

Lexical particles, semi-lexical postpositions*

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1. Introduction

In this paper, I suggest that the notion of semi-lexicality can be defined in morphological terms. I assume that a semi-lexical head is “half lexical, half functional”, by which I mean that it is a morphologically complex element that consists of a lexical node and a functional suffix.

I elaborate this hypothesis through a detailed discussion of the properties of postpositions and particles in German and Dutch. It can be shown that postpositions are functional heads that project functional phrases, whereas the projection of a particle is a lexical PP without functional structure. Although there are a number of differences between particle phrases and postpositional phrases that follow from this fact, particles and postpositions also show certain parallels that cast doubt on the claim that the functional status of postpositions mirrors that of other functional elements like tense affixes or determiners. Rather, I show that postpositions are not “genuine” functional heads, but semi-lexical elements. They are derived from lexical prepositions via suffixation of a zero-operator that alters the thematic properties of the P-element. Since this operator is a functional element, the derived postposition is a complex functional head. However, it inherits the semantics of the lexical preposition from which it is derived. Therefore, postpositions are semi-lexical elements; they have the semantic content of a lexical element, but the categorial properties of a functional suffix.

The paper is organized as follows. In section 2, I discuss prepositional, postpositional and particle phrases, and I show in what respects particles and postpositions differ and how they behave similarly. Section 3 provides an analysis of the

morphological structure and the thematic properties of postpositions. From this analysis I conclude that postpositions are semi-lexical elements. In section 4, I use the results of the previous sections to compare postpositional phrases in Dutch and post- and circumpositional phrases in German.

I first introduce some terminology and some notations. I treat local transitive prepositions as expressing relations between two (individual-type) entities. In (1), for example, the preposition *in* provides the information that the bread stands in the IN-relation to the closet:

(1) *The bread is in the closet*

I refer to the external argument of a preposition (the DP *the bread* in (1)) as the theme; its *internal* argument (*the closet*), I call the reference object. I assume that in examples like (1), the theme is generated in SpecVP and moves to SpecIP, whereas the reference object is the complement of the preposition and receives case from this lexical head.

I follow Wunderlich and Herweg (1991), Stiebels (1996), Olsen (1999), and others in expressing the semantics of prepositions through the general form in (2):

(2) $\lambda y \lambda x [\text{LOC}(x) \subset \text{R}(y)]$

According to (2), transitive prepositions are represented as two-place functions. The first argument corresponds to the reference object, the second argument corresponds to the theme. The argument structure of a preposition is expressed through the lambda operators that bind the respective variables inside the formula. The predicates in the formula provide the information that the location of the theme intersects with a particular region R of the reference object y. The specific properties of R are defined by the respective preposition. The preposition *in*, for example, is represented as in (3) (cf. Olsen 1999: 117):

(3) $\lambda y \lambda x [\text{LOC}(x) \subset \text{IN}(y)]$

(3) represents the situation in which the referent of the x-argument is located in the internal region of the referent of y.

Notice that (3) is the locative variant of *in*. The directional version is represented as in (4):

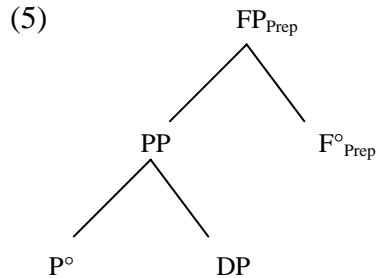
(4) $\lambda y \lambda x [\text{FIN}(\text{LOC}(x)) \subset \text{IN}(y)]$

The predicate FIN maps the location of x onto a final part of a path traversed by x. The directional preposition *in* provides the information that the final part of this path ends in the interior region of y.

2. Prepositional phrases and functional structure

2.1. The extended projection of prepositions

Van Riemsdijk (1990, 1998) and Koopman (1993) suggest that PPs are selected by functional prepositional heads that license certain lexical and grammatical properties of the lexical preposition. In terms of Grimshaw's (1991) theory, this means that prepositions, like the lexical categories N and V, have extended projections. I adopt this idea and assume with van Riemsdijk (1990) that the structure of prepositional phrases in German looks as in (5) (cf. Zeller 1999):¹



As (5) shows, the maximal projection of P° is the complement of a functional prepositional head that I simply label F°_{Prep} (it corresponds to p° in van Riemsdijk (1990)). In constructions with *transitive* or *intransitive prepositions*, F°_{Prep} is phonologically unrealized:

- (6) transitive P° : *Youri steigt auf den Berg*
 Y. climbs up/on the mountain
 [FP [F [PP auf [DP den Berg]] \emptyset]]
- (7) intransitive P° : *Youri wohnt oben*
 Y. lives upstairs
 [FP [F [PP oben] \emptyset]]

In (6), the PP is headed by the transitive preposition *auf* that takes its internal argument as a complement to its right. In (7), the PP consists solely of its head, the intransitive preposition *oben*.

F°_{Prep} may also host lexical material. Following van Riemsdijk (1990, 1998), I assume that in *circumpositional phrases* like those in (8), F°_{Prep} is realized by a postposition, printed in boldface:

- (8) a. *Mirco geht unter der Brücke **durch***
 M. goes under the bridge through
 ‘Mirco passes under the bridge’
 b. *Ein Tourist steigt auf den Berg **hinauf***
 a tourist climbs up/on the mountain *h-up/on*
 c. *Der Hund kommt aus dem Haus **heraus***
 the dog comes out-of the house *h-out*
- (9) [FP [F [PP auf [DP den Berg]] **hinauf**]]

As (8) shows, German has both complex and simple postpositions. Whereas the postposition *durch* in (8a) is homophonous with the preposition *durch*, the postpositions *hinauf* and *heraus* in (8b) and (8c) consist of the prepositional elements *auf/aus*

and a prefix *her/hin* (henceforth *h-prefix*) which has a deictic function (towards/away from the speaker). In the following, I will refer to these complex postpositions as *h-postpositions*; phrases headed by *h-postpositions* always receive a directional interpretation.² Notice that in (8b) and (8c), the prepositional parts of the *h-postpositions* (*auf* in *hinauf*; *aus* in *hinaus*) are identical to the lexical heads of the respective PP-complements. Constructions with this property are called *pleonastic circumpositional phrases*; their PP-constituents are referred to as “cognate” PPs (cf. Olsen 1996; McIntyre 1998).

Interestingly, *h-postpositions* may also appear without a complement:

- (10) a. *Ein Tourist steigt hinauf*
 a tourist climbs *h-up/on*
 b. *Der Hund kommt heraus*
 the dog comes *h-out*
- (11) a. *Johan schickt einen Touristen hinauf*
 J. sends the tourist *h-up/on*
 b. *Johan bringt den Hund heraus*
 J. takes the dog *h-out*
- (12) [VP [DP ein- Tourist] [V_i [FP hinauf] schick-]]

As I will show in detail in section 3.2, the PP-complement of a postposition helps identify the internal argument of the prepositional relation expressed by the FP_{Prep}. The *h-postpositions* in (10) and (11), however, are used intransitively. They occupy the F^o_{Prep}-position, but do not take PP-complements. Therefore, the internal argument of the relation expressed by the *h-postpositions* remains implicit; the constructions in (10) and (11) only provide information about the external arguments of *hinauf* and *heraus*, which are expressed by the DPs *ein Tourist* and *der Hund* (represented as derived subjects in (10) and as direct objects in (11)). For example, in (10b) and (11b), it is

clear that the dog moves out of something, but this something, the reference object, is not mentioned explicitly.

In the nominal domain, a functional head may occur without a lexical complement as well. Since Abney (1987), it is widely assumed that pronouns are realizations of a functional D° -head with no NP-complement (cf. e.g. Stowell 1991; Longobardi 1994). Analogously, we can analyze intransitive postpositions like those in (10) and (11) as *prepositional proforms*; they are F°_{Prep} -elements without PP-complements.

Some *h*-postpositions also project *postpositional phrases*:

- (13) *Ein Tourist steigt den Berg hinauf*
a tourist climbs the mountain *h*-up/on

Note first that postpositional structures like (13) must not be confused with examples like (11a). Although both sentences include a DP bearing accusative case, the DP *einen Touristen* in (11a) is the theme of the prepositional relation and is located outside the FP_{Prep} (cf. (12)), whereas the DP *den Berg* in (13) identifies the internal argument of the relation expressed by *hinauf* and is hence generated inside the FP_{Prep} . Evidence for this latter assumption is provided by the following contrast:

- (14) a. *Den Berg hinauf steigt ein Tourist*
b. *?*Einen Touristen hinauf schickt Johan*

In (14a), FP_{Prep} -topicalization has moved the *h*-postposition and the accusative DP to SpecCP. In (14b), however, topicalization of the accusative DP and the *h*-postposition is ungrammatical, because the *h*-postposition is a proform, and the DP is the theme which is not generated inside the FP_{Prep} .³

It has been suggested that the DP in postpositional structures like (14) is the complement of an empty preposition that projects the PP-complement of the *h*-postposition:

- (15) $[_{\text{FP}} [_{\text{F}} [_{\text{PP}} \emptyset [_{\text{DP}} \text{den Berg}]] \text{hinauf}]]$

Opinions differ with respect to the status of the empty preposition in (15). Van Riemsdijk (1990, 1998) argues that the head of the PP in (15) is the trace of the preposition *auf* that has moved to F°_{Prep} where it combines with the *h*-prefix. In contrast, McIntyre (1998) suggests that the head of the PP is an independent element, a preposition without a phonological realization, but with a specific meaning. I will return to this issue in section 4 where I compare the two proposals in light of a discussion of postpositional structures in Dutch and circumpositional phrases in German. For now, it suffices to assume that the structure of postpositional phrases includes a PP whose head is not realized phonologically.

