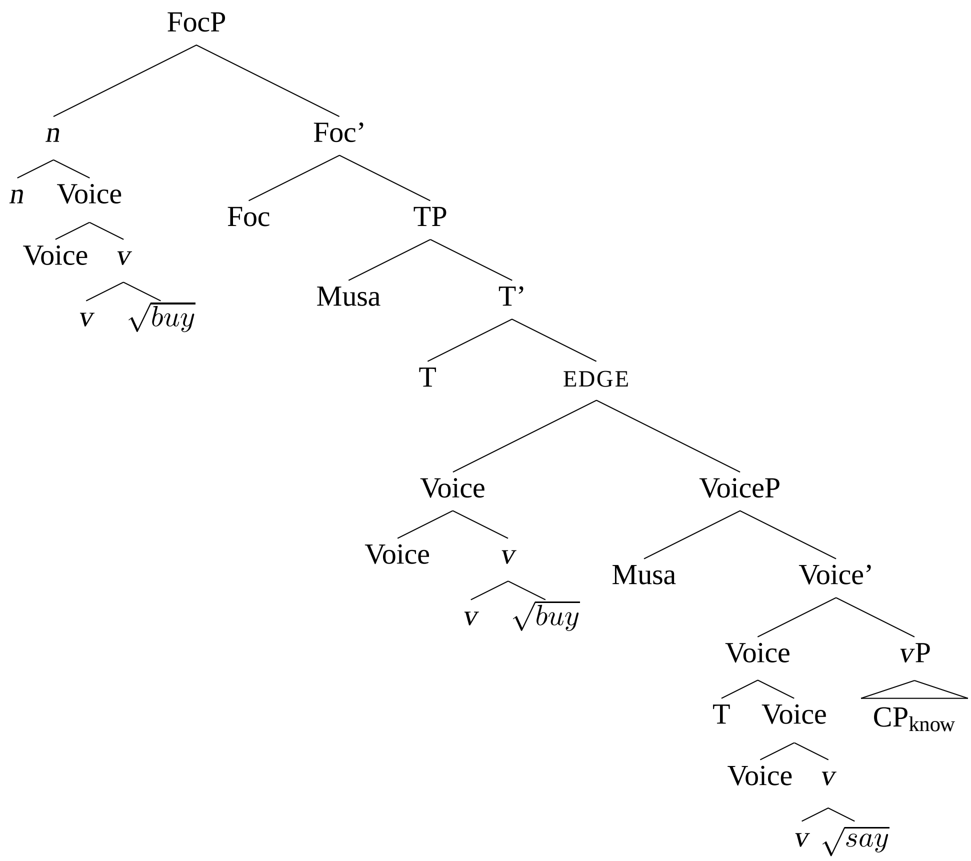
Since a copy of *buy* is located at the edge of the VoiceP phase, it can be accessed by Merge further up the tree. To continue the derivation, T from inside the *know* complex verb is Merged with EDGE before *Nana* is Merged to form the specifier of TP. C is added to generate CP_{know}, at which point the complement of the next lowest phase ($\text{Voice}_{\text{know}}$) transfers. The first half of CP_{say} is built in the same way as the first half of CP_{know} in that complex verb *say* is generated which allows parallel Merge to produce the *v*'. CP_{know} is Merged with *v*' to form the specifier position of *v*P. The verb *say* is then Merged in the Voice position and the highest subject is attached to the Voice'. As with the previous Voice phase, a copy of *buy* is positioned at the edge of the $\text{Voice}_{\text{say}}$ phase. A tree is presented in (202) to exemplify:

(202)



The next step in the derivation involves Merging T from inside *say* with $\text{VoiceP}_{\text{say}}$ to produce the T'. *Musa* is Merged into the specifier of TP. The focus head Foc is attached to TP to produce Foc'. The predicate cleft reading is generated by duplicating the *buy* complex verb using with parallel Merge. Then, while the *buy* copy is in the workspace, a nominaliser is attached to the verb before the whole constituent is externally Merged with the Foc' to generate the FocP. A tree representing the final stage of the derivation is provided in (203):

(203)



The tree in (203) illustrates that if Merge and parallel Merge, are sensitive to phase boundaries, it is possible to generate the A'-characteristics of PCCs using the new system developed in this thesis. Since Merge is able to duplicate elements once a complex verb has been built, proposing that Merge can produce facsimiles of a verb to be Merged again at a phase's edge is not unreasonable. In addition, once copying via Merge is argued to be a usable mechanism in a Minimalist grammar (see section 2.3), it must be restricted by phases and (195) in the same way as any other syntactic operation. Consequently, long distance displacement facilitated by copying has to leave multiple copies at the edge of certain phases in the same way as long distance wh-movement. These duplicates are then accessible to further Merge operations as illustrated by the derivation of (203).

The mechanisms which derive long distance predicate clefts can also be parametrised so that they cannot derive the non-bridge verb and island data shown in (193d)-(193j). If it is assumed that the phases at the outer edge of an island and non-bridge verbal complements do not have an edge position, then it will not be possible for a lower duplicate to be accessed in a higher phase. The result is that Merge will not be able to see inside an island or into the complement of a non-bridge verb. Since copying is Merge, it will behave in the same way as internal Merge with regard to phases, which given the A'-characteristics of predicate clefts, is the desired result.

To summarise, this section has shown that it is possible for copying via Merge to be constrained by phase theory so that it can derive the A'-characteristics inherent in the Nupe data provided in (193). This is accomplished by building verbs in the workspace and attaching them to the clausal spine in the usual fashion in combination with the restrictions required by adopting a phase theoretic Minimalist grammar. Thus if a predicate is built and Merged in the Voice position of a clausal complement, in order for it move beyond the c-commanding VoiceP phase, it must first be duplicated via Merge before being Merged in the edge position of that VoiceP phase.

6.1.3 Pied-piping

In section 3.1, it was shown that languages differ with regards to the amount of material which can be pied-piped with the clefted predicate. On the one hand, there are languages like Nupe which do not allow any additional elements to be fronted with the verb, while on the other, Hebrew permits the predicate to be bare or to appear adjacent to a pied-piped direct object. Despite the issues associated with the operation, head movement is a possibility when deriving predicate clefts in languages like Nupe and Hebrew (when nothing pied-pipes) since strict head movement does not allow anything other than a head to be displaced. Yet in languages where pied-piping is possible, the head movement operation fails which entails that two operations are required: one to produce data where nothing is pied-piped and one to generate data in which pied-piping occurs. The aim of this section is to illustrate how pied-piping and non-pied-piping predicate cleft data can be derived using the Merge based system from section 5.2.

The analysis presented in this thesis cannot draw on a distinction between features on the focus head since Merge is untriggered. For instance, if Merge was triggered, a language which permits pied-piping in predicate clefts (Hebrew) would use a focus head possessed with a feature satisfied by a head or one satisfied by a phrase, whereas languages which do not permit pied-piping (Nupe) only have access to a feature that targets a complex verb. A distinction between features that are checked by heads and those that are checked by phrases is not a new one and as such, versions of this distinction have been proposed and used in various analyses (see for example Chomsky 1995 and Adger 2003). For instance, in some languages, T can possess two features which trigger movement. The first is a [uD*] EPP feature while the second is a [uV*] which targets a verb. When both of these features have been satisfied, the specifier of TP will be filled with a DP and a complex verb will be in the T position. Yet as illustrated in chapter 1, differentiating movement inducing strong features which target heads and similar strong features that target phrases is not straightforward.

As Merge is untriggered in this thesis, the issue of differentiating features that target heads and those that target phrases is avoided, since features do not trigger Merge. Yet at the present time there is no way of explaining the difference between predicate clefts that pied-pipe and those that do not. In addition, as highlighted in section 3.1, movement cannot derive the fronted predicates in Hebrew because the verb is inflected as an infinitive. Landau (2006) assumes that the infinitival marking is present because the cleft is not assigned tense and as such is realised with a default marking. This approach is flawed however since T is Merged before the focus head which means that T is able to value the verb as past or present before it moves into the specifier of Foc. The issue is more significant in Landau's (2006) analysis because the verb moves to T which again occurs before the focus head has been Merged with the TP. Consequently, the closest verbal complex to Foc is the tensed one in the T position meaning that it should be the one Merged into Foc's specifier. The alternative is to assume that the movement feature on focus ignores the tensed verb and instead targets the *v*P copy left in the pre-movement position. This approach does not work because the tensed verb intervenes between Focus and the lower copy of *v*P.

While distinguishing languages which allow pied-piping from those which do not is at first blush problematic for the system developed in this thesis, deriving them is straightforward since the pied-piped and non-pied-piped examples can be generated using untriggered Merge in the same way as internal and external arguments. A method for producing non-pied-piped clefts was provided in subsection 6.1.1 and so the focus here will be on those that involve pied-piping. I propose that the relevant data can be derived using Merge (internal, external and parallel) in the same way as all the other examples discussed so far. Thus the fronted predicate is built in the workspace prior to it being Merged with the clausal spine. An example was originally provided in (51a), but is repeated in (204) for convenience:

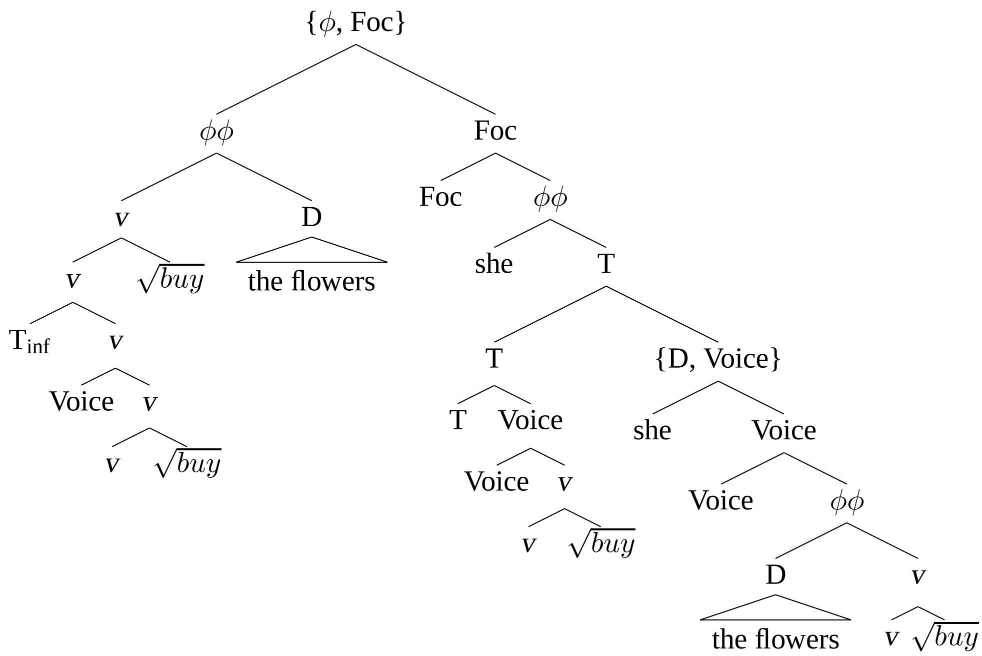
(204) liknot et ha-praxim, hi kanta.
to-buy ACC the-flowers she bought
'As for buying the flowers, she bought.'

(205) **Workspace**

$\{_{W}$ Foc, she, T_{Inf}, T_{Past}, Voice, *v*, $\sqrt{buy}$, the, *n*, $\sqrt{flowers}\}$

Building (204) follows the same procedure as the predicate cleft in subsection 6.1.1 in that all the lexical items needed to generate the clause are put into the workspace (represented by (205)). The internal argument is built along with the tensed lexical verb, e.g. $\{T_{Past}$, {Voice, {*v*, $\sqrt{buy}\}\}\}$. The clausal spine is then produced using parallel Merge, meaning that $\sqrt{}$ and *v* are Merged together forming *v*' as a separate tree in the workspace. The direct object is added to form *v*P. Voice is then parallel Merged with *v*P to form Voice' before the pronoun *she* is attached to complete the phrase. The lexical verb is found in the T position and as such gets Merged with VoiceP. The external argument is Merged into the specifier of TP and Foc is attached to form Foc'. The fronted predicate is now built using parallel Merge. The $\sqrt{buy}$, *v* and Voice from inside the lexical verb are selected from inside the complex verb and Merged together as a separate constituent in the workspace. Finally, the infinitival T morpheme in the workspace is attached to complete the uninflected verb. Since the predicate also contains an occurrence of the internal argument (IA), each element of the IA inside the *v*P is selected and a second occurrence of the IA is assembled in the workspace using parallel Merge. The duplicate is then combined with the infinitival complex verb to form the full cleft. The complete fronted predicate is then Merged with Foc' to finish the derivation. A final output tree is provided in (206) for reference:

(206)



To reiterate, the only difference between the tree in (206) and the one representing bare V-fronting in (192) is that the fronted predicate in (206) contains a copy of the internal argument. The processes by which the internal argument, lexical verb and fronted predicate are derived is the same regardless of whether pied-piping does or does not occur, and the only difference between the two derivations is that the fronted predicate in (206) requires more building since it contains an occurrence of the direct object.

As mentioned above, the derivation which produces (206) illustrates how Merge (internal, external and parallel) can avoid the issue of having an uninflected *v*P in the specifier of focus.

A movement analysis struggles because a duplicate created by the copy theory of movement has to be identical to the element from which it is copied. Once the focus head is Merged, the verb will have already been valued by T and as such, moving the *v*P would produce a predicate cleft where the fronted phrase contains an inflected verb. Yet since this Merge based system builds the clefted element outside of the main clausal spine, it can contain an infinitival verb without an issue.

One question that this section has not dealt with is how some languages have pied-piping and how some do not. Untriggered Merge prohibits the difference between the two being parametrised using a feature on the focus head, e.g. a [uPred] for non-pied-piping examples and a [uPredP] for the piped-piping ones. Consequently, I propose that a post-syntactic parameter determines whether a language allows pied-piping, does not allow pied-piping or allows both. Drawing on work by Kayne (2005) and Baker (2008), the pied-piping parameter would be a so called *microparameter* since it refers to a particular construction rather than something more general such as the *head directionality parameter* which Baker (2008) suggests is a *macroparameter*. The purpose of the pied-piping parameter is to ensure that only constructions which match the parameter setting of a given language are interpretable at the interfaces. As Merge and the labelling algorithm generate structures until one is produced which satisfies full interpretation and headedness, the pied-piping parameter represents a language specific condition that determines whether pied-piping can occur in predicate clefts. This parameter and many others work in tandem with full interpretation and headedness to generate licit predicate cleft constructions.

To summarise this subsection, it has been argued that Merge (internal, external and parallel) is applicable in pied-piping and non-pied-piping contexts. Subsection 6.1.1 provided a derivation for non-pied-piping predicate clefts while this subsection focused on those examples which permit pied-piping. It was argued that the pied-piping data does not require any additional operations to position more material in the left periphery with the clefted predicate. Finally, as Merge is untriggered, a feature cannot be used to differentiate languages like Nupe and Hebrew, so work by Kayne (2005) and Baker (2008) inspired the proposal that the ability to pied-pipe is determined by a post-syntactic microparameter. Consequently, when Merge derives a structure which satisfies the way that the pied-piping parameter is set for a particular language, that derivation converges assuming it also satisfies headedness and full interpretation.

6.2 Verbal Repetition Constructions

The aim of this section is to apply the Merge based system developed in section 5.2 to the verbal repetition data provided in section 3.2. Any analysis attempting to generate the data explored in section 3.2 needs to handle a number of idiosyncrasies that are argued in the literature to be an inherent part of Nupe and Kabiye verbal repetition constructions. Each of these properties is derived in the following sections. Specifically, section 6.2.1 focuses on the Nupe data and as such illustrates how the extraction ban, the NI construction and the FACT head can be derived using Merge. Section 6.2.2 does the same for Kabiye and illustrates how the infinitival marking and clause internal focus position can be derived without head movement even though Collins and Essizewa (2007) provide data illustrating that the two verbal copies have to be derived from the same lexical item.

