Adverb shift in English: a new paradigm
(Submitted to *Natural language & linguistic theory*)

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January 9, 2025

1   Introduction

Abstract: This paper concerns an unusual and rarely noted phenomenon in English, where 'low' adverbs, e.g. manner adverbs, may surface in an exceptionally high clausal position in VP-ellipsis contexts— which I term *adverb shift*. Using novel data, I systematically outline the empirical contours of adverb shift. Based on this data, I show that adverb shift involves PF movement and that this movement occurs in order to avoid PF ill-formedness in such contexts. Moreover, I show that adverb shift parallels other proposed instances of PF movement. In particular, that the movement operation is driven by a PF-based need to resolve a specific, PF-related issue.

Keywords: ellipsis, syntax-PF interface, PF movement, prosody

2   Introduction

Previous research has observed that a certain class of adverbs, e.g. manner adverbs, must surface 'low' in the clause in English (e.g. in Jackendoff 1972; Travis 1988; Potsdam 1998). To illustrate this point, consider the minimal pair in (1a,1b). As shown below, the manner adverb *completely* must surface below the modal auxiliary *will* (i.e. (1a)) and cannot precede it (1b).

(1)   a.   John will completely loose his mind.
      b.   * John completely will loose his mind.

While such adverbs must typically surface low, Lasnik 1995 observes that in VP-ellipsis constructions such adverbs can surface in an exceptionally high clausal position— a phenomenon I term *adverb shift*. As (2) shows, in VP-ellipsis contexts the manner adverb *completely* can surface exceptionally high and precede the auxiliary *did* (cf. (1b)).

(2)   John will partially loose his mind and Bill **completely** did Δ. (Lasnik, 1995)

That 'low' adverbs, e.g. *completely*, can surface exceptionally high under VP-ellipsis is highly puzzling from a theoretical point of view. Assuming that the surface position of adverbs is a reflex of their licensing position, e.g. 'low' adverbs are licensed by merging to VP (e.g., as in Jackendoff 1972; Travis 1988; Potsdam 1998) and, thus, surface below elements in I^0 (e.g. *will* and *did*), and that ellipsis involves PF-deletion of syntactic structure (e.g. Merchant 2001), ellipsis should not have the effect of permitting the adverb to surface in a higher structural position.

The overarching goal of this paper is to resolve this puzzle regarding adverb shift, that is, to explain what allows 'low' adverbs to surface exceptionally high in the clause under VP-ellipsis. I will first outline

the empirical contours of adverb shift phenomenon. Based on this, I show that adverb shift is not due to high base-generation in the relevant contexts, as Lasnik 1995 argues, but involves phrasal movement of a focused adverb out of the VP-ellipsis target. Further, I show that the movement underlying adverb shift is highly restricted and sensitive to the linear order of elements in the remnants. After outlining the core properties of adverb shift, I will develop a proposal that argues that adverb shift is an instance of PF movement. Specifically, I propose that this operation occurs in PF to resolve contradictory PF requirements placed on the adverb in adverb shift contexts. Further, I argue that this adverb shift as PF-repair hypothesis derives the distribution of adverb shift.

3   The *adverb shift* phenomenon

This section concerns the basic empirical contours of the adverb shift pattern, where based on novel data, I show that adverb shift exhibits three key characteristics. First, adverb shift involves XP-movement of the adverb from VP to a higher projection. Second, I show that the projection that the adverb moves to is not fixed. Rather, I show that the shifted adverb always surfaces preceding the first element adjacent to the ellipsis site. Finally, I show that shifted adverbs are obligatorily focused elements.

3.1   Adverb shift is movement

As previously illustrated in (2) and further in (3) below, the adverb shift surface pattern involves a 'low' adverb, e.g. a manner or low frequency adverb, surfacing in an exceptionally high position under VP-ellipsis, where it precedes the auxiliary.[1]

(3)   a. A: Did Martha loudly declare her love for the Yankees? B: No, [IP she **quietly** did [VP Δ.]]

     b. I think that Peter barely understands the lecture but you think that [IP Martha **completely** does [VP Δ.]]

     c. The dogs were frequently let out for the entire day but [IP the cats **rarely** were [VP Δ.]]

Lasnik 1995 suggests that in cases like (2) and (3), VP-ellipsis allows for the adverb to be base-generated exceptionally high above the auxiliary (see also Bošković 2004 for a similar proposal). For example, on this proposal, (3a) has the underlying structure in (4) below, where *quietly* is base-generated above *did* and survives VP-ellipsis.

(4)   [IP *she quietly did* [VP *declare her love for the Yankees*]]

Although this proposal may be able to capture the surface facts in (2) and (3), as I will show below, there is strong evidence that the adverb is not base-generated above the auxiliary in these constructions but, rather, the adverb undergoes movement to its surface position.

    Evidence that adverb shift involves movement comes from the observation that shifted adverbs display reconstruction effects, which, in turn, indicate the presence of a lower copy—i.e. the reconstruction site, as the tail of a movement chain (Hornstein, 1984; Barss, 1986; Chomsky, 1993). The first case of reconstruction under adverb shift is observed with a class of adverbs, e.g. *rudely, stupidly,* that are ambiguous between a sentential and manner interpretation (Jackendoff, 1972). For example, (5a,5b) can have both a sentential interpretation (i.e. *It was rude/stupid of Martha...*) and a manner interpretation (i.e. *Martha asked in a rude/stupid way...*).

(5)   a. Martha rudely asked her brother to leave.   [✓sen.; ✓man.]

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    b. Martha stupidly asked a question during Q&A.   [✓sen.; ✓man.]

It is standardly thought that this type of ambiguity is a reflex of a difference in merge positions of the adverbs, where a sentential interpretation occurs when the adverb merges in IP (i.e. (6a)) and a manner interpretation when the adverb merges in VP (i.e. (6b)) (Jackendoff, 1972; Travis, 1988; Potsdam, 1998).

