On the paradigmatic nature of affixal semantics in English and Dutch
GEERT BOOIJ AND ROCHELLE LIEBER

Abstract

This article looks in some detail at the semantics of the affixes -er and -ee in English, at the affix -er in Dutch, and at the fact that Dutch seems to lack a specific process of word formation analogous to -ee in English. We also look at the formation of subject- and object-oriented nouns in a larger context, raising the question of what happens in a language that lacks a productive derivational means for expressing a particular morphological concept. We argue that an explanation of the most deviant derivations with these affixes arises only when we consider the paradigmatic nature of affixal semantics.

1. Introduction

In this paper, we will look in some detail at the semantics of the affixes *-er* (*writer*) and   *-ee* (*employee*) in English, at the affix *-er* (*schrijver* >writer=) in Dutch, and at the fact that Dutch seems to lack a specific process of word formation analogous to *-ee* in English. Two main issues arise from this comparison. One concerns the nature of affixal meaning itself. Roughly speaking, the affix *-er* might be characterized in both languages as Asubject-oriented@ and *-ee* in English as Aobject-oriented@. But this is only the roughest of characterizations; as we will see shortly, there are *-er* forms which are Aobject-oriented@ and *-ee* forms which are Asubject-oriented@, and both affixes form derivatives which are properly speaking neither subject nor object oriented, because they are based on nouns rather than on verbs. Further, we will look at

the formation of subject and object-oriented nouns in a larger context, raising the question of

what happens in a language that lacks a productive derivational means for expressing a particular

morphological concept.

While the -er affix in both English and Dutch has received much attention in recent years

(Booij 1986, Levin and Rappaport 1988, Rappaport Hovav and Levin 1992, Panther and

Thornburg 1998, Ryder 1999, Heyvaerts 2001), the affix -ee has received extended attention

only in the work of Barker (1998), and the equivalent Dutch process -- or the lack thereof -- has

received little attention at all. We intend to offer an extended comparison of these affixes, and to

concentrate on a number of points which have remained unresolved in previous analyses.

Specifically, we intend to pay close attention to derivatives with these affixes that seem most

deviant -- first, those which are not deverbal and second, those which have the unexpected

thematic interpretation (i.e., object-oriented for -er and subject-oriented for -ee). We will argue

that it is these more deviant formations that provide us with interesting evidence not only about

the intrinsic semantic contribution of these affixes but also about the paradigmatic nature of

derivational semantics. We will identify a semantic gap in both English and Dutch derivation --

a semantic category for which no productive means of word formation exists in either language --

and suggest a means by which the closest productive derivational process available in each

language is extended to cover cases in which nouns bearing this meaning must be coined.

In section 2 we present the relevant data from English and Dutch, and in section 3 a

discussion of past analyses. Section 4 outlines a basic framework of lexical semantic

representation that is developed in Lieber and Baayen (1997, 1999), and presents an analysis of

English -er and -ee and Dutch -er based on that framework. Finally, in section 5 we address the

cases of *-er* affixation in both English and Dutch which have proven most problematic, and show

how the notion of a semantic paradigm begins to offer an analysis of these cases.

2. Data

It has been noted in the morphological literature for some time (e.g., Marchand 1969, Levin and

Rappaport 1988, Rappaport Hovav and Levin 1992, Panther and Thornburg 1998, Ryder 1999,

Heyvaerts 2001, Barker 1998, Booij 1986, 2002, De Caluwe 1992) that affixes like *-er* and *-ee*

in English and *-er* in Dutch show a wide variety of meanings. We begin with a summary of the

range of data which we find for *-er* in both languages.

(1) subject-oriented *-er*
    a. English

base[1]	*theta-role of subject*	*derived noun*
write	agent	writer
drive		driver
open	instrument	opener
print		printer
hear	experiencer	hearer
please	stimulus	pleaser

    b. Dutch

base	**theta-role of subject**	**derived noun**
speel >to play=	**(animate) agent**	**speler >player=**
drink >to drink=		**drinker >id.=**

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[1] By base, we mean the uninflected form of the verb. For Dutch, which has somewhat
more inflection than English, this corresponds to what is generally referred to as the stem.

wijs >to point= **(non-animate) agent** **wijzer >lit. pointer, hand of a clock=**

brand >to burn= **brander >burner=**
open >to open= instrument **opener >id.=**
maai >to mow= **maaier >mower=**

The vast majority of words formed with *-er* are deverbal and can be characterized as >subject-

oriented= names for people and things, which is to say that they show roughly the range of

thematic roles that can be expressed by subjects in English or Dutch: agent, instrument,

experiencer, and stimulus.

Some deverbal forms, however, in addition to a subject-oriented interpretation, have an

>object= or at least a >non-subject= interpretation, being interpreted either as >thing which can

be or is Ved= or >thing with which/on which/in which one Vs=:

(2) object-oriented *-er*
    a. English
    base verb   *thematic role*   *derived noun*
    fry   patient/theme   fryer
    keep   keeper
    sink   sinker
    loan   loaner
    dine   location   diner (>place where one dines=)
    sleep   sleeper (>train in which one sleeps=)
    stroll   means   stroller (>baby carriage with which one
                                          strolls=)
    walk   walker (thing with which one walks=)

    b. Dutch[2]

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[2] **In addition, there is a restricted set of B*er* nouns with a more idiosyncratic interpretation, such as the stimulus name *giller* >what makes you scream= (< *gil* >to scream=), and the event name *misser* >failure=(<*mis* >to fail=).**

stijg >to rise= theme	stijger >riser= (said of shares)
blijf >to stay=	blijver >stayer=
aanraad >to advise=	aanrader >adviser, what one should buy or visit=
doordenk >to reflect upon=	doordenker >something one has to reflect upon=
dump >to dump=	dumper >something one dumps=[3]
dooreet >to eat continuously=	dooreter(tje) >what one eats continuously=[4]
heb >to have=	hebber >lit. haver, thing you want to possess=
krijg >to receive=	krijgertje >lit. receiver, gift=
weggeef >to give away=	weggever >thing you give away=[5]

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[3] *De meeste dieren die we hier krijgen zijn dumpers* >most animals we get here are dumpers= *(said by the director of an animal=s asylum) (Metro daily, 17.06.00)*

[4] *Deze zoutjes zijn dooretertjes* >These crisps are things one cannot stop eating= *(advertisement)*

[5] *Het Spectrum, uitgever van weggevers, krijgers en hebbers* >Het Spectrum, publisher of give-away-ers, receivers, and havers=

inruil >to trade in=	inruiler >a trade in=
instap >to step into=	instapper >loafer= (type of shoe)
opruim >to put on clearance	opruimer >what is on sale=
sale	
verkoop >to sell=	verkoper >something one sells=[6]
laad >to load=	voorlader >front loader=

These nonsubject-oriented forms are often -- perhaps almost always -- names for things rather

than people, a fact which will become important below. Further, they always express an affected

object (the thing impinged upon by the action) rather than an effected object (the thing created by

the action). It is also worth noting that new forms are created in this category with some

frequency. Ryder (1999) provides excellent data on this subject for English. **De Caluwe (1992)**

presents a list of 65 object names of this form, taken from dictionaries of present-day

Dutch, only four of which occur in the list of examples presented above. In some cases in

Dutch, the diminutive form of the B*er* noun is the preferred form. This is for example the

case for *rokertje* >cigar or cigarette= derived from the verb *rook* >to smoke=, and for the

word *krijgertje* (cf. 2). The diminutive suffix functions here as an endearment suffix; it

expresses a positive attitude towards things that can be smoked. In Dutch, the nonsubject

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[6] *Boeing is een goede verkoper* >Boeing is a good seller= *(Trouw daily 06.03.92)*

interpretation also occurs with deverbal nouns ending in B*aar*, an allomorph of B*er*, for instance in *gijzel-aar* >hostage=and *martel-aar* >martyr=, derived from the verbs *gijzel* >to take hostage= and *martel* >to torture= respectively.

