

Interconnectedness and variation of meaning in derivational patterns

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1. Introduction

Rochelle Lieber's recent book of (2016) entitled *English Nouns: The Ecology of Derivation* discusses the wide range of meanings displayed by the nominalizing suffixes of Modern English and how they are related.¹ Concentrating on just the deverbal suffixes, the following table taken from Lieber (2016) gives a slightly abbreviated summary of their potential readings (for the full table, cf. Lieber 2016: 60–61, Table 4.1):

- (1) Abbreviated summary of deverbal suffixes with potential readings from Lieber (2016):

	<u>Event</u>	<u>Res</u>	<u>Ag</u>	<u>Instr</u>	<u>Pat</u>	<u>Loc</u>	<u>...</u>
<i>-al</i>	1	1			2		
<i>-ance</i>	1	1		2	2	2	
<i>-ment</i>	1	1		2	2	2	
<i>-ure</i>	1	1			2	2	
<i>-ation</i>	1	1	2	2	2	2	
<i>-ing</i>	1	1	2	2	2	2	
...							
<i>-er</i>			1	1	2	2	
...							

A first group of suffixes – termed *event suffixes* by Lieber – derive in their primary function complex nouns that refer to the event or the result of an event (indicated by the 1 in the table). The deverbal suffix *-er* belongs to a second group of suffixes, termed *participant* and *personal suffixes*.² It derives in its primary sense nouns that carry the meanings of the most salient participants in an event: agent and instrument.

What is of interest to Lieber (2016) is that these suffixes extend their primary meanings to take on secondary functions (indicated by the 2 in the table). The secondary meanings of the event suffixes include reference to the participants in an event (agent, instrument and patient, as well as a few other minor cases not listed here) and to the location of the event. The secondary meanings of the main deverbal participant suffix *-er* include reference to the patient of the event or to its location.

¹ I am grateful to Claudia Maienborn, the participants of the conference and an anonymous reviewer for their constructive comments on the discussion in this article.

² The personal suffixes not listed in (1) as well as the collective and inhabitant groups of suffixes are not primarily deverbal and hence have been left out of consideration here. An account of denominal formations that lack a verbal base (cf. *whaler*, *Londoner*, etc.) depends on the inference of an implicit predicate for their interpretation and, thus, presupposes different principles, cf. Ryder (1999), Olsen (2012), Bierwisch (2015a). They, as well as derivation via conversion, will be left to a later discussion.

It is well-known that derivational patterns can subsume a broad range of meanings. Word-formation studies often speak in this regard of “polysemy” or “affixal polysemy”. Lieber herself uses the term *polysemy* in her book. *Polysemy* is a pre-theoretical term suggesting the relatedness of lexical meaning in general. The aim of this article is to investigate whether it is possible to characterize in more exact terms the sense (or senses) in which the meanings found in these patterns are related and how they vary. Success in this matter depends on the choice of an appropriate theoretical framework. Therefore, the discussion in the following will concentrate equally on finding a theory of word-formation that best captures the relevant generalizations.

The discussion proceeds by first considering the major findings of some earlier analyses of nominal derivations by means of the suffix *-er* that were carried out within different syntactically oriented frameworks. The discussion then turns in §3 to a consideration of the primary event suffixes and focuses on a major property of productive derivation, namely the compositionality of the derived meaning including the inheritance of arguments. In §4, it is shown that the secondary readings of event nominals lack the compositionality of meaning that is characteristic of the primary readings. This is seen most clearly by their inability to realize the arguments of their verbal base. §5 applies the same reasoning to the participant suffix *-er* discovering with the help of the criterion of compositionality that the two putative primary readings of agent and instrument actually arise via two semantically distinct variants of the formal suffix *-er*. §6 offers additional evidence for this assumption from the history of the Romance and Germanic languages. The final §7 summarizes the discussion as a whole.

2. Earlier analyses of the suffix *-er*

Early on, Rappaport Hovav & Levin (1992) identified two major properties of *-er* nominals:

- i) Although they are frequently labeled agent and instrument nouns, *-er* nominals refer more generally to the external argument of the base verb, irrespective of its thematic role. This observation has since become known as the *external argument generalization*.
- ii) The ability to inherit arguments from the verbal base of the complex formation and to realize them in a syntactic configuration is not consistent across the class of deverbal *-er* nominals.

