

## Aspect and modality in the interpretation of deverbal *-er* nominals in English

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### *Abstract*

This article argues contra Cohen (2016) that the core meaning of the affix *-er* (as in *writer*, *printer*, etc.) cannot be that of a dynamic modal and argues instead that deverbal *-er* nominalizations can have a wide range of modal (deontic, dynamic) and aspectual (bounded, unbounded, habitual) readings. To document these readings, we first present a corpus study of over 16,000 tokens of *-er* nominalizations on 62 verbal bases that we extracted from the Corpus of Contemporary American English and the British National Corpus. We show that an individual *-er* nominal can often be given a range of modal and aspectual readings and that a number of factors influence the availability of different readings for *er* nominals, including verb type, syntactic context (verb tenses, adverbs), and encyclopedic information. We show that neither Cohen's (2016) analysis nor syntactic analyses such as that of Alexiadou & Schäfer (2010) can account for the range of readings we find. We conclude by sketching a possible analysis in terms of the Lexical Semantic Framework of Lieber (2004, 2016) that postulates underspecified lexical representations of the *-er* nominals and resolution of underspecification in context.

### 1. *Introduction*

It might be thought that the subject of deverbal *-er* nominals in English is such well-trodden territory that nothing much more could be said about it.<sup>1</sup> Certainly, between descriptive accounts such as Bauer, Lieber and Plag (2013) and theoretical treatments over three decades (Roeper 1987; Levin and Rappaport Hovav 1988; Rappaport Hovav and Levin 1992; van Hout and Roeper 1998; Lieber 2004, 2016; Heyvaert 2003, 2010; Alexiadou and Schäfer 2010; Cohen 2016, among others) we have come to know a great deal about the possible interpretations of *-er* nominals. The thematic properties of *-er* nominals are well studied, the generalization encoded in what has come to be called the External Argument Generalization. It is also well known that *-er* nominals can have both eventive and modal readings. Indeed, Cohen (2016) has recently argued that the core semantics of the *-er* affix are modal and that its thematic behavior follows naturally from its modal semantics. Nevertheless, we will argue in this paper that there is much more to be said both in descriptive and in theoretical terms about the semantic behavior of *-er* nominals. We will argue that *-er* nominals can convey a wide range of aspectual and modal readings depending on both on the semantics of the verbal base and on the context in which the nominals occur. Given this, we must then ask what the core semantics of the affix is, and we must examine as well the relationship between the core semantics of the affix and the readings that are available to *-er* nominals in context.

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<sup>1</sup> Henceforth in this paper, when we refer to *-er* nominals, we specifically mean deverbal *-er* nominals. This is not to say that the *-er* nominals that are based on nouns (*villager*, *freighter*) or phrases of various sorts (*three pounder*, *back bencher*) are uninteresting. However, as we are concerned in this paper with modal and aspectual readings, and those readings only emerge in *-er* nominals on verbal bases, we will confine ourselves to deverbal *-er* nominals here. See Lieber (2004, 2016) for a discussion of denominal *-er* nouns.

Our first goal in this paper is descriptive: we will show that deverbal *-er* nominals can have both modal and aspectual readings, that the modal readings can sometimes be dynamic, but can also be deontic, expressing both possibility and obligation, and that the aspectual readings can be habitual or can suggest either bounded or on-going events. We will explore the extent to which the readings of *-er* nominals are dependent on such factors as the semantics of their base verbs, the temporal qualities of the discourse in which they are embedded, and the presence of adverbial modifiers of various sorts. Our second goal is to assess the theoretical implications of the data, specifically, the sort of analysis that could account for our observations about the suffix. Although we will not attempt a full theoretical analysis here, we will suggest that the data add support to arguments developed in Lieber (2016) that the core lexical representation of nominalizing affixes is underspecified, and that key components of that meaning are only fixed when the affix is deployed in context. We will also argue that purely syntactic accounts of *-er* nominals are unlikely to be successful. Our main theoretical result, however, will be to show that Cohen (2016) cannot be correct in his claim that the suffix *-er* in English is semantically a dynamic modal, and that its syntactic behavior can be made to follow from its modal nature. Although *-er* nominals sometimes do express dynamic (and other types of) modality, the modal reading does not arise from the semantic representation of the affix itself.

Before we begin, we need to be clear about the way in which we are using the terms aspect and modality. Aspect concerns the internal composition of an event, that is, the way in which events are played out in time. Although there are many possible aspectual distinctions that may be expressed in the languages of the world, the kinds of events that we will be concerned with here are bounded, unbounded, and habitual events. By ‘bounded’ we mean an event whose completion is implied – something that we understand to have happened in the past or to be the result of a telic event. By ‘unbounded’ we mean an event that we understand to be on-going or still in progress. ‘Habitual’ covers events that are implied to be not only actualized, but also recurring. When we refer to *-er* nominals as having a bounded, unbounded, or habitual aspectual reading, we will mean that the referent of the *-er* nominal is associated with a bounded, unbounded or habitual event.

We use the term ‘modality’ to refer to a dimension of meaning that involves such concepts as possibility and necessity. Although an agreed-upon classification of modality types is still a desideratum (Palmer 1990, 2003; Huddleston and Pullum 2002; Salkie, Busuttil and Auwera 2009), modality is frequently divided into three types: epistemic, deontic, and dynamic. Epistemic modality concerns whether a proposition is possible or necessary, relative to some information that is known or available (e.g., *It might rain* – we’ve consulted the weather forecast). Deontic modality concerns what is possible or necessary, relative to some system of rules external to the proposition under consideration (*She can go to the party* – her parents have said so). Dynamic modality involves dispositions<sup>2</sup>, abilities, capacities, propensities, relative to the subject of the proposition (*She can speak French* – she lived in France for two years).

While the notion that aspect and modality have something to do with the interpretation of *-er* nominals might seem odd, a brief look at the literature will begin to show its relevance. In section 2, we survey the literature on *-er* nominals and formulate the questions that we attempt to answer here. Our answers to these questions are based on a corpus study of over 16,000 tokens

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<sup>2</sup> In line with Borghini and Williams (2008: 23), we take a ‘disposition’ to be “the ability of an object to bring about some state of affairs (its ‘manifestation’) when met with the appropriate stimulus.”

of *-er* nominalizations from 62 verbs as they occur in context. Section 3 describes our methodology: the way in which we extracted data from the Corpus of Contemporary American English (COCA) and the British National Corpus (BNC) and how we coded those data for paraphrases, thematic roles, and the expression of aspect and modality. In section 4 we detail our findings. Section 5 takes up the theoretical implications of our observations.

## 2. *Dynamic modality and -er nouns: the literature*

The semantics of the *-er* affix in English has been a matter of discussion for decades. Early on, it was established that an *-er* nominal can bear any of the thematic roles (agent, experiencer, instrument, location, means, theme, and so on) that can be expressed by the subject of its base verb, an observation that has come to be called the External Argument Generalization (Levin and Rappaport Hovav 1988; Rappaport Hovav and Levin 1992; and Booij 1986 for Dutch). The range of interpretations is illustrated in (1):

- |     |             |          |
|-----|-------------|----------|
| (1) | agent       | writer   |
|     | experiencer | hearer   |
|     | instrument  | computer |
|     | location    | diner    |
|     | means       | stroller |
|     | theme       | loaner   |

This line of research led to the observation that *-er* nominals vary not only according to the thematic role they express, but also according to whether their interpretation is eventive or non-eventive. Roeper (1987: 292), for example, notes that in a phrase like *a trimmer of hedges*, the *-er* nominal typically refers to an agent rather than an instrument. Further, the phrase is most naturally interpreted as implying an actualized event of trimming; in other words, we generally do not call someone a *trimmer of hedges* unless she has engaged in (or is engaging in) an act of hedge-trimming. In contrast, the compound *hedge trimmer* might refer to either an agent or an instrument, but need not be eventive; a *hedge-trimmer* might sit on a shelf or a couch for eternity without ever touching a leaf. Levin and Rappaport Hovav (1988: 1069) suggest that the eventive interpretation, where it can occur, follows from the ability of the *-er* nominal to inherit argument structure from its base verb. Van Hout and Roeper (1998) agree with the basic observations, but attribute the eventive interpretation to the internal syntactic structure of the *-er* nominal, which in its eventive interpretation may project VP, AspP, and VoiceP internal to the nominalization. Non-eventive *-er* nominals such as the ones that occur in synthetic compounds lack AspP and VoiceP projections.