Further, there are a substantial number of forms derived with *-er* in both languages that have nonverbal bases, for the most part nouns, but also sometimes measure words or whole phrases:

(3) non-deverbal *-er*
        a. English

base	*base category*	*derived noun*
London	noun	Londoner
village		villager
freight		freighter
five	measure	fiver
part time	phrase	part timer
first grade		first grader
empty nest		empty nester

        b. Dutch

base	*derived noun*
Amsterdam >id.=	Amsterdammer >inhabitant of Amsterdam=
wetenschap >science=	wetenschapper >scientist=
drie pone >three pound=	drieponder >three pounder=
eerste graad >first degree=	eerstegrader lit. >first grader= >teacher with the highest degree=

In this use, the suffix B*er* creates personal nouns as well as nouns that refer to non-animate entities. For example, *drieponder* or *three pounder* are nouns that refer both to non-animate entities with a weight of three pounds, but can also be used to refer to babies with that weight. Again, it is important to note with respect to the data in (3) that this pattern shows some degree

of productivity both in English and in Dutch; it is less productive certainly than the deverbal

subject-oriented forms, but nevertheless, as Ryder (1999) shows for English, new forms are

coined with some frequency. In Dutch, the denominal use of *-er* is also rather productive (Van

Santen 1992, Booij 2002: 123).

The affix *-ee* in English also shows a range of meanings. Most often, it creates object-

oriented personal names:

(4) object-oriented *-ee*

verb	theta role	derived noun
employ	patient/theme	employee
nominate		nominee
deport		deportee
address	goal	addressee
offer		offeree
experiment	object of governed P	experimentee
laugh		laughee

Nevertheless, there are also words derived with *-ee* that seem to be subject-oriented person

names:

(5) subject-oriented *-ee*

verb	theta role	derived noun
escape	agent	escapee
attend		attendee
stand		standee
resign		resignee

And as with *-er* there are cases which are formed from nouns, rather than verbs:

(6) denominal *-ee*

base	derived noun
biography	biographee

mastectomy   mastectomee
asylum   asylee

Barker (1998) even cites one deverbal *-ee* form in which the referent does not correspond to any argument of the verb. Specifically, the form *amputee* refers neither to the person doing the amputating, or the thing amputated, but rather to the person whose limb is amputated.

Further, Barker notes (1998: 710) that there are a very few cases of *-ee* nouns that do not denote persons. Most often these belong to scientifically restricted fields. Notable among these are linguistic terms like *raisee* or *ascendee*. We will return to these forms in section 5.

It is also worth pointing out here a sort of derivational affix that English does not have, namely an affix which creates affected object words, that is, one that can be used to create concrete non-personal object nouns from verbs with the meaning >thing one Xes= or >thing which has been Xed=. We will see that this gap in the derivational system of English has some importance in explaining the scope of new formations in *-er*.

Interestingly, and importantly we think, there is no specific suffix in Dutch which forms personal object-oriented nouns parallel to the English suffix *-ee*. **The closest Dutch comes to this sort of process is a somewhat indirect way of creating object nouns from verbs in Dutch by substantivizing adjectives that are converted past participles by means of** B*e*-**suffixation. The resulting noun is either animate (with non-neuter gender) or non-animate (with neuter gender). In the first use, such nouns are roughly comparable to English nouns such as** *addressee* **and** *employee***:[7]**

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[7] Participles are only occasionally used in this way in English, and often they seem to be

(7)   *verb*   *adjectival participle*   *noun*
       adresseer >to address=geadresseerd >addressed=   **geadresseerd-e >addressee=**
       ontsnap >to escape=ontsnapt >escaped=   **ontsnapt-e >escapee=**
       koop >to buy=   **gekocht >bought=**   **gekocht-e >what has been bought=**
       speel >to play=   **gespeeld >played=**   **gespeeld-e >what has been played=**   **steel >to steal=**   **gestolen >stolen=**   **gestolen-e >what has been stolen=**

As the glosses indicate, these derived nouns refer to both persons and things that have been

involved in the action expressed by the verb, an action which has itself ended. In these

respects, such nouns differ both from the object-oriented B*er* nouns given above and from

the *-ee* nouns in English.

Other than from adjectival participles, there is only one direct way of creating

deverbal object names in Dutch, by means of the suffix B*sel*, as in **(8)**:

(8)   *transitive verb*   *object noun*
       aanhang >to append=   **aanhang-sel >appendix=**
       bedenk >to think=   **bedenk-sel >idea=**
       bouw >to build=   **bouw-sel >building=**

       intransitive verb
       aanslib >to deposit=   **aanslib-sel >deposit=**
       druip >to drip=   **druip-sel >what has dripped from a candle=**

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either frozen forms (e.g, *my beloved, the aforementioned*).

Opinions differ as to the productivity of this suffix. De Haas and Trommelen (1993: 244) consider it unproductive, whereas Baayen (1989) qualifies it as productive, but strongly restricted pragmatically. This suffix is certainly not productive for the purpose of coining new affected object nouns. That is, its semantics is such that the *-sel* noun refers in most cases to an object that is created by the event referred to by the verb, and thus refers normally to effected rather than to affected objects. But the *-ee* nouns in English and the object-oriented nouns in *-er* in both languages refer to affected objects, as the examples given above clearly illustrate. Another semantic difference between *-er* nouns and *-sel* nouns is that the latter tend not to function as names for individual entities but as mass nouns, as names for certain kinds of stuff. This is for instance the case for recently coined *-sel* nouns such as *afzuigsel* >what has been drained away= (< *afzuig* >to drain=), and *spreidsel* (<*spreid* >stuff that has been spread=). Therefore, when used in indefinite NPs, they usually occur without determiner, unlike the *-er* object nouns.

Finally, note that Dutch has a nominal deverbal suffix *-ling* for the coining of object names, as in *bekeer-ling* >convert= (<*bekeer* >to convert=), but this suffix is not productive in present-day Dutch.

What we think is important to emphasize at this juncture is that neither English nor Dutch provides a direct morphological means -- that is a specific affix -- for the creation of nouns with the meaning >affected object of the action expressed by the verb=. This fact will become essential for understanding why the deverbal suffix Β*er* in both languages can be used for the creation of object nouns.

There are a number of interesting questions to be asked about the suffixes *-er* and *-ee.* We might first ask whether the affixes themselves make any semantic contribution to their bases. This is an especially critical question to ask when we realize that there are so many *-er* and *-ee* words formed from nonverbal bases which nevertheless have a sort of dynamic or situational meaning in spite of the lack of a verbal base. Second, we should ask why the meanings of *-er* and *-ee* can sometimes overlap: although *-er* most often forms subject-oriented nouns and *-ee* object-oriented nouns, there are nevertheless a significant number of *-er* forms which are object-oriented and *-ee* forms which are subject-oriented. Why should this be the case? We argue in what follows that a formal answer to these questions helps us to understand the overall pattern of word formation in English and Dutch, specifically the gap in affixes we noted above.

