Head movement and external merge

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In the generative syntax literature, analyses deriving the operation of head movement (HM) differ widely but can be separated into two broad groups. On the one hand, some argue that HM is a syntactic phenomenon (see for example Bobaljik and Brown 1997, Lechner 2006, Matushansky 2006 and Roberts 2010) while on the other, some have proposed that HM could be analysed better as a PF operation (see for instance Boeckx and Stjepanović 2001 and Chomsky 2001). The aim of this talk is to provide a means of deriving the effects of HM syntactically without violating the extension condition. Similar proposals have been put forward that do the same, for example Bobaljik and Brown (1997) (henceforth B&B (1997)) and Matushansky (2006), but in each case an additional operation is proposed to make HM derivable in the syntactic component: B&B (1997) allow *interarboreal operations*, also called *sideward merge* in the literature (deVries 2012, 148), while Matushansky (2006) proposes an operation called *m-merger*. In contrast to these two approaches, I propose that the effects of syntactic HM can be derived without violating the extension condition and using nothing more than *external merge* (EM).

In order to accomplish this, I shall first review why HM is thought of as a PF phenomenon and examine the problems of head adjunction and of treating HM as a form of *internal merge* (IM) given that the moved element does not c-command its lower copy. These issues prompted Chomsky (2001) to propose that HM is better understood as a PF phenomenon which he supports by stating that the operation has little to no semantic effect (Chomsky 2001, 37).

Yet Roberts (2010) presents evidence indicating that at least some types of HM need to be analysed as being in the syntax because the effects are tangible at LF. Roberts examines negative polarity items (NPIs) and finds that subject auxiliary inversion (SAI) can be used to license NPIs. This analysis requires two assumptions which Roberts (2010, 8) makes explicit. The first is that the licensing of NPIs is an LF process, and the second is that SAI is a type of HM. Given these assumptions, it follows that if SAI affects whether an NPI is licensed, then at least one type of HM is syntactic and visible at LF. One of Roberts' examples, originally from Kayne (2000, 44), is provided below:

(1) SAI saving NPI licensing conditions

a. *I know why anybody didn't help.

b. Why didn't anyone help us?

Following Roberts, I take the examples in (1) to indicate that HM, or at least certain types of HM, should be treated as a syntactic phenomenon. The outcome is that an analysis needs to be proposed which can account for the less then syntactic behaviour of HM mentioned above.

To this end, I examine B&B (1997) and Matushansky (2006) who derive HM in a way compatible with the argument that HM is a syntactic phenomenon. B&B (1997) utilise sideward Merge which allows a head already part of an extended projection in the workspace to externally re-merge with another head also contained in the workspace. The newly derived complex head then merges with the extended projection containing the first occurrence of the externally re-merged head. The alternative proposed by Matushansky argues for a system where HM is triggered by the need to check uninterpretable features. As the trigger for HM is the same as for phrasal movement, the head moves into the specifier of the probe in the same way as a phrase before an operation called *m-merger* re-brackets the head and probe into a head adjunction structure. Both analyses derive HM without violating the extension condition, but in each case an addition to EM and IM is required: B&B (1997) propose side-ward Merge in conjunction with EM while Matushansky argues for a combination of IM and m-merger.

As the data in (1) indicates that at least some types of HM are syntactic, I follow B&B (1997) and Matushansky (2006) in arguing that HM is derived in the syntactic component, but propose that the effects can be generated using just EM in a system where an internally complex subject, e.g. *the cat on the mat*, is built in the workspace before being attached to the tree. To illustrate, in (2) W represents the workspace, α a subject, and β an extended verbal projection where Voice has merged with a *v*P:

(2) $\{_{\mathrm{W}}\ \{_{\alpha}\ \mathrm{D},\ \{n,\ \{\sqrt{cat}\}\}\},\ \{_{\beta}\ \mathrm{Voice},\ \{\{_{\mathrm{DP}}\ \mathrm{Object}\},\ \{v,\ \{...\}\}\}\}\}$

When α and β are combined using Merge, the result is a subject in the specifier of VoiceP. As α is merged to the root of β, the extension condition is not violated.

The analysis presented above can be applied to complex heads without further modification. An example is provided below:

(3) $\{_{\mathrm{W}}\ \{_{\alpha}\ \mathrm{Voice},\ \{v,\ \{\sqrt{eat}\}\}\},\ \{_{\beta}\ \{_{\mathrm{DP}}\ \mathrm{Object}\},\ \{_{v'}\ v,\ \sqrt{eat}\}\}\}$

In (3), α becomes the complex head and β represents the constituent to which α is attached, the *v*P. As the complex head is built and merged to *v*P in the same way that the subject is merged to β in (2), the effects of HM are derived without violating the extension condition and using nothing more than EM.

A consequence of this analysis is that a generalised pronunciation statement such as *pronounce highest copy in a chain* cannot apply to complex heads because a chain does not exist between the lexical items contained within a complex head and those that are merged as part of the verbal extended projection. To account for this issue, I follow Chomsky et. al. (2017) and assume that when a syntactic object is externalised to the phonetic interface, the hierarchy generated by Merge must be interpreted as an ordered sequence. In addition, I propose that a part of this externalisation involves a process where hierarchy is stripped away leaving just an unordered set of terminal nodes. In set theoretic terms, {x, x} is equivalent to {x} given that an unordered set cannot contain multiple occurrences of the same member. Thus if *Mary hit John* is used as an example, the externalisation process will generate the set in (4):

(4) $\{\mathrm{C},\ \mathrm{Mary},\ \mathrm{T},\ \mathrm{Mary},\ \mathrm{Voice},\ v_{[CAUSE]},\ \sqrt{hit},\ \mathrm{John},\ v_{[CAUSE]},\ \sqrt{hit}\}$

As (4) is an unordered set, and as {x, x} = {x}, the unordered set in (4) is equivalent to (5):

(5) $\{\mathrm{C},\ \mathrm{Mary},\ \mathrm{T},\ \mathrm{Voice},\ v_{[CAUSE]},\ \sqrt{hit},\ \mathrm{John}\}$

Example (5) contains the heads needed to produce the sentence *Mary hit John*. Of course, the unordered set will need to be linearised, but the method of linearisation is a problem for another time. As complex heads are generated by EM, set theory provides a novel way of deleting copies that is not reliant on the notion of a chain or of any kind of established relationship between the roots and categorisers in complex heads and those merged independently as part of the verbal spine. Once it is assume that externalisation generates an unordered set, multiple occurrences of identical elements have to be deleted.