The distinction between true and pseudo denominals? It's an illusion![*]

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1. Aim

We aim to test, on the basis of two acceptability judgment tasks answered by 100 native speakers of English, whether the distinction between true and pseudo denominal verbs holds.[1] Our results reveal significant effects of the semantic similarity of the PPs to the denominal verb's incorporated object on the acceptability of sentences with denominals. Instead of arguing that only some denominals are root-derived (Kiparsky 1997), we argue these verbs are all derived from nominal roots expressing *n*-like concepts. This would not only explain the fact that they combine with PP-objects different from *n*, but also the differences among them: the class covered by the nominal root seems to be larger for some denominals and smaller for others.

2. Kiparsky's proposal (1997): There are two classes of denominals

Kiparsky (1997) distinguishes between two types of verbs incorporating nouns: a) true denominals (noun-derived verbs), which imply the use of the incorporated noun, and b) pseudo denominals (root-derived verbs), which do not. This distinction holds for denominals incorporating nouns with various thematic roles such as instruments, locations and locatums (displaced Themes). In contrast to true denominal verbs like *chain*, pseudo denominals like *hammer* do not require any specific object, being more generic in their use. The criterion for distinguishing between the two is whether or not they can take a PP de-

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[1]Due to space constraints, we limit ourselves to presenting our first and main experiment testing true versus pseudo denominals. We conducted several follow-up experiments to establish a more accurate correlation between contextual and non-contextual similarity, where the subjects themselves had to rate objects for similarity in the absence of context, but presenting them is beyond the scope of this paper.

noting a different object from the one incorporated in the verb or not. While true denominal verbs (1) cannnot, pseudo denominal verbs can (2) (Kiparsky 1997:15-16):

(1) a. ??to tape a picture to the wall with pushpins[2] (true instrument verb)
b. ??to box a present in a brown paper bag (true location verb)
c. ??to crown someone with a hat (true locatum verb)

(2) a. to paddle the canoe with a board (pseudo instrument verb)
b. to shelve a book on a windowsill (pseudo location verb)
c. to butter a piece of toast with margarine (pseudo locatum verb)

3. Is there really a distinction between true denominals and pseudo denominals?

There are morphological and phonological arguments in favour of a real distinction between true and pseudo denominals. Firstly, according to Arad (2003, 2005), there is a real distinction between true and pseudo denominals in Hebrew, given that root-derived verbs allow for many interpretations of the root in different contexts, while noun-derived verbs do not (noun-derived verbs must share an interpretation with the noun from which they are derived). The meaning of *hisgir*(verb), 'extradite ', is very different from the meaning of *histager*(verb), 'cocoon oneself', although they are different realizations of the same root, while *misgeret* (noun) 'a frame' (noun) is close in meaning to *misger* (verb) 'to frame'. While the arguments brought by Arad (2003, 2005) seem to support the existence of a real distinction between the two classes of verbs at least in Hebrew, it is not clear whether this distinction holds for all languages.

Secondly, Nevins (2016) argues there is evidence coming from stress in favour of a real distinction between true and pseudo denominals. While true denominals maintain the stress patterns of the nouns they are derived from, pseudo denominals have a different stress from the noun, which suggests they may be root-derived. Examples involve verbs such as *p´ermit/to perm´it*, *r´ecord/to rec´ord*, where one can notice a difference in stress pattern between the noun and the verb, but also a difference in meaning (*to perm´it* versus *a p´ermit*, *to rec´ord* versus *a r´ecord*. However, most pseudo denominals (be they derived from instrument, locatum or location nouns) seem to have the same stress pattern as the noun: *paddle*, *saw*, *anchor*, *shelve*, *paint*, *butter*, *blanket* a.o. Moreover, a closer look at verbs with different stress patterns reveals numerous verbs with the same meaning as the corresponding noun, such as *increase*, *decrease*, *refund*, *conflict*, *contest*, *insult*, *protest* a.o. The absence of a correlation between change of stress and change of meaning casts doubt upon the distinction between true (noun-derived) and pseudo denominals (root-derived).

As we can see, the morphological and phonological arguments presented above in support of a distinction between the two verb classes are not that decisive. Harley and Haugen (2007) go even further, arguing that there is no real distinction between true denominals and pseudo denominals, and that Kiparsky's examples seem to support his distinction because

[2]This example could be considered independently bad because of blocking by the verb *pin* (see McIntyre 2015).

of the PP-objects he chose. According to Harley and Haugen (2007), if *n* is the name of the instrument, then the examples in (1) do not work simply because the verbs are combined with PPs involving a noun that is not *n*-like. Pushpins cannot act as tape, as the two objects are very different (although Harley and Haugen 2007 accept *She taped the picture to the wall with pushpins* as grammatical if it involves a manner of use similar to screwing something), a paper bag cannot act as a box (it is not an enclosed container), and a hat cannot function as a crown (it is made of a different material, and it has a different function). If, instead, the PP is replaced with an object that can act like that particular instrument, then the sentences become more acceptable. Thus, while taping a picture to the wall with pushpins may seem strange because pushpins are very different from tape, taping with bandaids is better because both tape and bandaids have adhesive properties.