The examples in (2) illustrate the wide range of referents that fall under the denotation of *-er* nominals as predicted by i). What ii) refers to is the fact that – as opposed to the other options – nominalizations in *-er* understood as instruments do not permit the expression of the complement of the verbal base in an accompanying *of* phrase (first brought to attention by Roeper (1987: 281–297) and also recognized by Fanselow (1988: 106)).

- (2) Range of referents of the external argument of a nominal in *-er*:
 - a. *signer of the contract* agent
 - b. *admirer of talent* experiencer
 - c. *owner of the car* possessor
 - d. *receiver of the package* goal

- | | | |
|----|------------------------------|------------|
| e. | <i>contributer of money</i> | source |
| f. | <i>heater (*of the room)</i> | instrument |

What is the source of the difference documented in example (2f) as opposed to the examples in (2a-e) in the ability to inherit arguments of the base verb? Rappaport Hovav & Levin (1992) propose that the difference is bound to the eventive vs. non-eventive interpretation of the nominal. *Mower of the lawn* (allowing a syntactic complement) is eventive because it implies that someone is participating in or has participated in the event of mowing. *Mower* and *lawn mower* can also be understood similarly as eventive. In the eventive reading, therefore, the verbal arguments are available and the internal argument of the verbal can be realized as a syntactic complement. However, its expression is not obligatory. But *mower* and *lawn mower* also have an interpretation in which they don't imply an event but rather label a category of instruments. This is the non-eventive reading in which the argument structure of the underlying verb can be accessed, cf. **mower of the lawn* (as an instrument).

A number of linguists have attempted to account for this generalization within a syntactic framework (cf., e.g., Keyser & Roeper 1984; Roeper 1987; van Hout & Roeper 1998; Borer 2003). Recently, Alexiadou & Schäfer (2010) have rejected Rappaport Hovav & Levin's (1992) explanation in terms of an eventive vs. non-eventive sense of the noun and have claimed that all deverbal *-er* nominals are eventive, irrespective of whether they are understood as an agent or an instrument.

Their main argument centers on the non-intersective interpretation of adjectives. The examples in (3) and (4) are intended to show that in both the *eventive* and the *non-eventive* readings of *-er* nominals an attributive adjective can modify the event expressed by the verbal base of the complex noun. In this non-intersective interpretation, the adjective functions like an adverb modifying the underlying verbs *dance* and *calculate*. *Beautiful dancer* in (3) has an intersective reading as well, in which the adjective modifies the referent of *dancer*, yielding the reading 'x is dancer & beautiful'.³

- | | | |
|-----|---|----------------|
| (3) | <i>beautiful dancer</i>
'x dances beautifully' | = eventive |
| (4) | <i>fast calculator</i>
'x calculates in a fast manner' | = non-eventive |

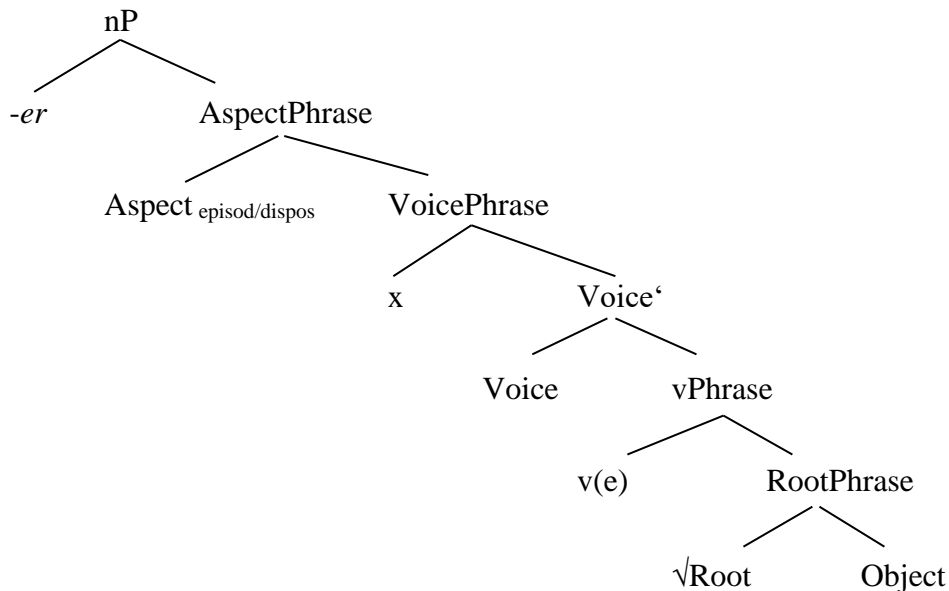
Alexiadou & Schäfer (2010) conclude from the non-intersective reading of the attributive adjectives in cases like (3) and (4) that both *eventive* and *non-eventive -er* nominals share a configuration in which an event is present and can be targeted by the adjective. They propose, in other words, that a nominal head embeds a verbal projection under it with its complete functional structure.