Alexiadou and Schäfer (2010: 9) push the distinction between eventive (what they call ‘episodic *-er* nominals’) and non-eventive *-er* nominals further, by suggesting that the non-eventive interpretation is in fact a modal interpretation, specifically one of dynamic (in their terms ‘dispositional’) modality:

Our main contribution to the theoretical discussion on these nominals is that we should distinguish between two groups of *-er* nominals: those that obey the external argument generalization, irrespectively of whether they are eventive or not, and whether they have complements or not, and those that do not obey the external argument generalization. *The first group of -er nominals sub-divides*

*into episodic ones, which always project their internal complements, and dispositional ones, which may leave these objects unexpressed.* [Italics ours]

Alexiadou and Schäfer's (2010: 22) approach to the semantic differences among *-er* nominals, is, like van Hout and Roeper's, syntactic. But unlike van Hout and Roeper, they argue that both episodic and the dispositional *-er* nominals have full internal syntactic structure including AspP, VoiceP, and vP. Where they differ is in expressing different 'flavors' of AspP, ASP<sub>EPISODIC</sub> for eventive *-er* nominals and ASP<sub>DISPOSITIONAL</sub> for dynamic *-er* nominals.

Cohen (2016) takes a rather different tack from Alexiadou and Schäfer, arguing that the External Argument Generalization and the expression of dynamic modality not only are connected, but in fact that the External Argument Generalization can be made to follow from the semantics of the *-er* affix if we assume that the affix has the semantic representation of a dynamic modal.

Dynamic modals are said to be subject-oriented in the sense that they encode abilities, capacities, propensities, or dispositions of the subject of the sentence (see for example, Palmer 1990, Papafragou 1998). Just as the modal *can* allows us to attribute dancing abilities to Fenster in a sentence like (2a), in (2b) the same abilities are attributed to Fenster.<sup>3</sup>

- (2) a. Fenster can dance.  
b. Fenster is a dancer.

Cohen (2016) suggests that if we consider the core semantic representation of the affix *-er* in English to be that of a dynamic modal, then the semantics of the affix will account for the morphosyntactic tendency of *-er* nominals to reference the external argument of their base verb.

Critically for Cohen's argument, in some instances dynamic modals require the disposition or ability to have been actualized: for example, for the phrase *trimmer of hedges* to be true, one putatively must have actually trimmed a hedge. This requirement presumably gives rise to the eventive reading. In other cases actualization is not necessary: someone or something might be a *hedge-trimmer* without ever having trimmed a hedge. The crucial thing for his account is that *-er* nominals must be ambiguous between the actualized (eventive) and non-actualized readings (2016, 96), and they necessarily involve dispositions. Cohen does acknowledge that there are *-er* nominals that have actual but non-dispositional readings; he gives as an example the *-er* nominal *murderer* in *John is a murderer*. His explanation is that modals like *can* also sometimes have non-dispositional readings, and that even in such cases they have a modal flavor (2016, 101-2). Exactly how this allows us to derive the eventive but non-dispositional interpretation of *murderer* remains unclear, however.

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<sup>3</sup> Note that there is a substantial literature concerning the semantics of modals like *can* and *may*, which convey both deontic/dynamic readings and epistemic readings. Kratzer (1977) is the classic treatment in possible world semantics. Papafragou (1998) pursues an analysis in relevance theory, and Vetter (2013) in what she calls an 'anti-Humean' framework. The details of these analyses are not important for our purposes. What is significant, however, is that none of these frameworks considers *can* to be only a dynamic modal, as Cohen's (2016) implies. Rather, modals like *can* and *may* have multiple meanings, which in some frameworks are the effect of polysemy and in others the effect of an interaction of context with a unitary (monosemous) meaning for the modals. In some sense, then, the argument we make here recapitulates for the suffix *-er* the debate that has gone on for modal *can*. The question is not so much whether *-er* nominals are dynamic modals but rather what the relationship is between dynamic readings where they occur and other readings that *-er* nominals can convey.

Note that treatments like Rappaport Hovav and Levin's, van Hout and Roeper's and Alexiadou and Schäfer's imply that the semantics of *-er* nominals follows from either argument structure or syntactic structure and that the two interpretations (eventive/non-eventive, episodic/dispositional) require distinct representations. We will leave open the question whether such analyses imply polysemy or more strongly homophony. Cohen's analysis, in contrast, seems to point to a unitary semantic representation for the *-er* suffix: on his account all interpretations of *-er* nominals should be derivable from a single semantic representation, which is irreducibly modal. As will become apparent in section 5, we will argue that Cohen is right to look for a unitary representation for the affix *-er*, but we will not try to derive the External Argument Generalization from the modality of *-er*. We will argue that while *-er* nominals sometimes express dynamic modality, they frequently do not, so that it cannot be correct that the core of *-er*'s semantics is irreducibly modal. But clearly, *-er* nominals sometimes do have dynamic (as well as other modal) readings, so we need to look at where modal readings occur and where other readings occur. Indeed, we need to sort out what the range of possible readings is and how those readings are related to the core semantics of the affix, whatever that may be. This is what we seek to do in section 4, but first we need to explain how we arrived at our findings.<sup>4</sup>

### 3. Methodology

Although a great deal is known about the semantics of *-er* nominals, our knowledge has largely been based on our intuitions about invented examples (the most prominent exceptions here are Ryder (1999) and Heyvaert (2003, 2010)). However, Lieber (2016) has shown for a wide range of nominalizations that our intuitions often mislead us, and that configurations that intuitively seem odd or unacceptable to us in decontextualized invented examples frequently appear unproblematic in examples that occur in natural discourse. We therefore base our descriptive claims here on a large sample of *-er* nouns in context that we have extracted from the Corpus of Contemporary American English (COCA) and to a lesser extent from the British National Corpus (BNC).

We began by choosing 70 English verbs from the 1000 most frequent verbs listed in the COCA frequency list.<sup>5</sup> The sample was balanced with 35 native and 35 non-native verbs, and equal numbers from each of five frequency ranges obtained by dividing the verbs in the list into five groups of 200 ranging from highest frequency to lowest frequency. Of the 70 verbs we selected, we found *-er* nominalizations for 62 (singular, plural, or both) that showed up in COCA and/or BNC.<sup>6</sup> Where the *-er* nominal was attested with a token frequency greater than 300, we extracted

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<sup>4</sup> Heyvaert (2010) gives a descriptively much more nuanced picture of the relationship between the thematic and modal interpretations of *-er* nominals than Alexiadou and Schäfer, van Hout and Roeper, or Cohen, discussing the extent to which the thematic role denoted by the *-er* nominal is correlated with a modal interpretation. She suggests that non-agentive *-er* nominals (in which she includes instruments, means, locations, themes, etc.) tend to be dynamic in modality, whereas agentive *-er* nominals may either encode abilities or have more temporal readings. Her description is much more consistent with our descriptive findings, to be set out in section 4. However, as her analysis is situated within a cognitive-functional framework, she does not offer any formal proposal as to the lexical or syntactic representation of the *-er* affix, and therefore does not address the questions we are interested in this paper.

<sup>5</sup> <http://www.wordfrequency.info/>.

<sup>6</sup> We designed the database with a larger study in mind, to examine modal and aspectual interpretations of a wide range of nominalizations. We therefore wanted to balance the sample with respect to frequency and etymological

the first 300 singular and the first 300 plural tokens. Where there were fewer than 300 singular or plural tokens, we supplemented (up to a maximum of 300) with examples from BNC. The verbs are given in Table 1, with the ones for which we found no *-er* nominals shaded in gray.

Table 1.

Frequency range (1 High →5 Low)	Etymology	Verb
1	native <sup>7</sup>	know, think, take, see, come, look, find
	non-native	provide, pay, include, continue, change, create, allow
2	native	shake, fly, worry, sing, step, beat, smile
	non-native	avoid, imagine, finish, respond, maintain, reveal, contain
3	native	stir, clean, stretch, rest, dance, cast, knock
	non-native	grant, account, separate, aim, cite, divide, oppose
4	native	split, flee, owe, rid, float, bite, wander
	non-native	constitute, convert, appeal, pretend, violate, adapt, distribute
5	native	strip, blend, chop, stumble, spring, heat, sail
	non-native	advocate, cancel, hesitate, debate, vanish, confess, diminish

It might well be asked why we examined up to 300 singular and 300 plural tokens for each *-er* nominalization type. Our rationale was that for many types there would be a typical reading (e.g. the small appliance reading for *blender*), but finding the whole range of readings available to a given *-er* nominal might require looking at many, many tokens. So for example, although the vast majority of the 600 *blender/blenders* tokens we looked at did refer to the small appliance, there were nevertheless some examples that exhibited agentive readings with various aspectual and modal nuances; these were much less expected and therefore much more interesting for our purposes. Choosing 300 as a maximum was arbitrary: it yielded a large enough sample to turn up interesting examples, but not so large as to be unmanageable.