So far, I have only provided examples from German. However, the structure in (5) also accounts for the properties of pre-, post-, and circumpositional phrases in Dutch:

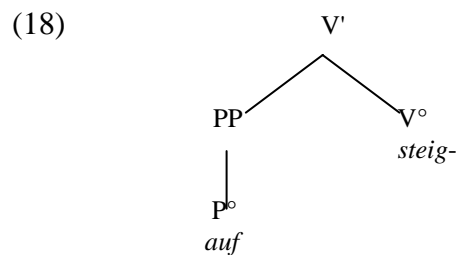
- (16) a. *omdat Jan op de berg reed*
 because J. up the mountain drove
 b. *Hij is binnen/buiten/boven/beneden*
 he is inside/outside/upstairs/downstairs
 c. *Het vliegtuig is onder de brug door gevlogen*
 the airplane is under the bridge through flown
 d. *omdat Jan de berg op reed*
 because J. the mountain up drove

The transitive and the intransitive prepositions in (16a) and (16b) are heads of PPs selected by an empty F°_{Prep} ; in the circumpositional structure in (16c), the PP *onder de brug* is the complement of the postposition *door*, and in the postpositional phrase in (16d), the postposition *op* selects a PP-complement with an empty P° . (Notice that Dutch does not have complex postpositions that correspond to *h*-postpositions in German.) I will come back to postpositional structures like (16d) in section 4.

2.2. Particles

In this section, I will briefly introduce the analysis of particle verbs that I develop in Zeller (1999). Based on proposals made by Koopman (1993) and Haiden (1997), I suggest that particles are represented as phrasal complements of their verbs that lack functional structure. Thus, the prepositional particle verbs in (17) have a structure like (18):

- (17) a. German: *weil Youri aufsteigt*
 because Y. Prt-climbs
 ‘because Youri moves up, rises’
 b. Dutch: *omdat Jan mijn broer op belde*
 because J. my brother up called



Furthermore, I argue that particles do not undergo incorporation in order to combine with the verb.⁴ Instead, I assume that the adjacency of a particle and the verb in verb-final clauses like (17) is the result of the structure of the VP in Dutch and German. Since both languages are SOV, the PP-complement which includes the particle precedes the verb (see Zeller 1999, chapter 2, for detailed discussion):

- (19) [C' weil [IP Youri [VP [V' [PP auf] steigt]]]]

Since particles do not move, the two terminal nodes that a particle verb consists of (i.e. P° and V°) do not form a syntactic word (a complex V°). However, the relation between the two

nodes is nevertheless strictly local, due to the absence of functional structure. I define the relevant local relation as “structural adjacency”:

(20) *Structural adjacency*

A head X and the head Y of its complement YP are *structurally adjacent*.

The central claim that I make in Zeller (1999) is that the particle status of a prepositional element is caused by its syntactic environment. If a lexical head P° is structurally adjacent to a functional head F°_{Prep} , it is a regular locational preposition; however, if it is structurally adjacent to a verb, it is a particle.

Following the extended Distributed Morphology-framework outlined in Marantz (1997), I assume that special meanings are associated with terminal nodes according to particular syntactic environments; meaning is determined on the basis of a syntactically determined locality domain. I suggest that the locality domain relevant for the thematic and semantic properties of prepositional elements is defined by structural adjacency. If a terminal node of category P° that has a particular phonological form (say, e.g., /an/) is structurally adjacent to a functional head, it is a regular preposition and is associated with the respective semantic and thematic properties. However, if *an* is structurally adjacent to a verb, it is a particle whose meaning may differ in crucial respects from the semantics of the preposition. For example, the preposition *an* in (21) is obligatorily transitive and expresses a location:

(21) *Die Leute stehen an der Ecke*
the people stand at the corner

In contrast, the particle *an* in (22) is intransitive; its reference object may be left unrealized:⁵

(22) *Die Leute stehen an*

the people stand Prt
'The people queue up'

Moreover, the particle *an* can have aspectual meanings which are entirely unrelated to the meaning of the preposition in (21):

- (23) a. *Peter brät das Fleisch an*
Peter fries the meat Prt
'Peter fries the meat lightly'
b. *Der Zug rollt an*
the train rolls Prt
'The train starts to roll'

In (23a), *an* expresses that the frying-event is only carried out lightly or partially; *an* in (23b) is an inchoative operator that focusses on the start of the rolling-event. Both uses of the particle *an* are at least semi-productive, but different from the prepositional meaning of *an* in (21). According to my analysis, the intransitivity or the aspectual meanings of a prepositional element like *an* are only licensed if P° is structurally adjacent to a verb. The different lexical properties of particles and regular prepositions are a result of their different structural contexts.

In a nutshell, the notion "particle" refers to a prepositional element that is structurally adjacent to a verb, i.e. to the head of a PP without functional structure. In contrast, a "regular" prepositional phrase is an FP_{Prep} . In the next section, I will show that there are certain systematic differences between particle verbs and verb + FP_{Prep} -complement-constructions that follow from this difference.

2.3. *Differences between particle phrases and functional prepositional phrases*

2.3.1. P° as a case-assigner

Compare (24) and (25):

- (24) a. *Peter hat sein Bier aus der Flasche getrunken*
 Peter has his beer out-of the bottle_{DAT} drunk
 ‘Peter drank his beer from the bottle’
 b. [*Aus der Flasche*]_i hat Peter sein Bier t_i getrunken
- (25) a. *Peter hat (*sein Bier) die Flasche ausgetrunken*
 Peter has his beer the bottle_{ACC} out-drunk
 b. **Die Flasche aus hat Peter getrunken*

In (24), we have a regular FP_{Prep} with an empty F°_{Prep} and a PP-complement *aus der Flasche*. The reference object, the DP *die Flasche*, receives case from *aus*, which assigns dative case. The preposition and its DP-complement can be topicalized together, as shown in (24b). However, if the prepositional element *aus* is used as a particle, the situation changes. First, if the reference object of *aus* becomes the object of the particle verb, the theme of the particle *aus* cannot be realized, (25a).⁶ Second, the reference object of *aus* now occurs to the left of P° , and it bears accusative case. Moreover, as (25b) shows, topicalization of P° together with the reference object is now impossible.

These differences follow from the different structural environments of prepositions and particles. On standard assumptions, case-assignment properties of lexical nodes are licensed through functional structure (cf. Koopman 1993; Borer 1998). This means that in (24), due to the presence of a functional head F°_{Prep} , P° can assign case to its internal argument-DP. Therefore, this DP stays inside the PP to the right of P° , it receives the case which is assigned by P° according to P° 's lexical specification, and both elements can be moved together. In contrast, particle phrases lack functional structure; therefore, P° is not able to assign case if it is a particle. Consequently, the reference object cannot be located inside the PP. It must either be generated in or moved to a position where it can receive the structural case assigned by the verb, which is accusative.⁷ As a result, the

particle and its reference object in (25) do not form a constituent that can be topicalized.

2.3.2. Complements of N

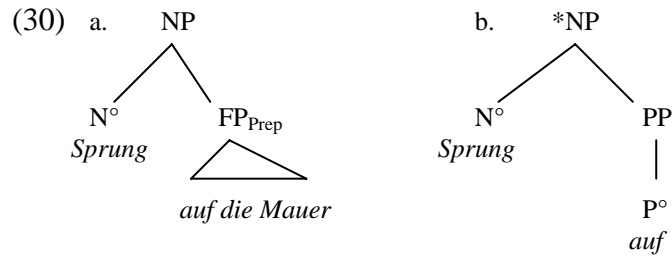
In German, regular FP_{Prep}-projections may also occur as complements of N. This is illustrated for prepositional and circumpositional phrases in (26b) and (27b):

- (26) a. *auf die Mauer springen*
on the wall jump
‘jump on the wall’
b. *der Sprung auf die Mauer*
the jump on the wall
- (27) a. *(in die Stadt) hinein fahren*
(in(to) the city) h-in drive
‘drive into the city’
b. *die Fahrt (in die Stadt) hinein*
the drive (in(to) the city) h-in

In contrast, as first observed by van Riemsdijk (1978), particles are not licensed as complements of N:

- (28) a. *aufspringen*
up-jump
‘jump up’
b. **der Sprung auf*
- (29) a. *(in den Hafen) einfahren*
(into the harbor) in-drive
‘sail into the harbor’
b. **die Fahrt (in den Hafen) ein*

(30) illustrates the different structures of (26b) and (28b):



The contrast between (26)-(27) and (28)-(29) follows from the specific conditions that must be fulfilled in order for an element to become a particle. A prepositional element becomes a particle only *by virtue of* a verbal context; i.e. if it is structurally adjacent to a verb. Therefore, (28b) and (29b) are excluded by definition, since *auf* and *ein* are structurally adjacent to N. In (26) and (27), however, these elements are used as prepositions and are structurally adjacent to a functional head. Since an FP_{Prep} is allowed as a complement of both V and N, (26b) and (27b) are grammatical. Again, the proposed analysis accounts straightforwardly for this difference between particle phrases and functional prepositional phrases.

2.3.3. Referentiality

A third difference between particle verbs and FP_{Prep} -constructions is best illustrated through a comparison between (31) and (32):

- (31) a. *Hier strömt Gas heraus*
 here streams gas *h-out*
 ‘Gas escapes (out of some contextually given entity)’
 b. *Peter will einen Kreis heraus schneiden*
 Peter wants a circle *h-out* cut

‘Peter wants to cut out a circle (out of some contextually given entity)’

- (32) a. *Hier strömt Gas aus*
 here streams gas Prt
 ‘Gas escapes here’
 b. *Peter will einen Kreis ausschneiden*
 Peter wants a circle Prt-cut
 ‘Peter wants to cut out a circle’

The examples in (31) show verbs with FP_{prep} -complements; the heads of these complements are intransitive *h*-postpositions. In (32), we have particle verbs. The particles correspond to the prepositional elements that form the *h*-postpositions in (31).

