Head Movement as a PF-Phenomenon: Evidence from Identity under Ellipsis

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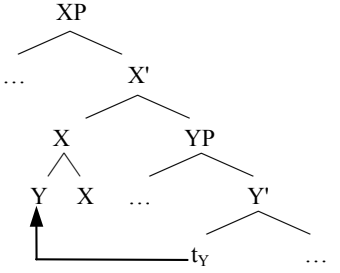
1. Introduction: the status of head movement

The status of head movement in the grammar has been the subject of fierce debate in the literature for the past fifteen years. The traditional view (cf. Travis 1984; Chomsky 1986; Baker 1988; Pollock 1989) is that head movement is a narrow syntactic phenomenon (with LF effects) and can be summarized as in (1):

(1) Head movement involves adjunction of the head Y of YP to the head X of XP, XP being the first projection dominating YP.



Within the minimalist approach, however, this traditional view has been argued to be problematic (cf. e.g. Chomsky 1995, 2001; Brody 2000; Surányi 2005; Matushansky 2006). Firstly, head movement generally seems to lack semantic effects. Secondly, it violates well-established principles of narrow syntax: for instance, it goes against the Extension Condition and the head of the movement chain does not c-command its tail. These problems have been considered evidence that head movement cannot be part of narrow syntax or the semantic component. Chomsky (1995:358) therefore suggested that verb second word order may be "formed by phonological operations". Later, he extended this proposal, saying that "a substantial core of head-raising processes" may take place in the phonological component instead of narrow syntax (2001:37). This stance was adopted by for instance Boeckx & Stjepanović (2001), Hale & Keyser (2002), Harley (2004), and Platzack (to appear). Other researchers (such as Matushansky 2006; Lechner 2007; Iatridou & Zeijlstra 2010; Roberts 2010) continue to adhere to syntactic head movement.

This paper aims at contributing to this discussion, by considering the interaction between head movement and ellipsis. Identity requirements under ellipsis provide evidence that there are cases of head movement that take place in the PF-component.

The paper proceeds as follows. Section two introduces the phenomenon of verb-stranding VP-ellipsis, which involves verbal head movement out of an ellipsis site. The 'stranded' verbs in this

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construction are subject to an identity requirement. In section three, it is shown that this requirement imposed on X-movement out of an ellipsis site is reducible to the general identity requirement on elided elements (whereas no such requirement is enforced on XP-movement out of an ellipsis site). Hence, it seems that, while the heads under discussion surface outside the ellipsis site, they are interpreted as though they are contained within it. We argue that this follows straightforwardly if head movement is a PF-operation. It remains unaccounted for, however, if head movement takes place in narrow syntax. Section four concludes and raises issues for future work.

2. Head movement out of an ellipsis site: Verb-stranding VP-ellipsis and verbal identity

In this section we introduce verb-stranding VP-ellipsis and one of its important characteristics, the verbal identity requirement. In the next section we show how this phenomenon provides an argument for the PF-view of head movement.

2.1. Verb-stranding VP-ellipsis

Verb-stranding VP-ellipsis involves ellipsis of a verb phrase, except for the main verb. All other elements within the VP (arguments and adjuncts) are elided. In the Portuguese example in (2a), for instance, the direct object *o desastre* 'the accident', the PP *na televisão* 'on TV' and the adverb *ontem* 'yesterday' are elided, while the verb *viu* 'saw' is pronounced. In the Irish example in (2b), the direct object *teach* 'house' and the subject *siad* 'they' are unpronounced, while the verb *cheannaigh* 'bought' is overt. Verb-stranding VP-ellipsis has been argued to occur in languages as diverse as European/Brazilian Portuguese (Cyrino & Matos 2002; Santos 2009), Irish (McCloskey 1991, 2007, 2010), Russian (Gribanova to appear), Hebrew (Doron 1990; Goldberg 2005), Swahili (Ngonyani 1996), and Modern Standard/Cairene Arabic (Tucker 2011).

