

Postsyntactic movement on the LF-side of Grammar: Quantifier Raising outside narrow syntax

Abstract: In this paper, I argue that a series of problems that arise when Quantifier Raising (QR) is taken to be a process that takes place within the syntactic component, either prior or after Spell-Out, disappears once it is assumed that Internal Merge also applies after the derivation is transferred to the Conceptual-Intentional System. QR is then an instance of post-syntactic, semantically triggered movement, just like head-movement can be taken as an instance of post-syntactic movement, triggered by linearization requirements.

Keywords: Quantifier Raising, Merge, movement, syntax-semantics interface

1. Quantifier Raising and covert movement

It has been a general topic of debate whether (both External and Internal) Merge should be restricted to the narrow syntax component of grammar, or whether it is an operation that also applies in other grammatical components, such as phonology, morphology and/or the lexicon. Post-syntactic Internal Merge has been proposed and is nowadays generally accepted, for the PF-side of grammar (cf. Boeckx & Stjepanović 2001, Embick 2001, a.o.). And even stronger, it has been argued that both External and Internal Merge (or their predecessors) are domain-general and can also apply in non-linguistic, cognitive domains, such as music (Lerdahl & Jackendoff 1983, Katz & Pesetsky 2011, Zeijlstra 2020). If that is the case, it should also be possible that Merge applies at the LF side of grammar, that is, Merge can apply *after* the derivation is transferred to the Conceptual-Intentional System (see Chomsky 2004).

In this paper, I argue that a series of problems that arise when Quantifier Raising (QR) is taken to be a process that takes place within the syntactic component, either prior or after Spell-Out, disappears once it is assumed that Internal Merge also applies after the derivation is transferred to the Conceptual-Intentional System. QR is then an instance of post-syntactic, semantically triggered movement, just like head-movement can be taken as an instance of post-syntactic movement, triggered by linearization requirements.

Often, QR has been assumed to be an instance of Internal Merge that applies within the syntactic component of grammar where a lower copy instead of a higher copy is pronounced. Examples are in (1b), where the object raises covertly across the subject to yield a wide scope reading. As it is theoretically unclear whether an existential quantifier like *some book* can be interpreted in its base position (as in (1a)), it is also possible that the subject then covertly raises across the raised object to yield the surface scope construal again (1c).

- (1) a. Every student likes some book $\forall > \exists$
 b. Some student [likes every book ~~some student~~] $\exists > \forall$
 c. [Every book [some student [likes ~~every book~~ ~~some student~~]]] $\forall > \exists$

2. Challenges for current approaches to QR

Two ways of implementing this view have been proposed: either QR takes place after the split between the routes to PF and LF (i. e., after Spell-Out) (cf. May 1977, 1985, Chomsky 1995, Chomsky 2004); or QR takes place in overt syntax, before Spell-Out, with PF targeting the lower copy and LF targeting the higher one (Bobaljik 2002).

Arguments for the latter come for instance from the Extension / No Tampering Condition. If a quantifier like *every book* or *some student* in (2) (where $\langle \dots \rangle_i \dots \langle \dots \rangle_j$ denote copies and boldface denotes phonological realisation) can internally merge into an IP-adjunct (where I use the term IP to stay theoretically neutral with respect to the exact nature of this phrase, being it either TP, AgrSP, FinP or something else) position after the complementizer has already been externally merged with the IP, the Extension / No Tampering Condition is violated.

- (2) ... [that \langle some student \rangle_j \langle every book \rangle_i \langle some student \rangle_j likes \langle every book \rangle_i]

Bobaljik's (2002) analysis does not suffer from this violation of the Extension / No Tampering Condition. In fact, it treats QR in exactly the same way as overt movement, the only difference being that PF does not realise the higher copy. However, there are several problems with the view that QR takes place in narrow syntax, and some in particular with the view that QR takes place prior to Spell-Out.