Having gathered our data, we then applied standard cleaning procedures, eliminating examples that we deemed too lexicalized (semantically opaque) to be useful for our purposes (e.g. *knockers*, where the meaning was ‘women’s breasts’, *chopper(s)*, where the meaning was ‘helicopter(s)’), examples occurring as part of idioms (e.g. *shaker* in *mover and shaker*, meaning ‘someone who makes things happen’), and examples where the *-er* form occurred as the non-head of a compound (e.g. *container* in *container ship*). We also eliminated examples that were proper nouns, typos or misspellings, foreign language examples, or other sorts of junk. In the end, our sample consisted of roughly 16,400 tokens of *-er* nominals in context. We coded these data for the following categories: (a) the general interpretation of the form by way of seven paraphrases, (b) the thematic role of the NP headed by the form, (c) the aspectual and modal interpretation of the form, and (d) the verb type the form is based on.

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origins of the verbs sampled, variables which turn out not to be relevant in the present study. As we were looking at verbs which attest a wide range of nominalizations, we did not control to begin with to include only verbs for which *-er* nominalizations were attested.

<sup>7</sup> Etymological origins were determined by checking the OED. For the purposes of this study, ‘native’ refers to verbs with origins in Germanic.

We started by roughly paraphrasing each *-er* nominal as it occurred in context with one of the following seven paraphrases:<sup>8</sup>

- (3) a. animate or person that Vs/ has Ved/ can V/ habitually Vs

*Outdoor Life 2003*: As a CASTER of your own bullets, you'll soon discover that you can make dramatic improvements in handgun accuracy simply by experimenting with bullet diameters...

- b. thing that Vs/ can V/ has Ved/ is intended to V/ allows one to V (concrete noun)

*Consumer Research Magazine 1992*: If test results show that something other than the appropriate R-12 or 134a is in the system, the mechanic will have to draw the refrigerant into a special CONTAINER and have it removed by a hazardous waste contractor-- an expense he will pass on to you.

- c. thing that is Ved/ can be Ved/ has been Ved/ is intended to be Ved (concrete noun)

*Christian Science Monitor 1996*: And today's fancy big portobellos used to be known as 'CHOPPERS ' or 'No. 2's'- they were sold wholesale for 25 cents a pound.

- d. that which Vs/ has Ved/ is Ving/ will V/ must V/ should V (abstract noun)

*Futurist 1992*: Many have argued that livestock raising should be discouraged, that it is a primary cause of desertification through overgrazing, and that it is an inefficient CONVERTER of basic material and energy into human food; ...

- e. that which is being Ved/ has been Ved/ can be Ved (abstract noun)

*Washington Post 2000*: None of his three hits-- a flare to right in the fourth inning, a CHOPPER to third base in the fifth and the soft liner to center in the seventh-- were hit particularly hard.<sup>9</sup>

- f. location of Ving

*Prevention 2000*: I prefer "functional" workouts-walking to the grocery store or CLEANERS and hiking the 3-mile round-trip to work from Penn Station in New York City (that's about 50 minutes a day, 5 days a week).

- g. means of Ving

*Chicago Sun Times 2010*: A good FINISHER would be the chiffon cake with orange puree.

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<sup>8</sup> Here and elsewhere in this paper, we follow the conventions for citing corpus data that are used in Bauer, Lieber and Plag (2013) and Lieber (2016). Unless otherwise noted, all citations come from COCA. At the beginning of each citation we indicate the title and year of the work the quotation is taken from. We have kept punctuation and spelling as it occurs in COCA. The *-er* nominal under discussion is placed in capitals.

<sup>9</sup> It should be noted that there are very few examples that fit into this category. We have interpreted the *-er* nominal here as abstract because the reference is not to the ball as such, but to the way it is hit.

The vast majority of our tokens are paraphrased as in (3a) and (3b), as might be expected, with relatively fewer examples in the categories (3c-g).

We then used the paraphrases as an aid in coding each item for the thematic role it plays in context. Thematic roles generally correspond straightforwardly to paraphrases, with (3a) ‘animate or person that Vs/ has Ved/ can V/ habitually Vs’ corresponding to Agent, Experiencer, or Originator, depending on the base verb and the degree of volitionality of the referent, (3b) to Instrument, (3c) to Patient or Theme, (3f) to Location, and (3g) to Means. The paraphrases in (3d) and (3e) were needed for the very few cases in which the *-er* nominal denoted an abstract rather than a concrete noun. These we considered to be Originators. We adapt the term ‘originator’ from Borer (2013: 74). Borer defines ‘originator’ as “a broad role, which within events roughly corresponds to ‘internal causers’ (in the sense of Levin and Rappaport-Hovav 1995), but with the understanding that ‘external causers’ are always ‘internal causers’ as well, insofar as they are the internal causers of their own causing action.” We use the term in a somewhat more restricted sense for internal causers or non-animate external causers, saving ‘agent’ for animate external causers with a degree of sentience and volitionality.

In more detail, the referent of the *-er* nominals in our data could be the agent, i.e. “a person or an animate entity that verb-s” (e.g. *dancer*, *provider*, *singer* in (4a)), the instrument, i.e. “a thing that verb-s” (e.g. *heater*, *separator* in (4b)), the theme, i.e. “the thing or person verb-ed, the thing affected or moved by verb-ing” (e.g. *choppers* as in (4c)), the means, i.e. “what allows one to V or aids one in Ving” (e.g. *finisher* in (4d))<sup>10</sup>, the location, i.e. “the place of verb-ing” (e.g. *die casters* in (4e)), the experiencer, i.e. “a participant that is aware of something, perceives something, has a non-volitional mental event of some sort” (e.g. *worrier* in (4f)), and the originator (e.g. *changer* in (4g)).

(4) a. Agent

*American Artist 2001*: The artist continues in the tradition of the Old Masters but in a contemporary context, using an endless parade of DANCERS, acrobats, and athletes to fill his canvases.

*Ebony 2004*: "Ultimately, she hopes to be able to settle down with a special man." Someone who is very independent, a good PROVIDER so that he won't need any of my money, very loving, a giver, a supporter of me," she says."

*Atlantic Monthly 1998*: On a rainy Sunday afternoon we sat on sprung leather seats in the Ideal and listened to a SINGER who took requests from customers who had probably been coming there for decades, including a family in which three generations were represented.

b. Instrument

*Consumer Research Magazine 1999*: When buying a portable electric space HEATER, select one with all of these safety features: Tip-over switch that automatically shuts off the heater if it falls over, ...

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<sup>10</sup> It should be mentioned that there are very few unambiguous cases in our data that exemplify the category of *means*.

*Recycling and Composting 2000*: Feeders transfer waste in an even layer to a belt conveyer, moving under the SEPARATOR of ferrous metals scrap.

c. Theme

*Christian Science Monitor 1996*: And today's fancy big portobellos used to be known as 'CHOPPERS' or 'No. 2's'- they were sold wholesale for 25 cents a pound.

d. Means<sup>11</sup>

*Chicago Sun Times 2010*: A good FINISHER would be the chiffon cake with orange puree.

e. Location

*Iowa Review 2005*: Great Planes sits mid-block between a die CASTERS and a glass factory and we get everyone, the Harley guys; the metalheads; the Alpha Pi Omegas, who all want dolphins on their ankles.

f. Experiencer

*Essence 2005*: That used to gall me, because I was a WORRIER. He'd say, "I'll think about so-and-so when we need money for something, but damned if I'm going to worry about it."

g. Originator

*Scholastic Scope 2002*: "About ten years ago, he predicted that Coyote, or the CHANGER as he is also known, was going to find his way to the Birchwood.

*The Books of the Keepers 1993*: Caitlin had seen the ancient pattern once before; there was no mistaking the design. "A shape CHANGER!" Bembo protested, tugging his sleeve back into place.

Our most difficult task was to first define and then code the range of aspectual and modal categories that seemed to be exhibited in the data. We started with a tripartite division into neutral, aspectual, and modal categories. Neutral examples were ones in which the *-er* nominal is mentioned rather than used, and therefore has a completely non-modal, non-aspectual reading; since these have no bearing on our analysis of aspectuality and modality, we will have nothing further to say about them here. For aspectual categories, we looked at bounded, unbounded, and habitual readings, as these are categories that generally play a role in English verbal semantics. Modal categories were chosen according to the standard classification described in section 1.

In (5) we give examples that illustrate each of these aspectual and modal categories:

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<sup>11</sup> Bauer et al. (2013: 241) distinguish instrument nouns (e.g. *beeper*) from means nouns (e.g. *stroller*) as follows: "Whereas a *beeper* is something that beeps, a *stroller* is not something that strolls, but something by means of which one strolls (with a baby or toddler)."