(2) a. *Portuguese VPE: main V (viu) overt*
O João viu o desastre na televisão ontem e a Maria também viu.
the João saw the accident on.the TV yesterday and the Maria also saw
"João saw the accident on TV yesterday and Maria did too." [Santos 2009:23]

b. *Irish VPE: main verb (cheannaigh) overt*
Ar cheannaigh siad teach? – Creidim gur cheannaigh.
COMP.INTERR buy.PAST they house believe.PRES.1SG COMP buy.PAST
"Did they buy a house?" "I believe they did." [McCloskey 1991:274]

The characteristics of verb-stranding VP-ellipsis closely mirror those of English VP-ellipsis. In the latter, the main verb is elided along with the other VP-internal elements (cf. Lobeck 1995; Johnson 2001; among many others).

(3) *English VPE: main V null*
Baz watched Black Swan, and Quentin did [$_{VP}$ ~~watch Black Swan~~] too.

McCloskey (1991, 2007, 2010), Goldberg (2005), Tucker (2011), and Gribanova (to appear) argue that verb-stranding and 'regular' VP-ellipsis have the same distribution, fulfill the same discourse functions, and show the same range of formal properties. For instance, both can apply inside islands, can be used in coordinations, can appear within one or more levels of sentential embedding, and can apply backwards. Because of these similarities, these authors propose that verb-stranding VP-ellipsis involves regular VP-ellipsis. The former is argued to only differ from the latter in that the elliptical process is preceded by movement of the verb to a position (e.g. T) outside the VP-ellipsis site. As a result, the verb survives ellipsis, but the verb's arguments and VP-internal modifiers are omitted.[1]

[1] Verb-stranding VP-ellipsis crucially needs to be set apart from (multiple) argument drop, which involves unpronounced pronominal arguments (cf. Doron 1990; Goldberg 2005; Santos 2009; Tucker 2011; Gribanova to

2.2. The verbal identity requirement

A well-known trait of verb-stranding VP-ellipsis is the *verbal identity requirement*, i.e. the fact that the stranded verb in the elliptical clause must match the verb in the antecedent (cf. Cyrino & Matos 2002 for Portuguese; Goldberg 2005 for Hebrew; McCloskey 2007, 2010 for Irish; Gribanova to appear for Russian). (2b) and (4) illustrate that verb-stranding VP-ellipsis in Irish is grammatical if the verbs in the antecedent and the ellipsis site are identical (*cheannaigh* 'bought' in (2b) and *chuir* 'put' in (4)).

(4) *Irish*

Ar	chuir	tú	isteach	ar	on	phost.	–	Chuir.
COMP.INTERR	put.PAST	you	in	on	the	job		put.PAST
"Did you apply for the job?"								"Yes, I did." [McCloskey 2010:17]

The examples in (5) show that verb-stranding VP-ellipsis is not well formed when the stranded verb is not identical to its correlate, i.e. the verb in the antecedent (*dhíol* 'sold' vs. *cheannaigh* 'bought' in (5a), *cháin* 'criticized' vs. *chosain* 'defended' in (5b)). Note that the two verbs in the examples in (5) exhibit the same argument structure and present a similar subcategorization frame.[2]

(5) *Irish*

a. * Níor **cheannaigh** siad ariamh teach ach **dhíol**.
NEG buy.PAST they ever house but sell.PAST
INTENDED: "They never bought a house but they sold (a house)." [McCloskey 2007:22]

b. * **Cháin** sé é féin, ach ag an am chéanna **chosain**.
criticize.PAST he him REFL but at the time same defend.PAST
INTENDED: "He criticized himself, but at the same time he defended (himself)."
[McCloskey 2010:22-23]

This verbal identity requirement is the cornerstone of our argument that there are cases of head movement that take place in the PF-component.