Working within the framework of Distributed Morphology, they assume the structure shown in (5) for a nominalization by means of the suffix *-er*. In Distributed Morphology, vocabulary items are not marked for a category but enter into an enumeration as a category-neutral root. They assume a category label only when they are inserted into a syntactic

³ For a more thorough discussion of the distinction the intersective and non-intersective readings of adjectives see Larson (1998).

configuration in which they are dominated by a functional item that determines the categorial features of the projection in which they occur.

(5) Structure of *-er* nominalizations according to Alexiadou & Schäfer (2010: 13)



In this analysis, a category-neutral $\sqrt{\text{Root}}$ merges with a potential object to yield a RootPhrase. The functional element *v* (little *v*) merges with the RootPhrase, categorizing it as a vPhrase which induces the category *verb* upon the $\sqrt{\text{Root}}$ that heads the phrase. The vPhrase then merges with the functional category *Voice* that projects to a VoicePhrase in whose specifier an external argument is projected. The functional category *Aspect* merges with VoicePhrase yielding an AspectPhrase that is sister to the functional morpheme *-er* that carries the category *n*. Hence, *-er* categorizes the structure dominated by AspectPhrase as an nPhrase, or a nominal projection. Rappaport Hovav & Levin's (1992) external argument generalization is accounted for by the occurrence of the external argument *x* in the specifier of the VoicePhrase. It is bound by the suffix *-er*, determining the referent of nP as whatever thematic role is assigned to the external argument *x* by the head of vP.

So contrary to Rappaport Hovav & Levin (1992), the difference between the two classes of nominals in Alexiadou & Schäfer's (2010) analysis is not a matter of the presence vs. absence of an event; the event variable *e* is provided by little *v* in both cases. The difference lies, rather, in the feature structure of Aspect: the so-called *eventive* nominals have an episodic aspect, while the *non-eventive* nominals are dispositional. The aspectual feature is picked up by the verb as it moves from its underlying position in the RootPhrase to join with the nominalizer *-er* in nP.

Under these assumptions the question now arises as to why dispositional *-er* nominals are unable to realize syntactic complements. That is, why can't **mower of lawns* be understood as an instrument. Alexiadou & Schäfer (2010) assume that dispositional nominals are similar to generic and habitual sentences in that they generalize over an unlimited number of instances. To take their example given in (6), *cut* is an obligatorily transitive verb (cf. **The instructor cut.*). But as shown in (6), in a habitual context the direct object can be omitted:

(6) *The sewing instructor always cuts \emptyset in straight lines.*

Alexiadou & Schäfer (2010) assume that in habitual contexts, unquantized objects can remain implicit, thus yielding dispositional events.

There are two points of concern with this analysis. First, non-intersective modification seen in the derived nominals in (3) and (4) applies to underived instruments as well as to those derived from a verb. For example, the instrument nouns in (7) are simple, underived nouns. Yet, when modified by an adjective like *fast*, *good*, or *slow*, the adjective takes on an adverbial function in the same manner as with derived instrument *-er* nominals in that it modifies an implicit event associated with *train*, *knife* and *gun*.

- (7)
- | | | |
|----|-------------------|-------------------|
| a. | <i>fast train</i> | = travels quickly |
| b. | <i>good knife</i> | = cuts well |
| c. | <i>slow gun</i> | = shoots slowly |

In fact, the non-intersective meaning is available in underived agents as well as the examples in (8) show.

- (8)
- | | | |
|----|-------------------|--|
| a. | <i>good pilot</i> | = good at flying planes |
| b. | <i>fast cook</i> | = cooks quickly |
| c. | <i>old friend</i> | = friendship has existed for a long time |

What this shows is that the non-intersective meaning must be available in both agent and instrumental nouns without having to postulate a full sentence structure in their representation, including verb movement up to the nominal suffix.