(5)

Neutral		<p><i>Motor Boating 1996:</i> A FLOATER is a real dead person and hopefully most of us will never find one.</p>
Aspectual	a. bounded	<p><i>Forbes 1995:</i> American Airlines, an early ADAPTER of information technology, still leads in overall systems assets.</p> <p><i>Astronomy 2006:</i> The Zagami meteorite fell in Nigeria near Zagami Rock in 1962, and the piece Haag purchased from one of the original FINDERS is the largest fragment.</p>
	b. unbounded	<p><i>Perspectives on Political Science 1999:</i> ...if difference is not based on species, it certainly is not based on the contemporary view that race, ethnicity, and gender are the key DIVIDERS .</p> <p><i>Literary Review 2003:</i> and since it was a week before Easter, the beaters were at it from early in the morning until dusk. Next to him on the balcony watching the BEATERS was a big-nosed blonde from a neighboring glass-factory town, whose blue-veined skin seemed infused by its lead-ridden air.</p>
	c. habitual	<p><i>Military History 2011:</i> Aaron, though in great pain and near exhaustion, directed the bomb AIMER to bring in the plane for an emergency belly landing.</p> <p><i>Atlantic Monthly 2003:</i> ... no planes at the gates, dull food, nonfunctioning air-conditioning, and snoring people stretched on uncomfortable boarding-lounge furniture made for a shock of the familiar to a frequent FLYER.</p>
Modal	d. dynamic	<p><i>Horticulture 1991:</i> Where my adapted Craftsman or any other mower fitted with an ADAPTER does not perform as well is in grinding up leaves</p> <p><i>Internet Journal of Ophthalmology and Visual Science 2007:</i> An anterior chamber MAINTAINER was used to during descemets stripping.</p>
	e. deontic – possibility	<p><i>Money 1995:</i> Analysts say the stock could return 19% in 1996. In what promises to be a difficult year ahead, that's almost sure to be an index BEATER.</p> <p><i>Music Educators Journal 1997:</i> The difficulty this presents for the potential ADAPTOR of Kodaly's ideas is not that space monsters are inherently less noble than the little game song about the black plague, but that the musical experiences of today...</p>
	f. deontic – necessity	<p><i>US News &amp; World Report 1991:</i> Such state-of-the-art managed-care systems are woefully scarce, but pressure from PAYERS could change that.</p> <p><i>Education 1990:</i> We are bilking the tax PAYER . We are cheating the tax payer by taking his money and not providing the services (education of America's young people) that were promised.</p>

In (5a), the participants are involved in a bounded event, that is, an event with an inherent endpoint. For example, *the original finders* are involved in an event that terminated with the finding of the Zagami meteorite. Past this endpoint the same event does not continue. In unbounded events, as in (5b), the participants are involved in an ongoing event that has no inherent endpoint. For instance, *beaters* in (5b) are involved in a beating event with no implied termination point. That is, the beaters may decide when the beating event stops, but this is an arbitrary and not an intrinsic endpoint. As illustrated in (5c), habitual readings imply recurring events that continue in time, although any one of those recurring events may be bounded. For example, *a frequent flyer* is one who is engaged in a recurring series of flying events.

As for modal events, in the dynamic reading illustrated in (5d), the focus is on properties and dispositions of the referent of the *-er* nominal. *Adaptors* or *maintainers* in the sense intended in these examples are objects that have properties making them suitable to performing actions of certain sorts. (5e) and (5f) illustrate two kinds of deontic readings, possibility and necessity. In (5e), the lexical modal in the context of *beater* and the adjective modifying *adaptor* introduce the possibility reading: an *index beater* is something that could beat the index<sup>12</sup>, and the referent of *adaptor* is someone who could adapt Kodaly. No event has been actualized in these examples – the focus is on potentiality that depends on external circumstances rather than internal characteristics of the subject. As for the deontic-obligatory reading, in both examples in (5f) the nominal *payer* refers to someone who must pay something – the costs of healthcare or an income tax.

Note that *-er* nominals like those in (5) can and do convey other aspects and modalities in other contexts, a point that we will explore in some depth in section 4. The examples in (5), however, illustrate aspectual and modal readings that we believe seem particularly clear in their respective contexts. Of course, we recognize that not all readers will agree with our judgments about individual readings, and we recognize as well that some examples that we give might be ambiguous in the given context as to reading. We would argue, however, that individual disagreements on judgments do not matter. What matters for this study is that the reading we have identified for a given *-er* nominal is one of the possible readings for some *-er* nominal in some context.

The final thing we coded our data for was verb type. Our initial dilemma was what sort of classification would be most useful for our purposes. We initially considered widely used systems like FrameNet or VerbNet, the latter of which is based on Levin's (1993) verb classes. However, not all the verbs that we chose from our frequency list turned out to be categorized in these systems. Further, classifications based on syntactic alternations like Levin's or narrowly defined participant roles, as used in FrameNet often seemed too fine-grained for our purposes. We therefore stuck roughly to a classification based on the verb classes of Lieber (2004):

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<sup>12</sup> An epistemic reading is available here as well, given the modifier *almost sure* preceding *index beater*.

(6) a. activity

aim, maintain, look, bite, smile, cast, find, beat, dance, step, knock, appeal, imagine, oppose, pretend, think, worry, violate, pay, debate, sing, cite, confess, grant, respond, strip<sup>13</sup>, advocate, see

b. causative

strip, clean, cancel, provide, create, reveal, take, chop, distribute, stir

c. causative/inchoative

adapt, blend, change, convert, divide, heat, separate, stretch, float, fly, shake, split

d. manner of motion

avoid, sail, wander, stumble

e. directed motion

continue, diminish, finish, spring, come

f. stative

contain, include, know, rest

Since the group of activity verbs was quite large, we subdivided them into a number of sub-groups according to types of activity (things done with the body, verbal activities, activities involving physical contact, etc.) and where relevant whether the verb had an inherently aspectual component of meaning (telic, atelic, iterative):

(7) a. activity done with the body

telic: aim, bite, step

atelic: look, smile, dance, see

b. physical contact

iterative: beat, knock

c. social activity

telic: violate, pay

atelic: maintain

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<sup>13</sup> The verb *strip* has two clearly defined senses which seemed to fall into different verb classes. When used to mean ‘peel off’ (for example, to strip a wire), *strip* seemed to be a causative verb. But when used to mean ‘remove one’s clothes’, this seemed to be more of an activity. Hence we repeat the verb in (6a) and (6b).

d. psych

atelic: appeal, imagine, oppose, pretend, think, worry

e. verbal activity

telic: cite, confess, grant, respond

atelic: debate, sing, advocate

f. unable to classify or multiple senses: cast, find, strip

We coded each token in our sample for paraphrase, thematic role expressed, most salient aspectual or modal reading in each context, and verb type. In section 4 we will illustrate the complex interactions we found among these factors.

#### 4. Findings

##### 4.1 General observations

In this section, we focus on the effects that follow from the semantics of the base verb, the role of the immediate context in which *-er* nominals occur, and the role of encyclopedic knowledge in fixing the interpretation of *-er* nominals. In particular, we will show that nominals formed with the suffix *-er* are only rarely monosemous, either with respect to their thematic role or the modal or aspectual nuances they may express. Thus, our findings militate against the proposal that the core meaning of *-er* is that of a dynamic modal (cf. Cohen 2016).

As can be seen in Table 2, in our sample the majority of *-er* nominals are attested as expressing more than one thematic role, most frequently both agent and instrument:

Table 2.

<b>verbal base of <i>-er</i> nominal</b>	<b>thematic roles exhibited by <i>-er</i> nominal</b>
<i>advocate, appeal, bite, confess, continue, create, debate, grant, imagine, include, look, oppose, pay, provide, rest, sing, smile, spring, stumble, violate,</i>	agent
<i>cancel, cite, contain</i>	instrument
<i>know, see, worry</i>	experiencer
<i>come, take, think, wonder</i>	agent, originator
<i>adapt, aim, avoid, beat, blend, dance, diminish, distribute, find, fly, heat, maintain, pretend, respond, sail, separate, stir, strip,</i>	agent, instrument
<i>step</i>	agent, means
<i>convert, divide, reveal, split, stretch,</i>	agent, instrument, originator
<i>cast, clean</i>	agent, instrument, location
<i>chop, knock</i>	agent, instrument, theme
<i>float</i>	agent, instrument, theme, action
<i>shake</i>	agent, instrument, theme, originator
<i>change</i>	agent, instrument, means, originator
<i>finish</i>	agent, instrument, originator, means

The majority of verbs that are limited to a single thematic role require an animate, and usually a human subject, which then is most naturally interpreted as an agent or experiencer. For verbs that allow either an animate or an inanimate subject, the norm is for the *-er* nominal to be able to express both the agent and the instrument role. Note that we do not claim that the roles listed in Table 2 are the only thematic roles these verbs can express, merely that these were the only roles we found attested in our sample.

Further, it is rare to find any of these verbs limited in context to a single modal or aspectual interpretation. It is the norm for a variety of modal and aspectual interpretations to be possible. Even for verbs that tend to express only a single thematic role, different aspectual and modal readings arise in context. Table 3 gives some representative examples:

Table 3.