First, unlike other instances of movement, QR often takes place optionally. The fact that a sentence like (2) is ambiguous between a surface scope and inverse scope construal shows that the relevant instance of QR must have been optional, as otherwise ambiguity could not have been yielded. In the example above, raising of *every book* out of the object position may be obligatory, but raising the

subject *some student* across the raised object is not. Such optional movement is unexpected from a syntactic perspective, since economy conditions rule out Internal Merge from applying unnecessarily. Here one might argue that scrambling is an instance of optional movement, but scrambling is only seemingly optional, as it is triggered by different movement triggering heads (such as clause-internal focus positions, see Corver & van Riemsdijk 1994 for an overview of approaches).

Second, QR must be triggered by semantic requirements (such as type mismatches or constraints on scope construals that should not play a role within the syntactic component, whereas movement prior to LF is arguably triggered by formal featural requirements (and not by semantic considerations). As Fox (1995, 2000) has pointed out, competition between possible derivations cannot even be fully syntactically determined (see also Mayr & Spector 2012): when determining whether QR should apply or not, only derivations with the same meaning must be considered and not derivations with the same numeration, as is the case in syntax (Chomsky 1995). For this reason, Fox (1995, 2000) argues in fact, contrary to more standard assumptions, that syntax and semantics are not autonomous.

Third, QR does not feed any other syntactic operations. Syntactic effects that result from moving certain phrases are never triggered by QR-ing such phrases. To see this, take French participle agreement: French participle agreement can appear only if the controller moves over the agreement probe (3a-c), but QR-ing over it never triggers agreement (3d):

- (3) a. J'ai vu/*vue Marie French
 I have seen/seen.FSG Marie.
 'I have seen Marie.'
- b. (Marie,) je l'ai vue /*vu.
 Marie I her.have seen.F.SG/seen
 '(Marie,) I have seen her.'
- c. Combien de femmes a-t-il vues/?vu?
 How.many of women has-he seen.F.PL/seen
 'How many women has he seen?'
- d. J'ai vu/*vues toutes les femmes.
 I have seen/ all the women
 seen.F.PL
 'I have seen all the women.'

If in (3d) *toutes les femmes* underwent QR prior to Spell-Out to a position above the agreement probe, there is no reason why it could not control agreement as well.

What (3) reflects is arguably a ban on covert movement being able to trigger agreement. Such instances of agreement have hardly ever been reported, reported cases being instances of information-structure driven cases of agreement in languages like Tsez (see Polinsky & Potsdam 2001). In Tsez an absolutive argument in embedded clauses can control agreement on the matrix verb if that argument is a topic. If it is not, no such agreement is possible and default agreement (noun class IV) pops up (4a-b).

- (4) Enir [uʒā magalu b-ācʹruhi] b-iyxo Tsez
 mother [boy bread.ABS(III) III-ate] III-know
 'The mother knows [(that) (as for the bread) the boy ate it]'
- (5) Enir [uʒā magalu b-ācʹruhi] r-iyxo Tsez
 mother [boy bread.ABS(III) III-ate] IV-know
 'The mother knows [(that) (as for the bread) the boy ate it]'

Polinsky & Potsdam (2001, 606) show that this pattern of cross-clausal agreement cannot be explained in terms of movement of the embedded absolutive into the matrix clause, or by doubling the embedded absolutive DP by a null *pro* topic. They conclude that cross-clausal agreement in Tsez can only be accounted for by assuming that topics covertly raise to a position at the edge of the embedded clause. Assuming that Agree probes cannot search past the edge of a finite embedded domain would guarantee that only topics can agree with matrix T, since non-topical arguments would not undergo this kind of raising.