The *h*-postpositions in (31) are prepositional proforms; the reference object of the prepositional relation remains implicit (cf. section 2.1.). In (32), it is the verbal context that licenses the intransitive use of the prepositional elements (as was illustrated in (21) vs. (22) in section 2.2.); the internal argument of the prepositional relation that is expressed by the particles also remains unrealized. Therefore, we have an implicit reference object in both (31) and (32).

Nevertheless, there is a systematic semantic difference between examples like (31) and (32). McIntyre (1998) observes that in spite of an implicit reference object, an FP_{prep} headed by an intransitive *h*-postposition still expresses a *referential* path. Like nominal pronouns that refer to a specific individual, the prepositional proforms in (31) refer to particular instances of a path-concept. The referentiality of a path can best be tested by considering the interpretation of the implicit reference objects in the examples in (31). As McIntyre (1998) notes, a referential path requires a referential reference object. This means that the internal arguments of the *h*-postpositions in (31), although not mentioned explicitly, must be contextually given. Whenever a speaker uses a prepositional proform, she also talks about a specific instance of a reference object. For example, although it is not specified in (31a) from where exactly gas is escaping, the

source of the OUT-OF-relation expressed by the *h*-postposition must be inferable from the context. (31a) can only be uttered felicitously if the discourse allows the hearer to discover the respective source of the escaping gas (a whole in the wall; a pipe) from the context. On the basis of this contextually given reference object, the hearer can construct a referential, token-like interpretation of the path denoted by the respective FP_{Prep}.

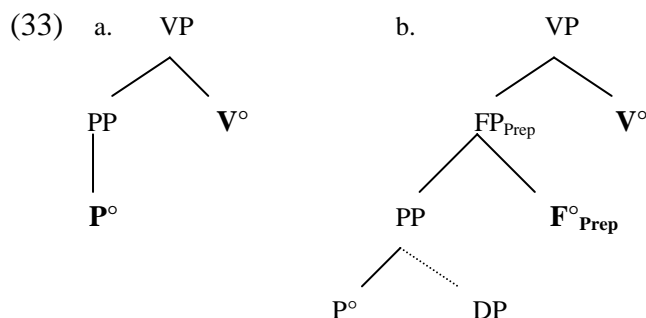
In contrast to the referential interpretation of the FP_{Prep}-constructions in (31), the particle phrases in the examples in (32) are interpreted *non-referentially*. They express non-specific types of paths characterized by the respective prepositional relation. Again, this can be tested through the interpretation of the implicit reference object. The implicit reference objects of the particle verbs in (32) are *not* contextually given. For example, if a speaker utters (32a), it may not be clear at all from where gas is escaping. The relevant information here is only that gas *is* escaping.

In Zeller (1999) I discuss the well-known correspondence between the referential interpretation of a phrase and functional structure. It is widely assumed that e.g. noun phrases can only be interpreted referentially if functional structure is present (cf. Stowell 1991; Longobardi 1994). According to the analysis presented above, it is not surprising that the prepositional phrases in (31) are referential, since the *h*-postposition is a pro-form and realizes a functional head. By the same token, the non-referential interpretation of particle phrases follows directly from the analysis of particle verbs presented in section 2.2. Particle phrases lack functional structure by definition. However, if a referential interpretation is only available if functional structure is present, we expect that particle phrases can only express non-referential path-types. Again, the different interpretations of the FP_{Prep}-constructions in (31) and the particle verbs in (32) follow from the differences discussed in sections 2.1. and 2.2. above.

2.4. Particle-like properties of postpositions

The data discussed in the preceding section show that a number of differences between particle phrases and pre-, post-, or circumpositional phrases follow from the assumption that the latter, but not the former, are functional projections. Particle phrases do not include arguments of the prepositional particle, they cannot occur as complements of N, and they always express non-referential paths. In contrast, functional structure licenses case-assignment to a DP inside the PP; a functional prepositional phrase can occur as a complement of N, and it is always interpreted referentially.

However, the structure of particle verbs and the structure of verbs that take FP_{Prep} -complements show an interesting parallel:



The lexical head P° in (33a) is structurally adjacent to the verb, whereas P° in (33b) is not, because functional structure intervenes. However, in (33b), there is also a head that is structurally adjacent to the verb: the functional head of the FP_{Prep} itself. This is an important fact in light of the observation that F°_{Prep} can be filled with lexical material like postpositions. If the proposal illustrated in section 2.2. is on the right track, and the particle-properties of a preposition follow from its local verbal environment, then we might expect to find similarities between postpositions and particles, because both heads are structurally adjacent to the verb.

In fact, there are certain parallels between particles and *h*-postpositions which I will discuss in the following sections.

However, I will also show that, although *h*-postpositions are structurally adjacent to verbs, an additional assumption is needed to account for the particle-like properties of postpositions. This assumption is explored in section 3.

2.4.1. Meaning variations

In section 2.2. I noted that the meaning of many particles differs from the meaning of the corresponding preposition, and I suggested that these semantic peculiarities of particles follow from the fact that they are structurally adjacent to a verb. Interestingly, similar semantic differences between postpositions and the basic prepositions from which they are derived are also attested. McIntyre (1998) observes that not all *h*-postpositions are systematically related to their corresponding prepositions:

- (34) a. *herum* (*um* = around)
action without immediate accomplishment of its purpose; inappropriate or inept activity: *herumdoktern*, 'try one's hand at'; *herumschreien*, 'shout for no reason', *herumalbern*, 'fool around'
- b. *heran* (*an* = at, to)
expression of temporal approach: *heranrücken*, *heranbrechen*, *heranziehen*, 'draw near, approach, advance'
- c. *herab* (*ab* = off, from)
expression of downward movement (not part of the meaning of *ab*): *herabkommen*, 'come down'; *herablassen*, 'let down'
- d. *hervor* (*vor* = in front of)
expression of emergence from concealment: *hervorkommen*, *hervorgehen*, 'emerge from', *hervorblicken*, 'peep from behind', *hervorheben*, 'emphasize'

The examples in (34) hint that at least some *h*-postpositions have special meanings that are not derived entirely on the basis of a combination of the meanings of their parts. Like particles, postpositions are structurally adjacent to the verb. Let us as-

sume for the moment that this structural environment is responsible for the semantic peculiarities of *h*-postpositions that are illustrated in (34) and turn to another striking parallel between particles and postpositions.

2.4.2. Word formation

An important property of particle verbs is that they can form the input to further operations of derivational morphology:

- (35) a. *einführen*, ‘introduce’ → *Einführung*, ‘introduction’
 b. *ausgraben*, ‘excavate’ → *Ausgrabung*, ‘excavation’
 c. *aufblasen*, ‘inflate’ → *aufblasbar*, ‘inflatable’
 d. *annehmen*, ‘accept’ → *unannehmbar*, ‘unacceptable’

(35) raises the question of whether the structure of these derived nominals and adjectives is morphological (= the respective words are derived exclusively from minimal projections like stems and affixes) or syntactic (= the structure of the derived nominals and adjectives in (35) includes a maximal projection, for example a VP). The analysis of particle verbs that I proposed above seems to favor the latter conclusion. If particles have to be structurally adjacent to verbs, this requirement automatically implies that particle verbs are V's or VPs. This seems to suggest that the derivational suffixes *-ung* and *-bar* in (35) combine with a VP-structure like (33a) that corresponds to the particle verb. The affixal properties of *-ung* and *-bar* may then be satisfied via incorporation of the verb into the structurally adjacent N- or A- node.

However, a syntactic derivation of nouns and adjectives makes certain predictions that are not realized with all words derived from particle verbs. For example, Borer (1993) argues that the well-known differences between *process* and *result* nominals are caused by a structural difference. According to her proposal, process nominals are derived syntactically and include a VP-projection of the base verb; this VP gives rise to the “verbal” properties of process nominals. In contrast, no such VP

is present in result nominals. If all word formation with particle verbs were syntactic, we would predict that nouns derived from particle verbs are always process nominals. However, (36) shows that this prediction is not borne out:

- (36) a. *die Anweisung wurde ihm zugeschickt*
 ‘the instruction was sent to him’
 b. *die Ausarbeitung lag auf dem Schreibtisch*
 ‘the elaboration lay on the desk’
 c. *die Auszahlung bestand nur aus 100-Dollar Scheinen*
 ‘the disbursement consisted only of 100-dollar bills’

Since the nouns in (36) are result nominals, it is extremely unlikely that they include a phrasal projection of the verb. In Zeller (1999, chapter 6) I provide more evidence that particle verbs are non-phrasal constructions when they appear inside derived adjectives or nouns.

Of course, this creates a problem for the analysis suggested in section 2.2. If particles must be structurally adjacent to their verbs, the structural representation of a particle verb is phrasal; it is a V'- or VP-node that dominates the verb and the particle phrase. I therefore suggest in Zeller (1999) that structural adjacency of the particle and verb is not required in morphological contexts. I argue that the local domain that is established between a particle and a verb through structural adjacency can be *reanalyzed* when morphological operations are applied to the particle verb.