(6)   a. [$_{IP}$ Martha *rudely/stupidly* I^0 [$_{VP}$ V^0 ...]] $\Rightarrow$ *sentential interpretation*

     b. [$_{IP}$ Martha I^0 [$_{VP}$ *rudely/stupidly* V^0 ...]] $\Rightarrow$ *manner interpretation*

While this difference in merge positions is obscured in (5a,5b) due to both configurations generating a string identical output, this correlation between merge position and interpretation can be readily observed in cases when I^0 is realized as an auxiliary. As shown below, when the adverb follows the auxiliary, as in (7a,8a), only a manner interpretation is available. But when the adverb precedes it, as in (7b,8b), only a sentential interpretation is available.

(7)   a. Martha will [$_{VP}$ rudely ask her brother to leave.]   [✗sen.; ✓man.]

     b. Martha [$_{IP}$ rudely will ask her brother to leave.]   [✓sen.; ✗man.]

(8)   a. Martha had [$_{VP}$ stupidly asked a question during Q&A.]   [✗sen.; ✓man.]

     b. Martha [$_{IP}$ stupidly had ask a question during Q&A.]   [✓sen.; ✗man.]

But under adverb shift, the situation is different. As (9a,9b) show below, in adverb shift contexts, the shifted adverb is ambiguous between a sentential and manner interpretation when it precedes the auxiliary (see also Abels 2003 for similar cases).

(9)   a. Jane tactfully asked her brother to leave but Martha **rudely** did △. [✓sen.; ✓man.]

     b. Jane wisely asked a question during Q&A but Martha **stupidly** did △. [✓sen.; ✓man.]

That the shifted adverbs in (9a,9b) are ambiguous despite preceding the auxiliary in IP, I argue indicates that adverb shift cannot be due to high base-generation but, rather, involves movement. On the high base-generation proposal, the surface positions of the adverbs in (9a,9b) are due to those adverbs being base-generated above the auxiliary in IP. Assuming that a manner interpretation requires a copy of the adverb in VP (as in (6b)), then on the high-base generation approach, only a sentential interpretation should be possible. However, if adverb shift involves movement, then the facts in (9a,9b) straightforwardly follow. Here, the adverb is base-generated in VP and undergoes movement to a position above the auxiliary, where it is pronounced. Due to a lower copy in VP, the adverb can reconstruct for the manner interpretation.

    The second case of reconstruction under adverb shift concerns scopal ambiguities. As shown below, frequency adverbs, e.g. *frequently*, can surface either above (10a) or below (10b) a modal, e.g. *can*, resulting in either a wide or narrow scope interpretation.

(10)   a. Martha [$_{IP}$ **frequently** can eat spicy food.]   [FRQ > CAN; *CAN > FRQ]

     b. Martha can [$_{VP}$ **frequently** eat spicy food.]   [*FRQ > CAN; CAN > FRQ]

Further, when the adverb is elided under VP-ellipsis, as in (11), only a narrow scope interpretation is possible. Assuming that scopal possibilities are a reflex of the merge position of the adverb, an obligatory narrow scope interpretation of the elided adverb in (11) is expected given that the adverb is below the modal in VP.

(11)   John can't frequently eat spicy food but Martha can △. [*FRQ > CAN; CAN > FRQ]

However, under adverb shift, both a wide and narrow scope interpretation are possible with the adverb preceding the modal:

(12) a. John can rarely eat spicy food while Martha **frequently** can Δ. [CAN > FRQ]

      b. John rarely can spicy food while Martha **frequently** can Δ. [FRQ > CAN]

Assuming that a narrow scope interpretation in (12a) requires a copy of the adverb below the modal, I interpret the availability of such an interpretation in (12a) as indicating that the adverb has moved from VP to IP and, thus, can undergo scope reconstruction to its launch position in VP, where it results in a narrow scope interpretation relative to the modal in IP.

Given that the above reconstruction data indicate that adverb shift involves movement of the adverb, an issue emerges regarding the type of movement. One possibility is that adverb shift involves X^0-movement, where the Adv^0 undergoes X^0-movement and head-adjoins to I^0, as in (13a). An alternative hypothesis is that it involves XP-movement where AdvP moves to IP, as in (13b).

(13) a. $[_{IP} \ldots Adv^0{+}I^0 \; [_{VP} \; \overline{Adv^0 \; V^0 \ldots} \;]\,]$

      b. $[_{IP} \ldots AdvP \; [_{IP} \; I^0 \; [_{VP} \; \overline{AdvP \; V^0 \ldots} \;]\,]\,]$

I argue that the relevant movement type is XP-movement (13b). Evidence for XP-movement comes from the observation that complex adverbs, e.g. *very carefully/ clumsily*, may undergo adverb shift, as in (14a,14b).

(14) a. How will you tell Martha you can't come to her big party? B: I **very carefully** will Δ.

      b. ? Peter very carefully moved the furniture up the stairs but Martha **very clumsily** did Δ.

Similarly, conjoined adverbs may undergo adverb shift, as in (15a,15b).

(15) a. Martha will quickly and roughly chop the onions but Peter **methodically and neatly** will Δ.

      b. ? The dogs had completely and enthusiastically destroyed the furniture, while the cats **partially and hesitantly** did Δ.

Assuming that complex and conjoined adverbs are phrasal, i.e. AdvPs, and, thus, cannot undergo X^0-adjunction, the observation that AdvPs can undergo adverb shift is strong evidence that the movement involved is XP-movement. Thus, I conclude that adverb shift involves movement of an AdvP from its base VP-internal position, to a higher position above the VP-ellipsis target.