3. Verbal identity under verb-stranding VP-ellipsis: Head movement as a PF-phenomenon

3.1. Ellipsis and identity

Although the verb in verb-stranding VP-ellipsis is pronounced, its identity requirement is actually reminiscent of the interpretation of elided (i.e. unpronounced) elements. It is well known that the interpretation of an elided constituent has to be identified by means of a salient linguistic antecedent (known as the identification or recoverability condition on ellipsis, cf. Hankamer & Sag 1976; Johnson 2001; Merchant 2001; among others). Only phrases whose content is recoverable from an antecedent can thus be elided. Merchant (2001:26 *et seq.*) formulates the semantic identity between an elided constituent and its antecedent in terms of mutual entailment of ∃-closed expressions. The technical notion he uses to formalize this is e-GIVENness: an expression can only be elided if it is e-GIVEN. A

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appear). This is required because these two phenomena could potentially result in the same surface form (i.e. a structure with an overt verb but unpronounced arguments). Irish, however, does not tolerate object drop (cf. Goldberg 2005; McCloskey 2010), so the direct object in (2b) cannot have undergone argument drop. It can only have been omitted through ellipsis of the VP. Similarly, the null PP in (4) must have been elided, since Irish does not allow 'PP drop' (Goldberg 2005; McCloskey 2010). Goldberg (2005:64-72) also argues that the null subject in (2b) and (4) cannot have undergone argument drop.

[2] Gribanova (to appear) reports that contrastive focus on the verb (marked by a different word order) ameliorates violations of the verbal identity requirement for some speakers of Russian. Whether or not focus allows the verbal identity requirement to be circumvented is, however, subject to crosslinguistic variation. Goldberg (2005) for instance claims that in Hebrew, focusing of the verbs does not result in licit non-identity.

constituent is e-GIVEN when it has a salient antecedent and when this constituent and its antecedent mutually entail each other. Consider the example in (6), based on Merchant (2001, ex. (45a)-(46)).

(6) Abby [called me an idiot], after Ben did.
= … after Ben did [call me an idiot].
≠ … after Ben did [insult me].

The elided constituent in (6) must be interpreted as *call me an idiot*, i.e. in exactly the same way as the antecedent VP. The ellipsis site in (6) cannot convey the meaning that Ben insulted me in some other way. Although *call me an idiot* entails *insult me* in (6), the reverse does not hold. This means that *call me an idiot* is not an appropriate antecedent for *insult me* (as the latter would not be e-GIVEN).

Above, we showed that the stranded verb in verb-stranding VP-ellipsis has to be identical to the verb in the antecedent. Goldberg (2005: ch.4) convincingly argues that this verbal identity requirement is reducible to the recoverability condition on elided elements. Despite being phonologically realized, the stranded verb is interpreted as if it were contained inside the ellipsis site. The overt verb in verb-stranding VP-ellipsis and its correlate are identical and, hence, mutually entail one another. The stranded verb is thus e-GIVEN, just like the elements inside the ellipsis site. The former only differs from the latter in undergoing head movement from its base position inside the ellipsis site to a head (e.g. T) outside the elided constituent (cf. section 2.1). Goldberg (2005), McCloskey (2010), and Gribanova (to appear) propose that the origin of the verb within the ellipsis site is the cause for the identity requirement.

There is evidence that this reasoning is on the right track. If the verbal identity requirement is indeed due to the verb being part of the ellipsis site prior to head movement, one predicts the following: the identity requirement should be limited to those parts of the verbal complex that originate in the ellipsis site (Goldberg 2005; McCloskey 2007, 2010; Gribanova to appear). The verbal root and derivational morphology, which originate within the elided VP, are thus predicted to be necessarily identical to that of the verb in the antecedent. Inflectional verbal morphology that is associated with functional projections outside the ellipsis site on the other hand should not be subject to the identity requirement. This prediction is borne out, as shown for Irish verb-stranding VP-ellipsis in (7). Although the verbal root of the stranded verb in this construction must be identical to that of its correlate, differences in mood, finiteness, tense, and agreement are allowed (cf. McCloskey 2007, 2010). For instance, in (7a), the stranded verb has a present tense form, while its correlate in the antecedent has a conditional form. In (7b), an imperative form antecedes a finite past tense form.