3. Previous analyses

We are by no means the first in recent years to study these affixes, to note their polysemy, and to seek a unitary characterization of their behavior. Indeed, our own analysis will owe a great deal to previous treatments, building on them, integrating their insights, formalizing them in a particular way, but also, as we hope to show, going beyond them in explaining something about the overall picture of English and Dutch word formation that has not been noted before. We briefly review the studies that we build on below, principally Booij (1986) for Dutch, and Rappaport Hovav & Levin (1992), Ryder (1999), and Barker (1998) for English. Significantly, each of these studies confines itself to the analysis of only one of the relevant affixes and therefore does not treat the issue of their overlap in meaning, and each in turn fails to account for

some of the observations we have made above concerning the range of derivatives in *-er* and *-ee*. We claim that none of the past analyses has offered a complete answer to what we see as central questions: what the affix *-er* means in both English and Dutch, what *-ee* means in English and why these affixes display the range of polysemy that they do.

In Booij (1986) it is argued that the deverbal suffix *-er* binds the external argument of the verb. Since the external argument can bear different thematic roles, such as Agent and Theme, the interpretation of the deverbal noun will vary accordingly, and thus we get Agent names, Theme names, etc. As to the Instrument interpretations of deverbal nouns, Booij (1986) argues that the Instrument role does not have the same status as the Agent role because there are cases in which the subject argument of the verb does not allow for an instrumental interpretation, whereas the corresponding deverbal noun does allow for an interpretation as instrument noun. For instance, the deverbal noun *smelter* >melter= may be interpreted as an instrument name, whereas a sentence such as *De warmte smelt het ijs* >The heat melts the ice= is awkward, although not ungrammatical in an absolute sense (Booij 1986: 512). Therefore, Booij (1986) suggests deriving the instrumental interpretation by means of a conceptual extension schema that allows us to shift from Personal Agent, through Impersonal Agent to Instrument.

Rappaport Hovav and Levin (1992) (henceforth RHL) also analyze *-er* at the level of argument structure. They argue that *-er* saturates or binds the external argument of the verb to which the affix attaches, noting that appeal to a syntactic argument position makes it unnecessary to list a variety of thematic roles (agent, experiencer, instrument, stimulus, and so on) in the analysis of the affix: *-er* can take on any of the roles that the external argument of a verb can,

from agent and instrument to experiencer and stimulus. **Thus, we see that their analysis is very similar to the one proposed for Dutch in Booij (1986).**

RHL=s analysis provides a neat account for the vast majority of forms in *-er*, namely the subject-oriented ones with the agent, instrument, experiencer, and stimulus readings. It also accounts nicely for some of the object-oriented forms. For example, RHL treat the work *sinker* as formed from the inchoative alternant of the verb (*The ship sank*) and items like *looker* or *fryer* as formed from middle constructions (*She looks good; This chicken fries well*). This approach works for a large number of the object-oriented forms; nevertheless, there are still a few items with the patient reading for which the external argument analysis cannot be made to work: neither the verb *keep* nor *loan* has an inchoative or a middle form[8], and yet *keeper* and *loaner* have patient interpretations. Nor can the locational forms like *diner, kneeler,* and *jotter* be explained in this way. Similar problems occur in the analysis of the Dutch data: not all object-oriented forms correspond to verbs which have inchoative or middle forms.

Also problematic for RHL=s analysis are the denominal forms. Although it has been argued that nouns have arguments, or at least the AR@ argument (Higginbotham 1985), it is not clear that we would want to equate the AR@ argument of a noun with the external argument of a

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[8] *Keep* does have a middle form (*Ultrapasteurized milk keeps well*), but not in the sense that is relevant to the form *keeper* >something that is worth keeping=.

verb; nominal arguments do not have thematic interpretations in the way that the arguments of a verb typically do. The AR@ argument of a noun like *London* or *freight* is not interpreted as an agent, an instrument, or a theme, and yet nouns like *Londoner* >person who lives in London= or *freighter* >thing which carries freight= receive respectively a personal interpretation and an instrumental interpretation. How do they get these interpretations if there is no verbal base whose external argument has the agent or instrument reading? How, indeed, do they get a dynamic or situational meaning at all if they do not have a verbal base? In other words, there must be some semantic content to the affix that cannot be captured in a purely argument-structure theoretic framework, and therefore, good as RHL=s analysis is, there seems still to be more work to be done on *-er*.

Ryder (1999) notes just these problems with respect to RHL=s analysis, and offers a counteranalysis couched in terms of cognitive grammar. Roughly, she suggests that *-er* forms denote a participant in what she calls an event schema which is provided by the base. An event schema Ais a cognitive knowledge structure made up of components with specified relationships to each other@ (1999: 277). Event schemas are not restricted by syntactic category: although verbs generally denote events which are the subject of schemas, nouns and other parts of speech can serve as participants in schemas, and hence can evoke such schemas as well. All syntactic categories can therefore serve as the base of *-er* derivation.

As for which participant is denoted in a given *-er* form, Ryder suggests a number of pragmatic constraints: the participant should be both salient (ASalience refers to the degree to which something is noticeable in comparison with its surroundings.@ (1999: 285)) and identifiable (AIdentifiability refers to the extent to which a participant is readily identifiable by

mention of the event alone.@ (1999: 285)). According to Ryder, agents are more salient than

Patients, and Patients more salient than Instruments. Agents and Instruments are more

identifiable in some schemas than Patients. Thus, Ryder suggests that pragmatic constraints

make it likeliest that *-er* forms will refer to Agents, next most likely to refer to Instruments, and

less likely to refer to Patients.

While this analysis pays attention to exactly those areas in which formal generative

analyses of *-er* have been weakest, we find that the cognitive analysis does not really tell us what

we want to know about *-er*, namely what exactly it means. And although pragmatic factors like

salience might have something to do with the argument-structural effects of *-er* affixation, they

are rather loosely defined: just about anything can be salient and identifiable given the right

context. These factors alone do not really explain why *-er* is so much more often subject-

oriented than object-oriented. We conclude that there is still some work that might be done on *-

er* within a generative morphology framework.

To date, the most comprehensive treatment of the affix *-ee* is Barker (1998). Barker

argues that although an argument structure theoretic analysis of *-er* might be adequate (we

suggest that it is not), an analogous treatment of *-ee* is unworkable. It is too simplistic to say that

-ee binds the direct object argument of a verb. Such an analysis does not account for cases where

the referent of the *-ee* noun is the indirect object (*addressee*), the object of a governed preposition

(*experimentee*), or the many cases where the *-ee* form receives an agentive, or at least a subject-

oriented interpretation (*escapee, attendee*).

Barker argues instead for a semantic analysis in which the affix *-ee* binds an argument of

its base verb under three conditions: the argument bound by *-ee* must be episodically linked to

the verb, by which he means roughly that the argument must be a participant in the event denoted by the verb; it must denote something sentient; and it must lack volitionality. For the canonical cases like *employee*, the affix binds the patient argument of the base verb rather than the agent argument, because that argument is both sentient and nonvolitional. For indirect object cases like *addressee*, the theme may not be bound as it is not sentient, and the agent may not be bound because it is volitional. What is left to bind is the indirect object or goal argument. A similar analysis obtains for governed preposition cases like *experimentee*, where the argument of the base verb that is both sentient and nonvolitional is the object of the governed preposition.

The cases where *-ee* binds a subject argument require a bit more work. For example, in the word *standee* Barker argues that the external argument is sentient and episodically linked, and is at least nonvolitional enough to suit. For *escapee*, more special pleading is required: although the bound argument must be an agent in some sense (you have to do something on your own if you escape), Barker argues that the overall scenario lacks a complete sense of control (1998: 719):

> An escapee typically is volitionally, actively, and deliberately involved in bringing about the escaping event. Once the escape has been effected, however, the escapee undergoes a significant and relevant change of state: he or she is subject to consequences that are quite certainly not in their control and in fact are quite strongly negative, including pursuit, recapture and punishment for escaping.