3.2 Adverb shift targets the nearest auxiliary

The previous section showed that adverb shift involves movement of the AdvP to a position outside of the VP-ellipsis target. While the previous cases involved the adverb shifting to IP, in this section I will show, based on novel data, that the landing site of adverb shift is not uniformly IP. Instead, I will argue that the landing site of adverb shift is variable and, crucially, is dependent on what material is realized in the remnant. Specifically, I will show for regarding the surface position of shifted adverbs, the generalization in (16) holds:

(16) **Shift position generalization:** A shifted adverb must surface immediately preceding the first pronounced element adjacent to Δ.

That (16) holds can be demonstrated in cases of VP-ellipsis with multiple auxiliaries. In constructions with both a main and auxiliary verb(s), ellipsis can target the VP headed by the main verb (as in (17a,18a)) or a higher AuxP headed by an auxiliary verb (as in (17b,18b)) (Sag, 1976).

(17) a. The students have been thoroughly interrogated by the police and the staff have $[_{AUXP}$ been $[_{VP}$ Δ $]]$ too.

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b. The students have been thoroughly interrogated by the police and the staff have [$_{\text{AUXP}}$ Δ]] too.

(18) a. Trout will be completely dedicated to the Angels' success this season and Sandoval will [$_{\text{AUXP}}$ be [$_{\text{VP}}$ Δ]] too.

b. Trout will be completely dedicated to the Angels' success this season and Sandoval will [$_{\text{AUXP}}$ Δ] too.

In cases where VP is the ellipsis target, under adverb shift, the adverb must surface preceding lower auxiliary and cannot precede the higher auxiliary. As shown with VP-ellipsis in (19a,20a), the shifted adverbs can precede *been* or *be* but cannot precede or *have* or *will*. But under AuxP ellipsis, where *been* and *be* are elided, as in (19b) and (20b), the shifted adverb can precede *have* and *will*.

(19) a. The students have been thoroughly interrogated by the police and [$_{\text{IP}}$ the faculty {***partially**} have [$_{\text{AUXP}}$ {**partially**} been[$_{\text{VP}}$ Δ]]].

b. The students have been thoroughly interrogated by the police and [$_{\text{IP}}$ the faculty **partially** have [$_{\text{AUXP}}$Δ]].

(20) a. Trout will be completely dedicated to the Angels' success this season and [$_{\text{IP}}$ Rendon {***partially**} will [$_{\text{AUXP}}$ {**partially**} be [$_{\text{VP}}$ Δ]]].

b. ? Trout will be completely dedicated to the Angels' success this season and [$_{\text{IP}}$ Rendon **partially** will [$_{\text{AUXP}}$Δ]].

Assuming that *have* and *will* head IPs and *been* and *be* head lower AuxPs, what the above data show is that the landing site of adverb shift is not fixed. Rather, the AdvP moves to the XP headed by the first overt AUX that projects above the elided phrase. In (19a,20a), the first overt AUX heads AuxP and the AdvP moves to AuxP. But in (19b,20b), the lower AuxP is elided and the first overt AUX heads IP. Thus, in (19b,20b) the AdvP moves to IP. Hence, the key observation is that the shifted adverb must surface preceding the first overt element in the VP-ellipsis remnant.

3.3 Shifted adverbs are focused

The final characteristic of adverb shift is that shifted adverbs must be focused and, importantly, be realized with focal stress. In this section, I show that shifted adverbs not only can be focused (and, thus, bear focal stress) but that they must be focused.

As illustrated with the minimal pair in (21), a key condition for ellipsis is that there must be an element in the ellipsis remnant that is focused and realized with focal stress—i.e. be stress prominent.[2] Thus, in (21a), where the remnant lacks contrastively focused element—i.e. all material is background information provided by the antecedent clause, ellipsis is degraded. But in (21b), where the pronoun is contrastively focused and stress prominent, ellipsis is possible.

(21) a. * I know that Martha$_i$ has been cheering for the Mets and she$_i$ has been Δ too.

b. I know that Martha$_i$ has been cheering for the Mets and SHE$_j$ has been Δ too.

Interestingly, adverb shift can 'repair' VP-ellipsis constructions where the remnant lacks a contrastively focused element. As shown below, in the sluicing (22a) and VP-ellipsis (22b) constructions with a *the hell* modifier, ellipsis is ungrammatical (cf. (22c) from Chung 2013).

(22) a. * My library card has just been canceled but it's unclear why the hell Δ.

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[2]For discussion of the focus requirement see Rooth 1992; Tancredi 1992; Schwarzschild 1999, among others; for discussion of stress prominence with the focused element in the remnant see Winkler 2011, 2019.

     b.   * My library card has just been canceled but it's unclear why the hell it has Δ.

     c.   My library card has just been canceled; it's unclear why Δ.

Hartman and Ai (2009) argue that the ungrammaticality in cases like (22a,22b) is due to aggressively non-d linked *wh*-items, e.g., *what the hell*, being unable to be contrastively focused (or bear focal stress).[3] Thus, since there is no other contrastively focused element in the remnants, ellipsis is not possible in (22a,22b) (see Hartman and Ai 2009 for further discussion of this effect in sluicing). However, as (23a) shows, adverb shift can repair these types of remnants (cf. (23b)).

(23)   a. A: Martha has been slowly eating her pizza. B: Why the hell has she SLOWLY been Δ?

        b. A: Martha has been slowly eating her pizza. B: ?* Why the hell has she been Δ?

    While the previous data show that shifted adverbs can be focused, I will now show that shifted adverbs obligatorily must be focused. Evidence for focus being obligatory on shifted adverbs can be observed with the felicity of adverb shift in responses to polar questions. As illustrated in (24,25), adverb shift is possible in responses where the shifted adverb is contrastively focused with adverb in the polar question—i.e. (24a,25a). Additionally, contrastive focus may also be placed on the subject of the response, as in (24b,25b). Crucially, however, in cases like (24c,25c), where the subject is contrastively focused, adverb shift is degraded.[4]

(24)   Did Martha quickly dice the onion?

        a.   No, she SLOWLY did Δ.

        b.   No, PETER did Δ.

        c. ?* No, PETER SLOWLY did Δ.