6.2.1 Verbal repetition in Nupe

The way that verbal repetition is derived in Nupe using Merge (internal, external and parallel) relies on mechanics similar to those proposed in section 6.1 for predicate cleft constructions. Both types of construction involve a focused element and multiple copies of the verb being produced in the workspace. Yet Nupe verbal repetition and predicate cleft constructions differ with regards to the element that is focused. As seen in section 6.1, predicate clefts require a copy of the verb to appear in the specifier of a left peripheral focus phrase whereas in a verbal repetition construction, both verbal copies appear below the VoiceP node. In addition, the verbal repetition data explored in section 3.2 exhibited a number of characteristics which need to be derived. These include the ban on extraction from inside a verbal repetition construction; the difference between NI focus and verbal repetition, and the inclusion of the FACT head.

What follows is a summary of how a verbal repetition construction is built. Since many of the steps follow the same pattern as the predicate cleft derivation provided in section 6.1, the familiar aspects are skipped through with a degree of speed. An example is provided in (57) but repeated in (207) for convenience. As indicated by (207), this type of construction is said in order to generate a contradiction with a previous statement. The verbal repetition construction in the b. sentence opposes the truth value of the statement in the a. sentence:

(207) a. Musa (') pa eci à.
Musa FT pound yam NEG
'Musa didn't pound a yam.'

b. Ebà, Musa pa eci pa.
yes Musa pound yam pound

'Yes, Musa DID IN FACT pound a yam.'

(208) **Workspace**

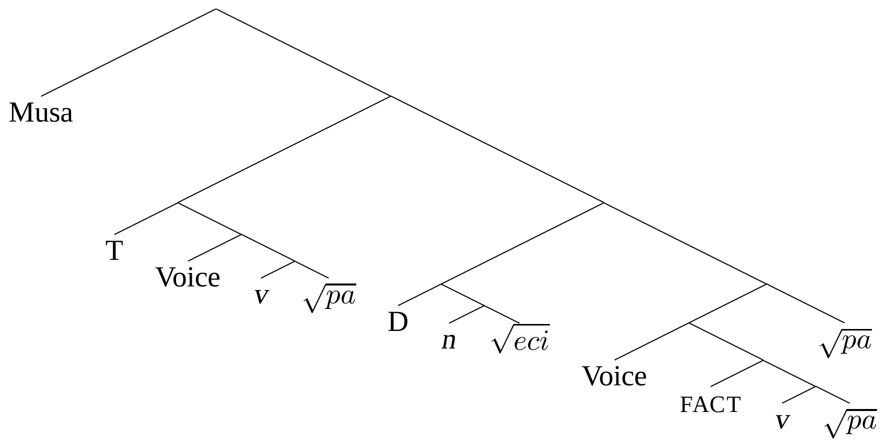
{W $\sqrt{pa}$, *v*, Voice T, D, *n*, eci, Musa, Σ, Foc, Fact}

To begin the derivation, all the lexical items needed to derive the sentence in (207b) are placed in the workspace. A representation of the workspace is shown in (208). The tensed verb is produced by Merging $\sqrt{pa}$, *v*, Voice and T. The next step is to derive the lower copy of the verb. At first glance, this appears less straightforward because the lower copy is associated with a low tone which Kandybowicz (2008) represents with the Fact head. The Fact head is part of the clausal spine for Kandybowicz (2008) which means in his analysis, when the verb moves up through the clause, Fact is realised as a suffix on each copy of the verb that dominates the Fact clausal head. For Kandybowicz (2008) two heads dominate clausal spine Fact: *v* and Agro (in my system, *v* and Agro would be synonymous with Voice and *v* respectively). Thus Kandybowicz's derivation contains three copies of FACT and all three of them are adjoined to different copies of the verb, but only one is associated with a low tone.

This is perhaps counter intuitive because in general terms, the highest occurrence of an element in a movement chain is pronounced which should mean that the highest copy of the Fact head (the one contained in the verb adjoined to *v* in Kandybowicz's (2008) system) is realised as the floating tone. However, this is not the case since the floating tone is associated with either the material adjoined to the Fact head or Agro. A benefit of using Merge is that only one verbal repetition has to be associated with the Fact head since successive cyclic head movement does not build inflected verbs in my system. Consequently, the lower verbal copy incorporates the Fact head and is built using parallel Merge. Thus $\sqrt{pa}$ and *v* are selected from inside the lexical verb and Merged together forming a separate tree in the workspace. Then the Fact head is attached to the {*v*, $\sqrt{pa}$} amalgam before Voice is selected and Merged to complete the lower verb. Since Fact is built into the lower verb, there is no need for the clausal spine to contain a Fact head. This situation is similar to how a fronted verb in a Nupe predicate cleft construction is nominalised even though *n* is not a part of the clausal spine.

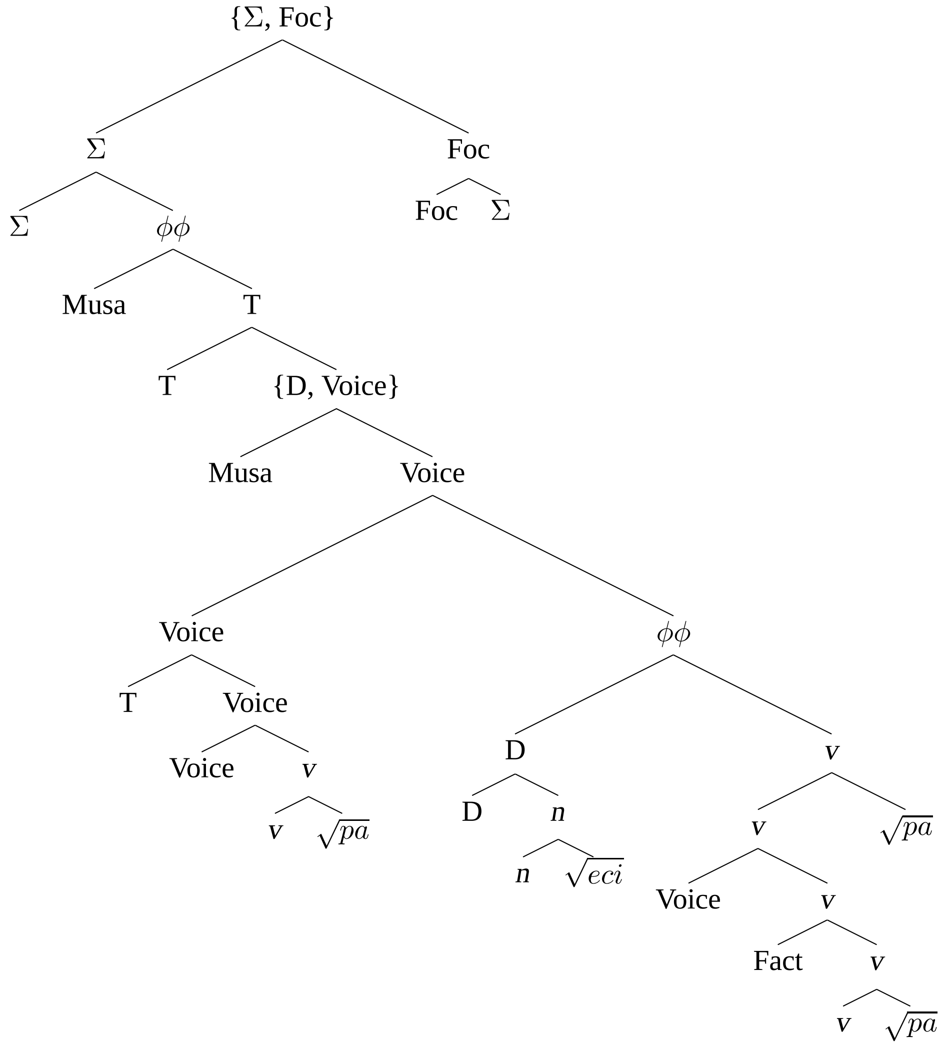
The next step is to generate the internal argument (IA) using Merge. When IA has been built, the clausal spine is derived using Merge and parallel Merge in the way shown many times before. With regards to verbal position, I assume that the tensed lexical verb is attached in the Voice position because the highest occurrence of the verb in (207b) precedes the IA. Conversely, the lower copy is Merged in the *v* position since it is preceded by the IA. Once the lexical verb has been combined with the verbal spine, the external argument *Musa* is Merged to complete the VoiceP. A tree representing the VoiceP is provided in (209). As before the tree is label-less since the algorithm in (173) applies during transfer:

(209)



In (209), both copies of the verb have been derived and the lower occurrence contains a Fact morpheme which is realised as a low tone when the structure is externalised. The T head is then selected from inside the lexical verb and Merged with VoiceP to produce T'. The external argument is Merged into the specifier of TP. Following Kandybowicz (2008), I assume that the focus reading of Nupe verbal repetition constructions is derived by moving an affirmative phrase labelled Σ into the specifier of FocP. Thus Σ is added next followed by Foc which enables the ΣP to be copied and Merged into the specifier of the focus phrase. A representation of these steps is provided in (210). Since the tree in (210) represents the final output of the verbal repetition derivation, the labels have been generated using the labelling algorithm in (173):

(210)



The tree in (210) produces an order where the direct object is in between two occurrences of the verb *pa* "pound". The lowest occurrence of *pa* is associated with a low tone by dint of it containing a Fact morpheme. The displacement of the Σ phrase into the specifier of FocP generates the interpretation associated with verbal repetition.

The analysis developed for Nupe verbal repetition can also account for the two other quirks explored in section 3.2, i.e. the fact that extraction from a verbal repetition construction is blocked and the difference between verbal repetition and the NI focus construction. The data which prompts the observation that extraction cannot occur is provided in (70) but repeated in (211) for convenience:

(211) Movement to the left periphery is impossible in a BRVRC

a. *Musa __ du eci du o.
   Musa cook yam cook FOC
   'Musa DID IN FACT cook a yam.'

b. *Zě __ du eci du o?
   who cook yam cook FOC

‘Who DID IN FACT cook a yam?’

c. *Eci Musa du __ du o.
yam Musa cook cook FOC
‘Musa DID IN FACT cook A YAM.’

d. *Ké Musa du __ du o?
what Musa cook cook FOC
‘What DID IN FACT Musa cook?’

e. *Kánci Musa du eci du __ o?
when Musa cook yam cook FOC
‘When DID IN FACT Musa cook a yam?’

The inability of a constituent to be focused in a Nupe verbal repetition construction is explained by the fact that the specifier of FocP already contains the Σ phrase, meaning that there is no room in FocP for *Musa* in (211a), the wh-phrase *Zě* in (211b) and so on. Thus in a nutshell, since the specifier of FocP is full, a second element cannot move into the left periphery.

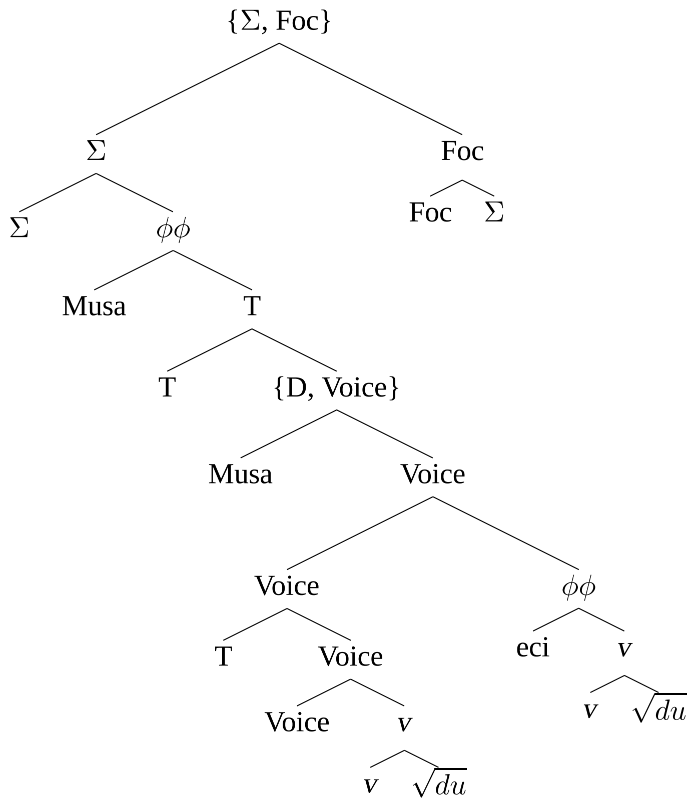
The analysis developed above can also be applied to the difference between verbal repetition and the *ni* focus construction. As discussed in section 3.2, verbal repetition constructions contain a factive meaning not found in clauses containing *ni*. A verbal repetition construction is compared with a *ni* construction in examples (71a) and (71c) respectively, but these are repeated as (212a) and (212b) for convenience:

(212) a. Musa du eci du.
Musa cook yam cook
‘Musa DID IN FACT cook a yam.’ (NOT: ‘Musa COOKED a yam.’)

b. Musa du eci ni:.
Musa cook yam FOC
‘Musa actually cooked a yam.’

Kandybowicz (2008) argues that the difference between the two is down to the verbal repetition construction containing a Fact head. The Fact head provides the factive reading and requires the lower verb to be pronounced since it is realised as a floating tone. Failure to pronounce a lower copy would result in a violation of Kandybowicz’s ToRC constraint, the ban on unsupported prosodic content. The *ni* construction does not contain a factive head since it does not convey a factive reading. The result is that in the *ni* construction there is no need to pronounce a lower copy of the verb because it is not associated with any unsupported prosodic material. Consequently, if a *ni* construction was derived using Merge, only one complex verb would need to be generated. As Kandybowicz (2008) argues that the difference between *ni* and verbal repetition is attributable to the Fact head, the *ni* construction will still contain phrasal movement of a Σ phrase into the specifier of focus. For the sake of completeness a structure of (212b) is provided in (213) for reference. All the labels are produced using (173):

(213)



In order to derive the tree in (213), the complex Voice head is built in the workspace using external Merge. The clausal spine is then generated as a separate tree in the workspace using parallel Merge. As the clausal spine is produced the internal argument *eci* "yam" and the external argument *Musa* are attached in the specifiers of *v*P and VoiceP respectively. Once the derivation has reached the point where *ni* is attached, the ΣP is duplicated and Merged into the specifier of Foc to generate the focus reading. Since a Fact head is not present, a lower copy of the verb does not need to be Spelled-Out. Consequently, and as mentioned above, the difference between Nupe verbal repetition and the *ni* construction is traceable to the appearance or absence of the Fact head.

To summarise this section, it has been shown how the Merge based system can be applied to Nupe verbal repetition constructions. The derivations are similar to the ones developed for predicate clefts in that the complex verbs are built in the workspace before each element inside the lexical verb is duplicated using parallel Merge. The difference between verbal repetition and *ni* constructions is attributed to the Fact head which appears in the former but not in the latter. When Fact is built into one of the verbs, it requires the syntactic object in which it is found to be pronounced since Fact is realised as a floating tone. Consequently, in a verbal repetition construction a lower copy has to be built and pronounced to act as a host for Fact while in a *ni* construction, the absence of a Fact head means that only one verb is built and attached to the clausal spine. This concludes the discussion of verbal repetition constructions in Nupe. What follows in section 6.2.2 is a description of how the verbal repetition data from Kabiye can also be derived using internal Merge, external Merge and parallel Merge.