He acknowledges, however, that the requirement that the argument bound by *-ee* lack volitional control is problematic in cases like these, and in other subject-oriented *-ee* forms such as *retiree* and *attendee*.

Barker=s analysis also provides a plausible explanation for the word *amputee* where the affix appears to bind something which is not an argument of the base verb at all. The problem here is that none of the actual arguments of the verb *amputate* fulfills the full set of criteria, as the subject argument is volitional, and the object argument not sentient in the appropriate way. But the object argument (the limb) entails a possessor which is both sentient and nonvolitional. Hence, an *amputee* is understood as the possessor of the limb that has been removed.

Barker makes an excellent case that the analysis of *-ee* must take place at the level of lexical semantics. But his analysis still leaves some issues open. Broad though Barker=s analysis is, it provides a less than satisfying analysis of the subject-oriented forms, as we have tried to show. Further, it does not really explain why the denominal forms have the same processual flavor that the deverbal forms do. Barker (1998: 717) suggests that nouns can be eventive in the same way that verbs can, and if so, can give rise to appropriate *-ee* forms, but he does not pursue the implications of this claim, or elaborate on just what it is that makes nouns eventive. His analysis therefore seems to be on the right track, but does not go quite far enough, in our minds. Below we will look more closely at nominal semantics and attempt to go a bit farther.

4. An analysis

4.1 *Theoretical proposals*

Our hypothesis is that it is not an accident that the affixes *-er* and *-ee* show the range of polysemy

that they do and that their ranges of polysemy overlap. Rather, we believe that these facts follow from the basic meanings of the affixes, indeed that each of these affixes has a unitary meaning, and in fact that the meanings of *-er* and *-ee* are closely related. We argue that a framework of lexical semantic representation which has atoms of the right grain size will allow us not only to describe the facts in an illuminating fashion, but to predict that they would have to be the way they are. Such a framework has been developed in work by Lieber and Baayen (1997, 1999), and we build on their insights here.

The theory of lexical semantics outlined in Lieber and Baayen (1997, 1999) is composed of two parts, the Semantic/Grammatical Skeleton (or skeleton, for short), and the Semantic/Pragmatic Body (body, for short).[9] The skeleton is comparable in some ways to Jackendoff=s Lexical Conceptual Structures (Jackendoff 1990). This is the decompositional part of the representation, the part which aims to isolate all and only those aspects of meaning which have consequences for the syntax. This part of the representation is relatively rigid and formal. Instead of Jackendoff=s semantic functions like BE, CAUSE, and the like, however, Lieber and Baayen propose a broad featural system for decomposing meanings of morphemes that allows us to make cross-categorial generalizations; we elaborate on this system below. The body, which will not play a role in what follows, is that part of the lexical semantic representation that is encyclopedic, holistic, and perhaps only partially formalizable. It is made up of those bits of cognitive and cultural knowledge that form the bulk of the lexical representation.

The basic form of the skeleton arises from Jackendoff=s standard form of the Lexical

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[9] Lieber (to appear) develops this system, adds features, and justifies the use of features, as opposed to semantic functions of other sorts, in greater depth.

Conceptual Structure. It consists of functions and their arguments as in (9a) (arguments are

enclosed in parentheses); skeletons may also be hierarchically layered in the sense that functions

can sometimes take functions as their arguments, cf. (9b):

(9) a. [F_1 ([argument])]
     b. [F_2 ([argument], [F_1 ([argument])]

Following work of Williams (1981) and Higginbotham (1985), we assume that nouns and

adjectives take arguments just as verbs do, and refer to the obligatory argument of the noun as the

AR@ argument, as is traditional in this literature.

We part company with Jackendoff (1990) in our treatment of semantic functions. Where

Jackendoff characterizes functions as undecomposable units like BE, CAUSE, GO, we

decompose functions into a smaller set of atoms.[10] These atoms are features of meaning that are

typically active across a number of categories. At least one of the features that we will make use

of here -- [dynamic] -- has already been proposed in various forms in previous literature (see for

example, Pinker 1989, Dowty 1979, Verkuyl 1972). We make use of another feature --

[material] -- as well. These two features may be defined as follows:[11]

(10) Semantic features

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[10] Jackendoff (1991, 1996) does begin to pursue a strategy in which semantic functions
are further decomposed, specifically with regard to their quantificational characteristics.

[11] Lieber and Baayen (1999) use the term [substance] rather than [material] for the first
feature. The change in terms is not substantive, but rather is in keeping with the terminology of
Lieber (to appear)

$ **[+/- material]**: The presence of this feature defines the conceptual category of

SUBSTANCES/THINGS/ESSENCES, the notional correspondent of the syntactic category

Noun. The positive value denotes the presence of materiality, characterizing concrete

nouns. Correspondingly, the negative value denotes the absence of materiality; it defines

abstract nouns.

$ **[+/- dynamic]**: The presence of this feature signals an eventive or situational meaning,

and by itself signals the conceptual category of SITUATIONS. The positive value

corresponds to an EVENT or Process, the negative value to a STATE.

Terms like SITUATION and SUBSTANCE/THING/ESSENCE are not meant to be primitives

themselves, but mnemonic terms that we can use for referring to these large

conceptual/ontological categories.

These two features can be used to define the major lexical syntactic categories, noun, verb

and adjective. Nouns are items which will bear at least the feature [material] as the outermost

function of their skeleton; we use the qualifier >at least=, because, as we will see shortly, some

SUBSTANCES/THINGS/ESSENCES may also bear the feature [dynamic].[12] Verbs and adjectives will

both be characterized by the presence of the feature [dynamic] without the feature [material].

Verbs may denote either EVENTS or STATES, and therefore may be characterized by either the

positive or the negative value of the feature. Adjectives are characterized by the feature

[-dynamic]; that is, adjectives are conceptually identical to stative verbs in this system, although

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[12] But without any inherent specification of positive or negative value for this feature.
See footnote 13.

syntactically they differ from verbs in that (in English at least) they occur only in nonfinite form, i.e., do not bear tense.

The semantic features [material] and [dynamic] are meant to be functions, in the same sense that Jackendoff=s primitives (BE, GO, CAUSE, etc.) are, and as such they may take arguments. The basic form of a skeleton will contain one or more of these features, and one or more arguments. The simplest possible skeleton will therefore be something like those in (11) for the concrete noun *chair*, the adjective *happy*, or the intransitive verb *snore*:

(11)   *chair*   [+material ([   ])]

     happy   [-dynamic ([   ])]

     snore   [+dynamic ([   ])]

Lexical items will always have at least one argument (the one obligatory argument of a noun being the one that is referred to in the literature as the AR@ argument)[13], but they may have more than one as well, as the lexical entries for the noun *leg*, the adjective *fond*, and the verb *kiss* show:

(12)   *leg*   [+material ([   ], [   ])]   >the leg of the table=

     fond   [-dynamic ([   ], [   ])]   >fond of pickles=

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[13] The AR@ argument is originally proposed in Williams (1981: 86) as the external argument of a noun, that argument which allows the noun to be used predicatively or to be linked with a determiner to give it a referential reading. The mnemonic AR@ is meant to suggest Areferential@.

kiss   [+dynamic ([   ], [   ])]   >kissed the baby=

Alone, each feature allows us to partition a lexical class into two subclasses, for SUBSTANCES/THINGS/ESSENCES a class of concrete items ([+material]) and a class of abstract items ([-material]). The SITUATIONS are divided into an EVENT class ([+dynamic]) and a STATE class ([-dynamic]).