However, as Bjorkman & Zeijlstra (2019) have argued for, these facts are better analysed without postulating covert topic raising. Specifically, they propose that the embedded absolutive DP bears an uninterpretable topic feature, abbreviated [uTop]. This feature probes upwards and is checked by a corresponding [iTop] feature, located on a head in the left-periphery of the embedded clause. For simplicity of representation, this head is referred to as C. Given that embedded clauses trigger morphological agreement in Tsez, it is natural to assume that in addition to this optional [iTop] feature, this embedded C head also bears ϕ -features but that these features are unvalued, as reflected by the fact that embedded clauses trigger default noun class agreement on the matrix verb in the absence of cross-clausal agreement. Whether or not the absolutive DP moves covertly to Spec,CP, the fact that it stands in a feature checking relation with C means that it is accessible to C, and can value its unvalued ϕ -features. As a next step, this feature will probe upwards and be checked by matrix *v*, making the ϕ -feature of embedded C accessible to value the [u ϕ] feature realised on the matrix verb. Hence, it is not the absolutive topic itself that agrees with *v*, but rather the intermediating topical C-head. If this approach is indeed correct, it follows straightforwardly that the Tsez effects are not the result of covert movement feeding agreement. Note that this conclusion is fully in line with Branigan &

MacKenzie (2002) who make a similar suggestion for Innu-aimûn. As demonstrated by Hamilton & Fry (2014), possible targets of cross-clausal agreement vary across the Algonquian family but in all cases the target DP is related via Agree to a head in the left periphery of the embedded clause, and that this Agree relation correlates with information-structural effects. This strengthens the conclusion that covert movement cannot trigger agreement, and thus the third problem upholds.

Of course, this third problem can be solved by assuming that QR indeed takes place *en route* to LF after Spell-Out, as then no effect of this movement would be phonologically visible. However, assuming that QR takes place after Spell-Out brings back the violation of the Extension / No Tampering Condition. The other two problems are independent of the position of QR with respect to Spell-Out.

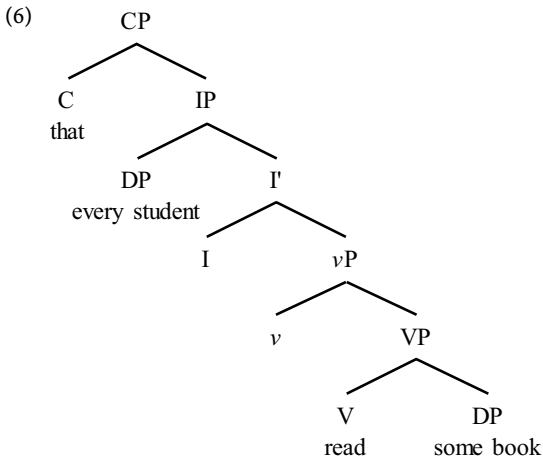
What appears to be the case is that the application of QR is only sensitive to semantic triggers and can only trigger semantic effects. This is hard to understand if QR takes place in narrow syntax. Hence, syntactic versions of QR, irrespective of whether they take QR to apply prior to or after Spell-Out, bring in several non-trivial problems and raise the question whether QR should take place within the syntactic component of grammar in the first place.

The reason why QR has generally been assumed a syntactic process is that it obeys syntactic locality but it has been argued for by Wurmbrand (2018) that these locality-restrictions can be more easily overruled than is the case for overt instances of movement. This means that locality restrictions on QR are better explained in terms of difficulties of processing covert scope shifting. Note also that Huang (1982) already showed that not every syntactic locality condition applies to every instance of covert movement; for instance, subadjacency effects do not emerge with covert *Wh*-movement in Chinese.