6.2.2 Verbal repetition in Kabiye

Deriving verbal repetition in Kabiye follows many of the same principles seen in section 6.1 and subsection 6.2.1. Yet despite the similarities, there is a significant difference between the interpretation of verbal repetition in Nupe and Kabiye because in Nupe the proposition is focused, whereas in Kabiye, it is the event denoted by the verb. As a consequence, the meaning of verbal repetition in Kabiye has more in common with Nupe predicate clefts than Nupe verbal repetition. Yet since neither verbal copy appears in the left periphery, Kabiye verbal repetitions are not analysed as predicate clefts.

As illustrated in section 3.2, Kabiye verbal repetition constructions require that both verbs are derived from the same lexical item. Examples illustrating this fact were provided in section 3.2, but (80) from Collins and Essizewa (2007, 192) is repeated as (214) for convenience:

(214) a. cíca mab-á ɛsɔ́ kí máb-ʊ (* kí lú-u)
teacher hit-PERF Esso KI hit-INF KI hit-INF
'The teacher only hit Esso.'

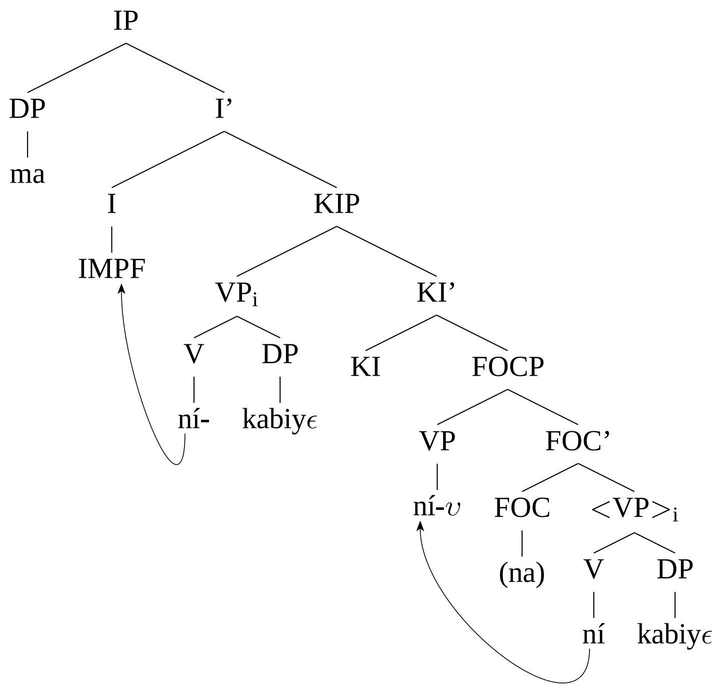
b. cíca lú ɛsɔ́ kí lú-u (* kí máb-ʊ)
teacher hit-PERF Esso KI hit-INF KI hit-INF
'The teacher only hit Esso.'

In (214), the verb *lú-u* "hit-INF" cannot serve as the repeat of *máb-ʊ* "hit-PERF" even though the interpretation of both verbs is the same. This property was used by Collins and Essizewa (2007) as evidence that a movement operation generates both copies of the verb. Yet given the issues explored in section 3.2, it was shown that movement was problematic not least because the repetitions are inflected differently, with one being tensed and other being an infinitive.

One aspect of Collins and Essizewa's (2007) analysis that is retained when the Merge based system is applied to Kabiye is the use of a low focus phrase. As seen in 3.2, object focus can be analysed as movement of the IA into the specifier of a low focus phrase. This low FocP is also argued to be the landing site of the lowest verb in a verbal repetition construction which provides a reason as to why the interpretation of examples such as (214) have more in common with Nupe predicate clefts than Nupe verbal repetition. A structure from Collins and Essizewa

(2007, 198) illustrating how their movement analysis derives Kabiye verbal repetition is provided in (92) but repeated as (215) for convenience:

(215)



The tree in (215) is simplified in that it does not represent the VP-internal subject hypothesis and a CP layer, but even so the derivation is straightforward. The VP is built before the focus head is added. The verb *ni* then moves into the specifier of Foc. KI Merges with the FocP which then allows the VP to move into the specifier of KI. If this movement did not occur, then lowest occurrence of the verb would not be able to move and adjoin to Infl. Once the VP has moved, the copy of the verb *ni* in the specifier of KIP can then be adjoined to I. The subject *ma* appears in the IP specifier position with its movement from inside the VP not represented. Collins and Essizewa (2007) propose that the KI is used as a means of *smuggling* (to use Collins (2005) term) the lowest occurrence of the verb past the infinitival copy in the specifier of focus. If this movement did not occur, then the verb would not be able to move to I. Yet as the Merge analysis does not assume that V-T displacement is derived by a movement operation, this explanation of the KI head is not applicable.

Instead, I propose that KI acts as an intermediary between *v* and Foc only when a verb is focused. This could have one of two consequences. The first is that KI allows a focus phrase to appear in a position dominated by *v* in the sense the *v* cannot be adjacent to Foc but can appear next to KI, which in turn is adjacent to Foc. Yet if this were the case, one would expect KI to appear whenever a focus phrase was Merged in a low position, which it does not.

The second option would be to assume that KI licenses the second verbal copy to be pronounced, since in object focus constructions which also contain a low focus phrase but no KI, a second copy of the object is not externalised. In all the multiple copy Spell-Out datasets and derivations built in this chapter using Merge (internal, external and parallel), whenever a complex verb is pronounced twice (as opposed to the *v*P in Hebrew pied-piping predicate clefts), a third categorised copy of the root does not intervene between the two pronounced copies of the same verb. In this case however, both verbal copies are separated by a third duplicate (see the tree in (218) for reference) since *v* dominates KIP. It is worth mentioning at this point that *v* has to dominate KI and the lower focus phrase because the direct object precedes both elements in (214). As a consequence, I argue that the purpose of KI is to establish an Agree relation between the pronounced copies of the verb since the highest copy can Agree with KI, while KI can Agree with the lower copy, which in turn allows the third intermediate copy to be ignored. If the purpose of KI is to allow the highest verb and the lowest verb to Agree, then it functions in a similar to way Collins and Essizewa's (2007) smuggling, only that in my case, features are being smuggled past an intermediary using Agree rather than the constituent itself.

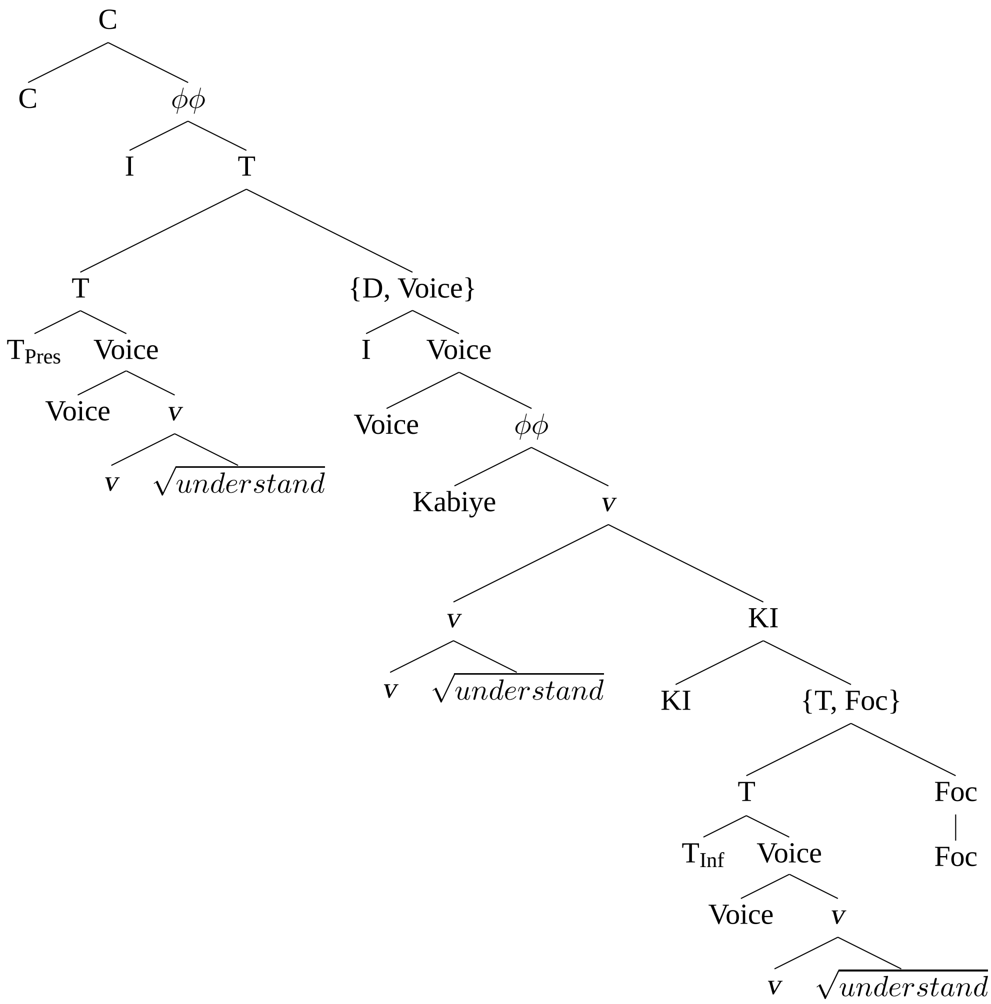
With these preliminary discussions in place, it is now time for Kabiye verbal repetition constructions to be derived using Merge. A clause is provided in example (216) (a repeat of (90a) for convenience) which will exemplify each Kabiye characteristic discussed so far. A workspace containing all the lexical items needed to derive (216) is also shown in (217):

(216) ma-ní-ʊ kabiyɛ kí ní-ʊ (?na)
1SG-understand-IMPF Kabiye KI understand-INF FOC
'I only understand Kabiye.'

(217) **Workspace**
{$_W$ $\sqrt{understand}$, *v*, Voice, T_{Pres}, T_{Inf}, I, Kabiye, KI, Foc, C}

The first step is to build the complex verbs. The highest is composed of $\sqrt{understand}$, *v*, Voice and present tense T. The duplicate is identical in structure and built using parallel Merge up until the final T affix, which in this case is the infinitive. With both complex verbs being in the workspace, the low focus phrase is then derived by Merging Foc with the infinitival complex verb to produce the FocP. The KI head is then Merged with the focus phrase which allows KI to Agree with the complex verb it dominates. The root $\sqrt{understand}$ and the verbaliser are parallel Merged before being combined with KIP to form the *v*'. The direct object *Kabiye* is added, completing the *v*P. Voice is selected and Merged with the *v*P. The first person singular subject is Merged with Voice'. The tensed complex verb is Merged with VoiceP which enables it to Agree with KI. The subject is then Merged into the specifier of TP. C is then Merged with TP to complete the clause. A full tree is provided in (218) to illustrate the output of the derivation. The labels are generated by (173):

(218)



There are two main differences between the derivation represented by the tree in (218) and the Nupe verbal repetition construction in (210). The first is connected to the material that is focused. In the Nupe example, the Σ phrase appears in the specifier of Foc while in (218) the specifier of focus is filled with the infinitival complex verb. The structural disparity between the two explains why both types of verbal repetition construction have a unique interpretation since in one a complex verb is focused while in the other the specifier of the focus phrase is filled with a proposition. The second difference is connected to the need in Kabiye for a head KI to establish an Agree relation between both pronounced copies of the verb. As the infinitival verb appears in a low focus phrase, the root and verbaliser amalgam comprising part of the verbal spine intervenes between the highest and lowest verbal copies. Consequently, the highest verb Agrees with KI which allows KI to Agree with the lowest verb, which in turn enables the third v+$\surd$ amalgam to be ignored.

To summarise this subsection, the aim was to show how Merge can be used to derive verbal repetition constructions from Kabiye. As mentioned above, there are two main differences between verbal repetition in Kabiye and Nupe. The first is connected to the low focus phrase while the second relates to the function of the KI head. Once these differences were discussed and incorporated into the system, both copies of the verb were derived in much the same way as the fronted predicates in section 6.1 and the Nupe verbal repetition examples from section 6.2.1.

6.3 Suffixes and Pre-Verbal Particles

The aim of this section is to show how Merge (internal, external and parallel) can be used to derive the suffix and pre-verbal particle data discussed in section 3.3. Specifically, subsection 6.3.1 addresses the Potawatomi examples which involve a verb being assigned multiple suffixes and Agr morphemes. Subsection 6.3.2 uses Merge to build the Kiowa data featuring suffixes and free-standing pre-verbal particles. As verbal suffixes and free standing particles are governed by the Clausal Mirror, the discussion also aims to show how Merge can generate this generalisation.

6.3.1 Verbal Suffixes in Potawatomi

This section focuses on the data from Potawatomi provided in section 3.3 to show how Merge can produce the structures that Halle and Marantz (1993) derive using head movement. Since strict head movement ensures the mirror principle, the structure of the complex verb mirrors that of the clausal spine. For reference, example (96a) from section 3.3 and the corresponding HM tree in (100) are provided in (219) and (220) for reference:[3]

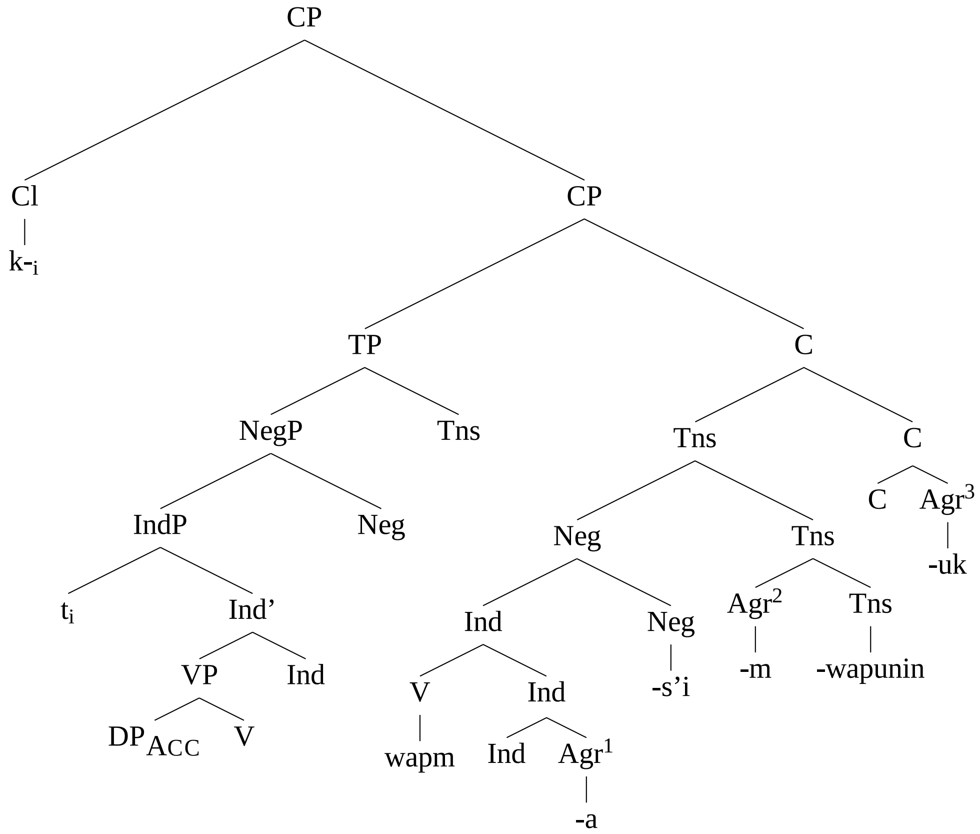
(219)

k-	wapm	-a	-s'i	-m	-wapunin	-uk
Cl	V	Agr	Neg	Agr	Tns	Agr

'you (pl) didn't see them.'