Secondly, dispositional *-er* nominals can indeed realize an inherited verbal argument just like episodic *-er* nominals and when they do, there is no difference in their behavior. In the presence of a syntactic complement, both the episodic nominal in (9) and the dispositional nominal in (10) enforce a personal actor reading on the *-er* noun and exclude an interpretation as an instrument:

- (9) Episodic
- | | | |
|----|--|-------------|
| a. | <i>The <u>mower of the lawn</u> just finished his job.</i> | person |
| b. | <i>*The <u>mower of the lawn</u> was just turned off.</i> | *instrument |
- (10) Dispositional
- | | | |
|----|---|-------------|
| a. | <i>I am looking for a good <u>mower of lawns</u>.</i> | person |
| b. | <i>*I want to buy a good <u>mower of lawns</u>.</i> | *instrument |

From this we can conclude that the property regulating access of the derived nominal to the argument structure of its verbal base is neither an eventive vs. non-eventive interpretation in the sense of Rappaport Hovav & Levin (1992), nor can it be explained by an episodic vs. dispositional aspect as Alexiadou & Schäfer (2010) propose.

How does Lieber (2016) view the *polysemy* of *-er* with respect to the agent and instrument meanings? She assumes a basic underspecified representation for *-er* nominals that is the same regardless of whether the nominal denotes an agent or instrument. The basic skeleton for the participant suffix *-er* within her Lexical Semantic Framework is shown in

is conceived of as a condensed version of CS. It represents the interface between CS and the system of grammar in that it encodes only the aspects of the more comprehensive conceptual meaning that are needed to establish the categories of grammar. Consider as an example the entry for the verb *construct* in (13).

(13)	[construct]	[V]	$\lambda x \lambda y \lambda e$	[e : [y CONSTRUCT x]]
	PF	Cat	AS	SF

The lexical semantic meaning of the verb *construct* is given in its semantic form (SF) which is the level of meaning visible to the grammar. SF characterizes the invariant aspects of meaning bound to the language system and is strictly compositional. The verb's argument structure (AS) is derived from its SF by lambda abstracting over the syntactically active variable positions in SF and prefixing the corresponding lambda operators to the SF in inverse order of occurrence in SF. The verb's arguments are thus assembled in a hierarchy in which the outermost argument is progressively assigned to the lowest complement in the syntactic configuration.

Affixes have similar lexical entries, but they are bound morphemes that combine with a lexeme, and not a complete phrase, as their argument. The suffix *-ion*, for example, selects a verb as its lexical argument and creates a noun (cf. its grammatical category [N]). Therefore, its AS in (14a) is made up of a predicational argument λP with the annotation [V] and an argument vector \tilde{v} that represents the verb's unsaturated arguments to be taken over by the derived. In the case of the verb *construct* in (14b) these will be the referential, external and internal arguments (= e, y und x, respectively). The result is *construction* in (14c), cf. the discussion in Bierwisch (2015: 1062–1082).⁴

(14)	a.	[-ion]	[N]	$\lambda P \lambda \tilde{v} \text{ Gen } e'$	[P(\tilde{v} (e'))]
				[V]	
		PF	Cat	AS	SF
	b.	[construct]	[V]	$\lambda x \lambda y \lambda e$	[e : [y [CONSTRUCT x]]]
	c.	[construct-ion]	[N]	$\lambda x \lambda y \lambda e$	[e : [y [CONSTRUCT x]]]

The highest argument in the AS of the verb *construct* in (14b) (= λe) is referential and as such can be anchored in time and modified by aspect, etc. The second highest argument (= λy) is the designated argument of the verb and the lower arguments (in this case only λx) are its internal arguments. The internal arguments of a verb are in principle obligatory unless they are marked as optional. The AS of the derived noun *construction* in (14c) is similar to the verb from which it is derived. The difference lies in the fact that *construction* is a nominal. The highest argument λe in the nominal AS takes on a nominal referent and the two lower arguments are internal arguments which, in the case of a noun, are optional, cf. Bierwisch (1989, 2015a). What this framework allows us to see is that the deverbal noun *construction* is the compositional product of the meaning of the verb *construct* and the suffix *-ion*.

As already mentioned, the event variable of the underlying verb is carried over in the derived noun as the nominal referent. So, *construction* as a noun refers to the event of

⁴ For the lexical entry of the suffix, I have used a formally equivalent variant of Bierwisch's actual proposal (for the discussion of which I am indebted to Claudia Maienborn).

constructing, allowing it to be assigned the feature [+/- definite], to be quantified, etc.