<b>-er nominal</b>	<b>reading in context</b>	<b>example</b>
biter(s)	agent; habitual	<i>Ploughshares 1997</i> : I was a nail BITER myself, and I kept thinking I'd outgrow the habit. Now I suddenly realized that I never would.
	agent; bounded	<i>Ploughshares 2003</i> : The wail of the BITER and the bitten were indistinguishable in the overcrowded terminal, and it had thrown Fran into a slump on a plastic chair, her thin knees tipped together helplessly.
	agent; possibility	<i>CNN_Burden 1997</i> : Now, Chris, looking down at Charlotte, she doesn't look like a big biter, and she's not a big biter, but if she were a BITER, what could...
	agent; dynamic	<i>BNC, Rosebook 1990</i> : The control of both BITERS and suckers has been revolutionized by the advent of the systemic insecticide.
changer(s)	instrument; dynamic	<i>Bicycling 2006</i> : We loved the SRAM drivetrain for its ability to crack off shifts with a confidence rarely found at this price, with only some occasional hesitation from the front CHANGER.
	agent; habitual	<i>Redbook 2003</i> : February 7 * Daddy duties I am the CHANGER of the diapers. I take care of all of the doodie.
	agent; dynamic	<i>Scholastic Scope 2000</i> : The Creator and CHANGER first made the world in the East. Then he slowly came westward, creating as he came.
	agent; bounded	<i>San Francisco Chronicle 2010</i> : One tattooed former construction worker, a career CHANGER, was nearly reduced to tears when Chef Nic cut open a "soft-boiled" egg to reveal a hard center. "You call this soft-boiled?"
	agent; unbounded	<i>Essence 1992</i> : Middle managers should take two weeks; those at the executive level need at least one month: "Most job CHANGERS jump right to steps two and three. They hastily retype their resume and go on interviews.
	means (or location); dynamic	<i>Smithsonian 1991</i> : We converted the chart table into a baby CHANGER, and the pilot berth, up above the settee in the main cabin, is where Oliver hangs out most of the time.
	originator; dynamic	<i>Washington Post 1994</i> : Basically I leave that to others. I spend my time looking at matchups, momentum CHANGERS, deciding when to blitz, when to be conservative, when to use timeouts, how to use the clock, that type of thing.
chopper(s)	instrument; dynamic	<i>Consumer Reports 2001</i> : A CHOPPER is the choice for small tasks like mincing garlic or mashing vegetables for a baby's dinner.
	agent; habitual	<i>Virginia Quarterly 2002</i> : In 1942, cotton CHOPPERS mostly women, were being paid a dollar a day, docked 25 cents if they damaged a cotton plant.
	agent; unbounded	<i>Washington Post 1990</i> : If you see a utility or some other agency chopping

		into new asphalt, then the CHOPPER is supposed to make a temporary patch (asphalt or a steel plate) and the city then contracts for the permanent repair and bills the chopper.
	agent; possibility	<i>Journal of Social History 1994</i> : Almost immediately after the walkout began, 300 Columbia students volunteered their services to the IRT as motormen, conductors, ticket sellers, and ticket CHOPPERS.
	agent; dynamic	<i>Natural History 1996</i> : ... and, indeed, dicynodonts occupied a variety of niches in the ancient Karoo, depending on whether they were browsers or grazers, CHOPPERS or grinders. Some fed on roots, some on leaves, some on fruiting bodies of plants.
	theme; dynamic	<i>Christian Science Monitor 1996</i> : And today's fancy big portobellos used to be known as 'CHOPPERS' or 'No. 2's'- they were sold wholesale for 25 cents a pound.
dancer(s)	agent; habitual	<i>Backpacker 2003</i> : To appear fluid and controlled, she says, a DANCER must constantly adjust her alignment. That requires exercises that build core muscle strength, like these.
	agent; unbounded	<i>Boys Life 1997</i> : Wade Bramlitt moves like a dancer-a DANCER who's racing across water at 40 miles per hour.
	agent; bounded	<i>Ebony 2006</i> : When he left Shalamar in 1985, the Akron, Ohio, native who had been a Soul Train DANCER enjoyed a number of solo hits, including "I'm For Real," "Show Me" and "Stay."
	agent; dynamic	<i>Ebony 1992</i> : At 47, Hines still has the chiseled, sinewy build of a man half his age: the sculptured arms, the DANCER's legs, the washboard stomach of a Malibu lifeguard.
	agent; possibility	<i>Essence 1993</i> : Pamela was by far the best dancer there, and the other girls definitely took notice. I loved being with the best DANCER in the place.
	instrument; dynamic	<i>Healthy Pet 2000</i> : For a cat, spend just a few more minutes with a "cat DANCER" or other toy.
divider(s)	instrument; dynamic	<i>Backpacker 1999</i> : Another feature that helps raise the center of gravity is a unique vertical DIVIDER that splits the main compartment into two long, wedgelike halves (there's also a zip-away divider for the sleeping bag compartment
	agent; habitual	<i>Atlanta Journal Constitution 2000</i> : But the historically close election, its unsightly aftermath and Bush's vow to be a "uniter, not a DIVIDER," make it unlikely that the president will use the partisan advantage as a hammer.
	originator; unbounded	<i>Mother Jones 1990</i> : Class, as always, is the great unifier, and great DIVIDER, of British society.
	originator; habitual	<i>Chicago Sun Times 2005</i> : You could have seen it coming by following the Great DIVIDER -- money.
	originator; bounded	<i>Journal of International Affairs 2004</i> : ... how key social actors and state officials in the late 19th-and early 20th-century United States used a variety of means, including pseudo-science, to make racial categories and the DIVIDERS between them seem hard and fast in the country.
floater(s)	instrument; dynamic	<i>Field and Stream 1995</i> : The top summer bass lure, of course, is the plastic worm, which includes the traditional Texas-rigged crawler, Carolina-style FLOATER, and soft-plastic jerkbait.
	agent; possibility	<i>New York Times 1993</i> : "No," he said, "there are others who are better leapers, like Dominique Wilkins and Clyde Drexler. But Michael is the best FLOATER.
	agent: bounded	<i>New York Times 2004</i> : And you? Were you a FLOATER? In the middle of the pack?
	agent; habitual	<i>Washington Post 1990</i> : Unfortunately I couldn't help but hear, on a summer weekend, the call of the pie-eyed FLOATER, an urban species that travels raucously by canoe or tube while feeding from six-packs.
	agent; unbounded	<i>Backpacker 2002</i> : The Smith's current is strong enough to keep things

		interesting, but rapids are few and none more difficult than class II. Most FLOATERS take 4 to 5 days to enjoy the camping, fishing, and hiking along the way.
	theme; unbounded	<i>Outdoor Life 2003</i> : When the job is done we walk upwind about 50 yards, hiding in the grass or behind a large "FLOATER," a tree trunk left by the river during high water.
	theme; dynamic	<i>Skiing 2006</i> : But it doesn't ski big. A pure FLOATER, it transitions from turn to turn effortlessly and skims the surface-- until you punch it in the belly and set it on edge.
payer(s)	agent; bounded	<i>Fortune 2005</i> : The busy radiologist is Ray Harron, who has, not coincidentally, also had a hand in diagnosing 52,600 asbestos claims, according to the Manville Trust-the PAYER of liabilities of the old JohnsManville Corp.
	agent; unbounded	<i>Inc. 1994</i> :"I own a lot of Ishpeming," avows Argall, who reckons he's now the largest property-tax PAYER in town.
	agent; habitual	<i>Consumer Reports 2000</i> : Within microseconds, says Dawson, the computerized telephony system can size up from transaction data whether you 're a valued customer or a chronic late PAYER.
	agent; possibility	<i>San Francisco Chronicle 2006</i> : "Is the only potential PAYER going to be the end user, the customer, or are there other ways to finance infrastructure by asking content providers to pay as well?"
	agent; obligation	<i>Education 1990</i> : We are bilking the tax payer. We are cheating the tax PAYER by taking his money and not providing the services (education of America's young people) that were promised.
shaker(s)	instrument; dynamic	<i>USA Today 2006</i> : Whitesell's faith was rewarded this year when the vacancy was filled by a seven-post SHAKER, a machine to test car setups that is the latest high-tech toy acquired by a constantly evolving company consumed with staying on the cutting edge in Nextel .
	theme; dynamic	<i>American Heritage 1997</i> : We sat on high stools at the bar while the barman shook martinis in a large nickelled SHAKER .... We touched the two glasses as they stood side by side on the bar.
	agent; unbounded	<i>Natural History 1996</i> : Perhaps, after sacking the city they had attempted to storm or ten long years, the Greeks, grateful for the fatal weakening wrought by the earth SHAKER in the Trojan defensive walls, left a wooden horse as a votive offering.
	agent; bounded	<i>Parenting 2006</i> : Anyone can snap under pressure, even experienced caregivers. But often it's a man. In one study, the biological father was the SHAKER in 37 percent of cases, the mother's boyfriend in another 21 percent.
	agent; habitual	<i>San Francisco Chronicle 1990</i> : Even so, Heston wasn't just handed the role-- he was called before the master SHAKER six times to be told the story and to be shown sketches and models.
	originator; unbounded	<i>San Francisco Chronicle 1999</i> : Because the bales are not as sturdy as wood, there is some concern that the walls will collapse during a SHAKER.
	originator; bounded	<i>New York Times 1991</i> : "It was a real confidence SHAKER," says Robert Haber, publisher of the College Media Journal New Music Report, the college-radio tip sheet.
	originator; habitual	<i>Rolling Stone 2003</i> : "...but Hits focused on gorgeous non-LP singles like "Hot Fun in the Summertime" and "Everybody Is a Star," as well as rump SHAKERS such as "Everyday People" and "Dance to the Music."