[3]The intermediate stages of head movement are not shown in order to keep the tree as compact as possible.

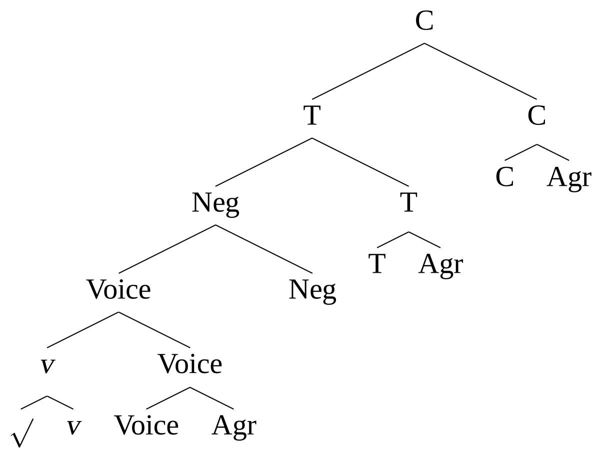
(220)



To reiterate, V is Merged with the direct object DP_{ACC} before Ind is attached to the VP. V moves and adjoins to Ind and the subject (realised as the clitic *k-*) is Merged to form the specifier of IndP. Neg is attached next which again triggers HM, this time of the V+Ind complex. The Tense node is combined with NegP, also causing HM. The final element attached to the tree is C which initiates HM of the tense complex verb. The subject clitic is a second person pronoun and as such is adjoined to CP. The agreement heads are then attached to Ind, Tns and C post-syntactically during Morphological Structure.

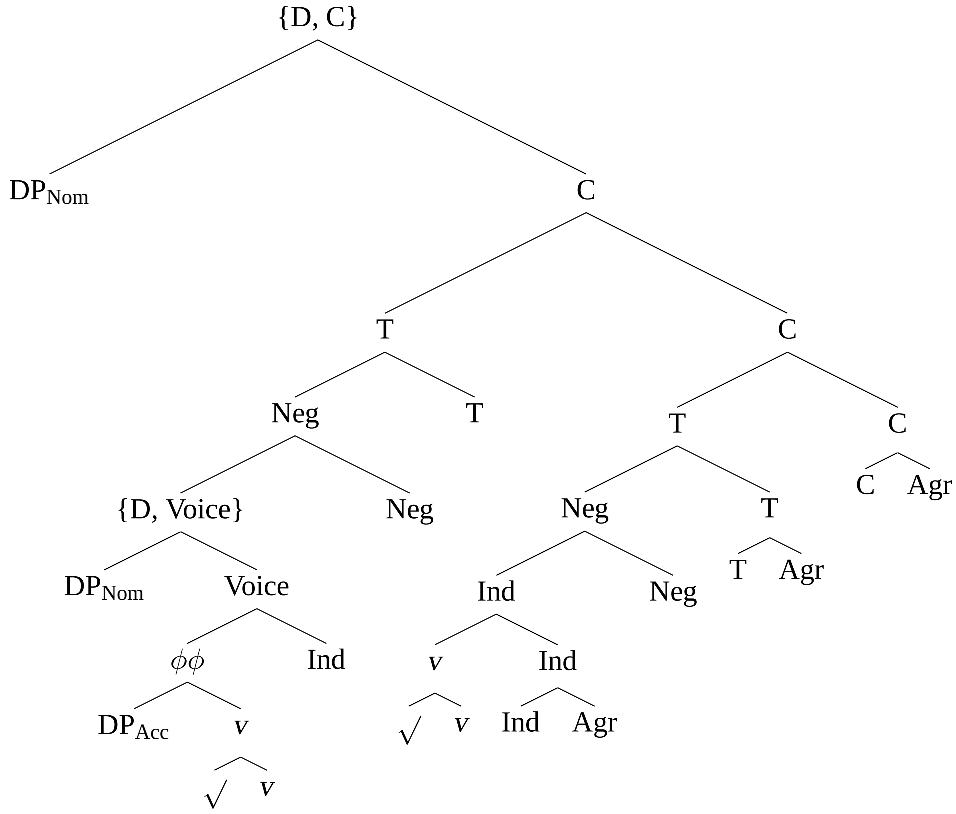
While HM can build Potawatomi complex verbs, the operation struggles with languages where the suffixes on the verb correspond to a free-standing particle found within the clause. To pre-empt the shift away from head movement, what follows now is a demonstration of how Merge is able to derive the Potawatomi examples. First, all lexical items needed to derive (219) are placed in the workspace. Since my derivations decompose V into a $\surd$ and *v*, my complex verb will contain a node not used by Halle and Marantz (1993). In addition, I shall assume that the agreement morphemes on Ind, Tns (T by my notation) and C are attached to the structure when the complex verb is built in the workspace (W). Once each element needed to derive the complex verb is placed in W, the $\surd$ is Merged with the verbaliser. Voice (Ind in Halle and Marantz’s system) is then Merged with an Agr morpheme before the Voice+Agr complex is combined with *v*. Neg is then attached to the Voice complex verb. T and Agr are joined together in W and Merged with Neg. Finally, C is combined with an Agr and then Merged with T to complete the verb. A representation is provided in (221):

(221)



The significant difference between the way that this structure is derived and the others in sections 6.1 and 6.2, is that here, Agr morphemes are added to the verb while it is being built in the workspace. The rest of the tree is produced using Merge in the way illustrated many times before in this chapter. The clausal spine is built by parallel Merging the necessary heads from (221). The argument pronouns are added into the specifiers of the VoiceP and *v*P as the tree is built. The complex verb is attached in the C position and the subject second person pronoun is adjoined to CP. A final output tree is shown in (222) to illustrate how (219) looks when derived using Merge. The tree is labelled using the algorithm in (173):

(222)



The structure provided in (222) is derived using the same mechanisms as the predicate cleft and verbal repetition constructions discussed earlier. The difference here is that the complex head contains multiple morphemes that are not used to build the clausal spine. This could pose a problem if Agr was duplicated rather than, for example, the T head since Agr would then form part of the clausal spine rather than T. Yet as Merge is free and generates structure until it produces something interpretable, it seems feasible to assume that a derivation where Agr is part of the clausal spine is one that would crash when it transferred.

In summary, this section has provided the groundworks for the discussion in the next section since the mechanisms required to derive the clausal mirror are identical to the ones used to build verbs in Potawatomi. Consequently, the pre-verbal particle and suffix data from Kiowa is tackled next and it is found that Merge in combination with an assumption that the pre-verbal selective particles are heads can derive the correct results without the issues associated with a head final approach or relying on head movement.

6.3.2 Pre-verbal particles and suffixes

The aim of this subsection is to derive data containing pre-verbal selective particles and their corresponding verbal suffixes. The examples are from Kiowa, but it is worth noting that this system is generalisable to any dataset which exhibits these properties, e.g. Passamaquoddy-Maliseet. Before providing a derivation, a brief summary is provided of Kiowa's main characteristics along with the issues associated with head movement and head final analyses.

First, it was shown in section 3.3 that Kiowa exhibits an unmarked word order even though the language displays a number of non-configurational properties, i.e. discontinuous of constituents, manoeuvrability of DP arguments and pro-drop. The example used to illustrate the basic word order is provided in (107a) but repeated in (223) for convenience:

(223) Hɔ́n Paithalíí P!ɔ́ɔ́thɔ́pdek!ii áádɔ ɔ́– thêm- ǫǫmɔɔ
NEG Vincent Daniel stick.I 3s:3s:3I–break-make.NEG
'Vincent didn't make Daniel break the stick.' (Harbour 2007, 14)

The order in (223) places pre-verbal selective particles before the subject, the indirect object follows the subject and the direct object is the last argument. The verb in example (223) is the last element. When more than one pre-verbal selective particle occurs in a clause, they are ordered in a specific way and all pre-verbal selective particles must co-occur with a specific suffix on the verb. The ordering restrictions on pre-verbal particles and verbal suffixes are provided in (122) and (123) respectively, but are repeated as (224) and (225) for ease of reference. To exemplify these orders, (118b) is repeated in (226) for convenience:

(224) **Order of suffixes**

Aspect Negation Modality Evidentiality

(225) **Order of pre-verbal particles**

Evidentiality Modality Negation Aspect

(226) **Háyátto hɔ́** ∅– dęį- hę́į́**-mɔ̂ɔ-t!ɔɔ**
probably NEG 3s–sleep-die-NEG-MOD
'Probably he won't fall asleep.'

When (224) is compared with (225), it is evident that the order of the pre-verbal particles is a mirror image of the verbal suffixes. These orders are shown in (226) since the negative suffix and negative particle are closer to the verb than the modal suffix and corresponding modal particle. As explored in section 3.3, analyses relying on head movement or on Kiowa being parametrised as head final do not produce the correct results. For instance, if head movement generated the complex verb, then it would have to move and attach to each of the pre-verbal selective particles. As a consequence, the head movement operation predicts that the verb should be in the wrong position with respect to other sentence elements. In addition, the head final approach is also problematic since it predicts that arguments should be able to intervene between the verb and its suffixes, which is of course incorrect.

An immediate benefit of adopting Merge (internal, external and parallel) is that the verb cannot be broken by any sentence elements because it is built in the workspace before the clausal spine. Also, the position of the verb does not pose a problem because it is externally Merged in the clause where required, e.g. in Potawatomi it occupies the C position, while English verbs appear in Voice. In addition, since pre-verbal selective particles correspond to the suffixes on the verb, the particles can be interpreted as duplicates of the verbal suffixes derived by parallel Merge. This allows each particle to be the head of its particle phrase which in my mind is more intuitive since, for example, negation, modals and auxiliaries in other languages are analysed as heads rather than adjuncts.[4] Furthermore, treating the particles as heads rather than adjuncts avoids the manoeuvrability problems mentioned above since heads are typically less mobile than adjuncts. In a language like English the particle *not* can only occur pre-verbally, e.g. *I will not run* vs **I will run not.* If *not* was adjoined to a negative phrase, it should be more manoeuvrable since adjuncts can typically branch to the left or to the right, e.g. *I will quickly run an errand* vs *I will run an errand quickly*.

I argue that deriving the clausal mirror using Merge is justifiable on the grounds mentioned above, so what follows now is a more thorough description of how the system derives Kiowa clause structure. In of itself, the analysis is no different from the one provided for predicate clefts and verbal repetition, but the Kiowa data is significant because both the suffixes and pre-verbal particles are pronounced. Before a derivation is provided for an example shown in section 3.3, several assumptions need to be made explicit regarding Kiowa clause structure. These assumptions are taken from Adger and Harbour (2007). First, I shall assume that verbal arguments are represented as ϕ-features and that these ϕ-features are realised as the verbal prefix. Second, when the arguments are pronounced as overt DPs, I assume that these DPs are adjoined to the highest verbal maximal projection which in my case is VoiceP. Finally, I shall assume that AspP is not optional in Kiowa and that it provides case to a VoiceP internal argument (like T in English). With these assumptions in place, a demonstration of how Merge is able to derive a Kiowa clause can begin. For the sake of clarity, example (107b) is produced since it contains a pre-verbal selective particle, three overt DPs adjoined to VoiceP, three sets of ϕ-features in argument positions and a complex head containing a negation morpheme. For ease of reference, the example is repeated as (227):

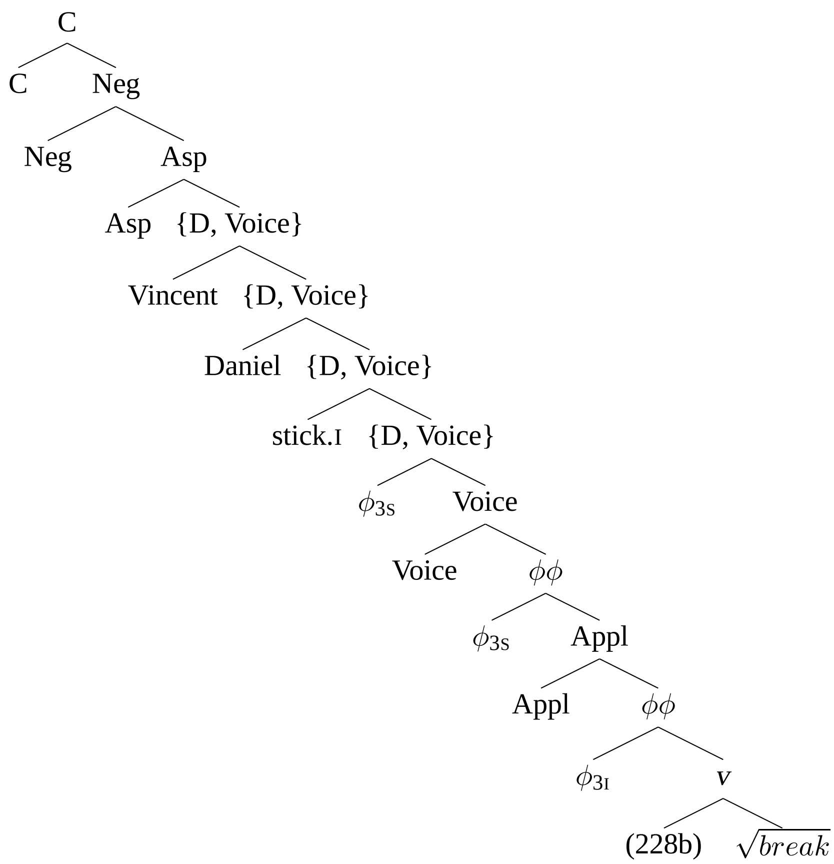
(227) Hɔ́n Paithalíí P!ɔ́ɔ́thɔ́pdek!ii áádɔ ɔ́– thêm- ǫǫmɔɔ
NEG Vincent Daniel stick.I 3s:3s:3I–break-make.NEG
'Vincent didn't make Daniel break the stick.' (Harbour 2007, 14)

[4]See Adger (2003) for an analysis where auxiliaries and negation are heads, but see Sportiche et al. (2014) and Haegeman (1994) for systems where auxiliaries are heads but negation is an adjunct.

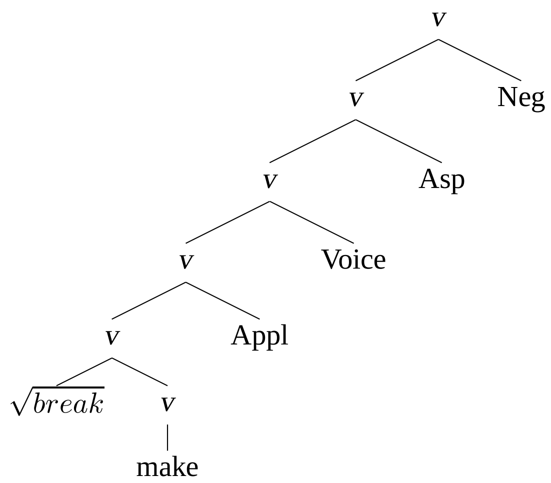
Deriving (227) follows the same procedure as each example in sections 6.1 and 6.2 in that the complex verb is built before the clausal spine. Consequently, all the lexical items needed to derive (227) are placed in the workspace, including $\sqrt{break}$, a light verb corresponding to *make*, Appl, Voice, the obligatory aspectual marker Asp, and finally Neg. These elements are Merged together. As the verb appears low in the Kiowa clausal spine (I assume it occupies the *v* position), $\sqrt{break}$ is selected from inside the verb and parallel Merged with the verb to form the *v*'. As mentioned in chapter 5, it must be that the complex verb is copied from the bottom up because otherwise, the clausal spine would be built from the top down, resulting in extension condition violations. Since the clausal spine and complex verb are both generated from the bottom up, the clausal mirror is ensured because their hierarchies have to match. The ϕ-features corresponding to the direct object are then attached to the tree in the specifier of *v*P.

