Adjunction to movement paths: Floating quantifiers as the little brother of parasitic gaps

Keywords: syntax, computational linguistics, Minimalist grammars, subregular complexity

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Overview Floating quantifiers (FQs) have been analyzed as either adverbs (Baltin 1995, a.o.) or the result of stranding (Sportiche 1988). Minimalist grammars (MGs; Stabler 1997) allow for a computational synthesis of these two strands such that FQs are instances of displacement-sensitive adjunction. This combines the strengths of these approaches while avoiding some of their pitfalls, and it establishes computational parallels between FQs and parasitic gaps. FQs are computationally simpler, though, which explains their limited size and their inability to be licensed by A$'$-movement.

Basic proposal MGs use Merge and Move to assemble sentences from lexical items that are annotated with positive features (selector, move-attractor) and negative features (category, mover). Each application of Merge/Move must check two features of opposite polarity. The features on each lexical item are linearly ordered, and this dictates the order in which Merge and Move apply. This is illustrated in Fig. 1 with a derivation tree for *The children have arrived*. Note that nom^- on *the* only becomes active after merger with the verb, and then the feature remains active for two more Merge steps before Move can finally apply. For any given movement feature f, the nodes that occur between the activation of f and the point where f is checked form the *movement path of* f (indicated by boxes in Fig. 1). As a first proposal (refined later on), I contend that **FQs are adjuncts that appear along movement paths**.

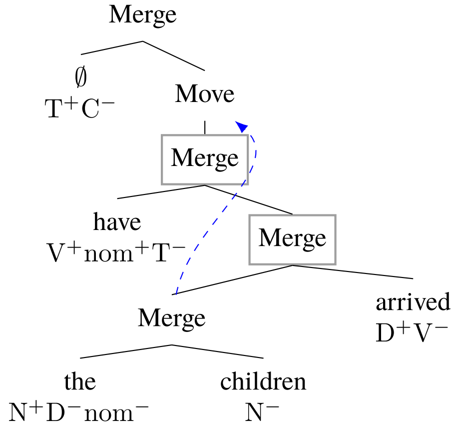

Figure 1: Feature-driven movement

Predictions Like the quantifier stranding analysis, my proposal views displacement as a central licensing condition for FQs. But it also readily explains why FQs cannot occur in θ-positions (Bošković 2004):

(1) [$_{\text{CP}}$ ∅ [$_{\text{TP}}$ [$_{\text{DP}}$ The children] have (all) [$_{\text{VP}}$ arrived (*all)]]].

Since FQs are adjuncts, they can only target maximal projections. This limits the possible adjunction sites to CP, TP, VP, and DP (abstracting away from various functional heads). The movement path does not contain CP or TP because nom^- has already been checked at this point, and it does not contain DP because nom^- only becomes active after the DP has been merged. Hence the VP is the only possible adjunction site. An FQ can never adjoin to the mover itself, only to maximal projections along its movement path (with a movement-based analysis of control, this extends to cases where FQs are licensed by PRO).

Like the adverbial analysis, this account also correctly predicts that one mover may license multiple FQs, and that FQs need not be able to form a constituent with the mover. It also explains why FQs are scope-frozen.

(2) a. They may all seem to have all cheated on the exam.
b. They may all have been all trying to get in.

(3) a. (*All of) some of the students might have (all) left in one car.
b. (*All of) Peter, Paul, and Mary will (all) drive home together.

Contrasting FQs and PGAs The current proposal likens FQs to adjuncts containing a parasitic gap (PGAs). Just like FQs, PGAs can only adjoin to positions along a movement path, but multiple PGAs can piggyback on the same mover. PGAs also cannot occur in a position below the mover's base position or above its target site, nor can they directly adjoin to the licensing mover. There are, however, two major differences between FQs and PGAs: (I) FQs cannot be as complex as PGAs; (II) FQs are licensed by A-movement and PGAs by A$'$-movement.

(4) a. Which books did John (*all) throw out [without giving Sue a chance to read *e*]?
b. These books were [all five (*that I read)] sold (*without giving Sue a chance to read *e*).