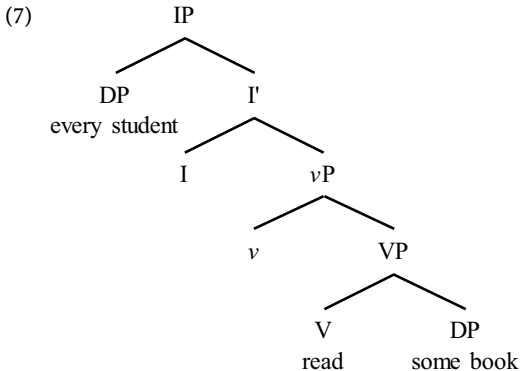
3. Proposal

In this paper, I argue that all these problems can be resolved once it is assumed that QR is an instance of Internal Merge that does not take place within the syntax, but applies post-syntactically, i. e., *after* transfer to the semantic component: QR applies within the Conceptual-Intentional System. That is, structures that are subject to semantic interpretation may be manipulated by means of Merge and (Internal) Merge is thus not restricted to narrow syntax, as has been argued for independently by Chomsky (2001), Boeckx & Stjepanović (2001), among many others. As we will see, this immediately solves the Extension / No Tampering Condition problem.

To see this in more detail, take the derivation of (2). Within syntax the following structure has been generated:



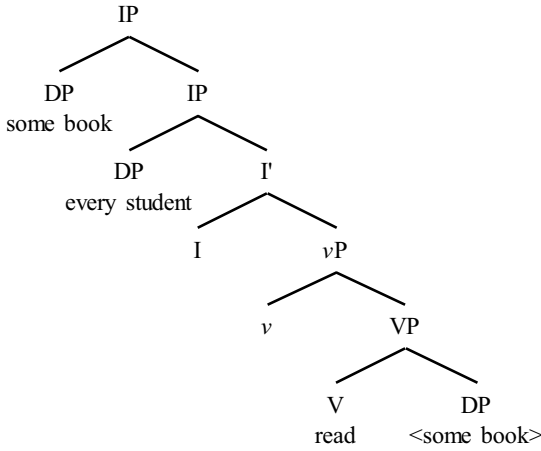
Given that C is a phase-head, but crucially not $\bar{\nu}$ (see Keine 2020, Keine & Zeijlstra 2022 for a series of arguments in favour of this view), the complement of the phase head is shipped off to the Conceptual-Intentional System. This happens when syntax reaches the interface with the semantic system(s), hence this transfer takes place at LF. Then, what enters the Conceptual-Intentional System is the IP (and not the CP):



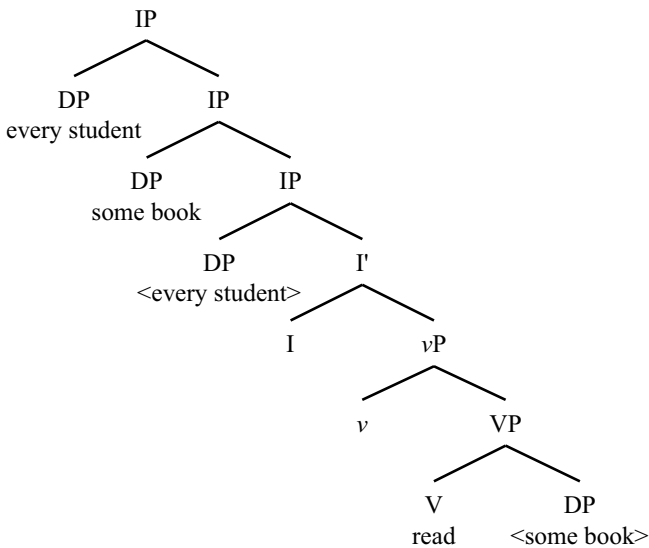
It is thus (7) that enters the Conceptual-Intentional System. There, first translation into function-argument relations takes place, followed by the actual interpretational procedure. In between, elements can externally and internally merge to establish (necessary or possible) scopal and binding relations, leaving variables behind that can be bound upon quantificational elements having been raised (along the lines of Heim & Kratzer 1998). It is thus at this stage that *every*

student can internally merge with the entire IP and adjoins to it without violating the Extension / No Tampering Condition, as informally shown already in (8)–(9).