(15) *the construction of the airport (by the city)*

As many linguists have pointed out, a deverbal event noun allows different aspects of its event reference to be discerned (cf. Grimshaw 1990; Borer 2003; Bierwisch 1989, 2015):

- | | | | |
|------|----|--|---------|
| (16) | a. | <i>The construction of the airport was approved by the city.</i> | Event |
| | b. | <i>The construction of the airport is taking many years.</i> | Process |
| | c. | <i>The construction of the airport cost in total around \$3.6 billion.</i> | Result |

How are these different readings to be accounted for? Bierwisch (2015) debates and then rejects the idea of assigning these different aspects (event, process, result) directly to the SF of the nominalizing suffixes because they are actually predicted by the architecture of the lexical system within the theory of two-level semantics. The lexical-semantic (SF) representation of a verb is more abstract than its representation in terms of conceptual structure (CS). SF reduces the highly complex knowledge encoded in CS to just the information relevant to the grammar, cf. again (14c) repeated here for convenience:

(14c) [construct-ion] [N] $\lambda x \lambda y \lambda e$ [e : [y [CONSTRUCT x]]]

The event variable (= e) is an example of the condensed information in the elements of SF: it abstracts over and abbreviates the conceptual options bound to the concept of an event. That is, it represents in reduced form our conceptual knowledge of an event with its different facets. This allows the SF variable e denoting an event to be flexible in its conceptual interpretation. The different facets of an event can remain indeterminate. Or, if the context requires it, they can be distinguished, cf. (17):

- | | | | |
|------|----|------------------------------------|-----------------------------------|
| (17) | a. | <i>acquisition of the painting</i> | (<u>e</u> vent, process, result) |
| | b. | <i>accumulation of wealth</i> | (event, <u>p</u> rocess, result) |
| | c. | <i>confession of guilt</i> | (event, process, <u>r</u> esult) |

What is noteworthy is that the different aspects of the subordinate category *event* all allow the realization of the verbal argument as documented in the *of* phrases of (17). This indicates that they are part of the compositional meaning of the derived noun.

In accordance with these assumptions, the two primary readings of event nouns in Lieber's (2016) table 4.1 can be conflated into a single derivational pattern Event/Process/Result in a lexicalist grammar. The revised table would thus take on the shape given in (18):

(18) Revised abbreviated table from Lieber (2016: 60):

	<u>Event/Proc/Res</u>	<u>Ag</u>	<u>Instr</u>	<u>Pat</u>	<u>Loc</u>
<i>-al</i>	1			2	
<i>-ance</i>	1		2	2	2
<i>-ment</i>	1		2	2	2
<i>-ure</i>	1			2	2
<i>-ation</i>	1	2	2	2	2
<i>-ing</i>	1	2	2	2	2

4. The event suffixes in their secondary readings

What about the secondary readings of the event suffixes? The agent, instrument, patient and location readings of event nouns (termed *referential* or *R* readings by Lieber) don't allow access to the argument structure of the underlying verb. Lieber (2016) finds no argument inheritance with the secondary meanings in her large corpus. This is also the distinction that Grimshaw (1990), Borer (2003) as well as many other linguists make between argument structure nominals and referential" nominals.

The lack of argument inheritance indicates a lack of compositionality because the full meaning of the verb with its AS is unavailable to the nominal in its secondary meaning. The examples in (19) contrast the readings of a small sample of deverbal nouns in their event readings that permit the realization of the internal argument with a possible secondary reading (such as agent, instrument, patient, or location) that can be assigned to these nouns. The secondary readings do not allow the expression of a verbal argument and, hence, are not a product of compositional derivation:

- (19) a. *prosecution* (of the criminal = event/ *ag)
 b. *illustration* (of the book = event/ *instr)
 c. *annexation* (of the wing = event/ *pat)
 d. (in the) *refrigeration* (of the flowers = event/ *loc)

So, the question now emerges as to how these secondary meanings arise. They are obviously the result of a transferred (i.e. non-literal) meaning on the basis of the primary reading of the noun, cf. Bierwisch (1989: 40–42) and (2015: 1113–1116). A semantic operation shifts the reference from the event of the regularly derived deverbal noun to a participant in the event (agent, instrument, patient) or to the location of the event in the shifted variant.⁵ As a result of the shift, the arguments originally inherited from the verbal base are suppressed.