(13)   SUBSTANCE/THING/ESSENCE   SITUATION

[+material]   [-material]   [+dynamic]   [-dynamic]
chair   time   kiss   be
man   fact   eat   happy
                        etc.

In a truly cross-categorial system, however, we should expect that the two features [material] and [dynamic] should not be mutually exclusive. In fact, when we look more closely at the class of SUBSTANCES/THINGS/ESSENCES we observe that among the concrete and abstract classes, there are those which are situational in flavor, denoting states, events, actions, or even relations of some sort, and also those which lack a situational flavor. Among the former are nouns such as *parent, author, chef, boss, habit, war, effort*; among the latter the vast majority of simplex nouns, for example, *dog, chair, hand, fact, morning*, and so on. Lieber and Baayen (1999) propose that SUBSTANCES/THINGS/ESSENCES which are dynamic in nature bear some value of the feature [dynamic] as well as [material]

(14)   SUBSTANCE/THING/ESSENCE

            [+material]   [-material]

[dynamic]^{14} [dynamic]

author   man   habit   time
chef   hand   war   way
mother money   effort   morning

In other words, simplex nouns can be characterized semantically by the feature [material] and

sometimes by the presence of the feature [dynamic] as well. Verbs and adjectives are

characterized by the presence of the feature [dynamic] and the absence of the feature [material].

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[14] Exactly which value of the feature [dynamic] a situational noun will bear depends on syntactic context. Briefly, when all arguments are present in the syntactic context (e.g., *Barbara=s habit of biting her nails*), the noun *habit* will have the plus value of [dynamic], and will receive a complex event interpretation. Without full specification of arguments (e.g., *one bad habit*), the reading of the noun will be a state or a result reading, and the [dynamic] feature will be contextually determined to have the minus value. Without a syntactic context, however, situational nouns are not inherently determined to have either the plus or the minus value of the feature.

(15) illustrates skeletons for some of the situational nouns:

(15)   *author*   [+material, dynamic ([   ], [   ])]

         poet   [+material, dynamic ([   ])]

         habit   [-material, dynamic ([   ], [   ])]

         sunset   [-material, dynamic ([   ])]

We have now developed enough of a framework to return to the first problem raised here:

what do affixes like *-er* and *-ee* mean, and why do they receive the range of overlapping

interpretations that they do?

The most important claim that we make is that affixes, like simplex lexical items, can

have skeletons, and that the semantic part of derivation involves adding the affixal skeleton as an

outer layer to the skeleton of the base, thereby subordinating that skeleton. Affixal skeletons will

consist of functions and arguments, just as simplex lexical skeletons do, and indeed of exactly

the same atomic material that makes up simplex lexical skeletons. We assume, in other words,

that affixes have actual semantic content. We suggest, as well, that affixation requires the

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[15] The careful reader will note that the feature [dynamic] is used in a binary fashion in distinguishing types of verbs and adjectives, but in a privative fashion in delimiting subclasses of nouns. See Lieber (to appear) for an explanation and defense of this point.

coindexation or binding of an affixal argument with a base argument, a process that serves to integrate parts of the composed skeleton and at least in the case of derived nouns to ensure that the resulting word constitutes a single referential unit. We will look further at coindexation below.

The novel proposal that we make is that the vast majority of category-changing derivational affixes in English add a function that corresponds in featural content to one of the major semantic categories of simplex lexemes, namely the categories in (16):

(16)   **Basic categories for derivational affixes:**

[+dynamic]   creating EVENTS

[-dynamic]   creating STATES

[+material]   creating simple, concrete SUBSTANCES/THINGS/ESSENCES

[-material]   creating simple, abstract SUBSTANCES/THINGS/ESSENCES

[+material, dynamic] creating concrete situational SUBSTANCES/THINGS/ESSENCES

[-material, dynamic] creating abstract situational SUBSTANCES/THINGS/ESSENCES

In other words, the basic semantic categories -- at least for category-changing derivation -- are expected to be broad, general, and in fact quite abstract. These are the basic categories of the simplex lexicon, and we use derivational affixes to extend these categories. We might expect affixes that derive statives or eventives by adding the features [-dynamic] or [+dynamic] respectively, or pure concrete or pure abstract nouns, or nouns that are concrete and situational or abstract and situational. The expectation that the system leads us to is one of rather extreme

parsimony and underdetermination in affixal meaning.[16]

The system also suggests a kind of basic paradigmatic structure for affixal semantics, a series of classes defined for the simplex lexicon into which affixes may themselves fall.[17] Affixes, especially transpositional ones, can have a limited number of effects on the semantics of their bases. We will return to this idea in section 5.

Given the system outlined here, we propose that the affixes *-er* and *-ee* actually make exactly the same fundamental <u>featural</u> contribution to their bases. Specifically, both form concrete dynamic nouns: the skeletal contribution of these affixes will be nothing more than the features [+material, dynamic] and an associated AR@ argument:

(17) *-er, -ee*

       [+material, dynamic ([   ], \<base\>)]

That is, these two affixes fall into one of the expected basic affixal types that the system predicts, a category of affixes that corresponds to simplex items like *author, chef, awl, victim*, and the like.

This is not, of course, to suggest that the two affixes are completely identical: their

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[17] We stress that they may fall into these classes, but in a more fully developed version of this theory, with other features motivated, there are other classes into which affixes may fall as well.

Aargument-structural@ properties are clearly somewhat different. To account for these

differences, we make use of a notion of coindexation, a specific formalization of the notions of

argumental binding that have been used before in morphological analyses (Booij 1986, RHL

1992, among others). Specifically, we assume that when a derivational affix attaches to its base,

the argument associated with the derivational affix -- its AR@ argument in these cases, as these

are both noun-forming affixes -- gets coindexed with or bound to one of the arguments of its

base. What coindexing means in argument-structural terms is that the two arguments must be

discharged and satisfied in the same way in the syntax. Perhaps more important is the claim that

coindexation is a device by which the elements of a complex word can be integrated in reference:

coindexing arguments ensures that they will be assigned only a single referent, that is, will be

predicated of only a single entity in the real world. Coindexation is effected by the Coindexation

Constraint in (18):

(18) **Coindexation Constraint**

     In a configuration in which semantic skeletons are composed, coindex the highest

     nonhead argument with the highest head argument. Indexing must be consistent with

     semantic conditions on the head, if any.

The notions of >head= and >nonhead= morphemes are the familiar ones from Lieber (1992).

Further, as we saw above, Barker=s (1998) analysis of -*ee* suggests that an affixal argument may

sometimes impose specific semantic requirements or conditions such as sentience on its

coindexed arguments. In effect, the affixal argument and the base argument it is coindexed with

must be semantically compatible, or at least semantically nondistinct in certain specified ways.

We can now give a more detailed analysis of this constellation of affixes. We propose that the affixes *-er* and *-ee* have the specific lexical entries in (19)-(20), where each lexical entry now shows not only the features of the semantic skeleton, but also the particular conditions (if any) of its argument, and also the syntactic subcategorizations of each affix (that is, the categories of base each affix attaches to):

(19) *-ee*

     Syntactic subcategorization: attaches to V, N

     Skeleton: [+material, dynamic ([$_{\text{sentient, \underline{nonvolitional}}}$], <base>)]

(20) *-er*

     Syntactic subcategorization: attaches to V, N

     Skeleton: [+material, dynamic ([   ], <base>)]

Our claim is that the basic semantic contribution of the two affixes is exactly the same, but the coindexation conditions of their arguments differ in small ways. The affix *-er* places no semantic restrictions on its coindexed argument, but *-ee* does place such requirements. Specifically, it places a **strict** requirement of sentience on its coindexed argument and a **weak** requirement (indicated by underlining) of nonvolitionality. Here, we agree with Barker that the characteristics of sentience and nonvolitionality are relevant, but we differ from Barker in that we attribute different strengths to the two semantic requirements of *-ee*. Let us now see how this analysis begins to account for a wider range of data than previous analyses.