(25)   Does Martha frequently bet on football?

        a.   No, she RARELY does Δ.

        b.   No, PETER does Δ.

        c. ?* No, PETER RARELY does Δ.

A similar effect is observed in VP ellipsis constructions, where a constituent other than the shifted adverb must be contrastively focused and be stress prominent. As illustrated in (26a), in the presence of an overt focus operator, e.g. *only*, the constituent that associates with the focus operator must be stress prominent (Jackendoff, 1972). In such cases where a focus operator is present, adverb shift is not possible, as (26b) shows (cf. (26c)).

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[3]Hartman and Ai 2009 show that quite generally 'aggressively non d-linked' (see Pesetsky 1987; den Dikken and Giannakidou 2002) *wh*-items cannot contrastively focused or be stress prominent, as shown in (i.)

    i.   a. ??/* He's writing something, he just won't tell me WHAT THE HELL he's writing.

        b. ??/* Mary kissed someone tonight, but I have no idea WHO ON EARTH she kissed.

        c. ??/* The prisoners escaped, but can't figure out HOW THE HELL they escaped.

[4]It should be noted that in examples (24c,25c) both the subject and adverb, crucially, have contrastive focus intonation–i.e. a falling intonation, which is crucially distinct from cases where the subject is a contrastive topic and is realized with a fall-rise intonation (Jackendoff, 1972; Büring, 2003). In cases where the subject is a contrastive topic and the shifted adverb is contrastively focused, the sentence is considerably less degraded, as in (ia):

    i   Did Martha quickly dice the onion?

        a. I don't know about Martha but. . . PetER SLoly did Δ.

(26) a. Did anybody completely understand this talk? B: Only MARTHA did Δ.

     b. Did anybody completely understand this talk? B: ?*Only MARTHA PARTIALLY did Δ.

     c. Did anybody completely understand this talk? B: Martha PARTIALLY did Δ.

Given that adverb shift is uniformly degraded in contexts where another element must be stress prominent, I argue that shifted adverbs must be focused elements. It is standardly thought that within a clause there can be at most be one stress prominent element and, additionally, elements that are focused must be realized as stress prominent (as in, e.g., Chomsky 1970; Jackendoff 1972; Ladd 1980; Selkirk 1995). Assuming that shifted adverbs must be focused and, thus, must be stress prominent, in cases where the adverb shifts to a clause where there is another obligatorily stress prominent element, there will be incompatible prosodic demands, that is, two elements that must be stress prominent but a general prosodic condition that permits at most one element to be most prominent. Thus, degradation results in the above cases (i.e. (24c,25c,26b)).

Additionally, this effect regarding the shifted adverb and another element requiring stress prominence can be observed in cases where the auxiliary in the remnant is contrastively focused with auxiliary in the antecedent. In such cases, while VP-ellipsis is available (27a), adverb shift is impossible (27b).

(27) a. Professors can quickly submit their grades but TAs MUST Δ.

     b. ?* Professors can slowly submit their grades but TAs QUICKLY MUST Δ.

Similar to the previously discussed cases, in (27a,27b) the auxiliary must is contrastively focused and, thus, is required to be stress prominent (Winkler, 2011). But given that shifted adverbs are obligatorily contrastively focused and must be stress prominent, adverb shift in (27b) is block due to the prosodic requirement that at most one element in the remnant can be stress prominent.

3.4 Summary

To summarize, there are three properties that characterize adverb shift. First, adverb shift involves XP-movement of an AdvP from its base VP-internal position, to a position above the VP-ellipsis target. Second, the landing site of adverb shift is variable. In some contexts, the adverb moves to IP, in other contexts it moves to a lower AuxP. Further, I showed that the relevant generalization regarding the landing site of a shifted adverb is that it moves to the projection that is headed by the first overt element outside the elided XP. Finally, I showed that shifted adverbs are obligatorily focused elements and, thus, must be realized as stress prominent.

4 Analysis

4.1 Previous approaches

While the adverb shift phenomenon has not received a systematic analysis, Lasnik (1995) and Bošković (2004) have suggested, on the basis of the data in (1a,1b) and (2), that this phenomenon may be related to avoiding a Stranded Affix Filter violation (Lasnik, 1981). The essential intuition behind this proposal is that in English, an affixal I^0 must combine with a verbal host through PF merger, which requires adjacency between I^0 and V^0. Moreover, if the affixal I^0 does not combine with a host, then the affix is stranded—i.e. a Stranded Affix Filter violation. Lasnik (1995) and Bošković (2004) propose that low adverbs, e.g. *quickly*, disrupt this adjacency relation if they are adjoined to VP, as in (28a) (in contrast to, e.g. Bobaljik 1994 who argues that adverbs/adjuncts are simply ignored for PF merger). Thus, in order to avoid a Stranded Affix Filter violation, in such cases, the adverb is base-generated above the affixal I^0, thus, allowing for PF merger between I^0 and V^0, as in (28b).

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(28) *John quickly walked*

    a. [$_{IP}$ John [$_{I'}$ *-ed* [$_{VP}$ quickly walk]]] → $_{PF\ Output}$ *John -ed quickly walk

    b. [$_{IP}$ John quickly [$_{I'}$ *-ed* [$_{VP}$ walk]]] → $_{PF\ Output}$ John quickly walk-ed

On this proposal, in non-ellipsis constructions, e.g. (28), the adverb is base-generated adjoined to IP, but this high base-generation position is obscured due to PF merger between I^0 and V^0. However, in VP-ellipsis constructions, as shown in (29a), where I^0 does not undergo PF merger with V^0, the high, IP base-generation position of the manner adverb is visible.