Next, Appl is duplicated from inside the complex verb and Merged with *v*P. Since (227) is a ditransitive, the specifier of the Appl phrase is filled with a set of ϕ-features representing the indirect object. The VoiceP is built in the same way as ApplP in that the Voice head is selected and Merged with *v*P to form Voice' before a set of ϕ-features are placed in the specifier. As all three arguments correspond to overt DPs in (227), these DPs are attached to the VoiceP. The final steps in the derivation are straightforward: the Asp suffix is selected from inside the complex verb and Merged with VoiceP. Neg is also selected and then Merged with AspP. Finally, C is combined with NegP. It is worth mentioning that if T is required to complete the clausal spine of Kiowa, it would occur in between C and Neg. However, as Asp provides case to the in-situ external argument, I have chosen to not represent T. Since the derivation is now complete, a tree representing the entire structure is provided in (228) for reference. As the tree is large, it was problematic to format without escaping the margins so the image has been split into the clausal spine provided in (228a) and the complex verb which appears in (228b). The position of the verb inside the clausal spine is represented by the (228b) label. The tree is labelled using the algorithm provided in (173) and the corresponding discussion from section 2.5:

(228) a.



b.



The trees in (228) show how Merge can be used to derive a Kiowa ditransitive clause. As the language has extensive pro-drop, it is uncommon for all the adjunct DPs to be present in the manner exemplified by (227). A version of (227) more likely found in unsolicited conversation is provided in (108a) but repeated in (229) for convenience:

(229) Hɔ́n ɔ́– thêm- ǫǫmɔɔ
NEG 3S:3S:3I–break-make.NEG
'He didn't make him break it.'

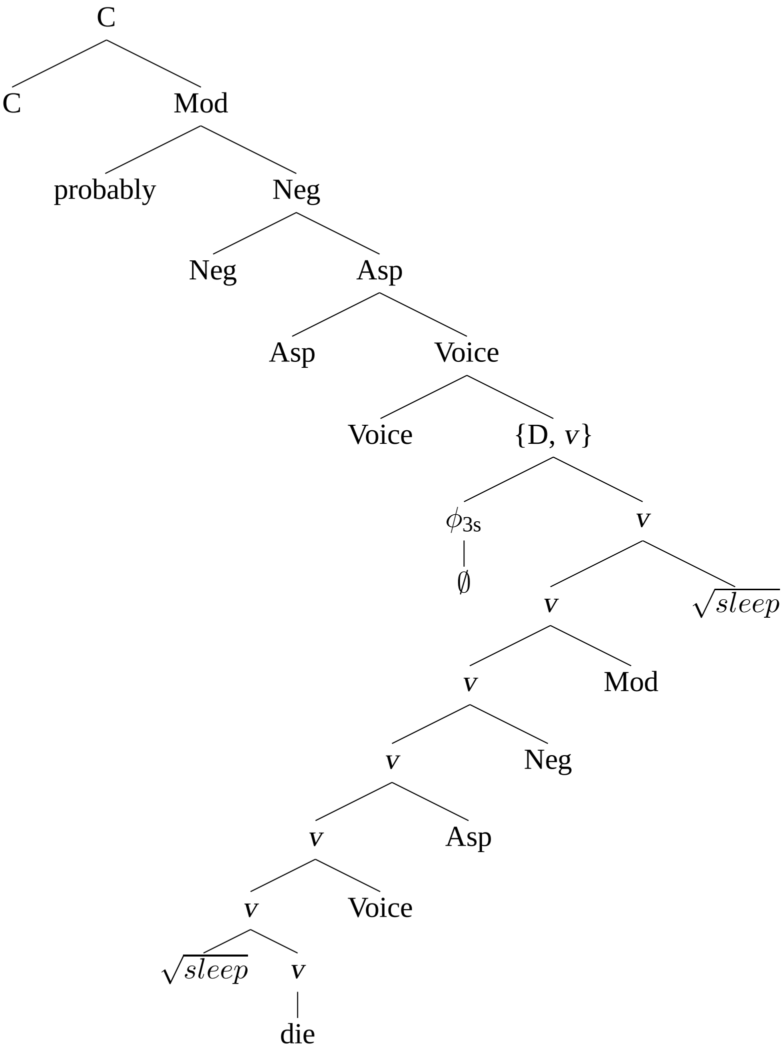
The structure of (229) is identical to that provided in (228), with one exception. As (229) does not contain any overt DPs, no adjuncts are attached to VoiceP. Yet since the agreement prefix is identical in both examples and the verb is still inflected with a negative suffix, the verb and clausal spine are built in the same way.

In order to demonstrate the system further, a different example is derived which contains two pre-verbal selective particles with corresponding suffixes but no overt DP adjuncts. The clause is an unaccusative built around the root *dȩį̀-* "sleep" and originally appeared in (118b) but has been repeated in (230) for convenience:

(230) **Háyátto hɔ́** ∅– dȩį̀- hȩ́į́-**mɔ̂ɔ-t!ɔɔ**
probably NEG 3s–sleep-die-NEG-MOD
'Probably he won't fall asleep.'

The verb in (230) contains a root, a light verb *hȩ́į́-* "die", an unaccusative Voice head, an obligatory Asp head, a negative suffix *mɔ̂ɔ* and a modal suffix *t!ɔɔ*. Once these items are selected from the lexicon, they are Merged together to produce the verb. The verb occupies the *v* position in the clausal spine so it is Merged with $\sqrt{sleep}$ as demonstrated by (228). The bundle of ϕ-features realised as the agreement prefix is Merged in the specifier of *v*P. The unaccusative Voice head is selected from inside the verb and Merged with the *v*P. The non-optional Aspect head is selected and Merged as is the negative suffix. The last element to be selected and attached to the clausal spine is the modal head realised as *Háyátto* "probably". Finally, C is Merged with the modal phrase. A tree is provided in (231) for reference:

(231)



The tree in (231) is built using the same mechanisms as (228) in that the verb is derived before the clausal spine. The pre-verbal selective particles are analysed as heads produced by Merge.

To summarise, it has been shown how Merge can be used to derive the clausal mirror in Kiowa. As with the predicate cleft and verbal repetition constructions, the complex verb is built prior to the clausal spine using external Merge from the bottom up which ensures a version of the mirror principle since the verb and spine are built in the same direction.

The next section examines data from Harley (2011) which is argued by some to be problematic for analyses which assume a strict ordering relation between a verb and the clause. Specifically, Harley argues that the Mirror Principle (a generalisation with a similar scope to the clausal mirror) from Baker (1985, 1988) can be upheld if the hierarchy within a verb is derived using a combination of three operations, two of which are countercyclic. I argue that Merge (internal, external and parallel) allows Harley's (2011) data to be generated without needing to assume any countercyclic operations.

6.4 Mirror Principle Violations

The aim of this section is to examine how the new Merge based system can derive examples that at first glance are problematic for the mirror principle since the structure of the verb does not match the hierarchy of the clause. The data is from Harley (2011) and consists of clauses from Cupeño and Navajo. Harley has to derive the data using a combination of three operations: head movement, affix-driven linearisation and Merger Under Adjacency. The first and last of these operations involves countercyclic displacement while affix-driven linearisation allows an element undergoing syntactic head movement to either left-adjoin or right-adjoin to the probe, giving either a prefix or a suffix respectively. Harley (2011) argues that a combination of these gadgets allows the Cupeño and Navajo clauses to be derived without having to argue that the mirror principle does not hold in these languages. However, I argue that using Merge is more efficient since it allows the data to be produced without having to resort to countercyclic movement when combined with a version of affix-driven linearisation modified so that it can apply in a system without head movement. Subsection 6.4.1 examines the Cupeño examples while subsection 6.4.2 generates the Navajo verbal data.

6.4.1 Cupeño

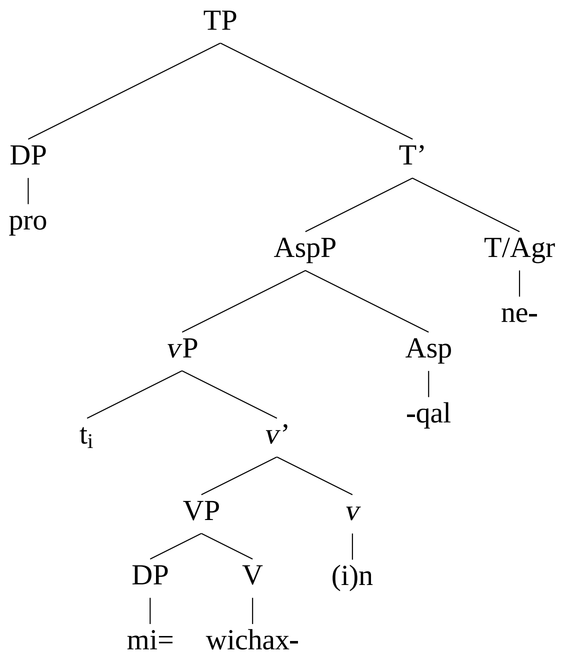
The aim of this subsection is to highlight how Merge (internal, external and parallel) can be applied to Cupeño verbal data which appears to violate the mirror principle, but first, Harley's (2011) system is detailed for reference. The triviality with which this data does not fall within the mirror principle allows a system to be developed where head movement, MUA and affix-driven linearisation can derive the problematic examples without assuming that the hierarchy of the inflected verb is different from that of the clausal spine. The problematic data from Harley (2011, 178) is provided in (232) for reference :

(232) mi=**wíchax**-ne-**n-**qal
3PL.OB=**throw**-Pst.1sg-***v*****AGT-**Imp.Sg
"I was throwing them."

The complex verb in (232) is an issue because the root *wíchax* "throw" and the *v* agentive marker realised as *n* (both in bold) are separated by the past tense morpheme *ne*. Given the mirror principle, one would expect *v* to intervene between the root and tense because the clausal spine is usually represented as having a $\surd$-*v*-T structure, low to high.

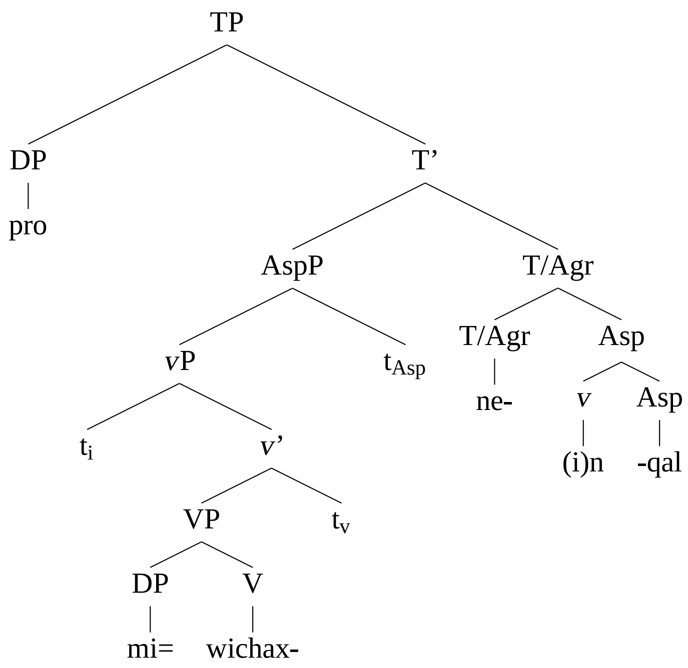
Harley (2011) presents an analysis by Barragan (2003) which derives the data in (232) using head movement and affix-driven linearisation. A tree from (Harley 2011, 179) (lightly modified) is provided in (233) to represent how the clause in (232) would look prior to head movement:

(233)



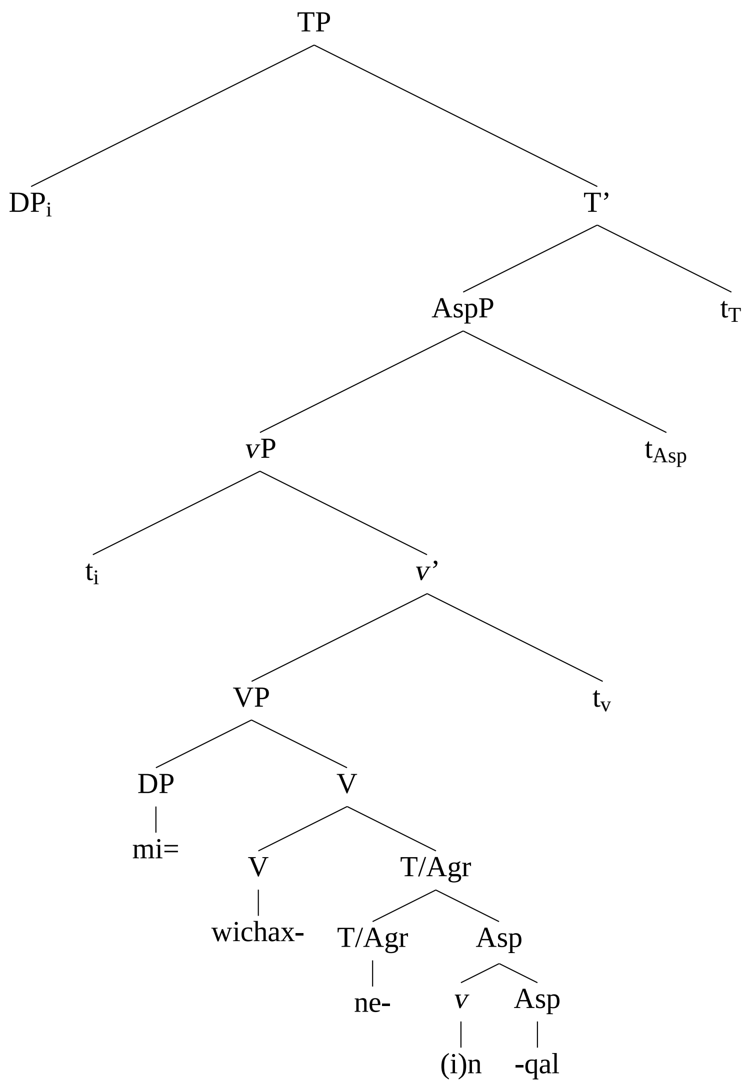
Harley states that in Cupeño, V does not move when *v* is agentive, in which case *v* moves through Asp to T. The subject moves from its Merge position (the specifier of vP for Harley) into the specifier of TP. The order of the morphemes inside the verb is generated by affix-driven linearisation which allows specific suffixes to be parametrised so that they can either be left- or right-adjoined to the head to which they are attached. In Cupeño, *v* is linearised as a suffix; Asp is linearised a suffix, and T is realised as a prefix. With these language specific details in mind, HM would apply in the following way. The *v* moves and adjoins to Asp, with Asp being a suffix. Then the *v*+Asp complex moves and adjoins to T with T being realised as a prefix. A second tree from Harley (2011, 180) (lightly modified) is shown in (234) to highlight how (233) looks once head movement has applied:

(234)



Once head movement has taken place, V is adjacent to T since T is linearised as a prefix once the *v*+Asp amalgam adjoins to T via head movement. The final step involves the second type of countercyclic movement, Merger Under Adjacency (MUA), which occurs post-syntactically and according to Harley is a modern implementation of affix-hopping (Chomsky 1957). In order for MUA to take place, the moving element and the landing site need to be linearly adjacent. In (234), V and the complex T head are linearly adjacent and as such MUA can apply. The complex T head "hops" down and right adjoins to the verb which creates its final form. A tree representing (234) after MUA is provided in (235):

(235)