4.2 *The affix -ee*

We start with the affix in English *-ee*, since it is the one which appears to place the most complex conditions on the coindexation of its arguments. Generally, *-ee* attaches to verbs, but it also attaches to nouns. Starting with those cases then, consider the skeleton for an *-ee* form like *biographee*:

(21) *biographee*

$$[\text{+material,dynamic} ([_{\text{sentient, \underline{nonvolitional}-i}} \ ],[\text{-material, dynamic} ([\quad], [_i \quad])])]$$
$$\text{-ee} \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad \text{biography}^{18}$$

This complex noun is formed on the base *biography* which is an abstract processual noun having two arguments of its own. The first of these is the $AR@$ argument, and the second the argument which is syntactically realized as the object of an *of* prepositional phrase in English. The $AR@$ argument in this case is the referent of *biography*, which is clearly nonsentient, so in coindexing the affixal argument skips over this one and finds a better match in the second argument, which indeed can be sentient and nonvolitional. The result is a concrete dynamic noun whose referent is sentient but nonvolitional, as required. There doesn=t need to be a verbal base for *biographee*

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[18] As the subject of this paper is the semantics of the affixes *-er* and *-ee*, we will in general not discuss issues concerning the phonological realization of given stems with these affixes. Thus whether there is a phonological deletion rule that removes the last vowel of *biography* before the suffix, or whether the base has an allomorph is not a matter we will attend to here.

to be a >patient= noun of sorts; this reading follows from the semantic content of the affix

combined with the conditions on the coindexation of the affixal argument.

The more prototypical deverbal derivatives follow straightforwardly in this analysis as

well. Verbal bases, of course, have skeletons with arguments, and these arguments often impose

conditions of their own with respect to sentience, volitionality, and the like. In coindexing the

affixal argument with a base argument, we must pay attention to matching as closely as possible

the semantic requirements of the affix with those of the base. The noun *employee* receives the

semantic structure in (22):

(22) *employee*

$$[+\text{material, dynamic} ([_{\text{sentient, nonvolitional - i}} \quad], [+\text{dynamic} ([\quad], [_i \quad])])]$$
$$\quad\quad\quad \textit{-ee} \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad \textit{employ}$$

Assuming the verb *employ* is an activity verb, it has the skeletal feature [+dynamic] and two

arguments, the first of which is volitional, and therefore incompatible with the AR@ argument of

the affix. The second argument is sentient but not necessarily volitional, and it therefore is more

consistent with the semantic requirements of the affixal arguments. They are coindexed, and the

AR@ argument then shares the >patient= reading of the coindexed base argument.

A similar analysis can be given for the so-called >indirect object= and >object of

governed preposition= cases *experimentee* and *addressee*. Consider the composed skeletons in

(23) and (24), where both verbs are again activity verbs, and both the Goal argument of the verb

address and the *on* argument of the verb *experiment* are introduced in our framework by a

general Locational function [+Loc]:

(23) *experimentee*

[+material, dynamic ([$_{\text{sentient, nonvolitional-i}}$], [+dynamic ([ ], [+Loc ([$_i$])])])]
   -ee   *experiment*

(24) *addressee*

[+material, dynamic ([$_{\text{sentient, nonvolitional-i}}$], [+dynamic ([ ], [ ], [+Loc ([$_i$])])])]
   -ee   *address*

The skeletons in (23) and (24) give enough detail to allow us to see why the argument of *-ee*

needs to be indexed as it is. That is, the first argument of both *experiment* and *address* is

volitional, and the second argument of *address* is nonsentient. It is only the argument of the

Locational function in each case which is compatible with both the requirements of the affixal

argument.

Let us now turn to the *-ee* derivatives that are more challenging, namely the ones like

standee or *escapee* which have >subject= interpretations. Why do these receive the

interpretation that they do? Consider the verbal skeletons for *stand* and *escape*:

(25) *stand*   [+dynamic ([ ])]

(26) *escape*   [+dynamic ([ ], [+Loc ([ ])])]

Barker suggests that the sole argument of *stand* is not particularly volitional, even when it is

sentient. But surely this is not quite right: *standing* can be involuntary, but it can also be as much

under conscious control as any other activity. *Standees* can stand voluntarily and intentionally or not, this being part of the odd nuance of the derived word.[19] The reason that *standee* is possible is that there is in fact only one verbal argument for the affixal argument to be coindexed with. It is now relevant to propose that the Coindexation Constraint might be violable under certain conditions. Let us say that if there is no compatible argument with which to coindex the AR@ argument of the affix, coindexation can apply between that argument and a base argument even if they are incompatible in some way, as long as there is some pragmatic need to do so. We suggest that this is what happens in the case of *standee*. With the violation of the Coindexation Constraint, we get a representation like that in (27) for *standee*:

(27) *standee*

$$[\text{+material, dynamic ([}_{\text{sentient, \underline{nonvolitional} -i}}\quad], \text{[+dynamic, +IEPS ([}_{\text{?volitional -i}}\quad])])]$$
        -ee   *stand*

There is a semantic payoff for this violation. The referent of *standee* receives mixed and incompatible requirements, being construed at the same time as volitional and nonvolitional. Rather than this being impossible, it actually constitutes part of the nuanced interpretation of the derived noun: *standees* might be active to some degree in their standing, but are certainly less so than *standers* would be.

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[19] Compare, for example, the word *bystander*, which has a much more agentive meaning. The word *stander* is in fact attested, and the OED gives citations like the following: *The crowd of sitters and standers gradually increases* (1815, *Sporting Magazine*); *The most obstinate stander on old ways* (1850, *Tait=s Magazine*). Examples such as these suggest a fully agentive interpretation.

Let us turn to an even more vexed form: *escapee*. Remember that Barker (1998, 719)

noted an odd nuance to this word as well. Although an *escapee* must initiate the activity of

escaping, there is something about the gestalt of the situation that is not completely under the

control of the *escapee*. [20] Why is it interpreted as it is? Consider the composed skeleton in (28):

(28) *escapee*

[+material, dynamic ([$_{sentient, \underline{nonvolitional}\text{-}i}$], [+dynamic ([$_i$], [+Loc ([   ])])])]
      -ee   *escape*

The affixal argument must normally be coindexed with a base argument that is compatible with

its conditions. The first argument of *escape* is volitional, and the second argument nonsentient

(one generally escapes from an institution of some sort). In fact, none of the arguments is

consistent with the conditions of the affixal argument. But the requirement of sentience is strict,

and that of nonvolitionality weak. It appears then that the Coindexation Constraint is violated

again, and that the affix coindexes the subject argument, that being the one that at least meets the

stricter requirement. But again, there is a semantic payoff in the violation. We suggest that the

mismatch in argumental semantics in fact gives rise to the two-sided meaning of the resulting

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[20] Compare the words *escapist* and *escaper*, both of which are attested, and have a much more straightforwardly agentive meaning than *escapee*.

derived lexical item noted above.