(29) *Martha slowly walked and John quickly did* Δ

    a. [$_{IP}$ John quickly [$_{I'}$ AUX+*-ed* [$_{VP}$ ~~walk~~]]] → $_{PF\ Output}$ John quickly did.

While this proposal can capture the basic facts in (1a,1b) and (2), there are both empirical and theoretical problems with this proposal in light of the complete adverb shift paradigm given in the previous section.

    Empirically, this account predicts that shifted adverbs should not display reconstruction effects due to being base-generated adjoined to IP. However, as was shown in §3.1, shifted adverbs systematically display such reconstruction effects. Further, this proposal cannot account for the distribution of shifted adverbs. As shown in (30), manner adverbs must consistently surface following the auxiliary *will* in non-ellipsis contexts.

(30)   Peter {* slowly} will {slowly} eat his dinner.

Assuming that *will* is base-generated in I^0 and is not an affixal element, then on the account under discussion, *slowly* will not be base-generated adjoined to IP and instead to VP, due to the absence of PF merger between I^0 and V^0 that *slowly* would disrupt. But, as shown in (31), *slowly* can precede *will* in VP-ellipsis construction.

(31)   Bill will quickly eat his dinner and Peter slowly will Δ

Assuming that *will* is base-generated in I^0 in (31) as well, the contrast between (31) and (30) regarding the possible position of *slowly* is unexpected on the account in question. If *will* does not undergo PF merger with V^0, then adverb shift should be uniformly unacceptable in (30, 31). However, as shown it is only unacceptable in the non-ellipsis context in (30). Additionally, it is unclear how the account in question can capture the observation that shifted adverbs must surface immediately preceding the first overt element before the ellipsis site; that is, the generalization in (16).

    From a theoretical perspective, there is a 'look ahead' problem with respect to PF requirements feeding syntactic operations. On the proposal under discussion, the key claim is that the adverb is base-generated in syntax adjoined to an XP higher than the normal case in order to prevent the adverb from disrupting PF merger between an affixal I^0 and V^0 by being VP-adjoined. If the adverb were base-generated adjoined to VP, then PF merger between affixal I^0 and V^0 would be impossible, and a Stranded Affix Filter violation would be triggered when the structure is sent to PF. Thus, the adverb is base-generated in the syntax adjoined to IP. However, this explanation essentially depends on a PF requirement (i.e. Stranded Affix Filter) crucially affecting a syntactic mechanism. That is, at the level of syntax, the derivation must 'know' whether there will be a stranded affix in I^0 at PF, if the adverb is base-generated adjoined to VP. Assuming that the syntactic derivation does not have access to this kind of PF information, then the claim that the adverb is base-generated adjoined to IP for this reason is problematic.

4.2 New Analysis

In this section, I develop an analysis of adverb shift that captures the facts outlined in the previous section. I propose that adverb shift is a PF movement operation triggered in ellipsis contexts to avoid outputting a PF ill-formed structure. I then argue that due to being a PF operation, adverb shift is a highly local operation. Subsequently, I argue that that the locality of adverb shift explains the distribution of the surface position of shifted adverbs.

4.2.1 Adverb shift is PF movement

The previous section showed that a key feature of adverb shift was that the shifted adverb undergoes movement from the VP to a position outside the ellipsis site. For example, it was shown that in a case like (9b), the adverb *stupidly* undergoes movement from VP to IP, and, thus permits a reconstructed interpretation.

(9b)   Jane wisely asked a question during Q&A but Martha **stupidly** did Δ. [✓sen.; ✓man.]

In this section, I argue that that while adverb shift involves movement, the relevant movement operation is not syntactic. Rather, I will show that adverb shift movement occurs in PF.

Evidence that the adverb shift operation occurs in PF comes from the observation that adverb shift cannot precede, i.e. feed, syntactic movement operations. As shown in (32a), in cases of VP-fronting adverb shift is impossible and the adverb must always front with the VP (as in (32b)).

(32)   a.   * Martha said she would completely finish her paper and [$_{VP}$ finish her paper]$_i$ she completely did t_i.

      b.   Martha said she would completely finish her paper and [$_{VP}$ completely finish her paper]$_i$ she did t_i.

That adverb shift cannot co-occur with VP-fronting follows straightforwardly if adverb shift occurs in PF, after syntactic operations apply. Assuming that VP-fronting is a syntactic operation, when the structure is sent to PF, the AdvP is in the fronted VP. Thus, since the adverb has already fronted with the VP, it cannot undergo adverb shift to IP (due to the locality of adverb shift discussed below). Conversely, if it were the case that adverb shift was a syntactic operation, then it should be possible for adverb shift to occur prior to VP-fronting, with the VP-remnant fronting (contrary to fact).

Further evidence that adverb shift occurs late, after syntactic operations, comes from the interaction between adverb shift and quantifier float. As (33a,33b) show, quantifier float and adverb shift can co-occur in the same clause. Moreover, as (33b) shows, the adverb can be shifted to the same projection that the quantifier has been floated in. Crucially, in such cases where the adverb and quantifier are in the same projection, the quantifier must always precede the adverb, as in (33b). If the adverb precedes the quantifier, as in (33c), the result is ungrammatical.

(33)   a.   All the girls have been quickly finishing their assignments, but the boys all have [$_{AUXP}$ slowly been [$_{VP}$ Δ]].

      b.   All the girls have been quickly finishing their assignments but the boys have [$_{AUXP}$ all slowly been [$_{VP}$ Δ]].

      c.   * All the girls have been quickly finishing their assignments but the boys have [$_{AUXP}$ slowly all been [$_{VP}$ Δ]].