The basic idea behind this reanalysis-proposal is simple. I assume that two syntactic heads that stand in a local (but non-morphological) relation to each other can be combined to form a morphologically complex word if this representation is required by independent conditions.⁸ The attachment of a derivational affix is such a condition; it may require its input to be a word. Since the relation between a particle and a verb is strictly local, the particle and the verb can be reanalyzed as a complex morphological object if a derivational affix is attached.⁹ Impor-

that J. his mother wants up-phone
(Neeleman 1994, 24)

Notice that transitive and intransitive prepositions, and (most) resultative predicates cannot be moved with the verb:

- (39) a. **dat zij de jas de stoel heen hebben* [*over gelegd*]
that they the coat the chair (heen) have over put
(Koopman 1993, 33)
- b. **dat Jan t_i wil* [*boven wonen*]_i
that J. wants upstairs live
(den Dikken 1995, 30)
- c. **dat Jan de deur t_i wil* [*violet verven*]_i
that J. the door wants violet paint
(Neeleman 1994, 23)

Curiously, postpositions, like particles, can move together with the verb in Verb Raising constructions, as shown in (40b):

- (40) a. *omdat hij de boom in t_i is* [*geklommen*]_i
because she the tree in is climbed
- b. *omdat hij de boom t_i is* [*in geklommen*]_i
because she the tree is in climbed
(van Riemsdijk 1978, 98)

Since Dutch does not allow for Verb Projection Raising, the raised constituents in (38b) and (40b) must be complex V°s that consist of the verb and the particle or postposition, respectively.¹¹ In Zeller (1999), I argue that these complex verbs have been derived via reanalysis, just like the complex verbs that form the input to operations of word formation in (35) and (37) above. The following data provide evidence for this view:

- (41) a. *dat Jan de bal [vlak over]_{FP} t_i heeft geschoten*_i
that J. the ball right over has shot
- b. *dat Jan de bal t_i heeft* [*over geschoten*]_i

- that J. the ball has over shot
 c. **dat Jan de bal [vlak t_j]_{FP} t_i heeft [[over]_j geschoten]_i*
 that J. the ball right has over shot
 (cf. Den Dikken 1995, 108)

The postposition *over* in (41a) is modified by the adverb *vlak*. In (41b), the complex verb consisting of postposition and verb has been raised into the matrix clause. If this V° had been derived via incorporation of the postposition into V° , we would expect that the adverbial modifier could be stranded inside the maximal projection of the postposition. However, (41c) shows that the modifier is not licensed if the postposition has undergone raising with the verb. This provides evidence that examples like (40b) do not include a maximal projection of the postposition. Complex verbs that undergo Verb Raising are derived via reanalysis of the verb and the postposition or particle. Structural adjacency is a necessary condition for reanalysis; postpositions, like particles, can be reanalyzed with the verb.

2.4.4. Functional elements as particles: The problem

The preceding section has shown that postpositions share certain properties with particles. As with particles, the meaning of an *h*-postposition may differ from the meaning expressed by the corresponding preposition, and like particle verbs, the combination of a postposition and the verb may be reanalyzed to form the input to morphological derivations or syntactic movement rules. As the two structures in (33) above show, both particles and postpositions are structurally adjacent to the verb. In line with the idea that properties of terminal nodes are determined by properties of their (syntactically defined) locality domains, the fact that both postpositions and particles occur in non-functional (namely, verbal) environments may be taken as one reason for the observed parallels.

However, whereas particles are lexical heads, postpositions are functional elements. If postpositions were genuine func-

tional heads like, for example, complementizers or determiners, we would face a serious problem. The particle-like properties of postpositions are properties that are usually not attested in the functional domain. For example, if postpositions are functional heads, we expect a certain “semantic stability” - functional elements in the verbal or nominal domain, like, for example, a past tense morpheme or an indefinite article, have fixed meanings and are not ambiguous. As the discussion in section 2.4.1. has shown, however, functional postpositions behave differently.

A similar problem arises with respect to reanalysis. If any two structurally adjacent heads can be reanalyzed in order to undergo operations of derivational morphology or Verb Raising, one wonders why reanalysis does not also form words that consist of other functional heads and the heads that select their maximal projections. For example, we would expect that a determiner and the verb that selects the respective DP can be reanalyzed and move as a complex verb in Dutch Verb Raising constructions. Of course, this option is absolutely excluded:

- (42) a. *dat hij een huis t_i wilde [kopen]*;
 that he a house wanted buy
 b. **dat hij huis wilde [een-kopen]*;
 that he house wanted a-buy

Furthermore, it is commonly assumed that derivational affixes do not attach to words that include functional material. Therefore, it should be impossible to reanalyze a functional and a lexical head and apply operations of derivational morphology to the resulting word. If an *h*-postposition like *heraus* is an F°_{Prep} , then a noun like e.g. *Herausforderung* should not exist. The nominalizing suffix *-ung* should not be allowed to attach to the complex verb *herausforder-*, because this verb includes functional material.

The solution to this problem that I will offer is based on the intuition that in a particular sense, postpositions are not “as functional” as e.g. determiners and complementizers. This par-

ticular sense will be specified in the next section. What I suggest is that postpositions are *semi-lexical* heads, and I will define semi-lexicality as a property of functional heads that are morphologically derived by attaching a functional suffix to a lexical node. The semi-lexicality of postpositions makes them elements of category F_{Prep} , which gives rise to the “functional” properties of their projections. At the same time, however, they incorporate the semantic content of a lexical preposition. I suggest that their semi-lexical status allows postpositions to behave like particles, i.e. like fully lexical heads that are structurally adjacent to a verb.

3. The semi-lexicality of postpositions

3.1. The morphological structure of postpositions

A first step in investigating the internal structure of postpositions is to look at the structure of complex *h*-postpositions like German *heraus* or *hindurch*. I will argue below that the deictic prefixes *hin* and *her* are functional elements. Therefore, one might assume that these prefixes are the source of the functional status of *h*-postpositions. However, there are two obvious problems with this idea. First, recall that some postpositions in German and most postpositions in Dutch do not require a prefix and are therefore homophonous with an existing preposition:

- (43) a. *auf den Wald zu* (cf. *zu dem Wald*)
 on the forest to
- b. *unter der Brücke durch* (cf. *durch den Wald*)
 under the bridge through
- (44) a. *de berg op* (cf. *op de berg*)
 the mountain up
- b. *het water in* (cf. *in het water*)
 the water in

If the functional status of an *h*-postposition were determined by its functional prefix, the functional status of the postpositions in (43) and (44) would remain unaccounted for.

There is a second problem with the idea that the functional status of an *h*-postposition is determined by its *h*-prefix. The categorial status of a complex word is determined by its morphological head. According to Williams' (1981) Right-hand Head Rule, the head of a word is its rightmost element. However, this implies that prefixes can never be category-changing.

In German, the validity of the Right-hand Head Rule can be illustrated by looking at combinations of a verb and a prepositional prefix. Besides separable particles, German has a class of non-separable prefixes that correspond to existing prepositions like *über-*, *um-*, *unter-* etc. and therefore are of category P. If they are combined with a verb, the resulting word is still a verb, because it inherits its categorial status from the morphological head:

- (45) a. *unter* (P) + *schreiben* (V) = *unterschreiben* (V)
 under write 'sign'
 b. *um* (P) + *fahren* (V) = *umfahren* (V)
 around drive 'drive around'
 c. *durch* (P) + *schneiden* (V) = *durchschneiden* (V)
 through cut 'cut through'

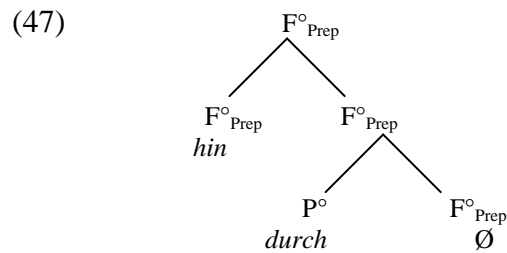
Since the Right-hand Head Rule holds in German, the functional status of an *h*-postposition cannot be determined by the functional prefix.

The alternative proposal that I make now assumes that apparently simple postpositions like e.g. German *durch* in (43b) or Dutch *op* in (44a) are in fact morphologically complex. They are derived from simple prepositional elements through the suffixation of a *functional head which is phonologically zero*:



P°	F°_{Prep}
<i>op</i>	\emptyset
<i>durch</i>	

According to my proposal, a postposition consists of a bare preposition of category P° that is combined with a functional suffix F°_{Prep} . According to the Right-hand Head Rule, this suffix is the morphological head of the complex word; therefore, the derived postposition is a functional head as well. This assumption has the welcome consequence that postpositions like those in (43) and (44) can be analyzed as functional heads even though no *h*-prefix is present. If an *h*-prefix is added, however, the postposition becomes the morphological head of the resulting *h*-postposition:¹²



The assumption that postpositions are derived by adding a functional suffix to a lexical preposition raises questions about the status of this suffix. In the following section, I will therefore discuss its semantic role in the derivation of postpositions.

3.2. The thematic properties of postpositions

3.2.1. Simple postpositions

Olsen (1999, 1999a) discusses the relation between the preposition *durch*, ‘through’, in (48a) and its use as a postposition in (48b):

(48) a. *Mirco fährt durch den Tunnel*

- M. drives through the tunnel
 b. *Mirco geht unter der Brücke durch*
 M. goes under the bridge through
 ‘Mirco passes under the bridge’

The preposition *durch* is obligatorily transitive. Olsen (1999, 1999a) assigns it the lexical representation in (49):

$$(49) \quad \text{preposition } \textit{durch}: \quad \lambda y \lambda x [\text{MID}(\text{LOC}(x)) \subset \text{IN}(y)]$$

The preposition *durch* expresses that the middle part of a path traversed by *x* intersects with the interior region of the reference object *y*. In (48a), this reference object is the DP *den Tunnel*, ‘the tunnel’, the complement of P° . The DP *Mirco* is the theme of the motion; it saturates the external argument of *durch* in (49).