(7) *Irish*
a. Dúirt mé go **gceannóinn** é agus **cheannaigh**.
said I COMP buy.CONDIT it and buy.PAST
"I said that I would buy it and I did." [McCloskey 1991:273]
b. **Gabh** ar mo dhroim anseo. **Chuaigh**.
go.IMPV on my back here go.PAST
"Get up here on my back. He did." [McCloskey 2010:24]

3.2. Explaining the verbal identity requirement: PF-head movement

The data in (7) confirm that the identity requirement on the moved verb in verb-stranding VP-ellipsis is related to the fact that it was once part of the (to-be-)elided constituent (i.e. prior to verb movement). Goldberg (2005) argues that the verbal identity requirement in verb-stranding VP-ellipsis and the recoverability condition on elided elements can be put on a par if the stranded verb is part of the ellipsis site at LF. This ensures that the verb is interpreted inside the ellipsis site. It then follows that the verb is interpreted in exactly the same way as non-moved elements inside an ellipsis site, i.e. identically to their correlates in the antecedent. We adopt this part of Goldberg's account.

We propose that the verb is inside the ellipsis site at LF because it simply has not yet undergone movement when the derivation (including the elliptical constituent) reaches LF. This, however, crucially implies that verb movement in verb-stranding VP-ellipsis cannot take place in narrow syntax.

If verbal head movement in verb-stranding VP-ellipsis takes place at PF, the verb remains in its base position inside VP throughout the syntactic component.[3] As a result, only one copy of V will be sent to LF, as in (8). Hence, at LF, the only V-copy is inside the ellipsis site. As a result, V is automatically interpreted like any other element in the ellipsis site (i.e. subject to an identity requirement with a correlate in the antecedent).

(8) [subject T [$_{\text{VP-elided}}$ **V** object]]

At PF, the verb undergoes PF-head movement whereby it moves out of the ellipsis site and thus gets a phonological realization. Given the Y-model of the grammar, this movement does not affect semantic interpretation: at LF, the verb is still inside the elliptical constituent. Therefore, even though it is pronounced, the verb still needs to be identical to its correlate in the antecedent. This explains the verbal identity requirement in verb-stranding VP-ellipsis. We thus take this requirement to provide evidence that head movement sometimes takes place in the PF-component.

3.3. Illustration of the proposal

In order to illustrate our proposal, we provide a derivation of an instance of Irish verb-stranding VP-ellipsis. In order to do so, we first briefly need to introduce the specific implementation of ellipsis that we adopt for our proposal.

We follow Merchant's (2001 *et seq.*) [E]-feature approach to ellipsis. Under this approach, ellipsis is the result of a feature [E] that is present on the syntactic head that licenses ellipsis. This [E]-feature has effects both at PF and at LF. At PF, the [E]-feature triggers non-parsing/non-pronunciation of the complement of its host head. At LF, it ensures that the content of the elided phrase is recoverable. In particular, it requires the complement of its host head to be e-GIVEN (cf. supra).

For instance, in the case of VP-ellipsis, the [E]-feature occurs on T.[4] It ensures that VP is not pronounced at PF and requires that the elided VP is e-GIVEN (i.e. that the elided VP and its antecedent mutually entail one another). This is illustrated in (9) for the English VP-ellipsis example in (6).

(9) a. SYNTAX: [$_{\text{TP}}$ Abby T_{past} [$_{\text{VP}}$ call me an idiot] [after [$_{\text{TP}}$ Ben $T_{\text{past.[E]}}$ [$_{\text{VP}}$ call me an idiot]]]]

b. PF: 1. *Spell-out: mark the complement of* [*E*] *for non-pronunciation*
[Abby -ed [call me an idiot] [after [Ben -ed [~~call me an idiot~~]]]]
2. *Actual pronunciation*
[Abby [called me an idiot] [after [Ben did [ ]]]]

c. LF: *complement of* [*E*] *(VP.E) has to be e-GIVEN:*
OK when copy of subject is interpreted as ∃*-bound variable*[5]
[$_{\text{TP}}$ Abby PAST [$_{\text{VP.A}}$ ∃x.x call me an idiot] [after [$_{\text{TP}}$ Ben PAST [$_{\text{VP.E}}$ ∃x.x call me an idiot]]]]