That the shifted adverb must always follow the floated quantifier, I interpret as indicating that adverb shift occurs in PF, after syntactic operations, in this case quantifier float, apply. The reason is the following.

Suppose that adverb shift is a syntactic operation, i.e. XP-adjunction, and that quantifier float involves QP-movement, where the Q is stranded in the Spec of an intermediate XP (Sportiche 1988, among others). Hence, in cases like (33b,33c) the Q is stranded in Spec, AUXP. But if adverb shift involves XP-adjunction, the AdvP must adjoin to AUXP, above Spec, AUXP, as in (34). On this approach the only derivable order is then: *adverb-quantifier-auxiliary*, which is ungrammatical (i.e. (33c)).

(34) [$_{IP}$ *The boys*$_i$ *have* [$_{AUXP}$ *slowly*$_k$ [$_{AUXP}$ [$_{QP}$ *all* t_i]$_j$ been [$_{VP}$ t_j t_k Δ]]]]

Alternatively, it may be suggested that XPs can support multiple Specs (as in, e.g., Richards 1997), and that the AdvP undergoes movement to Spec, AUXP. But in this case, both *adverb-quantifier-auxiliary* or *quantifier-adverb-auxiliary* surface orders should be possible, depending on whether AdvP movement precedes quantifier float or vice versa, as in (35a,35b). But as shown above, only the *quantifier-adverb-auxiliary* order, that is (33b), is possible.[5]

(35) a. [$_{IP}$ *The boys*$_i$ *have* [$_{AUXP}$ *slowly*$_k$ [$_{QP}$ *all* t_i]$_j$ been [$_{VP}$ t_j t_k Δ]]]

 b. [$_{IP}$ *The boys*$_i$ *have* [$_{AUXP}$ [$_{QP}$ *all* t_i]$_j$ *slowly*$_k$ been [$_{VP}$ t_j t_k Δ]]]

The key issue here is that if adverb shift is a syntactic operation, it is not possible to both rule in (33b) and rule out (33c) in a principled way (I will show below that the facts under consideration can be easily captured under the PF movement analysis proposed below).

   The final piece of evidence indicating that adverb shift occurs in PF comes from the observation that adverb shift is sensitive to the prosodic structure of the ellipsis remnant. Previously, it was shown that the landing site for adverb shift was always preceding the first overt element immediately before the ellipsis site (as in (16)). However, there is one exception to this generalization, which concerns cases of *to*-ellipsis. As shown below, in cases where the complement of infinitival *to* is elided, adverb shift to the embedded IP is ungrammatical, as in (36a,37a).

(36) a. * Martha wants to quickly leave if Bill wants [$_{IP}$ slowly to Δ].
 b.   Martha wants to quickly leave the party if Bill wants [$_{IP}$ to Δ].

(37) a. * The boys seem to quickly get frustrated in class while the girls seem [$_{IP}$ slowly to Δ].
 b.   The boys seem to quickly get frustrated in class and the girls seem [$_{IP}$ to Δ] as well.

Interestingly, however, under *to*-ellipsis, the adverb can shift to preceding the matrix verb, as in (38a,38b).[6]

(38) a. ? Martha wants to quickly leave the party, if Bill [$_{VP}$ slowly wants to Δ].
 b. ? The boys seems to quickly get frustrated in class, while the girls [$_{VP}$ slowly seem to Δ].

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[5]Note that on an adverbial analysis of quantifier float, as in e.g., Kayne 1975; Williams 1982; Bobaljik 1995, among others, this 'free ordering' problem would emerge as well.

[6]Importantly, in (38a, 38b) the shifted adverb is modifying the embedded predicates; that is, *leave* and *get frustrated*.

Zwicky (1982) and Zagona (1988) show that in cases of *to*-ellipsis, *to* undergoes prosodic rebracketing with the matrix verb due to *to*'s prosodically deficient status. As sketched below in (39), the output of this rebracketing process is that *to* prosodically incorporates with the matrix verb, e.g. *wants*, as a single prosodic word.

(39) $(_\omega$ wants $) (_\sigma$ to$) \Delta \Rightarrow (_\omega (_\omega$ wants $) (_\sigma$ to$)) \Delta$

Consider now, how the rebracketing process may interact with adverb shift if the latter is a PF operation. As previously shown, the landing site of the shifted adverb always (aside from *to*-ellipsis) precedes the first overt element outside of the ellipsis site, which can be restated as in (40):

(40)   **Shift Position Generalization (revised):** A shifted adverb must surface immediately preceding the first prosodic word (ω) adjacent to Δ.

In cases of ellipsis, where the auxiliary is a non-deficient prosodic word, e.g. *did*, this means that the shifted adverb immediately precedes the auxiliary, as in (41a). But in cases where the auxiliary is the prosodically deficient *to*, the shifted adverb surfaces higher, where it immediately precedes the matrix verb, as in (41b).

(41)   a.   John partially lost his mind and Bill $(_\omega$ completely$) (_\omega$ did$) \Delta$.
       b.   Martha wants to quickly leave the party but Bill $(_\omega$ slowly$) (_\omega (_\omega$ wants$) (_\sigma$ to$)) \Delta$.

That adverb shift is sensitive to the prosodic structure of the ellipsis remnant in this way, i.e. (40), strongly indicates that adverb shift is a PF operation. Given that prosodic structuring occurs in PF and that adverb shift is sensitive to prosodic structure, then adverb shift must occur in the derivation once such prosodic structuring has occurred—i.e. in PF.[7]

To summarize, I have argued that adverb shift is a movement operation that occurs late in PF. This was supported by observations that indicate that adverb shift occurs after syntactic operations (e.g. VP-fronting and quantifier float). Further, it was shown with the case of *to*-ellipsis that the landing site of adverb shift is sensitive to the prosodic structure of the ellipsis remnant. Thus, further confirming at adverb shift occurs in PF once prosodic structuring has occurred.