Olsen notes that the crucial semantic difference between (49) and the postposition *durch* is that the internal argument of the latter is not linked to syntax, but remains implicit. Instead, the postposition takes a predicative argument:

$$(50) \quad \text{postposition } \textit{durch}: \\ \lambda P \lambda x \exists y [\text{MID}(\text{LOC}(x)) \subset \text{IN}(y) \wedge P(x)]$$

In (50), the *y*-argument, which corresponds to the reference object of *durch*, is not linked to syntax. In Olsen’s original representation, this situation is captured by leaving the *y*-variable inside the formula unbound. In (50), I have instead represented the implicit internal argument as bound by an existential quantifier (I return to this point below). The fact that the internal argument of *durch* is not linked to syntax is directly tied to the presence of a predicative argument which is saturated in (48b) by the PP-complement of the postposition (*unter der Brücke*, ‘under the bridge’). The interpretation of the FP_{prep} in (48b) is as follows:

(51) *unter der Brücke durch:*

$$\lambda x \exists y [\text{MID}(\text{LOC}(x)) \subset \text{IN}(y) \\ \wedge \text{LOC}(x) \subset \text{UNDER}(\text{the-bridge})]$$

(51) says that the middle part of x 's path intersects with the interior region of an implicit y while x is under the bridge. This means that the region characterized by $\text{IN}(y)$ can now be identified through the location expressed by the PP-complement of the postposition. On the basis of conceptual knowledge, the path traversed by x is interpreted as intersecting with the region “under the bridge”. As Olsen (1999a) notes, the PP-complement of a postposition helps to recover the information that gets lost because the reference object is implicit.

It is important to note that I understand the range of the existential quantifier as being implicitly restricted by the conceptual condition that the PP-complement of the postposition identifies the region $\text{IN}(y)$. In other words, y in (50) and (51) cannot just be any entity, but rather must be something whose internal region can be defined by the newly added predicate. This restricted use of the quantifier in (50) and (51) is just another means of capturing the conceptual recoverability of the implicit argument, but it will be relevant in section 3.2.2. below.¹³

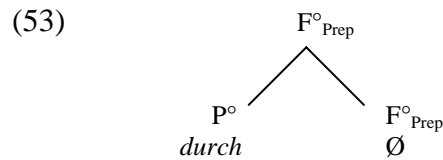
Olsen (1999) argues that (49) and (50) are two variants of one single lexical representation of *durch*. This is where I depart from her analysis. What I suggest instead is that the representation in (50) is derived from (49) through the addition of the functional zero-suffix discussed in section 3.1. This suffix's semantics is given in (52):

$$(52) \quad \emptyset\text{-F}_{\text{Prep}}^{\circ}: \lambda Q \lambda P \lambda x \exists y [Q(y)(x) \wedge P(x)]$$

(52) is an operator whose main function is to change the argument structure of the prepositional element with which it combines. It existentially binds one argument of the preposition and adds a predicative argument that helps identify this implicit argument. If the semantics of a preposition like *durch* is com-

bined with (52), it saturates the Q-argument, and we derive the semantics of the respective postposition.

The operator in (52) has an interesting parallel in the verbal domain: the passive operator PASS, which is realized in English through the participle suffix *-ed* plus the auxiliary *be*. Semantically, PASS is a function that changes the argument structure of the verb to which it attaches (cf. Chierchia 1989). Like the operator in (52), PASS existentially binds an argument of the verb (which may be then be identified through a prepositional *by*-phrase). Notice that the passive morpheme is an inflectional element; it is commonly assumed that this morpheme is associated with Infl° (cf. Baker 1988; Baker, Johnson, and Roberts 1989). Given the semantic parallel between PASS and the operator in (52), it is reasonable to assume that the latter is also a functional suffix. Therefore, the similarity between the passive morpheme and the operator in (52) can be taken as evidence that the morphological structure of a postposition looks in fact as in (53), as was argued in section 3.1.



3.2.2. Complex postpositions

The analysis can now be extended in order to capture the derivation of *h*-postpositions. A first question that must be addressed concerns the morphological and semantic status of the deictic *h*-prefix. The examples in (54) show that *h*-elements also occur in isolation:

- (54) a. *Olaf lief (zur Stadt) hin*
 O. ran (to-the city) *hin*
 ‘Olaf ran towards the city’

- b. *Olaf kommt (vom Bahnhof) her*
 O. comes from-the station *her*
 ‘Olaf walks towards the speaker, approaches the speaker, from the station’

The *h*-elements in (54) take optional PP-complements. The question is whether *hin* and *her* are of category P° or of category F°_{Prep} . I will henceforth assume that the latter holds. If *her* and *hin* are used intransitively, their maximal projections express referential paths, due to the deictic information which is part of their semantics. As argued in section 2.3.3., referentiality indicates the presence of a functional projection; therefore, I assume that *her* and *hin* are functional heads that project an FP_{Prep} . However, notice that their categorial status is not crucial for the categorial status of the *h*-postposition, because the latter is not determined by the *h*-prefix, but by its morphological head.

I formulate the semantic representation of *hin* as follows (the semantics of *her* can be formulated analogously):

$$(55) \text{ hin: } \langle \lambda P \rangle \lambda x \exists y [\text{FIN}(\text{LOC}(x)) \subset \text{PROX}(y) \wedge \neg [y = \text{speaker}] \wedge P(x)]$$

(55) is based on the representation given in Olsen (1999, 1999a).¹⁴ According to (55), *hin* expresses a path traversed by *x* whose final part intersects with the proximity region of an implicit argument *y* which is not the speaker. The (proximity region of the) implicit argument of *hin* is identified through an optional predicative argument.

Let me now turn to the question of how an *h*-postposition like *hindurch* is derived. I assume that the semantics of an *h*-element is not changed when it is used as a prefix. Therefore, I suggest that *hin* in (55) may saturate the predicative argument of the postposition *durch* in (50):

$$(56) \text{ a. } \textit{durch} \text{ (function): } \lambda P \lambda x_1 \exists y_1 [\text{MID}(\text{LOC}(x_1)) \subset \text{INT}(y_1) \wedge P(x_1)]$$

b. *hin* (argument):

$$\langle \lambda P \rangle \lambda x_2 \exists y_2 [\text{FIN}(\text{LOC}(x_2)) \subset \text{PROX}(y_2) \wedge \\ \neg [y_2 = \text{speaker}] \wedge P(x_2)]$$

c. *hindurch* ((56a), (56b), and function composition)

$$\langle \lambda P \rangle \lambda x_1 \exists y_1 \exists y_2 [\text{MID}(\text{LOC}(x_1)) \subset \text{INT}(y_1) \wedge \\ \text{FIN}(\text{LOC}(x_1)) \subset \text{PROX}(y_2) \wedge \\ \neg [y_2 = \text{speaker}] \wedge P(x_1)]$$

Semantically, the element *hin* in (56b) takes over the function otherwise performed by a PP-complement of a postposition. It saturates the respective argument of *durch*; at the same time, the resulting *h*-postposition *hindurch* inherits the optional predicative argument of the *h*-prefix. (As with simple postpositions, this PP-complement of an *h*-postposition is represented as the sister of the whole functional *h*-postposition; cf. the structure in (77) below). It follows that the PP-complement of an *h*-postposition is always optional, whereas the PP-complements of non-prefixed postpositions like *durch* and *zu* are always obligatory.¹⁵

Let me emphasize again that although the *h*-prefix and the PP-complement of a simple postposition fulfill the same semantic function, they are morphosyntactically quite different. Whereas a PP is a phrasal sister of F°_{Prep} , the prefix is an F°_{Prep} -node that combines with the postposition morphologically (cf. (47) above).¹⁶ The claim that prefixes can saturate arguments of their hosts that are usually saturated by full phrases, thereby transferring their own arguments onto the complex predicate, is nothing new. Similar cases are attested, for example, with the prefix *ver-* in German:

- (57) a. *Sie stellen Kisten vor die Einfahrt*
they put boxes in-front-of the driveway
b. *Sie verstellen die Einfahrt (mit Kisten)*
they Pref-put the driveway (with boxes)

In (57a), the predicative argument of the base verb *stellen* is saturated by its PP-complement *vor die Einfahrt*. In (57b), the prefix *ver-* fulfills the same function morphologically. The direct object in (57b) is an argument introduced by *ver-* and inherited by the complex verb (cf. Stiebels 1996:107).

Coming back to *h*-postpositions, notice that, according to (56c), *hindurch* has two implicit arguments. One is contributed by *durch*, the other one by *hin*. The *h*-postposition expresses that the middle part of the path traversed by *x* intersects with the interior region of the first implicit argument (y_1) and that the end part of this path intersects with the proximity region of the second implicit argument (y_2). Interestingly, if *hindurch* combines with a PP-complement, the location expressed by this PP identifies the (interior region of the) internal argument of the postposition *durch*, as shown in (58a). Although the P-predicate is introduced by the prefix *hin*, PP-complements that identify the internal argument of the *h*-element are not perfectly acceptable when combined with the complex *h*-postposition, (58b):

- (58) a. *Mirco geht unter der Brücke hindurch*
 M. goes under the bridge *h*-through
 b. ??*Yves geht zum Bahnhof hindurch*
 Y. goes to-the station *h*-through

(58a) is interpreted as Mirco going away from the speaker towards some unspecified region (= the internal argument of *hin* remains implicit), thereby passing under the bridge. (58b) means that Yves walks towards the station, which is not where the speaker is, thereby crossing some unspecified region (= the internal argument of *durch* remains implicit).

