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# Denominal Verb Formation in English

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# ABSTRACT

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This dissertation explores the factors that influence the creation and interpretation of novel denominal verbs in English. Of particular focus is the potential influence of one factor, termed here the Semantic Category Distribution Effect. The Semantic Category Distribution Effect involves the type frequency distribution of existing forms of a given denominal verb formation process (e.g. conversion, *-ize*, *-ify*, *-ate*) across semantic categories (e.g., ORNATIVE, RESULTATIVE, LOCATIVE, INSTRUMENTAL), and the impact of this distribution upon the probability of application of that process upon a novel verb. The central hypothesis of this dissertation is that native English speakers are sensitive to and make use of this kind of type frequency distribution information when creating or interpreting novel denominal verbs.

To provide evidence in support of this hypothesis, a corpus study was conducted to identify all verbs in the Oxford English Dictionary Online that were unambiguously derived from nouns. The results of this study were then compared to the results of two experimental tasks, which asked subjects to provide novel denominal verbs consistent with given scenarios of varying semantics. The results of both types of studies show that each of the English denominal verb formation processes is possible for each of the semantic categories, suggesting that all processes

cover the same semantic domain, and therefore that all processes share the same underlying semantic structure. However, the results also show that the processes are not equally distributed in terms of type frequency among the semantic categories, and that the semantic category distributions of the newly created forms are positively correlated with the semantic category distributions of the existing forms, providing evidence of the Semantic Category Distribution Effect. Lastly, analyses of both the corpus study and experimental data indicate that the nature of the interaction between processes is characterized by constant competition.

Taken together, the findings here suggest that distributional frequency information plays an important role in native speaker competence in denominal verb formation, and is further suggestive of a model of the mental lexicon that is quite dynamic and interactive.

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# Contents

# 1. Introduction

## 1.1 Focus of Current Research

The focus of this dissertation is the formation of denominal verbs in English. Denominal verb formation is to be defined here as the formation of a verb directly from a noun base. For example, from the noun *hospital*, the verb *hospitalize* 'to place in a hospital' is derived through the word formation process of *-ize* affixation. From the noun *salt*, the verb *salt* 'to add salt to' is derived without overt affixation through the word formation process of conversion[1]. A fair amount of work has been done on the factors influencing denominal verb formation in English, coming from many different perspectives. A very important question to ask, regardless of the particular perspective taken, is what is the nature of native speaker competence in denominal verb formation? That is, what information is relevant in the successful formation and interpretation of English denominal verbs?

A) What phonological information, if any, is relevant?

B) What syntactic information, if any, is relevant?

C) What semantic information, if any, is relevant?

D) What pragmatic information, if any, is relevant?

E) What extragrammatical information, if any, is relevant?

Some of these questions have already been responded to in the literature and they will be reviewed below; other questions still need answers and it is the goal of the present work to

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[1] The term 'word formation process' will be used to denote how these verbs are created. At this point, no theoretical significance is to be placed upon this terminology. It is not used here to indicate an assumption that the affixes that participate in these processes are rules rather than lexical entries or that conversion is to be distinguished from zero-affixation/zero-derivation.

address them. Specifically, through both corpus and experimental study, it is the intention here to provide evidence for yet another factor influencing the nature of English denominal verb formation: the Semantic Category Distribution Effect. ‘Semantic Category’ is intended to refer to the category of the relation between the base noun and the resulting verb. For example, with *hospitalize* above, the relation is ‘to place in/on BASE NOUN’ and belongs to the semantic category LOCATIVE. For the verb *salt*, the relation is ‘to add BASE NOUN to’ and belongs to the semantic category ORNATIVE. Including LOCATIVE and ORNATIVE, there are at least nine types of semantic relations that denominal verbs are able to encode; all are listed in (1) below with simplified paraphrases and examples[2]:

1) Semantic Categories of English Denominal Verbs

- RESULTATIVE: ‘make into/make (look) like BASE NOUN’ e.g. *victimize, cash*
- PERFORMATIVE: ‘do/write/say/perform BASE NOUN’ e.g. *botanize, tango*
- SIMILATIVE: ‘act or be like BASE NOUN’ e.g. *tyrannize, guard*
- ORNATIVE: ‘add/provide with/apply/cover with BASE NOUN’ e.g. *rubberize, water*
- LOCATIVE: ‘locate or put in/on BASE NOUN’ e.g. *canonize, box*
- PRIVATIVE: ‘remove/take BASE NOUN away from’ e.g. *behead, bone*
- ABLATIVE: ‘remove from BASE NOUN’ e.g. *pod/shell (peas)*
- INSTRUMENTAL: ‘use BASE NOUN’ e.g. *notarize, sponge*

[2] All category labels are found in Plag (1999) with the exception of ABLATIVE. ABLATIVE is taken from Marchand (1969).