4.2.2   Adverb shift as PF repair

The previous section argued that adverb shift is a PF operation. In this section, I develop an analysis that explains why such movement occurs. I argue that given that adverb shift is a PF operation, the operation is triggered to resolve a specific, PF issue. In particular, that adverb shift occurs in contexts if the adverb remained *in situ*, within the ellipsis site, a PF ill-formed structure would be generated. Thus, to avoid this problem, the adverb undergoes PF movement; that is, adverb shift.

Before presenting the analysis, I will outline some background assumptions. First, following Merchant 2001, among others, I adopt the proposal that ellipsis involves marking of an X^0 with an [E] feature, which triggers deletion of its complement in PF, as sketched in (42) below.

(42)

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[7]Given that adverb shift must occur after prosodification, there is an interesting issue concerning the derivational timing of when PF deletion for ellipsis occurs. Given that adverb shift occurs after prosodification and involves PF movement out of the ellipsis target, this suggests that PF-deletion occurs late in PF after prosodification as well. In this respect, the above adverb shift discussion is further evidence supporting that hypothesis that PF-deletion applies late in the PF after prosodification (Wu, 2022, 2024; Bennett et al., 2016, 2019).

Syntax: [$_{\text{XP}}$ X$_{[\text{E}]}$ [$_{\text{YP}}$ Y [$_{\text{ZP}}$ Z . . .]]]   **b. PF:** X ~~Y Z . . .~~

As for which X^{0}s can be marked with [E], I assume that in English VP-ellipsis, v is marked with [E] and VP is elided; in cases of AUXP-ellipsis, the AUX is marked with [E] and the AUXP complement is elided (Bošković 2014; Harwood 2015, among others).
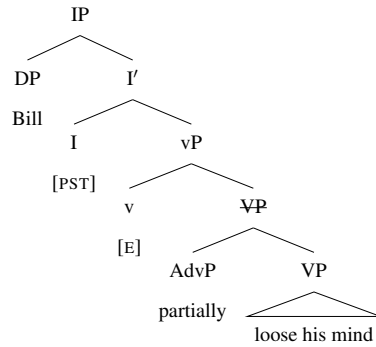
The second assumption is that focused elements are marked with a [FOC] feature in the syntax, which induces a focus interpretation at LF and, crucially, is realized as focal stress at PF (Chomsky 1970; Jackendoff 1972; Selkirk 1995, among others). With respect to the PF-realization of [FOC]-marked elements, I assume the following holds:

(43)   **Realize Focus:** If an X^0 bears [FOC], then X^0 must be PF-realized with focal stress.

With these assumptions in place, consider the basic case of VP-ellipsis without adverb shift in (44). As in (44a), the AdvP is base-generated in VP and v is [E]-marked. Subsequently, when (44a) is sent to PF, the entire VP (including AdvP) undergoes PF-deletion with (44b) as the PF output.

(44)   John will partially loose his mind and Bill did ~~partially loose his mind~~ too.

a. **Syntax:**

```
              IP
           /     \
         DP       I'
         |       /   \
        Bill    I     vP
               |     /  \
             [PST]  v    VP
                   |    /  \
                  [E] AdvP  VP
                      |    /  \
                  partially  loose his mind
```
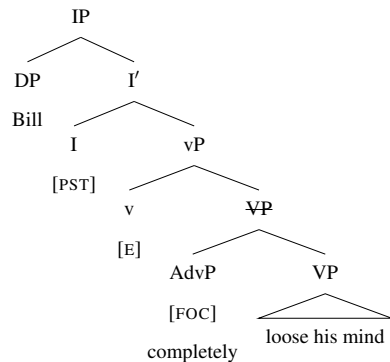
b. **PF:** [Bill did [~~partially loose his mind~~]] too.

Now consider the adverb shift case in (45) where the VP is elided. In the syntax v is marked with an [E] feature, which triggers PF-deletion of the VP complement, as in (45a). Crucially, when (45a) is sent to PF, the AdvP is inside the ellipsis site; if ellipsis were to also affect the AdvP it would be "silenced"; that is, ∅-realized. But, as previously shown, in adverb shift contexts the Adv^0 is focused, i.e. marked with [FOC] in the syntax and receives a focus interpretation in LF. Importantly, per (43), [FOC]-marked elements also have a realization requirement at PF, where they must be stressed. Thus, given (43), if the adverb remains in *in situ*, within the VP, in PF it will simultaneously have to satisfy two mutually incompatible PF requirements. Specifically, it would have to undergo PF-deletion due to being in the complement of an [E]-marked X^0, and it would have to be pronounced with focal stress due to (43), as in (45b) below.

(45)   John will partially loose his mind and Bill completely did ~~loose his mind~~.

a. **Syntax:**

```
              IP
           /     \
         DP       I'
         |       /   \
        Bill    I     vP
               |     /  \
             [PST]  v    VP
                   |    /  \
                  [E] AdvP  VP
                      |    /  \
                  [FOC]    loose his mind
                      |
                  completely
```

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b. **PF output (w/out AS):** *[Bill did [C̶O̶M̶P̶L̶E̶T̶E̶L̶Y̶ ̶l̶o̶o̶s̶e̶ ̶h̶i̶s̶ ̶m̶i̶n̶d̶]]

In order to resolve this PF conflict, i.e. (45b), I propose that the PF operation in (46) is triggered and the adverb shifts to the nearest position where it can escape elision and be pronounced, i.e. immediately before the first ω, as in (47).

(46) **Adverb shift rule**: If a focused adverb is targeted for PF-deletion, place the adverb immediately before the first prosodic word (ω) preceding the ellipsis site.