(20) Shift operation

- a. λP $\lambda z \exists e' [[z \text{ AGENT } e'] \& P(e')]$
 $[N_F]$
 b. *prosecution*_F: $\lambda z \exists e' [[z \text{ AGENT } e'] \& [\text{PROSECUTION } e']]$

⁵ The formalization of the operation is my responsibility; it differs from Bierwisch's (2015) proposal and is to be understood only as an approximation of what the shift accomplishes.

The predicative argument λP in (20a) is annotated with a feature N_F that picks out the (restricted) class of derived nouns that are subject to the shift. The variable z identifies the derived entity as the agent of P . For example, *prosecution* can be understood as an actor as well as an event. The more precise meaning of the shifted noun is given in (20b) where the derived event noun *prosecution* has substituted for the predicate variable P in the formula which shifts its reference from the event to an actor in a *prosecution* event.

Shift operations of this type presuppose the existence of the derived nominal. For example, the *agent* produced by the shift differs semantically from the referent of a productively formed agentive *-er* noun (cf. *prosecutor*). The *prosecution* is not understood as ‘one who prosecutes’, but as ‘person (or persons) carrying out the prosecution event’. The same goes for other such derived agents, cf. (21):

(21) *administration, government, resistance, meeting*

Interchanging the predicate constant *agent* with *instrument, result* or *location* will produce the other secondary meanings. In the case of *instrument*, for example, a different (and quite restricted) class of derived nouns enters into the shift and, again, the instrumental meaning derived from the shift is not equivalent to productively formed instruments in *-er*. The nominals in (22) refer in their regularly derived primary reading to an event in the broadest sense. But if subject to the shift, they can also be construed as the means of the event: *insulation, decoration*, etc. denote in addition to the event also the means of insulating, decorating, etc.

(22) *insulation, decoration, adornment, illustration*

5. The participant suffix *-er*_{actor}

Turning now to the participant suffix *-er*, it takes over the meaning of its verbal argument just like the event suffix *-ion* does but, in the course of doing so, it suppresses the event argument of its verbal complement by binding it with a generic operator *Gen*:

(23)	a.	$[-er_{actor}]$	[N]	$\lambda P \lambda \tilde{v} \text{ Gen } e'$	$[P(\tilde{v}) (e')]$
				[V]	
		PF	Cat	AS	SF
	b.	$[sell]$	[V]	$\lambda x \lambda y \lambda e$	$[e : [y [SELL x]]]$
	c.	$[sell-er]$	[N]	$\lambda x \lambda y \text{ Gen } e'$	$[e' : [y [SELL x]]]$

With the event variable e bound by the generic operator in (23c) (= *Gen e'*), it is no longer active and cannot be assigned. The highest argument in the AS of *seller*, originally the external argument of the verb, now becomes the referent of the derived nominal, thus capturing the external argument generalization of Rappaport Hovav & Levin (1992) and others, *seller* ‘one who sells’.

Although the variable e' is blocked grammatically, it is present in SF and is part of our conceptual knowledge. So, we could ask: What type of event is implicit in a nominal that refers – not to the event itself (like *construction*) – but to the actor in the event as in *seller*?

With personal referents, *-er* nominals can imply the following types of activity, cf. Rainer (2015: 1310):

- (24) Implicit activity types of *-er* nominals
- | | | |
|----|---------------------------------|------------------------------------|
| a. | a fleeting occasional activity: | <i>protester, voter, winner</i> |
| b. | a habitual activity: | <i>gambler, smoker, complainer</i> |
| c. | an occupation: | <i>designer, preacher, writer</i> |
| d. | often all types are possible: | <i>hunter, dancer, seller ...</i> |

In stark contrast to this, the referents of instrumental *-er* nouns don't imply an activity at all. In fact, what they denote is in no way dependent on an activity being carried out (cf. also Rappaport Hovav & Levin (1992); Alexiadou & Schäfer (2010), among others). They simply denote an instrument that has been constructed for an intended purpose, cf. *heater, grater, shredder*. In contrast to a *protester* or a *gambler*, a *heater* is not identified by virtue of any activity taking place or having taken place. It may never have been put to use to heat anything. A heater is a heater by virtue of its design and the purpose for which it was constructed. So, for instance, a *shredder* understood as an agent is identified by an activity: a person is or has implemented the activity denoted by the base verb. But the instrument *shredder* is a thing identified by its design, not by an activity.