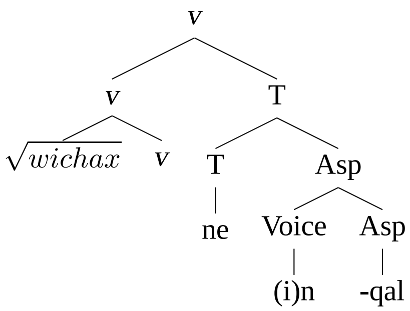
Significantly for Harley, the hierarchy of the clausal spine matches the hierarchy of the complex verb prior to MUA which means that, by the analysis represented by (235), the mirror principle holds in the syntax. It is also evident that the Merge system is as applicable to Cupeño as it is to other languages where a verb is pronounced low, e.g. Kiowa. One structural difference is that for me, the locus of agentivity is Voice, not *v*. In the analysis that follows, *v* is a verbaliser which introduces the internal argument. Consequently, the clausal spine in my system consists of $\sqrt{}$, *v* and Voice, Asp, T and C. What follows now is a derivation to illustrate how Merge (internal, external and parallel) can derive (232). A representation is provided in (236) to show the workspace before Merge combines lexical items:

(236) **Workspace**

$\{_{W}$ $\sqrt{wichax}$, *v*, Voice, Asp, T, C, pro, $mi_{DO}\}$

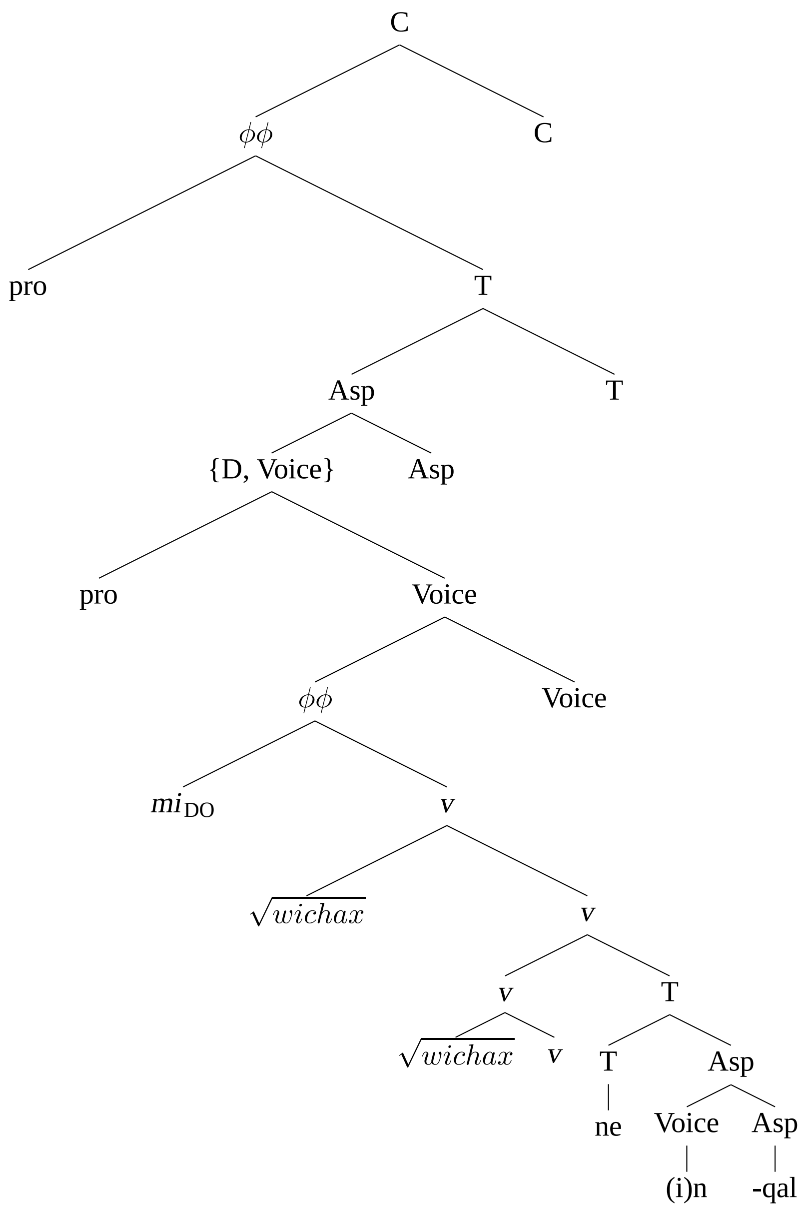
The first step in proceedings is to build the complex verb. The data in (232) allows one facet of the Merge system to be showcased, which until now, has been dormant. As Merge is untriggered, anything can Merge with anything in the syntax before the structure is then checked during Spell-Out when labels are assigned. Since head movement is successive cyclic, the type of data in (232) is difficult to derive without assuming a second type of countercyclic movement (MUA) to position the complex T head as an affix (see the tree in (235) for reference). Yet in my case, as Merge is untriggered, each suffix can be Merged in an appropriate place when the complex verb is being built. The simplest way of doing so is to combine *v* and $\sqrt{wichax}$, and then as a separate tree, Merge Asp, Voice and T together. The workspace would then contain two trees: a *v*+$\sqrt{wichax}$ amalgam and a T+Asp+Voice complex element. These two trees can then be Merged together to form the complex verb illustrated in (237):

(237)



Since the verb is built, the rest of the clause is assembled in the usual manner. The root $\sqrt{wichax}$ is selected and Merged with the complex verb. The direct object *mi* is Merged to form the specifier of *v*P before Voice is selected and combined with *v*P. The subject *pro* is attached to fill the specifier of VoiceP then Asp is selected and Merged with VoiceP. The T head is then selected and Merged with AspP. The *pro* is internally Merged into the specifier of TP before C is attached to complete the derivation. A tree is provided in (238) to illustrate how (232) can be derived by Merge:

(238)



To summarise the discussion of (238), the complex verb is built using external Merge before the clausal spine is assembled. Each element inside the complex verb is selected and used by Merge to assemble the clausal spine. The arguments are Merged into the appropriate specifiers as the clausal spine is built. The most striking aspect of this analysis is that the complex verb is built in two parts: a $\sqrt{}$+*v* and a Voice+Asp+T amalgam. These two structures are then attached together using external Merge. Since both elements are derived separately, the fact that the T morpheme is closer to the root then the one associated with agentivity is not problematic since the verb can be assembled in two halves and then combined into a single structure before being attached to the clausal spine.

This subsection has illustrated that it is possible to derive what appears to be a mirror principle violation without having to assume that structure is generated using countercyclic movement. The next subsection continues this theme and applies the Merge system to another dataset which has been used to argue the mirror principle does not hold.

6.4.2 Navajo

This subsection aims to show how Merge (internal, external and parallel) can derive more data which seems to show that the mirror principle does not hold. First, I show how Harley (2011) derives the problematic examples using a combination of head movement, affix driven linearisation and Merger Under Adjacency. Second, I aim to demonstrate how the system developed in this thesis can be applied to the problematic data without resorting to any countercyclic movement. This subsection is similar in content and scope to subsection 6.4.1 so rather than duplicating content, parallels will be glossed over rapidly.

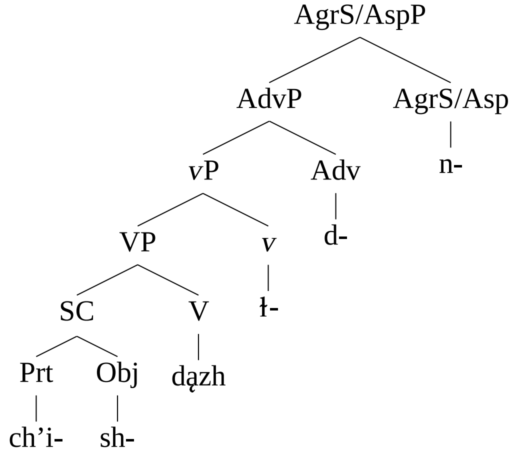
The Navajo data is similar to the Cupeño in that the order of the verbal affixes does not correspond to a structure derivable only by cyclic head movement. Thus Harley (2011) uses HM in combination with affix driven linearisation and MUA to derive the problematic case. An example that Harley (2011, 181) produces using these three operations is provided in (239). The format of the example has been modified lightly:

(239)	**ch'i-**	sh-	d-	n-	ł-	**dązh**
	out	1sgO	limb-	Perf-	Trans-	move

“He jerked me” (from a sentence translated *The policeman jerked me outdoors*)

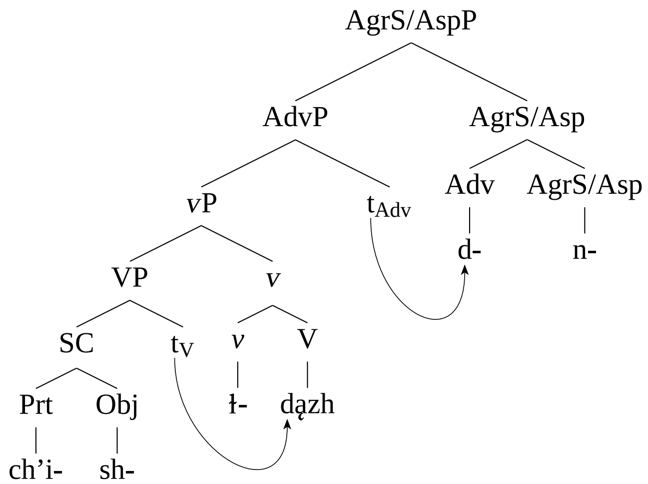
The issue with (239) is that the lexical material in bold is separated by a number of inflectional morphemes. In order to generate this data, Harley (2011) again relies on two types of countercyclic movement, HM and MUA, and an assumption that HM can either left- or right-adjoin to the target of the operation (affix-driven linearisation). A tree from Harley (2011, 182) is provided in (240) to illustrate how a (239) would look prior to any movement operation. The format of the tree is lightly modified:

(240)

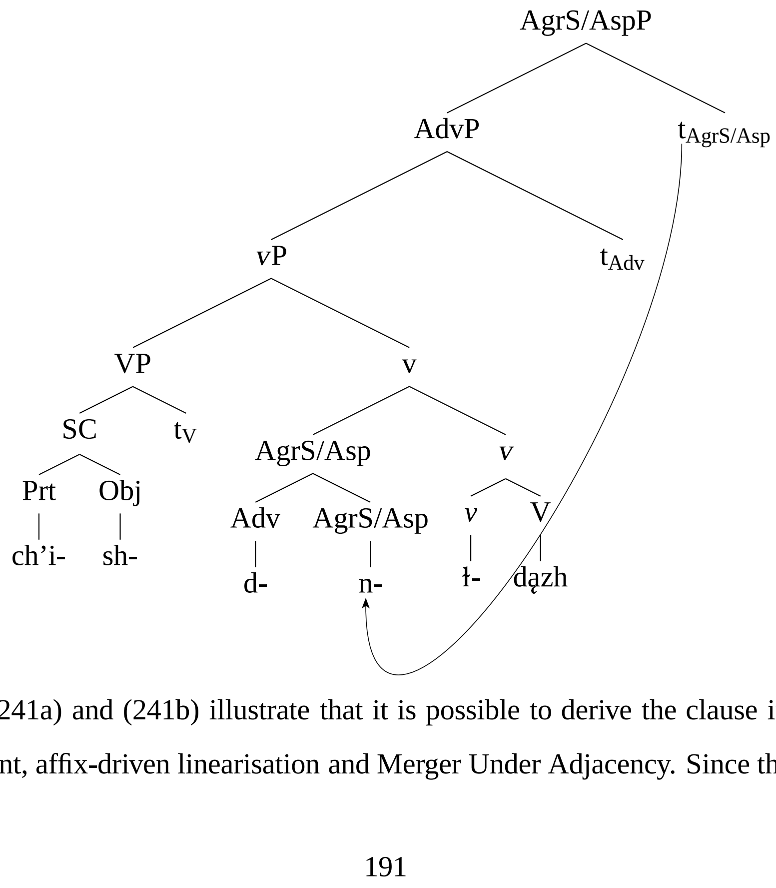


Harley assumes that *ch'i-* and *sh-* form a small clause and that the verb *dązh* has the small clause as its complement. Given the structure presented in (240), it is evident why (239) is problematic. Yet Harley (2011) argues that the three operations used for Cupeño can also be applied to the Navajo data. The first step in deriving (239) from (240) involves V undergoing head movement and right-adjoining to *v*, courtesy of affix-driven linearisation. Second, the head of Adv moves and left-adjoins to AgrS/Asp. Finally, Merger Under Adjacency applies post-syntactically and adjoins the Adv+AgrS/Asp complex to the *v* complex as a prefix. Two trees are presented below to illustrate Harley's derivation. The first (241) from Harley (2011, 184) (lightly modified) and shows both instances of head movement that occur in the syntax, while the second in (240) illustrates how the tree looks after MUA has applied:

(241) a.



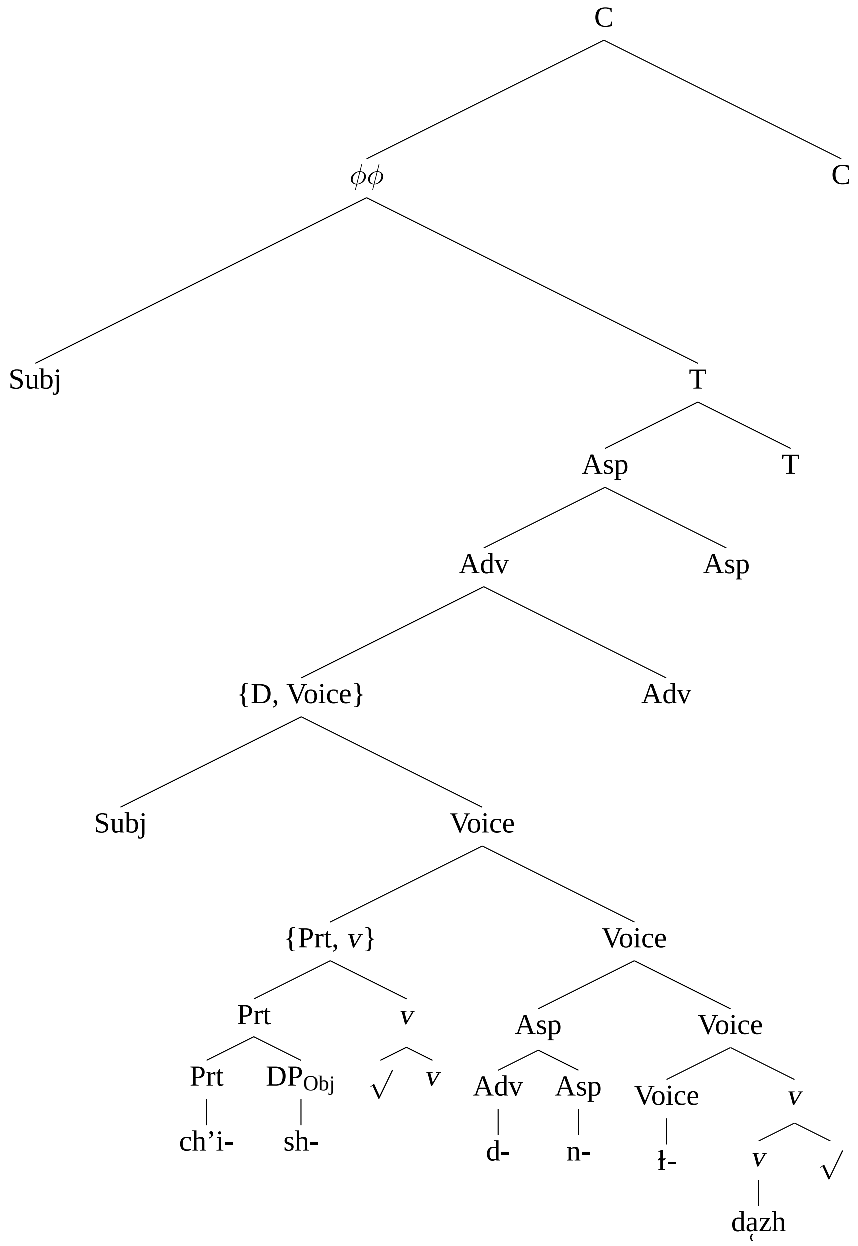
b.