Some correlations between thematic role and modal/aspectual reading are quite predictable. For example, *-er* nominals that are interpreted as instruments almost always have a dynamic

interpretation.<sup>14</sup> *Choppers*, *blenders*, and *containers* are things that have inherent characteristics that make them suitable for chopping, blending, and containing. But the examples in Table 3 suggest that other thematic roles are freer to take on a variety of modal and aspectual interpretations in different contexts. So, for example, while *biter* always denotes an agent in our data, sometimes the context implies habitual (recurring) actualized events (*I was a nail-biter*), sometimes an event that has been completed (“*The wail of the biter and the bitten were indistinguishable...* ”), sometimes possibility (“...*if she were a biter*”). The noun *chopper* appears in our data as an agent, an instrument, and a theme. As an instrument, its modality is predictably dynamic, but the theme usage also expresses dynamic modality (portobellos are mushrooms with characteristics that make them suitable for being chopped). If the referent of *chopper* is an animal, it can also express dynamic modality (a dicynodont is an animal with teeth adapted or suited to chopping), but when *chopper* refers to a human, context in the examples we found suggested either possibility (Columbia students offering themselves as potential *ticket choppers*) or habitual activity (people working as *cotton choppers*) or an on-going event (“*the chopper is supposed to make a temporary patch*”). It is obvious from the examples in Table 3 that a complex variety of clues exist in context that influence our readings of the *-er* nominals. Our task in the next section will be to examine some of the factors that influence the modal and aspectual nuances that we find exhibited in our data. We first look at the contribution of the base verb to the potential aspectual and modal readings of the *-er* nominal, and then we look at the contribution of broader contextual clues.

#### 4.2 Effects that follow from the semantics of the base verb

Part of the complexity that we observe in the interpretation of *-er* nominals has to do with the fact that the verbs on which they are based may be polysemous to begin with. Different senses of the verbal base in turn permit different thematic interpretations of the *-er* nominals. For example, the verb *stir* has (at least) three senses, and the polysemy exhibited by the nominal *stirrer* in the examples below follows from the polysemy of the base verb.

- (8) a. Sense Number 1: (cause to) begin moving; change the position of

*Science News 1991*: While their role as oxygen carriers is well appreciated, red blood cells serve other functions as well. Red cells act as " little STIRRERS," says Kenneth H. Keller, a chemical engineer at the University of Minnesota in Minneapolis.

- b. Sense Number 2: arouse feelings in, provoke, agitate, foment, urge, incite

*Chicago Sun Times 1992*: ,... and to complement it all there was an excellent piece of grilled focaccia. I'd call it a real stuzzicare, or appetite STIRRER.

- c. Sense Number 3: move an implement through with a circular motion, mix

*Mother Earth News 2001*: Pour in lime, stirring with a wooden rod or paint STIRRER, until the water level is within two or three inches of the top.

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<sup>14</sup> Our findings here in part corroborate those of Heyvaert (2010) who claims that the dynamic reading is the expected one for all non-agentive *-er* nominals. We agree that there is a tendency in that direction, but that non-agentive *-er* nominals are not inevitably dynamic in interpretation, nor is a dynamic interpretation impossible for agentive *-er* nominals.

The instance of *stirrer* in (8a) might be interpreted as a theme or an originator and in (8b) as an originator, whereas *stirrer* in (8c) is more naturally interpreted as an instrument.

But going beyond the effects of verbal polysemy on the thematic range of the *-er* nominal, we observe that the core semantics of a verb can place at least some limits on the ultimate readings that might be available for the *-er* nominal derived from that verb. Some of those limitations follow from aspectual characteristics of the verbal base – for example, whether the verb is inherently telic or atelic, that is, whether it implies a natural endpoint or not.<sup>15</sup> Others follow from our assumptions about specialized propensities, dispositions, or abilities that might or might not be associated with the performing of certain actions. We examine each of these issues in turn.

For verbs that have an inherently telic sense, we find that the related *-er* nominal tends to favor a bounded aspectual reading; if the context suggests an actualized event, that event tends to be understood as bounded. Consider the examples in (9) with the nominal *confessor*, with the basic meaning ‘one who confesses’<sup>16</sup>:

- (9) a. *BNC The Economist*: The classic illustration is one of the simplest games: the Prisoners' Dilemma. Two prisoners are accused of a crime. The prosecutor tells them that if they both confess they will go to jail for ten years; if neither confesses they will get two years; if only one confesses he (the CONFESSOR) will get just one year while his fellow prisoner goes down for 20.
- b. *Associated Press 1995*: Paul Erasmus, a former security policeman, and Craig Williamson, once a spy, have led the growing chorus of CONFESSORS . Their stories appear to bolster longstanding accusations that former President F.W. de Klerk's government sanctioned violence and nasty tricks against political opponents

The verb *confess* is inherently telic. An act of confessing implies an inevitable outcome, the confession. One cannot sensibly be called a *confessor* without a resulting confession. This completed act is implied in both (9a) and (9b).

Contrast the necessarily bounded interpretation of *confessor* with the unbounded interpretation that is typical of an *-er* nominal derived from an inherently atelic verb like *think*.

- (10) a. *Inc. 1998*: The company sounded small in scope when Dave described it, but Margaret is no small THINKER.
- b. *Futurist 2006*: In *On War*, nineteenth-century Prussian military THINKER Carl von Clausewitz pays next to no attention to technology.

The verb *think* does not imply a natural endpoint, and the associated *-er* nominal, when in a context that suggests an actualized event, is read as unbounded. In the contexts in (10), we understand the thinking events in question to be actualized, rather than possible or hypothetical, and the *-er* nominal implies an on-going act of thinking.

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<sup>15</sup> Telicity is, of course, a complex issue, as it is well known that whether a given verb is interpreted as telic or not is only partly a function of the semantic representation of the verb itself. Also important for such interpretations are the quantificational characteristics of the verb's arguments. See Lieber (2004) for a review of the extensive literature on this subject and for relevant references.

<sup>16</sup> The other potential meaning of *confessor*, the person who hears confession, is not relevant in these examples.

It is, of course, possible for context to override the correlation of telic verbal base with the expected bounded interpretation, but context must play a major role here, as the example in (11) suggests:

- (11) *Journal of Environmental Health 2003*: Proper disposal methods were discussed with these businesses. Because the LHWMP is not a regulatory program, continuing VIOLATORS were referred to agencies with enforcement authority.

While the verb *violate* implies an endpoint or outcome (the violation), the adjective *continuing* in (11) forces an unbounded reading on the *-er* nominal. Without the context supplied by the adjective, *violator* would normally receive a bounded interpretation if an actualized event is implied, as turns out to be the case with the vast majority of tokens of *violator(s)* we find in our data.

The verbal base also seems to play a role in the potential of an *-er* nominal to receive a modal interpretation. Generally, the more a verb denotes an action that demands specific characteristics or abilities of its subject, the easier it is to get a modal interpretation of the corresponding *-er* nominal.<sup>17</sup> Contrast, for example, verbs like *dance* or *bite* with verbs like *take* or *avoid*. It is relatively clear that dancing requires of its subject the ability or skill to move in certain ways, and biting requires teeth along with a motion of a certain sort, or at least the metaphorical equivalent of those things. It is harder (although not impossible) with respect to verbs like *take* or *avoid*, to think of what specific ability or characteristic is required of the subject for a successful event of taking or avoiding to occur; taking and avoiding imply directionality of motion, but virtually no characteristics of their subjects. If *taker* and *avoider* are to receive a modal interpretation, they must typically be the second element in a synthetic compound in which the first element narrows down or fixes the specific abilities or characteristics that must be ascribed to the referent of the *-er* nominal. In other words, it is not difficult to find *biter* or *dancer* with a modal interpretation outside the context of a compound as in the examples in (12), but *avoider* and *taker* tend to be interpreted modally only when they occur as part of synthetic compounds like *obstacle avoider* or *note taker* as illustrated in the examples in (13).<sup>18</sup>

- (12) a. *Field and Stream 2004*: Walleyes are notoriously tender BITERS, and the least bit of resistance caused by ice holding the line will make them drop the bait.  
b. *Antioch Review 2002*: I know by this response that I've got a BITER, which is, more often than not, a girl who's either very polite or very gullible, or both.  
c. *Essence 1993*: Pamela was by far the best dancer there, and the other girls definitely took notice. I loved being with the best DANCER in the place.
- (13) a. *Journal of Visual Impairment & Blindness 1997*: Brabyn (1982,1985,1995) presented excellent reviews of many of these devices, including obstacle AVOIDERS and navigation aids.