In a compound, the instrument noun can be modified by its purpose, cf. the left column in (25).⁶ But as head of a DP, an instrument noun cannot express a verbal argument, as shown in the righthand column.

- (25)
- | | compound | DP |
|----|-----------------------|----------------------------|
| a. | <i>water heater</i> | * <i>heater of water</i> |
| b. | <i>cheese grater</i> | * <i>grater of cheese</i> |
| c. | <i>paper shredder</i> | * <i>shredder of paper</i> |

How is this lack of argument inheritance with instrumental nouns to be explained? How do instrumental *-er* nominals relate to agentive *-er* nominals? Bierwisch (2015) suggests two possibilities using the examples in (26):

- (26)
- | | |
|----|------------------------|
| a. | <i>(piano) player</i> |
| b. | <i>(record) player</i> |

First, *player* could be derived as a personal noun from the verb *play* to which a coercive shift applies to yield a non-personal noun. Or, alternatively, the verb *play* has one reading with a personal and one reading with a non-personal subject. As for the first option, it is hard to see non-personal *-er* nominals deriving directly from personal *-er* nominals by shifting the referent from a person to a thing. The reason for this is because not all instruments depend on the existence of personal actors. The nominals in (27), for instance, resist an interpretation as an agent:

⁶ Rappaport Hovav & Levin (1992) considered the first constituent of a compound a modifier in contrast to the complement expressed in the corresponding phrase. This view actually contradicts a prominent assumption in the literature that the first constituent in such a compound is assigned a thematic role by the deverbal head, cf. Olsen (2017) for discussion of such synthetic compounds. Olsen (2012) argues explicitly however that the putative complement is a modifier as does Bierwisch (2015).

(27) Primarily instruments

computer, adapter, fertilizer, humidifier, thruster, blower, recliner, heater, trailer, freezer, feeder, condenser, muffler, bumper, beeper, tranquilizer, multiplier, refrigerator, vibrator, simulator, projector, calculator, ventilator, duplicator, monitor

As for the second option, it is unnecessarily redundant. This assumption necessitates the presence of two verbs in the lexicon, one with a personal, another with a non-personal subject. Besides the unwanted implication that the verbs are ambiguous in meaning, the problem still remains of how the verb with the non-personal subject would block the realization of its argument in the derived noun. If the verb *clean*, for example, has two lexical entries, the one with the personal subject would be chosen for the linguistic environment in (28a), while the second entry with the non-personal subject would be the basis for the sentence in (28b). But the construction in (28c), presumably resulting from the non-personal version in (28b), prohibits the realization of the argument that is expressed in (28b):

- (28) a. *The janitor cleaned the floor.*
 b. *This device cleans floors.*
 c. **cleaner of floors*

Let us therefore entertain a third option, namely that there are two (homonymous) *-er* suffixes:

- i) Personal actor *-er_{pers}* derives compositional formations that permit realization of the inherited argument, cf. *player of the piano*.
- ii) Non-personal, *-er_{instr}* derives instruments with no access to the verbal argument structure, cf. **player of the record*. They are instead characterized by a purpose. Under these assumptions, the instrumental *-er_{instr}* suffix characterizes a class of instruments with a variable purpose supplied by the generically bound verbal event argument, cf. (29):

(29) $[-er_{instr}]$ [N] $\lambda P \lambda z \text{ Gen } e' [INSTR(z) \ \& \ [z \text{ PURPOSE } e']] \ \& \ P(e')$
 [V]

The representation of the *-er_{instr}* suffix in (29) requires a one-place verbal predicate to substitute for the predicate variable P. Thus, all arguments of the verbal predicate apart from its referential event argument must be existentially bound before entering the formula. The result of applying the *-er_{instr}* suffix to the verb *shred* in (30a) is (30b):

(30) a. *shred*: $\lambda x \lambda y \lambda e [e : [y [SHRED x]]]$
 b. *shredder*: $\lambda z \text{ Gen } e' [INSTR(z) \ \& \ [z \text{ PURPOSE } e']] \ SHRED(e')$

The class of underived instruments, on the other hand, have lexicalized their purpose, cf. *knife* in (31):

(31) *knife*: $\lambda z \text{ Gen } e' [INSTR(z) \ \& \ [z \text{ PURPOSE } e']] \ \& \ CUT(e')$