(8)



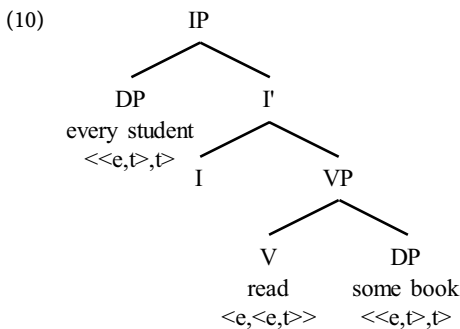
(9)



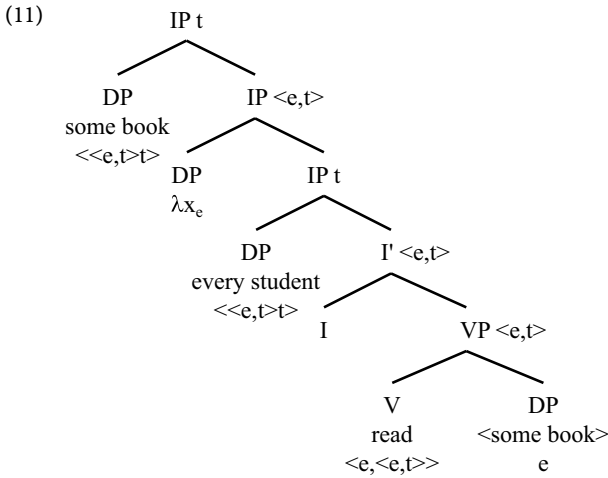
In fact, IP-adjunction is now the only possible landing site for QR, as Internal Merge must apply to the root. This means that the conundrum discussed before, namely, that QR always applies covertly but that it would then violate the Extension / No Tampering Condition is now resolved. The fact that QR applies after Transfer, i.e., after the complement of the phase head C is shipped off to the interfaces, renders IP the root of the structure instead of CP.

Apart from this, the other problems that QR is subject to also vanish. The first one concerns the optionality of QR. To understand the nature of this problem, it is important to realise that it is not the case that External or Internal Merge may never apply optionally. In principle, the operation Merge may apply freely. However, because of reasons of Economy it must be triggered. Regular instances of Internal Merge are triggered by some formal feature that needs to be checked in the course of the derivation (Chomsky 2000, 2001 and many after him), either an uninterpretable feature (following Zeijlstra 2012 or Bjorkman & Zeijlstra 2019) or an EPP-feature (Chomsky 2000, 2001) or even other formal properties (see Richard 2016 for a proposal). Such features all share that if movement does not take place (i.e., if Internal Merge does not apply) the unchecked or unsatisfied feature will render the derivation ungrammatical. The only way then in which optional movement may occur is either if the moving feature itself is only optionally present (see Biberauer et al. 2008, Keine & Zeijlstra 2022) or if it can be targeted by more than one element in the structure (see Biberauer & Richard 2008).

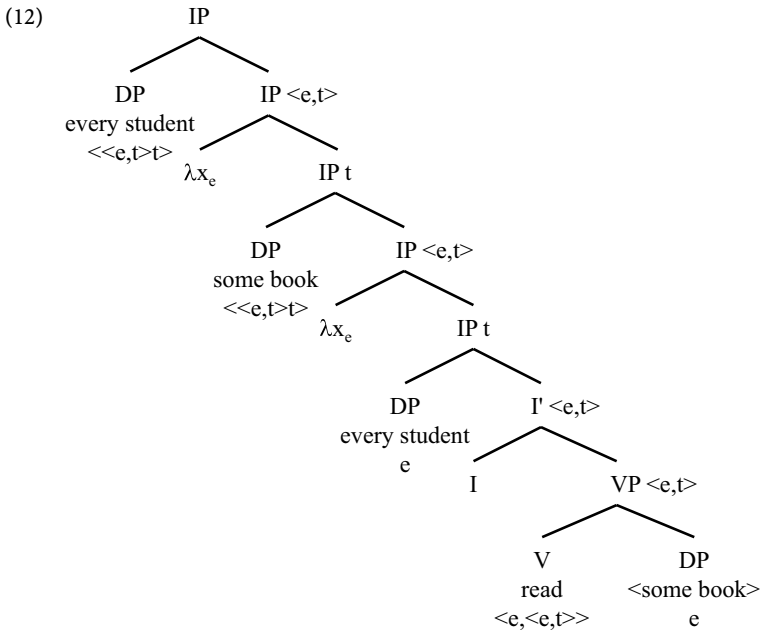
Internal Merge applies in syntax in order to satisfy the need of some formal features present on particular heads; without movement, the structure would be ill-formed. The same should hold for Internal Merge at the post-syntactic level, here the semantic level. The only way movement can be triggered here is if it is encoded that by not moving a particular element the derivation remains semantically ill-formed. To see the exact workings of this, take (7) again, but now with the relevant types included (ignoring vP):