It will be shown here that although most of the word formation processes deriving denominal verbs can create verbs which encode all of these semantic categories, they are not all the same in terms of the distribution of the type frequency among these semantic categories. Some processes participate more as RESULTATIVES, some more as LOCATIVES, some more as INSTRUMENTALS, and so on, and the processes come to be more strongly associated with the semantics of their most frequently represented semantic category or categories. This is, in essence, the Semantic Category Distribution Effect: it is hypothesized here that native speakers are sensitive to the semantic category distributions of the various denominal verb formation processes and make use of this information when producing and interpreting novel denominal verbs. In other words, it is claimed here that Semantic Category Distributions are an important part of morphological competence in denominal verb formation.

## 1.2 Status of Denominal Verb Formation in English

Before exploring any of these issues, it is necessary to determine what the current state of the formation of denominal verbs is in English. Are denominal verbs still being created? If so, what word formation processes are being used and to what extent? A good place to start any investigation of word formation is with Marchand (1969). In his extremely comprehensive description, he discusses many different methods of English word formation, including compounding, prefixation and suffixation (for which I will generally use the blanket term ‘affixation’), zero-derivation (referred to above as ‘conversion’), backformation (he uses the term ‘backderivation’), clipping, and blending. In terms of denominal verb formation, the processes he identifies as participating in this phenomenon in particular are affixation, backformation, and conversion. The affixes Marchand discusses as still being relevant to denominal verb formation in present day English are the prefixes *de-* (when used with a PRIVATIVE meaning such as *defrost* 'to remove frost'), *eN*[3]- (when used with a LOCATIVE meaning as in *encage* 'to put in a cage'), and *un-* (with the ABLATIVE meaning as in *unsaddle* 'to remove from the saddle'), and the suffixes *-ate* (*carbonate, vaccinate*), *-ify* (*classify, typify*), and *-ize* (*vaporize, victimize*). Backformation is the process whereby a lexical item comes to be perceived as having been derived by a familiar word formation process, such as affixation or conversion, when in actuality it was not, and a new lexical item, the putative origin of the perceived derived word, enters the language in this manner. A commonly used example is the pair *peddle* and *peddler*. Historically, *peddler* was the word that was found in the lexicon first, but because of its formal similarity to other agent nouns ending in *-er*, such as *singer*, consisting of a verb (*sing*) and the suffix *-er* with the meaning 'one who (sings)', native speakers began to use a verb *peddle* as if *peddler*, like *singer*, consisted of the verb *peddle* and the suffix *-er* meaning 'who who peddles'. For the non-linguist native speaker the fact that *peddle* is derived from *peddler,* rather than the other way around, is not necessary to their successful use of either lexical item. Therefore, for the most part, in terms of native speaker perception, the existing denominal verb formation processes are affixation and conversion, whether actual or reanalyzed as such. Conversion, or as Marchand prefers 'zero-derivation', occurs when a word of one lexical or syntactic category, in the case of denominal verb formation a noun, begins to be used as a member of another category, in the present case a verb, without any overt marking on the

[3] The prefix *eN-* includes *en-* and its allomorphs *em-*, *in-*, and *im-*.

newer form (e.g. *butcher* → *to butcher*; *bicycle* → *to bicycle*). By many accounts, this is the most productive denominal verb-forming process used in American English today (e.g., Marchand 1969, 365; Plag 1999, 117). As Bauer (1983, 226) points out, conversion has very few restrictions, and it seems as if conversion can be used to turn any lexical item, whether simplex, compound, acronym, blend, etc., into a noun, verb, adjective, or adverb. In addition to its relatively constraint-free application as compared to the other verb formation processes, Plag (1999, 104) has also performed a more quantitative measure, using the Oxford English Dictionary, of the word formation processes used to derive new denominal verbs in the 20th century and finds that new conversion verbs in the 20th century outnumber the new verbs from all the overt affixes combined. Thus in terms of productivity in the qualitative sense of unrestricted applicability and in the quantitative sense of number of forms, it does appear that conversion is the most productive process of forming verbs in present-day English. Table 1.1 below provides further examples of each process described above.