Now consider the Irish verb-stranding VP-ellipsis example in (10a), which is very similar to (2b). In narrow syntax, the verb remains in VP, both in the antecedent and the elliptical clause, as shown in (10b). At LF, cf. (10c), the VP-complement of the head carrying the [E]-feature needs to be e-GIVEN. Given that the verb *cheannach* 'buy' is still inside this VP, the verbs in the elliptical VP and its antecedent need to be identical. At PF, illustrated in (10d), the verb undergoes head movement to a position outside the ellipsis site. It therefore escapes non-pronunciation. Since this movement takes place at PF, it has no effect at LF. Hence, although it is pronounced outside the ellipsis site, the verb still needs to be identical to its correlate in the antecedent.

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[3] Goldberg (2005:181) mentions the possibility that the verbal identity requirement could be accounted for "on a view in which all head movement occurs at PF". Unlike the present paper, however, she does not pursue this option. Moreover, we do not want to defend the stance that *all* head movement takes place at PF.

[4] For ease of exposition, we are assuming a fairly basic clause structure, in which T immediately selects for VP. In VP-ellipsis, we assume that VP is elided and that T is the licensing head. Our argumentation, however, does not hinge on this. Nothing crucial changes if VP-ellipsis is actually vP-ellipsis licensed by a Voice head.

[5] See section 3.4 for how copies of phrasal movement get interpreted as ∃-bound variables.

(10) a. Ar cheannaigh siad teach? – Cheannaigh.
COMP.INTERR buy.PAST they house buy.PAST
"Did they buy a house?" "Yes, they did."

b. SYNTAX: Antecedent (A): …[$_{TP}$ T_{past} [$_{VP}$ **cheannach** siad teach]]…
Elliptical clause (E): …[$_{TP}$ $T_{past.[E]}$ [$_{VP}$ **cheannach** siad teach]]…

c. LF: *complement of* [*E*] *(VP.E) has to be e-GIVEN: OK*
A: …[$_{TP}$ PAST [$_{VP}$ **cheannach** siad teach]]… E: …[$_{TP}$ PAST [$_{VP.E}$ **cheannach** siad teach]]…

d. PF: 1. *Spell-out: mark the complement of [E] for non-pronunciation*
A: …[-past [**cheannach** siad teach]]… E:…[-past [~~**cheannach** siad teach~~]]…
2. *Head Movement*
A: …[**cheannach**+past [**cheannach** siad teach]]…
E: …[**cheannach**+past [~~**cheannach** siad teach~~]]…
3. *Actual pronunciation*
A: …[**cheannaigh** [siad teach]]… E: …[**cheannaigh** [ ]]…

As such, PF-head movement offers a straightforward explanation for the identity requirement in verb-stranding VP-ellipsis. In the next two sections, we provide additional evidence for our account.

3.4. Additional evidence for PF-head movement: phrasal movement out of an ellipsis site

If our analysis is on the right track, we make a prediction regarding syntactic movement out of an ellipsis site. Such movement should not give rise to an identity requirement like PF-movement does. This prediction is borne out. Unlike the moved heads in verb-stranding VP-ellipsis, phrases that have moved out of an ellipsis site are not necessarily identical to their correlates in the antecedent. This is shown in (11) for sluicing and in (12) for VP-ellipsis.

(11) WH-MOVEMENT OUT OF A SLUICED TP
a. She met **RINGO**, but I don't know **who else**. [Merchant 2008:147]
b. She has **five CATS**, but I don't know **how many DOGS**. [Merchant 2001:36]

(12) a. WH-MOVEMENT OUT OF VPE
Abby took **GREEK**, but I don't know **what language** Ben did. [Merchant 2008:147]
b. CONTRASTIVE FOCUS MOVEMENT OUT OF VPE
GREEK, you should take, **DUTCH** you shouldn't. [Merchant 2008:140]
c. A-MOVEMENT OUT OF VPE (PASSIVE)
The pressure should be monitored, and **the temperature** should be, too. [Schuyler 2001:5]