The trees in (241a) and (241b) illustrate that it is possible to derive the clause in (239) using head movement, affix-driven linearisation and Merger Under Adjacency. Since this thesis aims to derive complex verbs without resorting to countercyclic movement, HM and MUA are not adoptable even though the two combined can derive the data in conjunction with affix-driven linearisation.

As a consequence, what follows now is a description of how Merge can derive (239) without requiring any form of countercyclic displacement. The first step is to place all the lexical items needed to build (239) in the workspace. I have substituted AgrS/Asp for separate T and Asp nodes for ease of exposition. Second, the complex verb is built in two parts like in Cupeño and then joined together. Thus Asp is Merged with Adv to form $\{_{\text{Asp}}$ Adv, Asp$\}$ while the $\surd$, v and Voice are attached together to form $\{_{\text{Voice}}$ Voice, $\{v, \surd\}\}$. The Asp and Voice amalgams are then joined together to form the inflected verb. Third, the small clause is built by Merging the particle and the object DP. Fourth, *v*' is formed using parallel Merge. Fifth, the small clause is attached to *v*' to complete the *v*P. Sixth, the complex verb is Merged in the Voice position to generate the Voice'. Seventh, the subject is added before Adv and Asp are selected and Merged to form the AdvP and AspP respectively. Finally, the TP is generated by attaching T and internally Merging the subject into the specifier. C is added for completeness. An output tree is provided in (242):

(242)



To summarise (242), the aim was to show that Merge (internal, external and parallel) could derive the Navajo data without assuming anything not already adopted for PCCs, verbal repetition and pre-verbal particles and suffixes. The only structure building operation is Merge which means that all trees are produced without violating the extension and no tampering conditions. Deriving (242) followed the procedure advocated in chapter 5 in that the verb was built before the rest of the clausal spine, and in such a way that did not require any countercyclic operations to occur in the syntax.

6.5 Summary

The aim of this chapter was to illustrate how the Merge based system can be used to derive the data explored in chapter 3. Central to the proposal is an assumption that untriggered Merge applies to elements of the workspace and that the only difference between internal, external and parallel Merge relates to the location from where the Merging elements are selected. This system allows the complex verb to be built first before each element of the verb is selected and used to build the clausal spine through further applications of Merge. Once a clause is built, labelling applies to produce an object that satisfies headedness and full interpretation.

The system summarised above was first applied to predicate clefts in Nupe and Hebrew in section 6.1, and it was found that the idiosyncrasies of these constructions can be produced using Merge. It was illustrated that the Hebrew and Nupe data combined required an analysis which could generate the distinction between piped-piping and non-pied-piping and was also be able to produce the A'-characteristics inherent within the construction. The former was straightforward since the difference between the two was reduced to whether a copy of the internal argument was built into the constituent Merged in the specifier of focus. The latter required more theoretical considerations since the A'-characteristics were generated by assuming that parallel Merge is constrained by phase theory and the phase impenetrability condition in the same way as any other type of Merge.

Section 6.2 applied the Merge based system to the Nupe and Kabiye verbal repetition data presented in chapter 3. Deriving this type of construction is reliant on Merge in the same way as predicate clefts since complex verbs are built in the workspace prior to being attached to the clausal spine. Like PCCs, two distinct complex verbs are derived along with the internal and external arguments. In Nupe, one verb contains a tense morpheme while the other contains a Fact head, whereas in Kabiye, one verb is realised as an infinitive while the other includes a tense morpheme.

Then section 6.3 illustrated how the suffix and pre-verbal particle data from section 3.3 can be generated using Merge. First, an analysis was provided of a Potawatomi verb and it was shown that in the essentials, there is not a significant difference between how this type of data is derived when compared to an occurrence of V2 in a Germanic language. The reason is that like in V2 clauses, the verb is derived first and then each element in the verb is selected and used to generate the clausal spine, before the verb itself is Merged in the C position. Second, the data from Kiowa was analysed and it was shown that Merge avoids the issues inherent in assuming that head movement or a head final analysis produces the examples. The principle benefit is that the verb is built as a sealed unit meaning that nothing can intervene between the $\sqrt{}$+*v* amalgam and its suffixes. Finally, as the verb and the clausal spine have to be built from the bottom up to avoid an extension condition violation, a version of the clausal mirror is ensured because the hierarchy of elements inside the inflected verb has to match the clausal spine.

The last section 6.4 examined two sets of data from Cupeño and Navajo which are argued to be problematic for head movement because at first glance, they seem to exhibit mirror principle violations. Harley (2011) shows that the data can be produced with a set of three operations, two of which are countercyclic (head movement and merger under adjacency). In order to avoid HM and MUA, I apply Merge and its three subtypes to the data and find that it is possible to derive the problematic verbs. One difference between the derivation proposed in subsections 6.4.1 and 6.4.2 and all those developed earlier in the thesis, is that in Navajo and Cupeño, the verb is built in two parts before each chunk is combined to form a single constituent. Given the way that the system was developed in chapter 2, there is no reason why a verb cannot be generated in multiple sections and then Merged together, but it does create a question regarding how rigidly the mirror principle holds in Cupeño and Navajo when compared to a language like Kiowa where the hierarchy of the verb and clausal spine matches. More will be said on this topic in the next chapter which concludes the thesis and provides a host of further research questions to highlight where the analysis can be developed in the future.

Chapter 7

Conclusion and further research questions

This chapter marks the end of the thesis. It aims to take stock and reinforce what this work has attempted to accomplish and also to highlight where developments can be made, and in some cases, are needed. To this end, section 7.1 summaries the journey taken in thesis chapter by chapter. Section 7.2 provides a number of questions which require further work in the future. Finally, section 7.3 concludes this work.

7.1 In this thesis...

Chapter 1 provided an overview of the issues surrounding the head movement (HM) operation and highlighted how HM was problematic in Minimalist grammars which assume the Strong Minimalist Thesis and Merge as the only structure building operation. To illustrate why HM is problematic for Minimalism, a description was provided of Baker's (1988) head movement analysis since his work on the topic represents a significant keystone in the foundation of HM in modern syntactic theory. In Baker's system, HM falls out from a number of principles that cannot be formulated in Minimalist systems, including *Government* and *Barrier*. The discussion then provides a number of other head movement problems presented in the literature (see Chomsky 2001 for instance). It is then highlighted that HM is an issue for recent systems that adopt the labelling algorithm from Chomsky (2013, 2015) since it is not clear how the algorithm can label {X, Y} constructions without stipulating that either X or Y is too weak to label. The chapter then illustrates that the structure of a complex verb is the same as many other types of constituents. Minimally a verb contains, e.g. a $\sqrt{jump}$, verbaliser *v* and Voice head {Voice, {*v*, $\sqrt{jump}$}}. An argument contains the same type of elements, e.g. a $\sqrt{dog}$, a nominaliser and a determiner head D {D, {*n*, $\sqrt{dog}$}}. I used this similarity in conjunction with two others to motivate an analysis where complex verbs are built in the workspace prior to the clausal spine. The verb is then attached in an appropriate place along with the internal and external arguments. The rest of chapter 1 highlights a number of questions that arise immediately from the new system. It is my hope that they have been answered as the thesis has progressed.

Chapter 2 provided the theoretical base of the thesis. The operations discussed here were key to arguing that head movement is not a valid means of building structure in a Minimalist grammar. They also became the backdrop for the new system developed in chapter 5 since a combination of Merge and its subtypes, the workspace, Agree to a lesser extent, and labelling enables complex verbs to be derived in the workspace without having to assume any counter-cyclic operations.

The purpose of chapter 3 was to illustrate how head movement is used in the literature to determine whether the operation can derive multiple copy Spell-Out of complex verbs and verbal elements. This dataset was chosen since it is easier to plot the displacement path of a verb when more than one copy is pronounced. Section 3.1 examined the so called predicate cleft construction. This type of clause requires a verb to be pronounced in the left periphery while a second copy appears within the verb phrase. Head movement could not derive the Nupe data satisfactorily since the operation could not explain why the fronted predicate appeared nominalised without a dubious assumption that the focus head was a clausal determiner (see Kandybowicz 2008). Data from Hebrew was similarly problematic since Landau (2006) proposed that the infinitival marking on the fronted predicate is a default inflection which does not seem appropriate when infinitives in other languages are produced by a separate morpheme, e.g. English and *to run.*

The discussion in chapter 3 then turned to verbal repetition constructions and it was found that head movement could derive the data from Nupe (Kandybowicz 2008) as long as the foibles of the operation were accepted. Yet when Kabiye examples from Collins and Essizewa (2007) were analysed, it was highlighted that head movement fails again because the lowest verbal repeat is realised as an infinitive. The authors do not provide a satisfactory reason since they must stipulate that the lower verb is realised as an infinitive during its movement into a lower focus phrase. If infinitives contain a [-Tense] feature, then the lower verb in Kabiye must acquire its feature during a movement operation which is inherently problematic given that displacement is facilitated by internal Merge.

The final dataset analysed in chapter 3 provides examples containing heavily inflected verbs and pre-verbal particles from Kiowa (Adger et al. 2009). This type of data is significant because head movement derives inflected verbs by upward movement. Yet in this case, when a verb possesses a negative suffix, it cannot be the case that it moves as high as a free-standing particle since the particle is still free. Several alternative analyses were explored and it was highlighted that each was problematic for the Kiowa data or one of the other datasets examined in this chapter.

Chapter 4 used the contents of chapter 2 to argue that HM cannot be adopted in a strict Minimalist system. It is shown that combining Merge with the extension and no tampering conditions makes the inclusion of HM in a Minimalist grammar problematic since they disallow embedding. Since Merge is the only structure building operation given for free by the Strong Minimalist Thesis (SMT), assuming that head movement can assemble complex verbs is inherently costly because HM does not behave like Merge. Consequently, I argued that head movement is not a valid Minimalist operation.

Chapter 5 presented an alternative to head movement using the Minimalist gadgets discussed in chapter 2. The system assumes a workspace and that Merge is the only means of deriving syntactic structure. All the lexical items needed to build a structure are placed in the workspace. The complex verb is then assembled using untriggered Merge along with the internal and external arguments. The clausal spine is produced using Merge which can be either parallel, internal or external depending on where the lexical items are selected from. As the spine is being generated, the arguments and verb are attached in appropriate places. Once the tree reaches an appropriate phase level, the labelling algorithm provided in (173) is used to assign labels to the tree. The algorithm is influence heavily by the one proposed in Chomsky (2013), but is noticeably different in two ways. First the algorithm is not constrained by structural configurations, e.g. {XP, YP} and {X, YP}. Second, the condition in (173c) allows labels to be generated by combining a feature from each of the Merging elements, e.g. {D, Voice}. Combining this algorithm with untriggered Merge produces a system in which trees and labels are generated until something conforms with the interface conditions of full interpretation and headedness. The last part of the chapter explored some immediate consequences of adopting this system, e.g. how it can derive auxiliary and modal verbs along with the differences between VO, OV, V-in-T and V2 clauses.

Chapter 6 applies the Merge system to the data discussed in chapter 3, beginning with predicate cleft constructions. The Nupe and Hebrew data needed a system that could produce the A'-characteristics and pied-piping vs non-pied-piping distinction associated with this data set. Assuming that parallel Merge is constrained by the phase impenetrability condition in the same way as any other type of Merge derived the A'-characteristics in a straightforward manner. The pied-piping vs non-pied-piping data was more complex because it involved two components: first a means of building the clefted element, and second, a way of ensuring that pied-piped examples are ungrammatical in a non-pied-piping language and vice versa. The first was straightforward because the cleft in a pied-piping language is built in the same way as a cleft in a non-pied-piping language, i.e. using Merge. The difference just relates to how much material is added to the clefted element. The second was handled by a micro-parameter which could be set one of three ways: allowing pied-piping, not allowing pied-piping or allowing both. This parameter works in parallel with full interpretation and headedness to generate licit predicate cleft constructions.

Verbal repetition constructions were then derived using the Merge based system and the process was similar to that proposed for predicate cleft constructions. The difference between the two datasets originates from the position in which the extra verb is pronounced. In PCCs, the extra constituent is in the specifier of a high focus phrase while in a verbal repetition construction, the extra element is found in the verb phrase. The examples used in this section were taken from Nupe and Kabiye and these datasets differed in two significant ways. The first is that the Nupe clauses contained a Fact head embedded inside the lower verb, while the lowest verb in a Kabiye repetition clause is realised as an infinitive. Second, the clause in Kabiye contains a KI head which allows the lowest complex verb to Agree with the highest complex verb without an intermediary $\sqrt{}+v$ amalgam intervening. Despite the differences, both sets of data were derivable using Merge and its subtypes since both copies of the verb are derived in isolation before being attached to the clausal spine.

The Merge analysis was then applied to the clausal mirror in Kiowa and it was shown that the issues associated with head movement, a verb final approach and mirror theory could be avoided if the verb is built in the workspace before the clausal spine. Each element of the clausal spine was then derived by Merge (parallel and internal depending on from where the Merging element was selected). Furthermore, the clausal mirror is ensured because the verb and the spine have to be built from the bottom up to avoid an extension condition violation. Building the verb outside the tree dictates that nothing can intervene between the $\sqrt{}$ and its suffixes, which is a good result.

The final dataset derived in chapter 6 are referred to in the literature as mirror principle violations. Harley (2011) provides a means generating the problematic cases from Cupeño and Navajo but it relies on three operations, two of which are types of countercyclic movement. I illustrate that even these complex verbs can be derived by internal Merge, external Merge and parallel Merge without violating the extension condition. Yet the proposed analysis has possible ramifications regarding the continued existence of the mirror principle in these languages when compared to a language like Kiowa where the structure of the verb mirrors that of the clausal spine. This question and others like it will be addressed in the next section which is devoted to highlighting areas that need further research.

7.2 Many questions remain

Many questions remain unanswered in this thesis since the system proposed here has ramifications outside of the multiple copy dataset explored in chapter 3 and derived in chapter 6. Consequently, there are many ways in which the proposal in this thesis can be developed in the future. What follows are some details on topics which have not received the attention that they deserved for one reason or another, although mostly due to a lack of space.

7.2.1 Does the Mirror Principle hold?

The mirror principle is a statement from Baker (1985, 1988) which captures the tendency of complex verbs to match the hierarchy of the clausal spine. In systems which adopt head movement as a means of deriving syntactic structure, the mirror principle falls out from the cyclic nature of HM since a displaced head adjoins to each dominating X^0 until it reaches its final destination. A definition of the Mirror Principle from Baker (1985, 375) is provided in (243) along with a more general version of the definition in (244) from Harley (2011, 1):

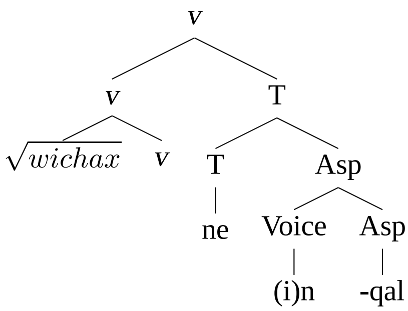
(243) **The Mirror Principle** (Baker 1985, 375)
"Morphological derivations must directly reflect syntactic derivations (and vice versa)."