4. Experiment

Starting from the observation that some of Kiparsky's unacceptable sentences relied on PPs not similar to the object *n*, we ran an acceptability judgment task to test whether the similarity of the PP to the incorporated object affects acceptability for native speakers of English. The experiment sets out to see whether (un)acceptability of sentences with denominals and PP-objects varies with Kiparsky's true/pseudo classification, or whether what matters is actually the degree of similarity of the PP to the incorporated object. We expect there to be no effect of the distinction between true and pseudo denominals. Instead, the more similar the PPs are, the more acceptable the sentences with denominals will be.

4.1 Method

The participants were 100 native speakers of English from all over the world. Their answers were collected via a web survey. The subjects rated the acceptability of sentences containing true and pseudo denominals in combination with similar/non-similar PPs on a Likert scale from 1 to 5, where 1 meant "low acceptability" and 5 meant "high acceptability".

The materials were divided into two versions/tests. In each of the two versions of the test, each denominal verb was presented only once, preventing the participants from seeing the same verb in both a similar and non-similar condition. Each version was presented to 50 participants. Each version had 56 sentences: (i) 28 test sentences: 12 instrumentals, 8 location and 8 locatum verbs; (ii) 28 fillers. There were four types of test sentences based on those of Kiparsky (1997): (a) sentences with true denominals considered unacceptable by Kiparsky, (b) modified sentences with true denominals, (c) sentences with pseudo denominals considered acceptable by Kiparsky, (d) modified sentences with pseudo denominals. In the modified sentences, the PPs were modified such that, instead of the instrument/location/locatum used by the author, we picked one that was semantically of greater or lesser similarity to the incorporated root object. The modified sentences were checked with two native speakers of English. For the denominals considered true by Kiparsky, the PPs were made more semantically similar (3a), while, for those considered pseudo denominals, the PPs were made less similar (not an object type *n*) (3b):

(3) a. He crowned her ??with a hat/with a rose garland. (true)
b. Tom paddled the canoe with a board/??with a spoon. (pseudo)

The test sentences vary in two ways: they can have PPs that are similar or non-similar to the incorporated object of denominal verb, and they can have pseudo or true denominal verbs (following Kiparsky's classification). This enables us to test the effect of these two factors on acceptability ratings independently.

5. Results

Table 1 shows some representative examples[3] for how rates of acceptability increase when the PP is made more similar to the incorporated object (in the case of true denominals) and decrease when the PP is made less similar from the incorporated object (in the case of pseudo denominals). There were four exceptions in the case of the verbs *bicycle*, *cage*, *pocket*, and *land*, possibly due to subjective evaluations of similarity. Overall, items with denominal verbs with semantically similar PP-objects ones are rated 4.10 on average and items with non-similar ones 3.23 for the pseudo-denominals. For the true denominals, items with similar PP-objects are rated 3.61 on average and non-similar ones 2.87.

		Sentence	-sim object	Mean	+sim object	Mean
T	IM	She taped the picture to the wall with	pushpins	2.48	bandaids	4.44
T	LN	Anne boxed the present in	a brown paper bag	1.80	a tin can	2.88
T	LM	He crowned her with	a hat	3.94	roses	4.65
P	IM	I paddled the canoe with	a board	4.04	a spoon	3.64
P	LN	He shelved the books on	the window sill	4.24	the table	2.68
P	LM	Lisa buttered a piece of toast with	margarine	4.12	honey	2.49

Table 1: Mean judgments for +/- similar objects for some of the test items. T = True, P = Pseudo, IN = Instrumental, LN = Location, LM = Locatum.

To test whether these differences are statistically significant and can be generalized, we modeled the effect of the factors similarity (similar/non-similar) and type of denominal (true/pseudo) on the ratings given by the native speakers, while controlling for verb type (instrument/location/locatum) as a fixed effect and participant and verb as random effects with random slopes for the within-subjects factor similarity. The model's estimate of the mean acceptability rating is 3.42 points (95% confidence interval 3.16..3.68 points). Estimates of the fixed effects on this mean are shown in Table 2.