(47) **Adverb shift:** [Bill COMPLETELY did [̶l̶o̶o̶s̶e̶ ̶h̶i̶s̶ ̶m̶i̶n̶d̶]]

Thus, on the present proposal, adverb shift (i.e. (46)) is triggered to repair a PF-illegitimate structure. In cases where the adverb is not [FOC]-marked it is elided, e.g. (44b). But in cases where the adverb is [FOC]-marked it should satisfy two mutually incompatible requirements: to be elided and to be pronounced. To resolve this conflict, (46) is triggered and the adverb undergoes PF movement immediately outside of the ellipsis target, where it can be realized with focal stress—i.e. be pronounced.[8]

On the present analysis, adverb shift is a PF movement operation to resolve a PF conflict, involving the shortest movement that can resolve such conflict. In this respect, adverb shift resembles other proposals made in the literature regarding PF movement (in fact, probably the most convincing cases of PF movement). It is often thought that PF movement differs from syntactic movement in that it is a highly local operation that is driven by a specific, PF-based need (e.g., Marantz 1988; Halpern 1995; Embick and Noyer 2001; Weisser 2020). Consider for example Prosodic Inversion (Halpern, 1995). When an enclitic does not have a suitable host to its left, e.g. when it ends up being sentence-initial in the syntax, the PF rule in (48) is triggered, moving the enclitic the minimal distance required to satisfy the enclitic requirement, i.e. after the first prosodic word, and the enclitic inverts with the first prosodic word on its right.

(48) **Prosodic Inversion rule:** If an enclitic is sentence-initial, place the enclitic to the immediate right of the first prosodic word (ω). (adapted from Halpern 1995)

To illustrate the logic of Prosodic Inversion, when the syntax outputs (49a), Prosodic Inversion is triggered and places the enclitic X_{CL} after the prosodic word, Y_ω, as in (49b).

(49) a. **Syntax output:** X_{CL} Y_ω Z_ω

b. **PF:** Y_ω X_{CL} Z_ω

The relevant point is that the Prosodic Inversion rule, given that it is a PF operation, is both highly local, with its locality stated in terms of PF considerations, involving shortest movement possible, and occurs to solve a specific PF problem (an enclitic without a host).

Returning to adverb shift, it is noteworthy that it patterns with Prosodic Inversion in the relevant respects. It is a PF-movement operation that has PF motivation, and it takes place to resolve a PF issue. Furthermore, it has the same kind of locality as Prosodic Inversion. Shifted adverbs must surface immediately before the first prosodic word preceding the ellipsis site. As was shown in (19a) (repeated below), when the VP-ellipsis remnant has multiple auxiliaries, the shifted adverb can only precede the first auxiliary adjacent to the ellipsis site. But when the lower auxiliary is elided, as in (19b), the adverb can shift over the higher auxiliary.

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[8]See also Weir 2014 for a PF-movement based analysis of fragments in English that follows a similar logic.

(19a) The students have been thoroughly interrogated by the police and [$_{IP}$ the faculty {*partially} have [$_{AUXP}$ {partially} been[$_{VP}$ Δ]]].

(19b) The students have been thoroughly interrogated by the police and [$_{IP}$ the faculty partially have [$_{AUXP}$$\Delta$]].

This effect straightforwardly follows if adverb shift is due to the PF operation in (46), and it involves the shortest movement operation needed to satisfy (46). In (19a), the lower AUX is marked with [E]. In PF, the complement of AUX is targeted for PF-deletion including the focused *partially*, which must be realized with focal stress. Thus, PF imposes two incompatible requirements on *partially*—i.e. silence and pronunciation. To resolve this, *partially* must undergo PF movement outside the ellipsis site. While both PF movement to before *have* (i.e. (50a)) and *been* (i.e. (50b)) would equally avoid *partially* being silenced, PF movement to before *been* involves the minimal PF movement distance required to avoid elision. Thus, the shifted adverb must precede *been*, as in (50b). In (19b), however, the AUXP is targeted for PF-deletion, thus, *partially* must undergo PF movement to before *have*, i.e. there is no shorter movement that would avoid *partially* undergoing ellipsis (see (50c)).

(50)   a. **PF:** *[The faculty PARTIALLY have been [~~interrogated by the police~~]]

   b. **PF:** [The faculty have PARTIALLY been [~~interrogated by the police~~]]

   c. **PF:** [The faculty PARTIALLY have ~~been~~ [$_{VP}$ ~~interrogated by the police~~]]

Further, the quantifier float facts also straightforwardly follow from the locality of the adverb shift rule (46). As shown, the shifted adverb can follow a floated quantifier in (33b), but it can never precede it, as in (33c).

(33b)   All the girls have been quickly finishing their assignments but the boys have [$_{AUXP}$ all slowly been [$_{VP}$ Δ]].

(33c)   * All the girls have been quickly finishing their assignments but the boys have [$_{AUXP}$ slowly all been [$_{VP}$$\Delta$]].

If adverb shift is due to the operation in (46), then the adverb must move before the ω before the ellipsis site. Since the floated quantifier is never the first ω before the ellipsis site (the auxiliary always is), the adverb cannot shift before it (i.e. (33c)). Rather, it must shift between the quantifier and the auxiliary, as in (33b).

5   Conclusion

In this paper, I examined the adverb shift phenomenon and argued that adverb shift does not involve exceptionally high syntactic base-generation of the adverb, as argued for in Lasnik 1995 (and in Bošković 2004). Rather it involves movement of the adverb; in fact, it involves PF movement of the adverb that is triggered by a specific PF-related issue. Moreover, the locality of adverb shift is also PF-related, it in fact involves the shortest possible PF movement that can satisfy the relevant PF condition. In these respects, adverb shift resembles other proposed PF movements, as with Prosodic Inversion.

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