I argue that both (i) and (ii) are due to a complexity split between FQs and PGAs that hinges on their sensitivity to different displacement mechanisms.

Movement paths VS slashed categories Kobele (2012) proposes an additional displacement mechanism for MGs similar to slash-feature percolation in GPSG. With this kind of displacement, the derivation in Fig. 1 does not contain any movement at all (see Fig. 2). The verb *arrived* selects no subject, but has a slashed category V/nom instead. This slash feature percolates, so that a v-head would actually be v/nom. At the T-head, nom^+ triggers merger of a nom-mover and the feature percolation stops, yielding a TP rather than TP/nom.

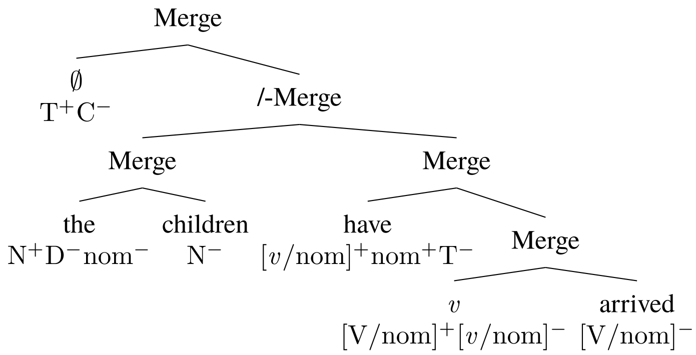

Figure 2: Displacement with a slash-feature

Kobele suggests that proper movement is only used for A′-movement, whereas A-movement is base merger triggered by slash feature percolation. While I do not endorse this strict correspondence, I adopt the idea that there are two distinct displacement mechanisms that differ in certain ways. Also following Kobele (2012), I assume that movement-driven displacement is not encoded in any way in the category features.

Suppose, then, that **only PGAs are adjuncts that must adjoin to a movement path**, whereas **FQs are adjuncts that adjoin to slashed categories**. As this reanalysis of FQs only changes the encoding of displacement, it does not affect any of the insights above regarding the distribution of FQs. But it can greatly reduce the computational complexity of FQs in comparison to PGAs. The intuition is as follows: assume that both PGAs and FQs contain some kind of empty element e that looks for the presence of a movement path or slashed category, respectively (cf. Doetjes 1992 for FQs). Now consider how large a domain e has to be able to search. For a PGA, the distance between the PGA and the licensing mover may already be enormous. As a result it does not matter if the PGA itself is very large — if the distance to the mover is large, limiting the distance from the root of the PGA to e does not make the problem any more local. If e is contained in an FQ, on the other hand, it only has to bridge a minimal distance outside the adjunct to determine the category of the phrase it adjoins to. Hence the size of the FQ itself is the decisive factor for the size of the search domain — a tight limit on the size of FQs ensures that the search remains very small (in terms of subregular complexity (Heinz 2018), an upper bound on the size of FQs keeps them in the class Strictly Local, whereas PGAs are at least Tier-based Strictly Local). This is the link between (i) and (ii): limiting the size of an adjunct is computationally advantageous only if it is sensitive to feature percolation ($\approx$A-movement) rather than movement paths ($\approx$A′-movement).

Conclusion Combining insights from quantifier stranding and the adverbial analysis, I have argued that FQs are displacement-sensitive adjuncts. More precisely, FQs are a computationally limited counterpart of PGAs. PGAs pay attention to proper movement paths, which are difficult to detect independently of the size of the adjunct. FQs instead are sensitive to slashed categories, which in combination with a more restricted size greatly reduces their computational complexity.

My analysis necessitates that all FQs require slash feature percolation, including apparent instances of A′-movement licensing FQs (McCloskey 2000). The prediction is that these cases of displacement display the limitations identified in Kobele (2012) for slash feature percolation. In particular, reconstruction should be impossible. If correct, this suggests that the relevant distinction for FQs — and perhaps syntax at large — is not A-movement VS A′-movement, but movement versus slash feature percolation.

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