[3]The full table of all critical test items, as well as the survey answer dataset, can be found in the online supplementary materials of this paper: `https://github.com/bloemj/truepseudodenominals`

Factor	Category	t	P-value	Est. difference	95% conf. int.
Similarity	+Similar	2.79	< 0.001	0.93	0.63 – 1.23
Classification	+Pseudo	6.24	0.008	0.57	0.16 – 0.99
Verb type	+IN, -LN/LM	-0.81	0.425	-0.17	-0.82 – 0.15
	+LN, -LM	0.81	0.426	0.22	-0.24 – 1.06

Table 2: Fixed effects of variables on the acceptability ratings of denominals with different objects (2792 observations). IM = Instrumental, LN = Location, LM = Locatum.

With respect to the semantic similarity of the PP-object to the verb, we see that the model's estimate of ratings for denominals with similar PP-objects is significantly higher than the estimate of ratings for denominals with non-similar PP-objects (t[2792] = 6.24; p = < 0.001). We conclude that denominal verbs with PP-objects similar to the incorporated object of their denominal are rated higher than those with non-similar PP-objects (estimated difference = 0.93 points higher). In other words, we estimate that denominals with similar PP-objects are rated almost 1 point higher than those with non-similar PP-objects, regardless of the other factors. With respect to the true or pseudo-denominal status of the verb, we also see a significant effect (t[2792] = 2.79; p = 0.008) and conclude that pseudo-denominals are rated higher than true ones (estimated difference = 0.57 points higher).

The results confirm our hypothesis that acceptability depends mainly on similarity of the PP-object to the incorporated object of the denominal verb, but the model also shows a smaller effect of Kiparsky's classification, which poses problems for an account treating both types alike.

This true/pseudo class effect, however, is smaller than that of the verb random factor, which controls for variation between specific verbs. When comparing our full model to a model lacking the verb random factor, information loss increases by 388.6 AIC[4] (p < 0.001), while removing Kiparsky's classification as a factor only increases information loss by 15.5 AIC (p > 0.999). This shows that the inclusion of the true/pseudo classification does not significantly help the model to fit the acceptability ratings, while the verb random factor does. Indeed, the verbs show large individual differences between them. For example, Figure 1 shows that items with the verb *to blanket* (4th from the top) are estimated to be rated 0.98 points higher than average, when controlling for the other factors.

This result suggests that the difference in ratings should not be attributed to a true/pseudo classification, but to differences between specific verbs. Therefore, the difference in ratings between denominals is more likely to be due to meaning differences between the *n*-like roots, rather than due to any discrete distinction between categories of denominals.

6. Account

In what follows, we try to offer a formal account for the types of denominals discussed. We discuss two issues: (i) how to account for the different classes of verbs: instrument,

[4]The Akaike Information Criterion (AIC) is a measure of information loss.