Let me finally turn to *h*-postpositions in pleonastic circumpositional phrases like (59):

- (59) a. *aus dem Haus hinaus*
 out the house *h*-out
 b. *auf den Berg hinauf*

on the mountain *h*-on

The derivation of the *h*-postpositions in (59) follows the pattern illustrated above. The functional operator in (52) is attached to the preposition *aus* in (60a) and derives the postposition *aus* in (60b). Prefixation of *hin* derives the *h*-postposition *hinaus*:

- (60) a. *aus* (preposition): $\lambda y \lambda x [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(y)]$
 b. *aus* (postposition):
 $\lambda P \lambda x \exists y_1 [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(y_1) \wedge P(x)]$
 c. *hinaus* (*h*-postposition):
 $\langle \lambda P \rangle \lambda x \exists y_1 \exists y_2 [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(y_1) \wedge$
 $\text{FIN}(\text{LOC}(x)) \subset \text{PROX}(y_2) \wedge \neg [y_2 = \text{speaker}] \wedge P(x)]$

The *h*-postposition *hinaus* in (60c) expresses that the final part of a path traversed by *x* ends in the outer region of an implicit reference object y_1 and in the proximity region of another implicit argument y_2 , which is not the speaker.

Now consider how the PP-complement of *hinaus* in (59a) directly identifies the implicit argument y_1 . Crucially, the PP in (59a) is a cognate PP. Therefore, the local relation expressed by the preposition *aus* is introduced once again:

- (61) *aus dem Haus hinaus*:
 $\lambda x \exists y_1 \exists y_2 [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(y_1) \wedge \text{FIN}(\text{LOC}(x))$
 $\subset \text{PROX}(y_2) \wedge \neg [y_2 = \text{speaker}] \wedge \text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(\text{the-house})]$

Recall that I have represented the implicit argument(s) of a postposition as being bound by an existential quantifier whose range is restricted by the interpretation of the PP-complement. It is clear that in interpreting pleonastic circumpositional phrases, the DP-complement of the preposition (*dem Haus* in (61)) directly identifies the implicit reference object of the original postposition, because the preposition's complement and the postposition's reference object are arguments of identical

predicates. Therefore, we can simplify the representation of the FP_{Prep} *aus dem Haus hinaus*:

$$(62) \text{ aus dem Haus hinaus:} \\ \lambda x \exists y_2 [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(\text{the-house}) \\ \wedge \text{FIN}(\text{LOC}(x)) \subset \text{PROX}(y_2) \wedge \neg [y_2 = \text{speaker}]]$$

(62) says that the path of the individual x ends outside the house and in the proximity region of some individual y who is not the speaker. (62) only differs from the meaning of the directional FP_{Prep} *aus dem Haus* in that it includes the deictic information contributed by the *h*-prefix. Otherwise, pleonastic circumpositional phrases have the same meaning as the corresponding prepositional phrases. This fact will be highly relevant for the discussion in section 4.¹⁷

3.3. The semi-lexical status of postpositions

The discussion in sections 3.1. and 3.2. has shown that the morphological and thematic properties of postpositions justify an analysis according to which they are functional elements derived from lexical prepositions. Postpositions in German and Dutch inherit the categorial status of their morphological heads (= the operator in (52)) and are therefore functional. If they project a phrase, this phrase is an FP_{Prep} with all the properties of fully referential phrases.

However, postpositions are not simply functional elements. Rather, they are “inflected” prepositions; they consist of a lexical element with a functional suffix. I suggest using the term “semi-lexical” to refer to morphologically complex functional heads that are derived from a lexical node. Postpositions are semi-lexical elements, and I claim that it is this property that explains why postpositions, although they are $\text{F}^{\circ}_{\text{Prep}}$ -heads, may behave like lexical particles when they are structurally adjacent to a verb.

The interaction between a verb and a structurally adjacent head H of the sort discussed in section 2.4. is only licensed if H is lexical or semi-lexical. Only lexical heads (i.e. particles) or functional heads *derived from* lexical heads (i.e. postpositions) may be reanalyzed with a structurally adjacent verb, and only lexical particles and semi-lexical postpositions are expected to show meaning variations caused by their local verbal context.

4. German vs. Dutch

In this final section I want to compare post- and circumpositional constructions in Dutch and German. Let me start by looking at German. (63a) shows a regular prepositional phrase; (63b) the corresponding postpositional phrase:

- (63) a. *Niels steigt auf den Berg*
N. climbs on the mountain
b. *Niels steigt den Berg hinauf*
N. climbs the mountain *h-up/on*

Following van Riemsdijk (1990) and McIntyre (1998), I suggested in section 2.1. that the DP in (63b) is the complement of an empty preposition. The postpositional structure is in fact a circumpositional structure where the head of the postposition's PP-complement is phonologically unrealized. Notice that this assumption is necessary on both syntactic and semantic grounds. Syntactically, postpositions realize the extended projection of prepositions and hence are expected to have PP-complements. Furthermore, I argued that postpositions take predicative arguments; they therefore need to combine with PP-complements for interpretative reasons as well.

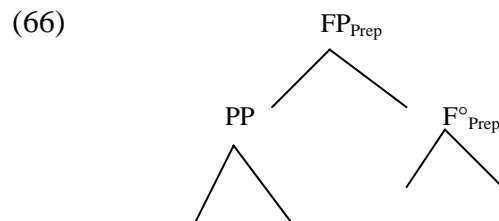
It can be shown that the semantics of the empty preposition is different from, and unrelated to, the semantics of the *h*-postposition. This can be seen if we compare the thematic interpretation of the DP *den Berg*, 'the mountain', in (63a) and in

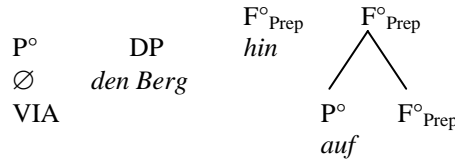
(63b). In (63a), this DP is the *goal* of Niels' trip; the climbing ends *on* the mountain. However, *den Berg* in (63b) does not denote the goal of the event, but rather the actual *path* that is traversed by the theme. (63a) means that Niels climbs on top of the mountain, (63b) means that Niels climbs up the mountain. The apparent similarities between (63a) and (63b) result from the fact that the mountain can define both the goal of the motion and the path that leads to it. However, if we choose different DPs, the difference between prepositional and postpositional phrases becomes immediately obvious:

- (64) a. *Youri stieg auf die Leiter*
 Y. climbed on the ladder
 b. *Youri stieg die Leiter hinauf*
 Y. climbed the ladder *h-up*
- (65) a. *Youri stieg auf den Stuhl*
 Y. climbed on the chair
 b. **Youri stieg den Stuhl hinauf*
 Y. climbed the chair *h-up*

Whereas (64a) is true as soon as Youri has his feet on the ladder, (64b) is only true if Youri uses the ladder as a path, which means that he has to take more than one step. The thing denoted by the DP *den Stuhl*, 'a chair', in (65) can be used as a possible goal, but not as a path. Therefore, the use of this DP in a postpositional phrase is impossible.

McIntyre (1998) captures the difference illustrated through (64) and (65) by postulating the existence of an empty preposition VIA that denotes a path. He argues that in postpositional constructions, this preposition is the head of the PP-complement of the *h*-postposition:





The tree in (66) is interpreted as follows:

- (67) a. (VIA) *den Berg*
 λx [MID(LOC(x)) \subset ON(the-mountain)]
- b. *hinauf* :
 $\langle \lambda P \rangle \lambda x \exists y_1 \exists y_2$ [FIN(LOC(x)) \subset ON(y₁) \wedge
 FIN(LOC(x)) \subset PROX(y₂) \wedge \neg [y₂ = speaker] \wedge P(x)]
- c. (VIA) *den Berg hinauf*
 $\lambda x \exists y_1 \exists y_2$ [FIN(LOC(x)) \subset ON(y₁) \wedge FIN(LOC(x)) \subset
 PROX(y₂) \wedge \neg [y₂ = speaker] \wedge MID(LOC(x)) \subset
 ON(the-mountain)]

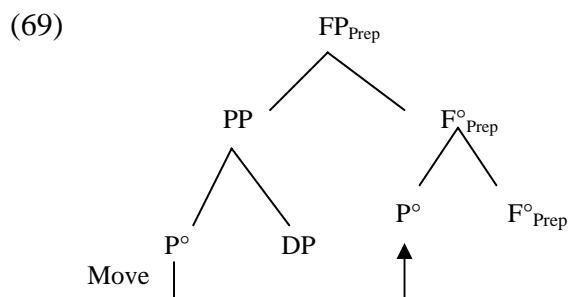
I have represented the meaning of the VIA-PP in (67a) as expressing that the middle path traversed by x intersects with the ON-region of the mountain. The derivation of the *h*-postposition *hinauf* and its combination with the PP in (67a) proceeds along the lines discussed in section 3.2. The denotation of the F_{Prep}^o *den Berg hinauf* is the set of individuals x that move along the mountain to become located in the ON-region of some individual y₁ and in the proximity region of a second individual y₂ who is not the speaker.

Let me now turn to Dutch. The question is whether the interpretation of postpositional phrases in Dutch patterns with that of their German counterparts. Consider (68):

- (68) a. *Hij springt op de trap*
 he jumps on the stairs
 ‘In one jump, he landed on the stairs’
- b. *Hij springt de trap op*
 he jumps the stairs up
 ‘He jumps all the way up, via the stairs’

The interpretation of (68) suggests that, as in German, a postpositional phrase in Dutch includes a PP with an empty VIA-preposition that determines the DP's thematic properties. Whereas (68a) is true if there is only one jump that ends on the first step of the stairs, (68b) is only true if the agent jumps all the way up the stairs. This difference follows from McIntyre's proposal on which (66) and (67) are based.