Given a Coindexation Constraint like (18), one would of course expect that this sort of mismatch of argumental requirements should generally not happen. That is, we might expect that words like *standee* and *escapee* should never be formed. They are, however, although this type of *-ee* form is intuitively far less productive than the usual >patient= forms. We speculate that they are coined only when the argumental mismatch that results from the violation of the constraint allows for a nuance of interpretation that is useful, in other words, when there is pragmatic pressure to violate the Principle of Coindexation. We will return to the notion of pragmatic pressure in section 5.

There is one last *-ee* form that the present analysis accounts for nicely, namely the interpretation of the word *amputee*. Here, the referent of the affix is not an argument of the base verb itself, but an implied argument of one of the arguments of the verb. Suppose that the composed skeleton of *amputee* is the one in (29):

(29) *amputee*

[+material, dynamic ([$_{\text{sentient, nonvolitional}}$], [+dynamic ([   ], [   ])])]
          -ee   *amputate*

Assuming that *amputate* is an activity verb whose first argument is sentient but volitional and whose second argument is nonsentient, there is no good match for the semantic requirements of the affixal argument. But normally, the second argument position of the verb *amputate* is occupied by a noun like *leg* or *arm*, which has its own two arguments, the second of which is its possessor, an argument which can be sentient and nonvolitional. Assuming that semantic

interpretation above the lexical level involves the successive composition and integration of skeletons, the AR@ argument of the affix will eventually come to an argument which is compatible with its semantic requirements, namely the possessor of the limb. And that is what ultimately gets coindexed with the affixal argument. Again, this is not a preferred strategy, which is to say that this is not a productive way of forming new *-ee* nouns. But it is clearly not impossible.

4.3 *The affix -er*

We can now extend the analysis to the suffix *-er*. In fact, the analysis that we propose here is very much like that of Booij (1986) and Rappaport Hovav and Levin (1992), except that we reformulate the earlier argument-structure theoretic analysis in terms of lexical semantics. The move to a lexical semantic analysis has two advantages. First, it gives us a way of talking about denominal *-er* forms, which RHL could not explain in argument-structure theoretic terms, and second, it allows us finally to see how *-er* and *-ee* can come to have overlapping interpretations. Note that the analysis of *-er* which we sketch here works equally well for English and Dutch.

We begin with the denominals. As the lexical entry in (20) indicates, *-er* forms concrete situational nouns; its featural content is exactly the same as that of *-ee*. But it differs from *-ee* in that it imposes no special semantic conditions on its AR@ argument. In other words, the affixal argument is compatible with base arguments that are sentient or nonsentient, volitional or nonvolitional. Given the Coindexation Constraint in (18), we would expect, then, that the argument of *-er* will always be coindexed with the highest base argument, whatever that is.

Composed skeletons for both agent nouns like *villager* and *wetenschapper* >scientist=, and

instrumental nouns like *freighter* will look like (30):

(30) English: *villager, freighter*; Dutch: *wetenschapper* >scientist=

   [+material, dynamic ([$_i$], [+material ([$_i$])])]
        -er   *village, freight*

   [+material, dynamic ([$_i$], [-material ([$_i$])])]
        -er   *wetenschap*

The affixal skeleton attaches to a noun (*village, freight, wetenschap*) and makes it into a concrete

situational noun. The AR@ argument is coindexed with the sole argument of the base noun. As

there are no special conditions on the linked AR@ argument, it can receive either an

agentive/personal reading if the derived noun is predicated of something sentient, or an

instrumental reading if the derived noun is predicated of something nonsentient. The affix itself

is compatible with either reading, as it does not specify the sentience of its argument. It is a

matter of lexicalization, we would say, that *villager* is conventionalized with the personal reading

and *freighter* with the instrumental one. The affix, however, does add the semantic content that

makes the base noun dynamic in some way; in other words, denominals in *-er* always have a

Averby@ sort of paraphrase: a *Londoner* is someone who lives in London, a *mouser* a cat which

catches mice, a *wetenschapper* someone who does science, and so on.

   Deverbal forms in *-er* are analyzed in much the same way. Again, *-er* forms concrete

dynamic nouns and imposes no semantic requirements on the linked base argument. The

Coindexation Constraint (18) therefore always links the affixal AR@ argument to the highest

base argument, with the resulting *-er* derivative absorbing whatever thematic interpretation the

verbal base argument has: agent in the case of *writer*, instrument in the case of *print*, and so on:

(31) *writer;* Dutch: *schrijver* >writer=

  [+material, dynamic ([$_i$], [+dynamic ([$_i$], [   ])])]
    -er   *write*, *schrijv*

(32) *printer;* Dutch: *maaier* >mower=

  [+material, dynamic ([$_i$], [+dynamic ([$_i$], [   ])])]
    -er   *print*; *maai*

As RHL point out, if *-er* is attached to an inchoative verb like *sink*, whose highest argument is

interpreted as a theme or patient, the *-er* form takes on that interpretation as well:[21]

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[21] See Lieber and Baayen (1997) for an explanation of the feature [IEPS] and an analysis of inchoative and unaccusative verbs in this framework. Roughly, the feature [IEPS], which stands for >Inferrable Eventual Position or State= adds a Path meaning to the verbal skeleton, generalizing over the notions of motion towards a place and change to a state. With the plus value, the path is a directed one, and with the minus value a random one.

(33) *sinker;* Dutch: *stijger* >riser=

[+material, dynamic ([ᵢ   ], [+dynamic, +IEPS ([ᵢ   ])])]
     -er   *sink*; *stijg*

Similarly, assuming that in the skeleton of a middle verb (e.g., *fry*) the highest argument is in fact the patient argument, the affixation of *-er* will involve linking the affixal argument to that argument.

There is clearly more to be said about *-er* and *-ee*, but at this point we can at least summarize the answers that we have developed to two of the questions we raised at the outset, namely what *-er* and *-ee* mean, and why it is that affixes like *-er* and *-ee*, although clearly distinct, nevertheless sometimes derive forms which overlap in meaning or function. The answer to the first question is that both affixes have semantic content in the form of features. In fact, the basic featural content of these two affixes is identical: both affixes form concrete situational nouns. The answer to the second question is that the Coindexation Constraint allows the affixal argument to be linked to the same sort of base argument under a number of specific conditions. The AR@ argument of *-ee* is rather specific in the conditions it places on the arguments it can be coindexed with -- far more so than that of *-er*. Since *-er* has no special conditions, its argument can sometimes come to be coindexed with the patient argument of a base verb (e.g., *sinker, fryer*), specifically when that argument is the highest base argument. And since *-ee* can sometimes attach to verbs none of whose arguments is perfectly compatible with its AR@ argument, this argument can occasionally get coindexed with an argument whose semantic conditions conflict, for example, in a form like *standee*, with an argument which is more

volitional in flavor. In other words, the overlap in the output of the two affixes follows from both their intrinsic meaning and the precise operation of the Coindexation Constraint. We take this to be progress in the analysis of *-er* and *-ee.*

5. Derivational paradigms, pragmatic pressure, and the remaining problematic cases

There are still, however, a significant number of cases both in English and in Dutch which the analysis in section 4 does not account for. These specifically are the object-oriented *-er* forms that cannot plausibly be said to derive from verbs with inchoative or middle forms, that is, verbs in which the highest argument can be the Theme/Patient, Location, or Means. (34) shows some of these forms in English and Dutch; it should be kept in mind that this category shows at least some productivity in both languages:

(34) a. English: *loaner, keeper, diner, sleeper, jotter, stroller, walker*

b. Dutch: *aanrader* >lit. adviser; what one should buy or visit=; *doordenker* >thing one has to reflect upon; *hebber* >thing one wants to have=, etc.