As the reader can see, the types here do not match. However, following Heim & Kratzer (1998) in allowing (external) merger of a lambda-bound variable at the top node, and Fox (2002, 2003) in assuming that traces of movement converse into type e , the derivation can result into one where all semantic elements can undergo Functional Application and where the entire structure will be of type t (again, ignoring vP).



The same holds for the optional next step where the subject raises across the raised object to yield wide scope, as in (12).



The moment a lambda-bound variable, an element whose presence is solely semantically motivated and that is included after the transfer to the semantic system, merges with the top node and forms a trigger to move a quantifier to an

even higher position, the entire structure is of type t again. This means that what is optional is not so much the application of Internal Merge but rather the application of External Merge to include the trigger for movement (λx_e) into the tree. Note that this fills the lacuna mentioned in Chomsky (2004) that Internal Merge appears to apply after Transfer, but External Merge does not, an assumption at odds with the reduction of both to Merge. Under this proposal, External Merge can also apply after Transfer (see Landau 2022 for another proposal that External Merge applies after Transfer).

Apart from the fact that this resolves the apparent optionality of QR, it also resolves another long-standing open question in the syntax-semantics interface: what motivates and allows the inclusion of lambda-bound variables into an already existing structure? Under the current proposal that question can now be addressed. At the semantic level nothing blocks inclusion of purely semantic material as long as it is merged into the tree and therefore must be a sister to the root. The same holds for the inclusion of other semantically motivated elements such as particular type-shifters or exhaustifiers (see Zeijlstra 2022, pace Chierchia 2013, Chierchia et al. 2012 among many others).

As for the second problem, the fact that QR is semantically and not syntactically motivated, as outlined before, it should be clear by now that this problem no longer emerges. Since the relevant instances of Internal and External Merge take place within the Conceptual-Intentional System, it follows immediately that only semantic considerations can determine whether a quantifier raises for scope-taking or not. Note that this also dismisses the need to give up on the autonomy between narrow syntax and the semantic and phonological systems.

Finally, since QR does not take place within the syntactic component, it should not feed any other syntactic operation, such as agreement, and must, trivially, never be overt, as the cases concerning French participle agreement show. Hence, the fact that QR cannot feed agreement follows immediately. This also explains why type-shifters, exhaustifiers and lambda-bound variables themselves are never phonologically realised. These elements simply cannot be present before the structure is transferred to the interfaces.

4. Conclusions

Hence, with the solution presented in this paper, all problems listed above disappear once the ability of (Internal and External) Merge to apply within the Conceptual-Intentional System is assumed, something that should be predicted to be possible anyways if movement is allowed to apply post-syntactically.

Naturally, this proposal also raises a number of questions as well. For one, the question emerges as to whether every instance of QR must take place outside the

syntactic component. The answer to this question is no. There are cases of overt QR, as reported by Johnson (2012). Also, I do not preclude any other mechanisms of deriving inverse scope effects. My goals here are modest. I only wanted to show that certain problems for QR that emerge under the view that QR applies within narrow syntax disappear once it is assumed it applies post-syntactically.

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Hedde Zeijlstra
Georg-August-Universität Göttingen
hzeijls@uni-goettingen.de