This account, however, is different from the analysis of postpositional phrases presented in van Riemsdijk (1990, 1998), according to which (68b) would have been derived from (68a) via head movement of the preposition to F°_{Prep} :



Adopting the copy-theory of movement (cf. Chomsky 1995; Brody 1995), I represent the base position of head movement through a copy which is not spelled-out at PF. According to (69), a postposition is derived by moving a preposition and adjoining it to the functional head F°_{Prep} .¹⁸

Clearly, a head movement account is inadequate for the example in (68), since it does not capture the semantic difference between (68a) and (68b). Nevertheless, I want to argue now that some postpositional phrases in Dutch are derived as in (69). There are two observations that provide support for this idea. Consider the examples in (70) and (71):

- (70) a. *uit het huis*
out the house

- b. *het huis uit*
the house out

- (71) a. *in de gevangenis*
in the jail
b. *de gevangenis in*
the jail in

First, note that it seems implausible to assume that the DPs *het huis* and *de gevangenis* in (70b) and (71b) are arguments of a preposition VIA, because this would yield the implausible interpretation “the theme moves along the house/the jail in order to get out of something/into something”. The DPs in (70b) and (71b) do not qualify as complements of a path-denoting preposition; rather, they seem to receive the same θ -role that is assigned by the prepositions in the (a)-examples. The DP *het huis* denotes a source; the DP *de gevangenis* denotes a goal. This means that, in contrast to the DP in (68b), the DPs in the (b)-examples in (70) and (71) seem to be arguments of the prepositional elements *uit* and *in*, respectively.

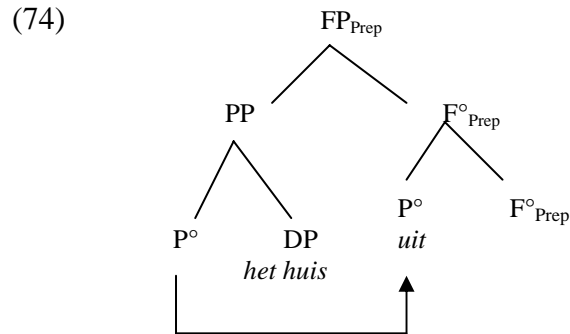
Second, notice that the *h*-postpositions *hinaus/heraus* and *hinein/herein* in German, which correspond to the postpositions *uit* and *in*, do not occur in postpositional constructions, as is shown by the (a)-examples in (72) and (73). Instead, in order to express the meaning of the phrases in (70b) and (71b), a German speaker would use a pleonastic circumpositional phrase, viz. (72b) and (73b). This possibility does not exist in Dutch, as the (c)-examples illustrate:

- (72) a. **das Haus hinaus*
the house *h*-out
b. *aus dem Haus hinaus*
out the house *h*-out
c. **uit het huis uit*

- (73) a. **das Gefängnis hinein*

- the jail *h-in*
 b. *in das Gefängnis hinein*
 in the jail *h-in*
 c. **in de gevangenis in*

It seems that what is expressed through pleonastic circumpositional phrases in German is expressed through postpositional structures in Dutch. Based on this observation, I now suggest the following. The postpositional structures in (70b) and (71b) are in fact derived via head movement:



As noted above, the chain created by P° -movement is only spelled-out in its head position. However, what I propose here is that *both* links of the P° -chain in a postpositional construction like *het huis uit* are interpreted semantically. The higher link is attached to F°_{Prep} and derives the postposition *uit* whose meaning is based on the semantics of the preposition *uit*. Crucially, the same semantic value is assigned to the copy of P° . In its base position, the preposition now takes the DP *het huis* as its internal argument; the semantics of the PP in (74) corresponds to the semantics of the PP *uit het huis*. This PP saturates the predicative argument position of the postposition *uit*:

- (75) a. *uit* (preposition):
 $\lambda y \lambda x [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(y)]$
 b. *uit* (postposition):
 $\lambda P \lambda x \exists y [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(y) \wedge P(x)]$

- c. \emptyset (= copy of *uit*) *het huis*:
 $\lambda x [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(\text{the-house})]$
- d. *het huis uit*:
 $\lambda x \exists y [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(y) \wedge$
 $\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(\text{the-house})]$
- d.' *het huis uit*:
 $\lambda x [\text{FIN}(\text{LOC}(x)) \subset \text{NOT-IN}(\text{the-house})]$

The PP in (74) is interpreted as in (75c) and saturates the predicative argument of the postposition. Since the predicates introduced by the preposition and the postposition are identical, (75d) can be simplified as (75d'). The implicit argument of the postposition *uit* is identified through the argument introduced by the PP, which is the complement of the (copy of the) preposition *uit*. Therefore, the meaning of (75d') is identical to the meaning of the phrase *uit het huis*.

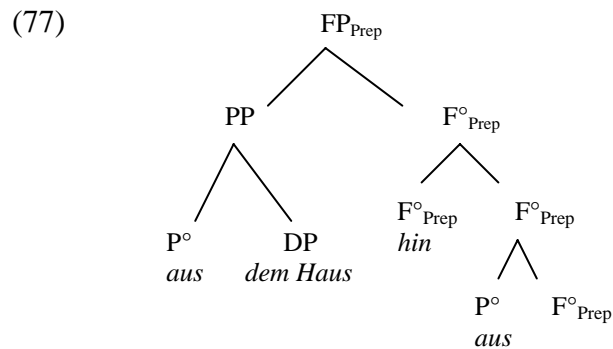
However, in certain cases, it does not seem that postpositional phrases in Dutch that are derived by movement always receive exactly the same semantic representation as the corresponding prepositional phrases. Compare (76a) and (76b):

- (76) a. *Hij loopt op de berg*
 he runs on the mountain
- b. *Hij loopt de berg op*
 he runs the mountain on/up

According to my Dutch informants, the postpositional phrase *de berg op* does not have the same interpretation as the postpositional phrase *den Berg hinauf* in German. This excludes an analysis according to which *de berg* in (76b) is the complement of a VIA preposition. This leaves the second option, i.e. that (76b) is derived by head movement of *op*. However, this predicts that (76a) and (76b) essentially have the same semantics; a prediction which is not borne out either. The FP_{prep} *op de berg* in (76a) has a locative interpretation, whereas the postpositional structure in (76b) is interpreted directionally.

However, I think this problem can be solved by assuming that the locative or directional character of a preposition is determined by properties of the functional head to which it is structurally adjacent. (76a) and (76b) involve different functional heads. The F°_{Prep} -head in (76a) does not trigger movement and yields a locative interpretation of *op*. In contrast, the functional head in (76b) triggers head movement of the preposition and thereby assigns a directional interpretation to both links of the P° -chain.¹⁹

Now compare (74) to the structure of the German pleonastic circumpositional phrase *aus dem Haus hinaus*:



In both (74) and (77), the lexical preposition occurs twice, once as the head of the PP, and once as part of the postposition. The only difference is that the second occurrence of *uit* in (74) is created by movement, whereas in (77), the P-element *aus* is just “used” twice.²⁰ However, if we disregard the contribution of the deictic prefix for the moment, we find that (77) receives exactly the same interpretation as the postpositional phrase *het huis uit* (cf. (75) and (60)-(62) in section 3.2.).

Let me summarize my proposal. In both Dutch and German, the argument structure of postpositions requires a PP-complement. First, the head of this complement and the prepositional base of the postposition may be entirely different elements. In that case, no movement relation exists between both prepositional elements, and we derive circumpositional phrases like (78a) and (78b) that exist in both languages:

- (78) a. *Mirco fährt unter der Brücke durch* (German)
M. drives under the bridge through
b. *He vliegtuig is onder de brug door gevlogen* (Dutch)
the airplane is under the bridge through flown

Second, the head of the PP might be the same prepositional element that forms the lexical base of the complex postposition. Dutch and German have two different ways of creating a structure which corresponds to this situation. Whereas in German, the preposition is merged into the tree twice (and is therefore spelled-out in both positions), Dutch simply moves the prepositional head of the PP and uses the head of the chain to derive the postposition:

- (79) a. *aus dem Haus hinaus* (German)
out the house *h-out*
b. t_i *het huis uit_i* (Dutch)
the house out

In both (79a) and (79b), the head of the PP is semantically interpreted in exactly the same way as the P-head that is part of the postposition, regardless of whether it is a fully spelled-out element as in German or the phonologically unrealized copy of a moved preposition (represented by the trace t_i in (79b)) as in Dutch.

Finally, not all simple postpositional phrases in Dutch are generated by movement. If the phonologically unrealized head of the PP-complement and the P-head that is part of the postposition have different meanings, the head of the PP-complement must be analyzed as a zero-preposition whose semantics is different from the prepositional part of F°_{Prep} . These postpositional structures also exist in German:

- (80) a. *Youri stieg die Leiter hinauf* (German)
Y. climbed the ladder *h-up*
b. *Hij springt de trap op* (Dutch)

he jumps the stairs up
 ‘He jumps all the way up, via the stairs’

In both (80a) and (80b), the head of the PP is a phonologically unrealized VIA-preposition.

5. Conclusion

The properties of particles, prepositions, and postpositions discussed in this paper suggest that the differences and similarities between these elements are best captured in a theory that takes into account the local environment of a lexical P-node. If P° is structurally adjacent to a verb, it is a particle; if it is structurally adjacent to a functional head, it is a preposition. If P° is suffixed with a functional head, it is a postposition. This explains why postpositions are mixed creatures. On the one hand, the presence of functional structure causes them to adopt properties of functional heads. Therefore, post- and circumpositional phrases are functional projections. On the other hand, postpositions are also structurally adjacent to the verb. Therefore, their syntactic environment is the same as that of particles.

However, the fact that postpositions behave like particles with respect to phenomena like word formation or Verb Raising does not follow from their local environment alone. It requires the additional assumption that postpositions, although they are functional categories, also have properties of lexical elements. I argued that these properties follow from the idea that postpositions are derived from lexical P-elements through the suffixation of a functional zero-morpheme, and I elaborated this idea by investigating the systematic difference between the thematic properties of postpositions and those of prepositions. The argument structure of the former was analyzed as being derived from the argument structure of the latter through an operator that corresponds to the functional suffix that derives postpositions morphologically. This explains why postpositions are semi-lexical elements; they have the lexical status of preposi-

tions, but inherit the functional status of their morphological heads.