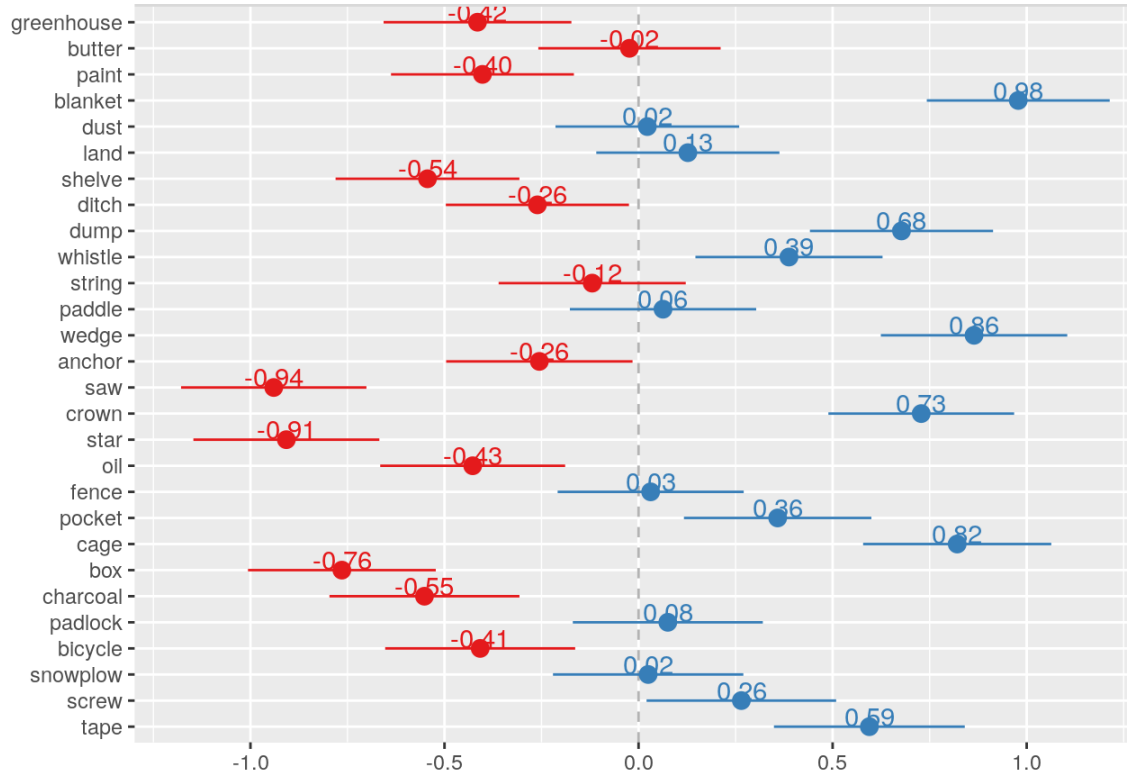

Figure 1: Estimates of random effects for each verb in the survey. 0.59 for *tape* means that items with that verb are estimated to have been rated that much higher than the average.

location and locatum verbs, and (ii) how to account for the absence of differences between true and pseudo denominals formally/structurally.

6.1 Differences between instrument, location and locatum verbs may lead to distinct structural representations

Harley and Haugen (2007) argue that all instrumentals (true and pseudo alike) are the same, and they all derive from nominal roots, through direct conflation of the manner root onto the verb. In the case of instrumentals, there is direct conflation, while, in the case of location and locatum verbs, there is lexico-syntactic decomposition and successive conflation (Hale and Keyser 2002):

(4) a. $[_{VP}\ [_{V'}\ V\ [\sqrt{Root}]_n]]$ ($\sqrt{}$tape/$\sqrt{}$paddle -IM)
b. $[_{VP}\ [_{V'}\ V\ [_{PP}\ [_{P'}\ P\ [\sqrt{Root}]_n]]]]$ ($\sqrt{}$box/$\sqrt{}$shelf -LN, $\sqrt{}$crown/$\sqrt{}$butter-LM)

However, one might wonder whether a uniform analysis for instrumentals and location and locatum verbs alike would not be preferable, either direct conflation of the root onto the verb for all verb classes or a uniform (lexico-syntactic) analysis with root conflation into P, then V. The first 'uniform' account would be more economical, relying on less structure, while the second would be semantically richer, making use of additional silent material (not just verbs, but prepositions as well). Nevertheless, a uniform representation

would fail to capture that PP instruments are adjuncts, while PP locations/locatums are arguments (Rissman 2010, 2011, Levin and Rappaport Hovav 1988, Jackendoff 1990). [5] In addition, incorporating instruments would violate the Head Movement Constraint (Travis 1984, Harley 2005, 2008):

(5) Head Movement Constraint (Minimal Link Condition version): An X^0 may only move into a c-commanding head Y^0 if there is no closer intervening head Z^0 c-commanded by Y^0 and c-commanding X.

The impossibility to incorporate by head-moving from adjunct position calls for a different analysis for instrument denominals, on the one hand, and location and locatum denominals, on the other hand.

6.2 True and pseudo denominals are alike

Given that there is no difference between true and pseudo denominals, there is no need to derive true denominals from noun (N), while deriving pseudo denominals from root (R). Considering that any instrument/location/locatum denominal may combine with PP-objects similar to *n*, several possible solutions arise: an OBJECT TYPE *n* account and a nominal root account.

6.2.1 OBJECT TYPE *n* account

According to the OBJECT TYPE *n* account, denominals are derived from something bigger than the noun, namely, OBJECT TYPE *n*, a function returning all objects similar to *n* (including *n* itself). Just like the nominal root account, such an account captures the gradual nature of the distinction between true and pseudo denominals, accounting for the compatibility with more or less similar PP-objects. Nevertheless, while the nominal root account is meaning-based (nominal roots do not refer), OBJECT TYPE *n* is a referential account (nouns and, consequently, OBJECT TYPE nouns refer) (Acquaviva 2014), explaining the compatibility with various PPs through the number of *n*-like objects denoted by OBJECT TYPE *n*. However, we reject the OBJECT TYPE *n* account on the grounds that it is uneconomical, relying on an additional silent noun projection. Borer (2014), for instance, also rejects decompositions making use of silent material, arguing they are too burdensome for the system, and generate too much ambiguity.