(244) **The Mirror Principle** (Harley 2011, 1)
"Mirror Principle is expected to hold quite generally, cross-linguistically—in other words, morpheme order should respect the hierarchy of syntactic projections, as the default situation. In certain cases, however, this ideal situation does not seem to hold."

As mentioned in section 6.4, Harley (2011) presents data from Cupeño and Navajo which seems to violate the mirror principle, but that is derivable using a combination of the syntactic and post-syntactic movement. In Harley's system, the mirror principle holds since HM applies cyclically in the syntactic component in such a way that does not violate (243) since the hierarchy of the complex verbs still matches the clausal spine. The post-syntactic operation Merger Under Adjacency (MUA) generates what seems to be a mirror principle violation. Since MUA applies once a tree has been sent to the interfaces, the mirror principle is not violated since the statement holds during the syntactic component.

The Merge based system developed in chapter 5 can also derive the data without a problem. In Cupeño, the complex verb is built in two halves and each half is Merged together to form the complete constituent. To be more specific, the $\sqrt{}$ and verbaliser are combined and then, T, Voice and Asp are Merged to form a second tree. Once both trees are attached together, the verb is complete and the rest of the clausal spine can be built using Merge and its subtypes. A tree representing a Cupeño verb is provided in (237) but repeated in (245) for convenience:

(245)



The issue is the T node. Using the Merge analysis, it is not possible to build a representation of the verb in (245) without producing two trees and then Merging them together. As Merge and labelling are free and untriggered, nothing prohibits the derivation needed to build (245) from taking place because nothing violates the extension condition and interface conditions of full interpretation and headedness. Yet adopting this derivation for (245) entails that the mirror principle does not hold fully in the syntax. It is true that the statement in (243) is not violated when the *v*+$\sqrt{}$ and Asp+Voice+T amalgams are built in isolation, but combining the two together requires T to be Merged with *v* which does violate (243). The same issue is also evident when deriving the Navajo data.

Currently, it is not clear whether it's possible to maintain the mirror principle as stated in (243) and (244) without head movement. True the Kiowa data demonstrated that Merge did produce a version of the generalisation because the complex verb and the clausal spine have to be built from the bottom up. In this case, the mirror principle could be restated as a generalisation which captures how Merge interacts with the extension condition. However, it is not clear at this point whether allowing two trees to be built in isolation and then combined in the way exemplified by (245) is a positive or a negative step given that it reduces the significance of adopting (243) or (244), since violations are easy to derive. More work needs to be done in this area.

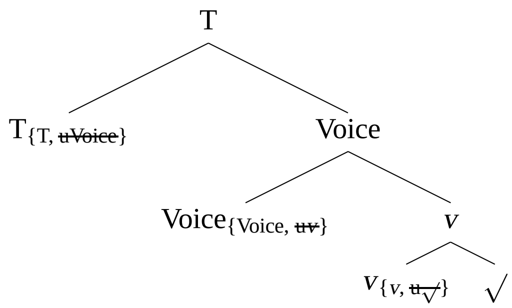
7.2.2 Verbs, the Mirror Principle and triggered Merge

In this thesis Merge is not triggered since the operation does not satisfy a requirement. Yet in many systems, Merge is triggered (see for instance, Abels 2003; Adger 2003; Chomsky 2000; Collins 1997, 2002; Collins & Stabler 2016; Pesetksy & Torrego 2006; Watanabe 1996; Wurmbrand 2014 for various implementations of triggered Merge). In section 2.1, I argued that Merge is untriggered, but since triggered Merge is a popular choice in the literature, the aim of this section is to answer the question of whether triggered Merge can be adopted instead of it untriggered cousin.

If triggered Merge was assumed, then it becomes difficult to duplicate elements of the verb to form the clausal spine using Merge. For instance, say that a verb $\{\{\sqrt{run}, v\}, \text{Voice}\}$ was built and each application of Merge was triggered by a selection feature on one of the Merging elements. And say *v* has an uninterpretable [u$\sqrt{}$] feature which is only satisfied in a local relation with an appropriate head. When it comes time to generate the clausal spine, there are no features left on *v* and $\sqrt{}$ to warrant them being selected a second time and parallel Merged to form the *v*'. When *v* and $\sqrt{}$ are combined initially, the uninterpretable feature that triggers the Merge operation is checked and deleted. Thus nothing is left to trigger the parallel Merge operation which begins the derivation of the clausal spine.

Yet if a workaround for the previous problem was developed and triggered Merge could be adopted to build structure, then the system would provide a means of deriving a strict version of the mirror principle. For instance, each application of Merge that built the complex verb is triggered by a feature. A representation of a complex verb built using selection features is provided in (246):

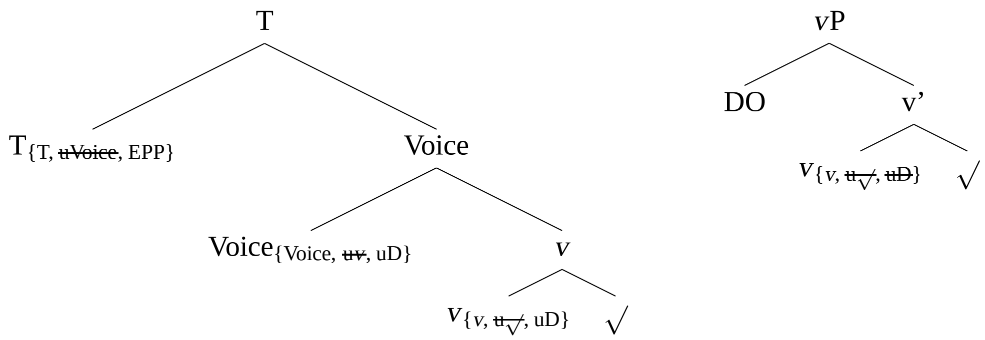
(246)



Each head inside (246) possesses a categorial feature and a selection feature. The selection features target categorial features during applications of Merge. Because the selection features are satisfied in the complex verb, the same relations must also hold in the clausal spine. So for instance, in (246) *v* possesses a feature that targets a $\surd$. Thus in the clausal spine, the duplicate *v* must also be in a position where it is sister to a $\surd$. Likewise, the Voice head inside the verb selects a *v* projection which also means that the duplicate of Voice inside the clausal spine has to be in the same position relative to a *v* projection. The same holds for T and where present C. Since all selection relations have to be matched in the verb and clausal spine, the mirror principle necessarily holds.

Yet the feature bundles in (246) cannot represent the whole story because each set of features must also contain additional selection properties that are satisfied when arguments are attached to the clausal spine. A representation of a complete *v*P is provided in (247) along with an updated complex verb that contains all the extra selection features needed to generate a clause:

(247)



In (247), the feature bundle of *v* has been updated to contain a [uD] which selects the direct object. As the verb is built first and each head comprising the clausal spine is a duplicate of a verbal head, the selection features that target arguments must also be contained in the verb, as shown in (247). However, the selection features that are contained inside the complex verb are not satisfied during the derivation since the verb does not contain any DPs. One way around this problem would be to assume that when each element of the verb is duplicated using Merge, only the categorial feature is left behind. Yet tampering with Merge in such a way would not be an ideal solution because it requires a more complex version of the operation, e.g. one that can disassemble the feature bundle of a head and strand only the feature required. Such an instantiation of Merge is not possible to formulate while still adhering to the Strong Minimalist Thesis.

7.2.3 Merge and the empty set in other domains

The data that I have used to develop this Merge based system has been centred in the verbal domain. Each of the datasets explored in chapter 3 focused on multiple realisations of verbs and verbal-type elements. Consequently, one way in which the system can be developed is for it to be applied to examples from other domains. Yet before beginning with an entirely new set of data, it is worth noting that Merge and its subtypes have been used inside the DP domain in a trivial way already. For instance, in a sentence containing two DPs such as *the dog bit the boy,* the initial workspace can only contain one occurrence of *the* and *n* since {x, x } = {x}. A representation of the workspace is provided in (248) for reference:

(248) Workspace

$\{_W$ the, *n*, $\sqrt{dog}$, $\sqrt{boy}$, T, Voice, v, $\sqrt{bite}$, C$\}$

The complex verb is built first along with the subject, but it is not possible to then build the direct object immediately because *the* and *n* do not appear in the workspace since W is an unordered set and does not allow multiple membership. The solution to this problem is to parallel Merge *n* and *the* with the root $\sqrt{dog}$, thus generating a complete direct object containing a categoriser and determiner. What follows are another two brief examples which may serve as viable candidates for further developing the Merge system.

One set of data to which this Merge based system may be applicable are clauses containing so called partial wh-movement. These constructions have been discussed in many places (see for instance Cole & Hermon 2000; Fanselow 2006; McDaniel 1989; Reintges et al. 2006; Sabel 2006; Tsoulas & Yeo 2017; von Stechow 2000; Yeo 2010) and involve movement of a wh-phrase from its Merge position to the specifier of an embedded clause. The scope of the wh-phrase is then signalled using a marker consisting of a wh-word (German), a particle (Albanian) or an agreement morpheme (Coptic Egyptian). Examples of partial wh-movement are provided in (249), (250) and (251):[1]

(249) German (Fanselow 2006, 442)

a. Was glaubst du wen$_i$ Irina t$_i$ liebt?
what believe you who-Acc Irina loves
"Who do you believe that Irina loves?"

b. Was glaubst du was er sagt wen$_i$ Irina t$_i$ liebt?
what believe you what he says who Irina loves
"Who do you believe that he says that Irina loves?"

(250) Albanian (Fanselow 2006, 441)

a. A mendon se Maria thotë se çfarë ka sjellë burri?
Q think that Mary says that what brought her husband
"What do you think that Maria says that her husband brought?"

[1]The format of all the examples has been modified slightly to fit in with the conventions of this thesis

b. A mendon se çfarë thotë Maria se ka sjellë burri?
Q think that what says Mary that brought her husband
"What do you think that Maria says that her husband brought?"

(251) Coptic Egyptian (Reintges et al. 2006, 182)

a. eye əntɔtən *e*-tetən-tšɔ əmmo-s ero-i [tše ang *nim*]?
Q you(-PL) REL(-PRES)-2PL-say DO-3SG:F about-1SG C I who
"Who are you saying of me that I (am)?"

b. *e*-n-ər khria kʸe əm-məntre [e-ər *u* tšin tenu]?
REL(-PRES)-make need PCL as-witness to-make(-INF) what? since now
"What further witness do we need to bear now?"

In (249a), the wh-phrase *wen* appears to move into the specifier position of an intermediate CP while the wh-word *was* appears to mark the scope position of *wen.* A similar example is provided in (249b) in that *wen* moves to an intermediate position and *was* marks the edge of each CP that *wen* has scope over. Since *wen* has scope over the matrix clause, it is argued that *wen* moves to matrix CP but is pronounced in an intermediate position. The *was* elements mark each position that *wen* moves through on its journey to matrix C. Each occurrence of *was* thus acts a "breadcrumb" (to quote Tsoulas & Yeo 2017) showing the path that *wen* uses on its way to the specifier of matrix CP. The Albanian sentences in (250) are similar in that the wh-phrase scopes over the matrix clause but is pronounced inside a lower CP, with scope being marked by the Q particle. Finally, the Coptic examples in (251) follow a similar pattern in that the wh-phrase stays low even though it scopes over the matrix clause. In this case, scope is marked by the relative tense morpheme REL-.

In the literature, data of the sort shown in (249)-(251) is derived by moving the wh-phrase into the specifier of the matrix CP even though it is pronounced in a lower position. The wh-word, Q particle and relative tense morpheme signal the scope of the wh-phrase. So in each case, scope is marked by a small piece of structure. An avenue of further research for Merge and its subtypes would be to see whether it could derive this type of data. The most obvious comparison between partial wh-movement and the data discussed in chapter 3 and built in chapter 6 is between predicate clefts and the German examples in (249). The reason is that in both types of clause, a constituent is pronounced twice with a different form. For instance, Nupe predicate clefts feature a nominalised fronted predicate and a tensed verb while the German example in (249a) features a default form wh-word in the left periphery and a full wh-word lower down the clause. The Nupe cleft is built by generating a second copy of the lower verb using parallel Merge which is then clefted in spec-CP. Consequently, it may be possible to derive the different wh-words in the same way, e.g. build the contentful lower word first and then parallel Merge the parts needed for the default form that appears in the higher position. In addition, the same analyses may be applicable to (250) and (251) if it could be argued that the Q particle in Albanian and the relative tense morpheme in Coptic Egyptian are duplicates of something inside the lower wh-phrase. At first glance, this line of research looks like it might be promising, but only time will tell whether it can be sustained.

A second set of data to which the Merge analysis could be applied is from Dutch and involves the double realisation of a *-s* morpheme. Traditionally, the double *-s* has been analysed as two occurrences of a genitive case suffix and the first *-s* is said to be proleptic in that it anticipates the appearance of the second *-s*. Examples of the data from Corver (2007, 179-80) are provided in (252):

(252) Dutch

a. blootshoofds
bare-s-head–s
"bare headed; with the head bare"

b. binnensmonds
inside-s-mouth-s
"under one's breadth; between one's teeth"

c. 's Zondags
-s Sunday-s
"on Sundays"

Each example in (252) features two occurrences of *-s*. In Corver's (2007) analysis, an application of head movement generates the higher copy of the morpheme which then allows both copies to be externalised. As seen in chapter 6, Merge and its subtypes serve as an alternative to the head movement operation and a potential research area would be to determine whether the new system can be used to derive the data in (252). For instance, it may be possible to derive a copy of the lower head in the workspace using parallel Merge which allows the copy to then be attached to the phrase in the higher position. Furthermore, Corver (2006) also explores a different instance of prolepsis involving adjectives, but again it is not clear whether Merge can be applied in this context. More work needs to be done in the future to determine the system's validity.

7.3 Conclusion

This thesis aimed to introduce an alternative to head movement that used nothing more than operations that are already a part of Minimalist grammars. Despite that Merge and its subtypes were able to produce the data to which they were applied, there is a great deal left to explore in order to determine whether the system is sustainable. One point which I want to emphasise at this late stage is that the operation Merge is able to derive any binary, and possibly unary, syntactic structure. In the Minimalist world within which this thesis is set, I do not think that it is appropriate to suppose that structure can be built by anything other than Merge because untriggered Merge can build anything. The issue currently relates to how the ungrammatical trees built by the operation are weeded out during transfer and externalisation. A little work on this topic has been done in this thesis by exploring a proposal that labels interact with output conditions such as full interpretation and headedness, but it may be the case that a better way to derive complex verbs, and structurally complex elements in general, is found in the future. Even so, I think that given current Minimalist assumptions, structure building has to just involve Merge.

Abbreviations

1, 1st	first person
2, 2nd	second person
3, 3rd	third person
ACC	accusative
Agr	agreement
ASP	aspect
AUX	auxiliary
COMP	complementiser
COND	conditional
Conj	conjunct, e.g. conjunct vs independent word order
CONJ	conjunction
D	dual
DEF	definite
Dir	direct voice
DO	direct object
EA	external argument
Emph	emphatic particle
ERG	ergative
EVID	evidential
FOC, FOC	focus
FT	floating tone
FUT	future
HAB	habitual
HORT	hortative
I	inverse
IA	internal argument
IC	Initial change

IMP	imperative
IMPF	imperfective
IN	inclusive
Ind	independent
INF, Inf	infinitive
INFER	inferential
IO	indirect object
LOC	locative
MIR	mirative
Mod, MOD	modal
Neg, NEG	negative
NOM	nominative
Obj	object
Obv	obviative
Part	participle agreement
PAST	past tense
PERF, Perf, PERF, PF	perfective
P, PL, P, pl	plural
POSS	possessive
PRS	present tense
PRT, PRT, PRT	particle
RED	reduplicant
REFL	reflexive
SG, S, SG, S	singular
Subj	subject

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