Hence, instrumental *-er* nominals are not the result of transferred meaning (a coercive shift) as Bierwisch's first option and Lieber's analysis imply, nor do they result from Bierwisch's second proposal of an additional entry with a non-personal subject. Rather, they are derived directly by a second non-personal suffix *-er_{instr}* that is homonymous to the personal actor suffix *-er_{pers.}*⁷

6. Diachrony of the agentive and instrument suffixes

The analysis just proposed receives support from the historical facts. It can be shown that the apparent *polysemy* of the agent and instrument suffixes in Romance and Germanic can be traced back to two independent suffixes stemming from Latin *-tor* (agentive) and *-torium* (instrumental). In Old High German these suffixes emerged as *-ārius* and *-ārium*. The two distinct suffixes became conflated with time into a single form due to phonological weakening during the borrowing process, cf. Müller (2011).

The development of the suffixes in Romance was much more complex, taking different courses in each of the Romance languages. Rainer (2015: 1313) first explains that Latin *-tor* originally was limited to an agentive meaning. However, agent nouns in Latin *-tor* could give rise to relational adjectives in *-torius* so that phrases such as *opus tectorium* 'work of covering; i.e. plaster' were created. With deletion of the head noun *opus*, *tectorium* remained the sole carrier of meaning and took on the interpretation 'that which serves for covering; i.e. plaster'. This was the basis for the reanalysis of *-torium* as an instrumental suffix, distinct from the agentive suffix *-tor*.

The interplay between borrowing, reanalysis, ellipsis, conflation, and analogy that took place following this development is meticulously documented for the standard languages and many of their primary dialects in Rainer (2011). And remnants of the original distinction agent vs. instrument can still be seen in the present-day Romance languages, although a clear-cut distinction in meaning no longer exists primarily due to borrowings from the dialects that conflated the two suffixes, cf. Rainer (2011: 10):

(32)	Language	Agent/ instrument
a.	Spanish	<i>-dor/ -dero</i>
b.	French	<i>-eur/ -oir</i>
c.	Italian	<i>-tore/ -toio</i>
d.	Portuguese	<i>-dor/ -douro</i>

⁷ Rappaport Hovav & Levin (1992) cite *defuser* in *Anger is a great defuser of pentup emotions* as a non-agentive nominalization that shouldn't be able to realize the verbal argument. *Defuser* is surely understood here as a metaphor/personification that would fall under the actor suffix. *Inducer* in *A protein that is an inducer of blood vessel growth*, on the other hand, is meant to show that instruments can realize arguments. *Inducer* here, however, does not fall under the definition of instrument given in this section. And could be understood as an actor in the same manner as *defuser* in the first example.

7. Conclusion

The aim of this discussion was to examine the inter-connectedness and variation of meaning in the deverbal nominal patterns of English. In her book of (2016), Lieber speaks of “a complex web of polysemy”. The question posed at the outset of this discussion was: Can the nature of this polysemy be determined with more precision? It has been argued that Bierwisch’s (2015) lexicalist framework provides a clear definition of compositional formations. This criterion enables us to distinguish compositional derivational patterns (Lieber’s primary functions, cf. the eventive *construction*) from non-compositional semantic shifts resulting in transferred meaning (i.e. Lieber’s secondary functions, cf. *prosecution* understood as an agent).

The criterion of compositionality has also exposed an ambiguity found in the *-er* pattern. While both the agent and instrument meanings of *-er* nominals are compositional formations, their meaning results from two distinct suffixes, a personal *-er* that inherits the argument structure of its verbal base and a non-personal *-er* that characterizes a class of things, i.e. instruments, that have a variable function whose actual content is spelled out by the predicational argument with which the suffix combines, serving as a modifier of the PURPOSE constant in the SF of the suffix.

In summary, the primary meanings of the deverbal nominal suffixes isolated by Lieber in her (2016) study are compositional derivations; their secondary readings result from the primary meanings via meaning transfer. In addition, there are two homonymous *-er* suffixes, each with its own primary meaning.

(33) Summary of discussion given as a revised table

	Ev/proc/res	Ag	Instr	Pat	Loc	...
<i>-al</i>	1			2		
<i>-ance</i>	1		2	2	2	
<i>-ment</i>	1		2	2	2	
<i>-ure</i>	1			2	2	
<i>-ation</i>	1		2	2	2	2
<i>-ing</i>	1		2	2	2	2
<i>-er_{pers}</i>		1				
<i>-er_{instr}</i>			1			

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