[5] We rely both on semantic and syntactic diagnostics of argumenthoood (Rissman 2010, 2011) which instruments fail, but locations/locatums pass. The semantic diagnostics of argumenthood involve (i) a restricted range of heads, (ii) semantic obligatoriness and (iii) dependence on head for interpretation. The syntactic diagnostics of argumenthood are (i) the double *with* diagnostic, (ii) the adverb placement diagnostic, (iii) *do-so* replacement, and (iv) weak *wh*-island extraction diagnostics. If one extends the status of locata and location objects in syntax to l-syntax, locata and the type of location PPs inside the structure of denominals are also arguments. Moreover, instruments are adjuncts both in l-syntax and syntax proper.

6.2.2 The nominal root account

According to the nominal root account, denominal verbs are derived from roots which are or become nominal. The nominal root view does not tell us anything about the categorial or acategorial nature of roots, as roots may very well originate as acategorial and become categorial during the derivation. It is thus compatible with the distributional morphology account (Marantz 1997, Embick and Noyer 2007, Embick and Marantz 2008), according to which words decompose into category-free roots and the abstract category-assigning morphemes [v] and [n], which are semantically contentful and necessary for the primary conceptualization of the word as an entity or state-referring expression. However, in the case of denominal verbs, the analysis according to which denominals are derived from nominal roots is opposite to the account proposed by Acquaviva (2009) and Borer (2014), according to whom there is no need to state that the verb includes the noun (or viceversa) in order to express this lexical relatedness, and denominals derive directly from acategorial roots, not from nouns. Borer's argument goes as follows: if verbs are derived from nouns, then why can't verbs be derived from more complex nouns (like *destruction*, for instance), but only from bare nominals? The impossibility of verbs such as **to destruction* suggests, according to her, that denominals are not actually derived from nouns but from something else. However, the non-existence of certain verbs derived from complex nouns is not evidence in favour of the complete absence from the lexicon of denominals derived from complex nouns altogether. In fact, using lexical databases, one can easily discover the existence of many verbs derived from more complex nouns, such as *to disillusion, to proposition, to champion* a.o. Such verbs suggest that there is no ban on deriving verbs from nominals (even complex ones) and recommend the nominal root account as a good theoretical proposal. Further evidence in favour of the nominal nature of the root comes from pseudoresultatives (*thin* in *He sliced the bread thin*) (Levinson 2007).

From a semantic point of view, the nominal root account is meaning-based. Importantly, function seems to be more important than object-level reference in word-formation. As pointed out by Aronoff (1980), zero-derived denominal verbs typically express the ability or function encapsulated in the noun, not what the noun is true of: one can *nurse* someone without being a nurse, but simply by doing well what nurses do. A slightly different but interesting point of view belongs to Dowd (2010), who argues that some nouns are defined by their functions, and some by their forms, and that function-defined nouns allow formally dissimilar objects to exemplify them (one can *hammer* with a shoe), but form-defined nouns do not (one cannot *tape* with pushpins). However, objects with similar functions often have similar forms as well. Given that nominals combine with a complex lexical predicate only as concepts, not as instance-referring expressions (Acquaviva 2014), we embrace Dowd's (2010) viewpoint, but assume instead that the nominal elements present in the make-up of denominals are roots rather than nouns. An even more fine-grained theory of concepts argues that the *n*-like concept expressed by $\sqrt{}$n defines a function (*telos*) and a mode of composition for the parts, namely *qualia* structure (Pustejovsky 1995)-possibly including form, material, size a.o. While function seems the most important in the case of pseudo denominals such as *hammer*, in the case of true denominals such as *butter*, mode of composition seems to play an equally significant role: buttering bread with margarine is better

than buttering it with honey, as margarine is more similar to butter than honey in terms of composition, although both honey and margarine can be spread over slices. While representing distinct aspects of meaning, mode of composition and function are not completely unrelated: a similar mode of composition may increase function similarity. The alleged distinction between true and pseudo denominals seems to be an illusion created by the concept (primarily) expressed by the nominal root (mode of composition/function).

7. Conclusion

In conclusion, the true/pseudo distinction in the case of denominals is an effect of combining verbs with PP-objects of various degrees of similarity to the incorporated objects. Giving up on the distinction between true and pseudo denominals has the theoretical consequence that all denominals are derived from nominal roots which express *n*-like concepts. While the difference between true and pseudo denominal verbs seems to belong to pragmatics, the difference between instrument verbs and location and locatum verbs is structural in nature, and different syntactic representations are required to capture their internal make-up. Interestingly, whether a nominal root is understood as expressing function/mode of composition/form may affect its compatibility with various PP-objects.

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