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<sup>17</sup> See Heyvaert (2010: 67) for a similar observation.

<sup>18</sup> Note for all of the examples in (12) and (13) that we are dealing with non-actualized, events with modal interpretations, dynamic in the case of (12a) and (13a) and deontic (possibility) in the case of (12b,c) and (13b).

b. *Money 1991*: Before the group starts talking, select at least one note TAKER to record the discussion and list any items that may require follow-up, such as who was designated to have power of attorney.

It appears that the tendency of the first element of a compound to narrow down the set of abilities, dispositions, and propensities associated with the verbal base of the second element of the compound explains why we tend to see the dynamic reading more strongly in a compound like *hedge trimmer* than in the corresponding syntactic phrase *trimmer of hedges*, an observation that has played a prominent role in the literature, as we saw in section 2. We can see this tendency even more strongly when we find a dynamic reading suggested for an agentive *-er* nominal, something which turns out to be relatively rare in our data. Consider the example in (14):

(14) *New York Times 2008*: Children don't need many excuses to feel embarrassed over their parents, and Jenna is dreading her turn in Career Day at school, when her father is revealed to be a light bulb CHANGER.

The general context of 'Career Day' here suggests that *light bulb changer* is some sort of occupation, and occupations tend to go along with specific skills and abilities. From this we get the (ironically intended) dynamic reading in (14).

As a final note in this section, recall that Cohen (2016) admits the existence of what he calls 'non-dispositional' *-er* nominals like *murderer*, but does not provide an account for them. For us, the verb *murder* turns out to be more like the verbs *take* and *avoid* than like the verbs *dance* and *bite*, in the sense that it is difficult to ascribe special characteristics, abilities, or skills that the referent would require apart from an actualized event of murdering.

#### 4.3 Effects that can be inferred from context

There are any number of clues that allow us to arrive at a particular modal or aspectual reading for an *-er* nominal. Some of these are present in the syntactic environment in which the *-er* nominal is found, and others require wider encyclopedic knowledge. We will begin by illustrating some of the grammatical cues that allow us to fix the reading of the *-er* nominal in context.<sup>19</sup>

##### 4.3.1 The role of syntactic context

Specific clues that syntactic context provides contribute to fixing the interpretation of the *-er* nominal include the animacy of the referent of the *-er* form, the tense or aspect of surrounding verbs, and adjectives and to a lesser extent verbs and adverbs that suggest temporal readings.

First, surrounding syntactic context allows us to fix whether the referent of the *-er* nominal is animate or not and if animate, whether it refers to a human or not. Determining animacy and sentience then allows us to distinguish instrumental readings from agent or experiencer readings. Consider the examples in (15) and (16):

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<sup>19</sup> Brandtner and von Heusinger (2010) also note the importance of context in determining the reading of German event/result nominalizations.

- (15) a. *Journal of American Ethnic History* 1990: The son of an Irish-Catholic cottager, an orphan in childhood, a farm laborer and wood CHOPPER by trade, and reformed drunkard, he knew first-hand the privations of life and this allowed him to relate easily to working men impoverished by the depression.
- b. *Natural History* 1992: I have fewer possessions than they do-- I own no television set, no stereo or compact disk player, no video machine, home computer, food CHOPPER, or any number of other items my friends seem to dote on.
- (16) a. *Forbes* 1999: Master BLENDER Jean-Marc Olivier combined more than 50 different vintages-- from as far back as 1802, and none more recent than 1929-- to come up with, well, one hell of a hooch.
- b. *Country Living* 2001: In a BLENDER or food processor, puree the vegetables in batches.

Context in these examples makes clear that the referent of the *-er* nominal in the (a) examples is animate (and human) and in the (b) examples inanimate, and this in turn determines that the former are interpreted as agents and the latter as instruments.

Where the verbal base of the *-er* nominal is not inherently telic or atelic, the tense of verbs in the surrounding context can help to fix an actualized interpretation as bounded or unbounded, or even as a deontic possibility reading. Consider, for example, the different interpretations of *adaptor/adapter* in (17), *debaters* in (18), *looker* in (19), and *caster* in (20):

- (17) a. *Entertainment Weekly* 2004: "Some of its first customers were in the TV industry, where the gizmo's chirps and whistles were used for cartoon noises and other peculiar sounds (although experimental composer John Cage was also an early ADAPTER). (bounded)
- b. *NPR\_ACTW* 2001: And ADAPTOR Brad Kaaya has been astonishingly smart about finding contemporary parallels for "Othello's" plot points. (unbounded)
- (18) a. *Theological Studies* 2006: Contending ecclesiastical parties during the Reformation era in England sought to conscript the biblical text and enlist it in battle against their adversaries. To have the Bible on one's side was a boon for theological DEBATERS. If annotations had had no influence on the interpretation of the sacred text, there would have been no reason to fight over them in the 1500s. (bounded)
- b. *Journal of Interamerican Studies & World Affairs* 1999: The dynamism of that Pentecostal movement arises from the Pentecostal DEBATERS sharing a distinctive Pentecostal spirituality, radically conversionist, sanctifying control over self and daily life, sealing conversion and control in the personal experience of the Holy Spirit. (unbounded)
- (19) a. *Defeat the Darkness* 2010: Oh, no. The first serious LOOKER she'd had, and it had to be this guy. (bounded)

b. *Natural History 1997*: Three-year-olds *show* that they understand the nature of beliefs and desires and where they come from—for example, that a LOOKER often wants what he is looking at, that you can't eat the memory of an apple, ... (unbounded)

(20) a. *Outdoor Life 2003*: As a CASTER of your own bullets, you'll soon discover that you can make dramatic improvements in handgun accuracy simply by experimenting with bullet diameters—

b. *Associated Press 2003*: Trollers using spoons with Jet or Dipsy Divers have been most successful, with CASTERS also catching fish on weapon-style lures.

In the (a) examples in (17)-(20), we have a context of past tense verbs, whereas the (b) examples have verbs in the present, progressive, or present perfect. Whether the *-er* nominal signals an actualized event that is bounded or unbounded is implied by the temporal context set by these tenses/aspects. In (20), the future tense in the (a) example suggests a non-actualized event, and the deontic possibility reading comes to the fore. The progressive participle in the (b) example, gives an actualized but unbounded reading.

Temporal context may also be signaled by the adjectives that modify the *-er* nominal, as illustrated in (21), or by verbs or adverbs that occur in the syntactic contexts surrounding those *-er* nominals, as illustrated in (22). Adjectives like *frequent*, *chronic* or *persistent* suggest the habitual reading, *former* suggests a bounded interpretation, *possible* or *potential* a deontic possibility reading, *current* or *ongoing* an unbounded reading:

(21) a. habitual

*Anthropological Quarterly 2010*: Likewise, the view that Israel is a gross and frequent VIOLATOR of human rights, with a sophisticated team of international lawyers employed to justify the country's violations, has become widespread among human rights advocates and organizations;...

*Rolling Stone 1990*: But Westerberg-- the band's singer, songwriter and chronic CONFESSOR -- sounds so alone here, so frustrated and emotionally wrung out, that it gives new meaning to the phrase "solo album."

*Today's Parent 1995*: Even determined and persistent BITERS tend to outgrow the problem fairly quickly, as they develop new skills for coping with stresses and angry feelings.

b. bounded

*Ebony 1996*: A former DANCER and a featured performer on daytime and primetime TV, Victoria Rowell works out with personal trainer Mark Eckhardt and (right) practices a ballet routine.

c. unbounded

*Consumer Reports 2008*: Choose Your Phone Because your choice of phones will be limited by your service provider, you need to decide whether to stay with your current PROVIDER or select a new one before you start shopping for a phone.

*Christian Science Monitor 2003*: Dick Wolf, creator and ongoing PRODUCER of the New York-based "Law & Order" shows, says when he decided to bring back the old L.A.-based "Dragnet" this season, he had to tap local advisers.

d. deontic-possibility

*Musical Educators Journal 1997*: The difficulty this presents for the potential ADAPTOR of Kodaly's ideas is not that space monsters are inherently less noble than the little game song about the black plague, but that the musical experiences of today's children are often provided for them by television and radio rather than being the products of their own musical fantasies.