The boldfaced phrases in the examples in (11) and (12) are clearly not identical in their root and derivational morphology, as was required for verbs in verb-stranding VP-ellipsis (cf. section 3.1). These examples might at first sight even seem problematic for Merchant's (2001) proposal to define identity between the antecedent and the ellipsis site in terms of mutual entailment. In (12b), for instance, *Greek* and *Dutch* have undergone contrastive focus movement out of VP. Under the copy theory of movement (Chomsky 1995), both movements leave behind a copy. Hence, the elided VP in (12b) is *take Dutch*, while its antecedent is *take Greek*. Similarly, in (12c), both derived subjects (*the pressure* and *the temperature*) have A-moved, leaving behind a copy. The elided VP in (12c) is therefore *monitored the temperature*, whereas its antecedent is *monitored the pressure*. In both cases, the two VPs do not entail one another. Merchant (2001:26, fn.9) proposes, however, that lower copies of phrasal movement are interpreted at LF as existentially bound variables (cf. also Hartman 2010). On this view, both the elided VP and the antecedent VP are interpreted as $\exists x.take\ x$ in (12b), and as $\exists x.monitored\ x$ in (12c). The elided VP and its antecedent therefore do entail each other in the examples under discussion. In order to account for cases in which there is movement out of the ellipsis site, but no corresponding movement in the antecedent, Merchant (2001) proposes that focus marked elements are also replaced by existentially bound variables. He calls this process F-closure. In (11b),

for instance, *five cats* in the antecedent clause is focus marked. It therefore undergoes F-closure and, as such, is replaced with an existentially bound variable. Given that the lower copy left by movement in the ellipsis site is also interpreted as an existentially bound variable, the sluiced TP and its antecedent will mutually entail each other. Like this, the data in (11) and in (12) are rendered compatible with Merchant's (2001) definition of the identity that holds between the ellipsis site and its antecedent.

It should in any case be clear that phrasal movement and verbal head movement out of an ellipsis site differ when it comes to the calculation of identity. If the identity requirement in verb-stranding VP-ellipsis can indeed be ascribed to PF-head movement, a similar identity requirement is not expected for (syntactic) phrasal movement. As such, the data in this section support our proposal.[6]

3.5. Refuting possible syntactic accounts of the verbal identity requirement

In the previous sections, we proposed that verbal head movement in verb-stranding VP-ellipsis takes place in the PF-component. We argued that this straightforwardly explains the identity requirement on head movement out of an ellipsis site. In this section, we want to strengthen our argumentation by showing that it is impossible to provide an account for the verbal identity requirement if the verb undergoes head movement in narrow syntax.

On the copy theory of movement (Chomsky 1995), syntactic movement of the verb in verb-stranding VP-ellipsis leaves a copy inside the ellipsis site. Therefore, the input to LF will contain (at least) two copies of V. The higher of these copies will be outside the ellipsis site, i.e. outside VP. The lower one will be inside the elided VP. This is shown in (13).

(13) [subject **V**+T [$_{\text{VP-elided}}$ **V** object]]

If the structure in (13) is the input for LF, can (13) then be interpreted in such a way that the verb is necessarily identical to its correlate in the antecedent? We will argue that the answer to this question is negative. There are three possible interpretations of the structure in (13) which we will now critically examine in turn.

First, Hartman (2010) proposes that the lower copy left by head movement is interpreted as a bound variable at LF, just like phrasal copies (cf. section 3.4). Given that phrasal and head movement are treated equally on this proposal, the contrast between these two kinds of movement noticed above remains unaccounted for. This approach predicts that there should be no verbal identity requirement at all. The reason for this is that, as explained above, interpreting the lower copy as a bound variable is exactly what permits a moved phrase to be non-identical to its correlate under Merchant's (2001) approach. Verbal head movement in verb-stranding VP-ellipsis is therefore incorrectly predicted to be able to have a non-identical correlate in the antecedent.

A second possibility is to only interpret the higher copy in (13) at LF, ignoring the lower one (cf. Bobaljik 2002). This option, however, also leaves the verbal identity requirement unresolved. If this were the case, the verb would only be interpreted outside of the ellipsis site at LF. It would then remain mysterious why the verb should be subject to the same identification requirement as elements inside the ellipsis site.