We might also mention here the nonpersonal but object-oriented linguistic terms like *raisee* and *ascendee* that Barker mentions in passing. Forms like these are not derived productively, but they do exist, and it is certainly worth contemplating at this point why they might occur at all.

In order to understand and explain these cases, we believe that we need to return to and elaborate on the idea of the derivational paradigm that we mentioned briefly in section 4. Let us

suppose that the featural system which defines the basic semantic classes into which items of the simplex lexicon fall also serves to define a set of possible derivational categories or semantic fields that might be available for extending the simplex lexicon by affixal means. Further, let us look briefly at the extent to which the actual derivational affixes of English and Dutch cover that paradigm. We repeat the six basic predicted categories from (16) in (35), along with a suggestion of the sorts of derivational affixes that might instantiate them:

(35)	English	Dutch
[+dynamic]	*-ize, -ify*	*-iseer* >-ize=
[-dynamic]	*-ive, -ed/-en* forming pples.	*-ief, -isch* >-ive=
[+material]	**	**
[-material]	*-ship, -hood*	*-schap* >-ship=, *-heid* >hood=
[-material, dynamic]	*-ation, -ment, -al*	*-atie* >-ation=, *-ing* >-al=
[+material, dynamic]	*-er, -ee*	*-er*

In fact, we need to look more closely at the last row, as that is the one that we are most concerned with here. Specifically, we need to break down this row according to the existence of what we have called subject-oriented vs object-oriented affixes:

(36)   English   Dutch

[+material, dynamic]

    subject   *-er*   *-er*

    personal object   *-ee*   *-e* on passive pple.

    affected object   **   **

    effected object   **   **[22]

What becomes obvious through this comparison is that both languages to some extent

lack the derivational means for extending the class of concrete dynamic object-terms, with

English having slightly more means at its disposal than Dutch. In English, at least, we have a

reasonably productive affix *-ee* that creates personal object oriented terms. But we have no affix

that specifically derives words for affected or effected objects. Dutch is even more poverty-

stricken. The only means of creating personal object-oriented forms is a roundabout one

involving affixation of *-e* to an adjectival passive participle.

    Why should object-oriented affixes be less prevalent than subject-oriented ones? One

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[22] As mentioned above, the affix *-sel* which fills this slot is, however, not productive for the coinage of affected object names in current Dutch.

explanation that comes to mind is that it is more costly -- in terms of the framework developed in section 4 -- to derive object terms than subject terms, as the former requires special restrictions on coindexing. An affix deriving affected or effected nonpersonal objects would have to look something like (37) in this system, placing the requirement of nonsentience on its coindexed argument:

(37)   [+material, dynamic ([$_{nonsentient}$], <base>)]

That is, the Coindexation Constraint makes it cheaper in the grammar for affixes to be subject-oriented than to be object-oriented, as it is stated to identify the highest arguments of affix and base, and the highest argument is linked to the subject. To override that simplest of indexings, we need to specify the semantics of arguments further -- requiring that they be sentient or nonsentient, for example.

The next issue, given the idea of the derivational paradigm, is to explore what happens when speakers have a pragmatic need for a term but their language lacks the specific derivational means for creating such a term. We find that the area of object-oriented terms is a perfect one in which to explore this question. The basic idea that we would like to defend here is one that we refer to as >pragmatic pressure=. By >pragmatic pressure= we mean a situation in which there is a real world need for a specific kind of word, but no available productive affix in a language with which to create such a word. In other words, context forces speakers to create a word -- often on the fly -- but the language does not have a specific derivational means for doing so. We suggest that when such

pressure exists, one of two things happens: either a formally more complex process (e.g., conversion or substantivization of a participle) is employed, which implies a higher degree of morphological complexity, or, more interestingly, the semantically closest productive affix is put to use even if it requires us to violate the Coindexation Constraint in the process. In other words, there appears to be a trade off between the costs of added structural, formal complexity, and the costs of added semantic complexity due to a non-prototypical semantic extension of the meaning of the affix.

We have seen that the actual affixes available within a given language may in fact not cover the entire semantic space that can be expressed by items in the simplex lexicon. Missing in both English and Dutch are specific affixes which serve to create concrete nonpersonal object nouns, that is, nouns which would have the meaning >thing which has been Xed= or >thing which one Xes=. Dutch also lacks a specific suffix that is parallel to English *-ee*, but it compensates for this lack by using the first strategy: substantivization through the addition of *-e* to the passive participle allows reference to the person who is affected by an action. In fact, English occasionally uses a roundabout strategy as well for things which are affected by an action; consider conversion forms like *drink* >thing which one drinks= or *eats* >things which are eaten=.

But for both languages the strategy that speakers resort to in creating object-oriented forms seems more often to be the second one, in which the closest productive affix is employed, even if it requires a violation of the Coindexation Constraint.   In fact, both languages make use most frequently of the affix *-er* , which is defined by the features [+material, dynamic] and which does not place any particular semantic conditions on its

argument. Only very occasionally B and only in scientifically restricted areas of the vocabulary B do English speakers extend the *-ee* suffix to create forms like *raisee*. In order to make use of *-er* in this extended way, they must violate the Coindexation Constraint in coindexing the AR@ argument of the affix with an argument other than the highest one. Thus, the production of object-forms in *-er* in both English and Dutch is possible, but because these formations require a violation of the Coindexation Constraint, they are much less productively formed than subject-oriented *-er* derivations, and they are often more heavily dependent on context for their interpretation. The violation of the Coindexation Constraint necessary in the case of non-personal object-oriented *-ee* forms is even more drastic, and these forms are very rare indeed, and certainly not formed productively.

It is a well known generalization (cf. van Marle 1981) that the use of productive affixes may be extended in order to allow for the creation of new categories. For instance, the very productive diminutive suffix of Dutch attaches basically to nouns, but is also used with verbal and adjectival bases, and even with adverbs. Thus, the diminutive suffix can be used to create certain sets of nouns that could otherwise not have been formed:

(38) speel 'to play'   speel-tje 'toy'
      strijk 'to bow/pluck (a stringed intrument)=   strijk-je 'string ensemble'
      zwart 'black'   zwart-je 'black person'
      vooraf 'before'   vooraf-je 'appetizer'

However, this extended use of the diminutive suffix does not apply as productively to non-nouns as it does to nouns, that is, there is clearly a violation of a (soft) constraint on the syntactic category of the base involved. In particular, the extended use is only found for

simplex verbs and adjectives. Similarly, the the use of *-er* for the creation of object nouns is not as productive as its use for subject nouns, and it also restricted to verbal bases that are simplex such as *keep, loan, denk*, *eet* and *krijg*.[23]

6. Conclusion

In this article we have tried to give a more comprehensive analysis of forms in *-er* in English and Dutch and *-ee* in English than has hitherto been available. Making use of the framework of lexical semantic representation developed in Lieber and Baayen (**1997, 1999**), we were able to ascribe semantic content to these affixes in the form of the features [+material, dynamic], thus allowing us to account for the denominal formations that have not been explained well in previous analyses. Further, in using the Coindexation Contraint we were able to compare the linking properties of *-er* and *-ee*, and to begin to show why they can overlap in meaning. Finally, we introduced the notions of the derivational paradigm and pragmatic pressure and argued that even the most deviant of the *-er* forms were susceptible to treatment, if we took into account the fact that neither English nor Dutch apparently has a productive affix with which names for affected objects can be

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[23] Note that verbs such as *dooreten* consist of two words, of which the second, the verb, is simplex.

created. Together these devices give us a fuller explanation than we have seen before of how affixal polysemy arises in languages like English and Dutch.

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