I had to leave open many questions about the precise relation between the particle-like properties of postpositions and their semi-lexicality. Nevertheless, I hope that my analysis has opened an interesting empirical window which provides a new perspective on issues concerning lexical and functional nodes and their interaction in morphosyntactically defined locality domains.

Notes

- * I would like to thank the participants of the workshop on semi-lexical heads and an anonymous referee for their valuable comments. I would also like to thank Dori Posel for proof-reading this article.
1. Van Riemsdijk (1998) argues that the whole prepositional phrase only includes one maximal projection, the FP_{Prep} . This means that there is no maximal lexical projection in his theory.
 2. Besides *h*-postpositions, German has other complex postpositions that consist of a prepositional element and a prefix *dr-* or *r-* (cf. McIntyre 1998). Some of the *dr*-postpositions may also be used non-directionally.
 3. (14b) might be analyzed as an instance of remnant topicalization of the phrase which includes the object-DP and the FP_{Prep} , but not the verb. This might explain why for some speakers, (14b) is not entirely excluded. However, notice that the topicalized phrase still includes the unbound trace of the verb and therefore still contrasts clearly with (14a).
 4. An anonymous reviewer reminds me that a syntactic analysis of particle verbs which does not assume incorporation has first been proposed by Taraldsen (1983) for Norwegian.
 5. Examples like (22) have led researchers like van Riemsdijk (1978) and den Dikken (1995) to consider particles as particular instances of intransitive prepositions. Notice, however, that the particle verb in (22) is not simply an intransitive version of the construction in (21), but has adopted an idiomatic meaning. From a lexicalist point of view, according to which special meanings are only associated with words, the idiosyncratic properties of particle verbs seem to raise a problem for the phrasal analysis of particle verbs. However, this lexicalist perspective has been criticized in recent work (cf. Jackendoff 1997; Marantz 1997). In Zeller (1999), I propose an analysis of particle verbs which is based on an alternative model of grammar. Since this model allows for the association of

special meanings with non-minimal syntactic structures, the idiosyncratic semantics of many particle verbs does not raise a problem for a phrasal analysis.

6. The particle *aus* licenses so-called *Objektvertauschung* or *Objektumsprung* (cf. e.g. Kühnhold 1973, Hundsnurscher 1968), i.e. it may also realize its Theme as the direct object of the particle verb. In that case, the reference object must remain implicit, cf.:

- (i) *Peter hat sein Bier (*die Flasche) ausgetrunken*
 Peter has his beer_{ACC} the bottle out-drunk

Since it will be argued below that the direct object of the particle verb *austrinken* receives case from the verb, and since the verb *trinken* has only one objective case to assign, it follows that the theme and reference object in this example are mutually exclusive.

7. Some prepositions (like *zu*, ‘to’, or *nach*, ‘after’) that assign dative case to their reference objects may transfer this property onto a structurally adjacent verb, such that the particle verb also assigns dative case to its object. See Zeller (1999) for further discussion.
8. Similar assumptions about terminal nodes in complex syntactic structures, and about their relation to words formed by directly merging these nodes, are made in Marantz (1989) and Borer (1991, 1993). See Zeller (1999), chapter 6, for discussion.
9. So-called root formations are sometimes analyzed as being derived by combining a particle with a noun derived from the base verb (cf. Stiebels and Wunderlich 1994):

- (i) *der Absprung*, ‘the take-off’ [Ab [sprung]]
 (ii) *der Ausguss*, ‘the gutter’ [Aus [guss]]

If root formations are indeed combinations of a particle and a noun, they pose a problem for my claim that particles always require local verbal contexts. Therefore, as an anonymous referee points out, one might be forced to assume that root formations are syntactically derived. According to this view, they would include a full VP which consists of the verb and the particle. The verb incorporates into an abstract nominalizing head; the complex noun is then affected by the phonological process characteristic of root nominalizations. However, this analysis wrongly predicts that all root formations are process nominals. I therefore tentatively assume that root formations like those in (i) and (ii) are genuine nominalizations of (reanalyzed) particle verbs and that the Ablaut-process that triggers the phonological change may also effect complex verbs (see Zeller (in preparation) for some discussion):

- (iii) [[ab spring] + N] → [Absprung]

10. As shown in (i), adjectival resultative constructions differ from particle verbs in that they do not allow for further word formation; cf. Neeleman and Weerman (1993); Neeleman (1994); Kratzer (1994):

- (i) particle verb: *abwaschen*, 'wash off'
 derived adjective: *abwaschbar*
 resultative construction: *sauber waschen*, 'wash clean'
 derived adjective: **sauberwaschbar*

Assuming that adjectival resultatives involve an extended projection of the resultative predicate, the analysis presented in the text explains the impossibility of having word formation with resultative constructions.

11. Booij (1990) argues that particle verbs are verbal projections of a specific kind that can be raised in Dutch. However, this claim is based on Booij's questionable notion of a V*-node which is formed in the lexicon and includes the particle and the verb. Since the postulation of this special node seems rather *ad hoc* and does not capture the fact that Verb Raising with postpositions and certain kinds of resultatives is also possible, I reject Booij's assumption.
12. As an anonymous reviewer notes, *h*-postpositions in Austrian dialects may show the order [postposition-*h*-prefix], cf. *auf-i* (= *auf-hin*) instead of the German *hin-auf*. The problem for the present proposal is posed by the fact that the Austrian examples apparently violate the Right-hand Head Rule. However, it might be possible that the functional deictic element in Austrian dialects has been reanalyzed as an inflectional suffix and has adopted properties quite similar to those of the functional zero-suffix discussed in example (46). This assumption gains support from the observation that the deictic element occurs in a phonologically reduced form, a characteristic typical of grammaticalization (cf. Hopper and Traugott 1993).
13. If the range of the existential quantifier in (50) and (51) were not restricted, its interpretation would be too weak. For example, the sentence in (i) would be true in the situation in which Mirco crawls through a pipe that lies under the bridge:
 - (i) *Mirco kriecht unter der Brücke durch*
 M. crawls under the bridge through

If Mirco crawls through the pipe, there is a *y* such that the path traversed by Mirco intersects with *y*'s interior region while Mirco is under the bridge. However, (i) is not a correct statement to describe this situation. In order to prevent (i) from being true in the aforementioned context, I assume that the reference of *y* is restricted to entities whose interior regions can plausibly be defined by the PP-complement of the postposition.
14. In contrast to Olsen, I have marked the predicative argument of *hin* as optional (the triangle brackets); as (54) shows, the PP-complement of an *h*-element can be omitted. Again, I have represented the implicit argument as being bound by an existential quantifier whose range is restricted in the same way as was noted for the quantifier in (50) above.

15. In other words, a postposition in German either needs a PP-complement or a prefix. As far as I can see, this generalization seems correct. However, notice that it is not always easy to test, because *durch* and *zu* may also appear as particles. According to my theory, whenever these elements appear without a PP-complement, they must be particles, i.e. P°-heads of PPs without functional structure (cf. Olsen 1997 who draws a similar conclusion):
- (i) *Ebbe geht auf mich zu*: *zu* = functional postposition
'Ebbe walks towards me'
 - (ii) *Die Tür geht zu*: *zu* = particle
'The door closes'
16. If used without a host, the *h*-element may also project a full FP_{Prep}, as shown by the examples in (54).
17. One important question that I have to leave unanswered is why only some postpositions in German, like *durch*, can appear without a prefix, whereas others, like *auf* and *an*, require a prefix. McIntyre (1998) argues that the prefix is needed in order to absorb the case assigned by the prepositional element. However, although McIntyre's proposal explains why German postpositions like *auf*, *ein* etc. cannot occur without a prefix, it still leaves open the question of how case is absorbed with simple postpositions. It seems that the zero-operator turns certain prepositional elements (like e.g. *auf* and *an*) that are free morphemes into bound morphemes that require a prefix. Interestingly, there are other constructions in German with similar properties (cf. Höhle 1982: 97):
- (i) *zweitklassig*, 'second-rate'; *ganztägig*, 'all-day';
südländisch, 'southern'
- The adjectives in (i) are derived from the nominal compounds **Zweitklass-*, **Ganztag-*, and **Südländ-*. The heads of these compounds are free morphemes (*Klasse*, *Tag*, *Land*); however, the compounds themselves do not occur independently. They are only licensed in combination with the adjectival suffixes in (i). Höhle (1982) labels words that only occur as parts of other words *Zusammenbildungen*. According to my theory, postpositions like *auf* and *an* are *Zusammenbildungen* as well.
18. This assumption implies that head movement can derive words, and that these words obey morphological rules. For a discussion and a defense of this assumption, see Zeller (1999), chapter 1.
19. The idea that functional heads determine the directional or locative interpretation of prepositions is defended in Zeller (1999) to which I refer the reader for details.
20. One may wonder whether there is a substantial syntactic difference between (74) and (77) with respect to the relation between the two P°-heads. Notice that "head movement" is a metaphor for "copy and merge". The copying of a moved element might be nothing else than ac-

cessing a lexical element twice and merging it into the structure in two different positions. In that case, the “movement” operation in Dutch postpositional phrases is identical to the formation of pleonastic circumpositional constructions in German. It might therefore be possible also to analyze the relation between the two prepositions in (75) as a chain. Formally, the difference between Dutch postpositional phrases and German pleonastic circumpositional phrases would then reduce to the fact that only in German, the copy of the moved P° is phonologically interpreted.

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