(22) a. habitual

*Italian Fever 2000*: He was usually a WRITER or a journalist; sometimes he traveled.

b. unbounded

*Popular Mechanics 2009*: MAINTAINERS and designers constantly adopt new materials and inspection devices to prevent heavily stressed parts of planes from failing during flights.

c. unbounded

*Fox\_Hume 1999*: My point is the president wants to cut the debate short because the longer the DEBATER goes on, as the Harris poll finds, the more people become interested in tax cuts and do support them.

c. bounded

*Journal of International Affairs 1991*: Ed Fouhy, formerly a PRODUCER at ABC News, told me that in 1980 he visited a French television network.

In (22) the verb *go on* and adverbs *usually*, *constantly*, and *formerly* help to suggest the aspectual nature of the readings.

#### 4.3.2 The role of encyclopedic knowledge

Encyclopedic knowledge is also important in fixing the ultimate reading of any given *-er* nominal. We will illustrate this briefly with examples of *chopper*. This *-er* nominal is attested in many readings, not only because of the polysemy of the base verb *chop*, but also because of encyclopedic knowledge of who or what can chop or be chopped.

(23) a. theme/bounded

*Chicago Review 1992*: Coach hit a CHOPPER. Elliot charged the ball.

b. agent/habitual

*Golf Magazine 2003*: The smell of my armpits at the top of my backswing is powerful, but it's not as odiferous to golf's ruling bodies as the power now available to the average

sweaty CHOPPER, due to the latest bulbous drivers and these incredibly bouncy yet strangely stoppable golf balls.

c. agent/dynamic

*Natural History 1996*: These variations on the successful feeding theme led to the possibility of diversification, and, indeed, dicynodonts occupied a variety of niches in the ancient Karoo, depending on whether they were browsers or grazers, CHOPPERS or grinders.

d. theme/dynamic

*Christian Science Monitor 1996*: And today's fancy big portobellos used to be known as 'CHOPPERS' or 'No. 2's'- they were sold wholesale for 25 cents a pound.

In interpreting the examples in (23), syntactic cues only go so far in helping us to arrive at an interpretation. Encyclopedic knowledge fills in what syntactic context fails to supply. For these examples of the nominal *chopper*, it helps to know something about baseball, golf, zoology, and cooking. Out of context, *chopper* in (23a) might be referring to an instrument or an agent; however, the fact that the text is about baseball, and the context provided in the following sentence suggest that *chopper* is meant as neither an agent nor an instrument, but rather as something (a ball) that has been hit using a chopping motion. That is, in this case *chopper* is interpreted as a theme involved in an actualized and bounded event. The example of *chopper* in (23b) also involves the manner of motion sense of *chop*, but context here dictates an agent with a habitual reading rather than a theme and bounded event: a *sweaty chopper* refers to someone who regularly golfs using a particular kind of golfclub and ball to produce a particular kind of motion. Both (23c) and (23d) express the sense of *chop* as a cutting motion that results in detachment and both have a dynamic flavor. But in a context that concerns the feeding habits of various species, the agent interpretation comes to the fore, as in (23c). The reader needs to infer that dicynodont is a kind creature whose feeding habits involve a disposition to chop, presumably aided by the configuration of its teeth.<sup>20</sup> In (23d), on the other hand, one needs to know that a portobello is a kind of mushroom, specifically an unusually large and meaty one, in order to read *chopper* as a theme.

Encyclopedic knowledge also plays a role in fixing modal interpretations. Consider, for instance, the examples in (24):

- (24) a. *Education 1990*: We in public education are guilty of far worse a deed. We are bilking the tax payer. We are cheating the tax PAYER by taking his money and not providing the services (education of America's young people) that were promised.
- b. *Money 1995*: Why the high-yield theory still looks like a Dow BEATER. The strategy of buying the 10 highest-yielding Dow stocks on Jan. 1 each year came up short in 1994.

Both examples in (24) can plausibly be said to get a modal reading, and specifically a deontic reading, but because of what we know about taxes and the stock market, we are inclined to ascribe an 'obligatory' reading to *payer* in (24a) but a 'possibility' reading to *beater* in (24b).

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<sup>20</sup> <https://en.wikipedia.org/wiki/Dicynodont>

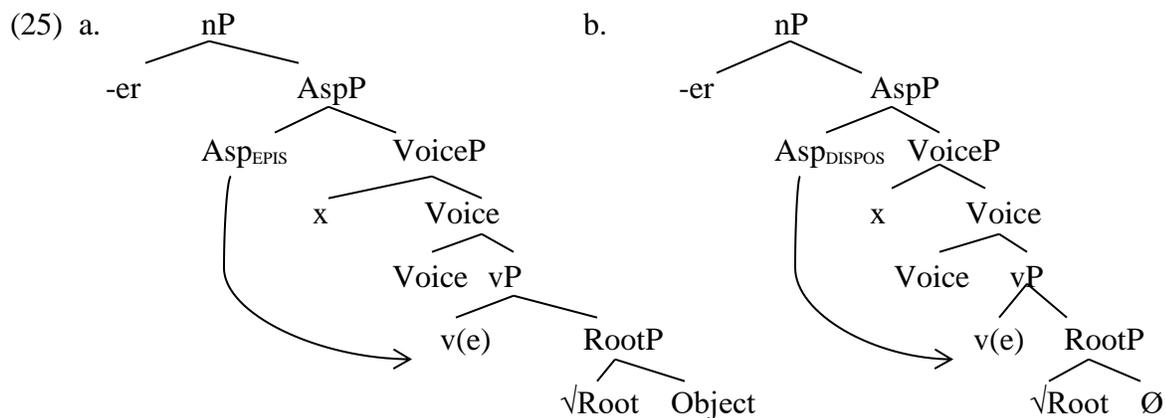
Without the encyclopedic knowledge that taxes must be paid, but that the stock market may or may not go up, we doubt that these readings could be distinguished.

### 5. Modeling the semantics of *-er* nominals

We now turn to the theoretical implications of our study. Any formal analysis of *-er* nominals must take into account the findings laid out in section 4, namely, that *-er* nominals can express thematic roles of the subject of their base verb (the External Argument Generalization), but also, given sufficient appropriate context, can express thematic roles other than that of the subject. The readings given to *-er* nominals may be eventive or modal, but these general rubrics cover a number of different readings. Eventive or ‘actualized’ readings can be bounded, unbounded, or habitual in nature. Modal readings may be dynamic/dispositional, but may also include deontic readings of both possibility and necessity. Which reading we get in any given case is dependent on a whole raft of factors ranging from the sense of the verbal base to the syntactic context in which the *-er* nominal finds itself to the encyclopedic information available to the speaker and hearer. How, then, are we to model the lexical semantic properties of *-er* nominals?

Our first conclusion is that Cohen (2016) cannot be correct in positing that the core meaning of the *-er* affix is first and foremost that of a dynamic modal, and that the External Argument Generalization follows from the modal nature of the affix. Deverbal *-er* nominals need not be dynamic, and in fact occasionally do not even adhere to the External Argument Generalization. There is often a correlation between the External Argument Generalization and dynamic interpretation, but the thematic interpretation of an *-er* nominal and its modal or aspectual reading are independent features of its reading in context. So if there is a core meaning for this affix, it cannot be solely that of a dynamic modal. A monosemous analysis of *-er* cannot be correct if it is based on dynamic modality.

But we also claim that any analysis is bound to fail if it relies on polysemous representations for *-er* nominals, with one representation encoding the dynamic meaning and another the eventive meaning. The reason for this is that such analyses assume that these two meanings are lexically fixed; such analyses provide no mechanisms for allowing context or encyclopedic knowledge to influence the readings of *-er* nominals. We will illustrate this point using Alexiadou and Schäfer’s analysis (2010: 22). For them, the eventive *-er* reading is associated with an  $ASP_{EPISODIC}$  projection and the dynamic/dispositional *-er* with an  $ASP_{DISPOSITIONAL}$  projection, as in (2010: 22):







(originator) or the instrument. Context then forces the identification of the R argument of the affix with the closest semantically suitable argument of the verb, which in this case is the theme. Context and encyclopedic knowledge are everything here.

We have of course not yet provided a full analysis of *-er* nominals in LSF, but it is not our intention to do so here. We merely offer LSF as a framework that seems to provide an appropriate division of labor between the fixed but underspecified semantic contribution of the affix and the contributions of context and encyclopedic knowledge that allow us to arrive at a reading of the *-er* nominal. As a model of the meanings of derived words, LSF in effect claims that *-er* nominals are not inherently eventive or modal. They are concrete processual nouns whose typical (but not inevitable) referent is the subject of their base verb and whose ultimate readings, including modal and aspectual readings, can only be determined with the help of context and encyclopedic knowledge. This seems to us to be a promising result. Frameworks other than LSF, as for example Frame Semantics (Plag et al. submitted), may very well be able to account for the data we have set out in this paper. What we hope to have established, in the end, is that any adequate account of the semantics of *-er* nominals must acknowledge the division of labor between context and affixal meaning that we have tried to document here.

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