A third option is to only interpret the lower copy in (13) at LF, ignoring the higher one. This would amount to obligatory reconstruction of the verb in its base position. This is Goldberg's (2005) proposal. At first sight, interpreting only the lower V-copy in (13) looks promising to account for the verbal identity requirement. It ensures that a verb that undergoes head movement out of an elided VP is interpreted inside the ellipsis site. This verb will therefore need to be identical to its correlate – just like other elements inside an ellipsis site. The only difference between the verb and the other elements in the ellipsis site is that the verb also has a copy outside of the ellipsis site. Although it is not interpreted at LF, this higher copy is phonologically realized at PF.

[6] Potsdam (1997) discusses identity and the distinction between XP- and X-traces in the context of English VPE, but not verb-stranding VPE. We therefore do not discuss his data and analysis in this paper.

Goldberg's (2005) account faces several problems, however. First, it is unclear why head movement should be different from phrasal movement with respect to (obligatory) reconstruction. Goldberg simply stipulates this difference without providing any independent theoretical or empirical motivation. Moreover, as pointed out by Thoms (2010), phrasal movement can, and sometimes must, also reconstruct into the ellipsis site. On Goldberg's account, one would expect the moved (and reconstructed) XPs in these cases to be subject to the identity requirement.[7] They are not, though. Consider the sluicing example in (14a).[8] The movement of the WH-constituent *which stories about himself* has left a copy inside the TP-ellipsis site, as shown in (14b). The anaphor inside this WH-constituent (*himself*) needs to be bound by the subject (*John*) in order to obey Principle A of the Binding Theory. This is only possible if the lower copy of the WH-phrase gets interpreted at LF. The phrasal WH-movement thus has to reconstruct into the ellipsis site. Nevertheless, the sluiced WH-constituent *which stories about himself* is not identical to its correlate *many stories*.

(14) a. John told many stories, but I don't know which stories about himself.
b. … but I don't know which stories about himself [$_{TP}$ ~~John told which stories about himself~~].

Given these problems, Goldberg's (2005) account is inadequate.

We conclude that there is no satisfactory way of explaining the verbal identity requirement if one assumes that the verb in verb-stranding VP-ellipsis undergoes syntactic head movement. This strongly supports our claim that the verb in verb-stranding VP-ellipsis moves at PF.

4. Conclusions and prospects

In this paper, we argued that the movement 'stranding' the verb outside of the ellipsis site in verb-stranding VP-ellipsis is a PF-phenomenon. This was based on the observation that this head movement is subject to the same identity requirement as elements inside an ellipsis site. As such, this paper contributes to the debate on the status of head movement by providing an argument for the PF-view Note that our analysis predicts that head movement subject to the verbal identity requirement should never have any semantic effects. This crucially needs to be substantiated in future work.

It has, however, been argued in the literature that there are cases where head movement seems to have semantic effects. For instance, according to Roberts (2010), head movement of an auxiliary (in T) to C in English can license a subject NPI when it pied-pipes negation, as shown in (15). Moreover, Lechner (2007) and Iatridou & Zeijlstra (2010) argue that there are scope interactions between modals and negation or negative quantifiers.

(15) a. * Which one of them does anybody [not] like?
b. Which one of them doesn't anybody like? [Roberts 2010:10]

This state of affairs gives rise to the following questions. Does head movement take place at PF *and* in narrow syntax (feeding the semantic component)? If this is the case, what motivates this (apparent) redundancy in the system? Could the arguments for semantic effects of head movement be reconsidered and made compatible with a PF-analysis? In this case, all head movement would be part of the same component, which at first sight seems to be the preferred option. We hope to address these issues in future research.

[7] As Thoms (2010:5) formulates it: "Why should [the identity requirement] not hold for WH-movement [in sluicing and maybe also in VPE – ES & TT], given that we know that WH-phrases also obligatorily reconstruct (at least to a position below the subject in the TP)?"

[8] This example is from an abstract by M. Yoshida (2010). J. Griffiths (p.c.) confirmed its grammaticality.

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