Table 1.1 Denominal verb-forming processes in present day English

| **Verb formation process** | **Based on simplex nouns** | **Based on complex nouns** |
|---|---|---|
| Affixation | *beautify; chlorinate; victimize* | *computerize; nonsensify; post-mortemize* |
| Conversion | *paint; steam* | *leap-frog; referee; subtotal* |
| Backformation | *gondole; liaise; symbiose* | *gold-dig; pre-empt; typewrite* |

The examples demonstrate that these processes can form verbs both from simplex (i.e. monomorphemic) nouns (such as *victim*, *paint*, and *gondola*) and from nouns that are themselves derived items (*nonsense*, *subtotal*, *gold-dig*).

As aforementioned, English denominal verbs may be interpreted as members of the nine semantic categories listed in (1). It may be perceived that there is some degree of overlap between these categories. One might determine that *satirize*, for example, is PERFORMATIVE in the sense of performing a satire, RESULTATIVE in the sense of converting something into a satire, ORNATIVE in the sense of applying satire to some situation, or even INSTRUMENTAL in the sense of using satire. This is not at all unproblematic and has consequences for any theory attempting to account for the semantics of these types of verbs. In particular, the question arises whether these categories indeed reflect a multiplicity of separate meanings or instantiations of a core meaning that are filled in contextually. Are the categories consistently able to be related in this manner? Are any of these categories able to be combined into one or subsumed under another? Is there some other system of categorization that may be appealed to that better captures these related senses? Responses to these questions are proposed in section 2.3.3 below. However, as a starting point, Marchand (1969, 368-371) offers an analysis that makes use of "syntactic-semantic relations". These are listed below with examples and, in parentheses, where the categories above might be found:

- Predicate-Subject Complement: *father; burglarize* (SIMILATIVE)
- Predicate-Object Complement: *cash; atomize; beautify* (RESULTATIVE)

- Predicate-Adverbial Complement of Place: *corner; hospitalize* (LOCATIVE; ABLATIVE)
- Predicate-Adverbial Complement of Instrument: *butter; alcoholize* (ORNATIVE; PRIVATIVE; INSTRUMENTAL)
- Predicate-Object[4]: *calve; bloom; fish; curtsey; waltz; apologize* (RESULTATIVE; EFFECTIVE; PERFORMATIVE)

The potential syntactic-semantic relation of Subject-Predicate is excluded as the Subject is the part of the sentence (Marchand uses 'determinatum'; others may prefer 'topic') that the Predicate provides further detail about ('determinant' for Marchand; 'comment' perhaps). For all the other relations above, it is what follows the Predicate that further specifies the Predicate.

Still, Marchand himself sees limitations: "It will, however, be observed that within these grammatical categories numerous semantic types develop which must likewise be described. This goes to show that a mere statement in terms of grammatical relationship is not enough" (Marchand 1969, 368). He also states, "word-formation deals with the making of words insofar as they are new formal and lexical units and are built as syntagmas. This at once establishes a threefold division, that of form, meaning, and grammatical structure. A description of word-formation patterns can therefore be in morphological, semantic, and grammatical terms. In practice, the possibility of such a threefold description has led to various methods of analysis with the stress laid on one or two of the three, the last being the most neglected of all. A

[4] The Predicate-Object relation is intended to represent the relationship between the verb and an effected object, i.e. an object that is created, manufactured, produced by the action of the verb. The Predicate-Object Complement relation, on the other hand, represents the relationship between a verb and an affected object, i.e., an object that is converted into, given the form of, or otherwise changed into something else by the action of the verb.

combination of all three in equal parts is necessary, but has never been undertaken" (Marchand 1969, 31). Marchand's point here is well taken: a description of word formation must take into account all the aspects involved before a complete picture can emerge. It is the aim of the present work to examine the influential factors of denominal verb formation as a whole and to provide evidence for some that have been as yet undetermined.

For the most part, Marchand's statement above still holds true: while recognizing these other necessary aspects of denominal verb formation, much of the work that has followed has approached the topic from one of four perspectives: morphophonological; syntactic, lexical-semantic, or pragmatic. Sections 1.3-1.6 provide an overview of work that adopts each of these four perspectives.

### 1.3 Morpho-Phonological Perspective

The work to be described below examines the interplay between morphology and phonology in terms of the phonological behavior of derived words. First to be discussed is Kiparsky (1982), who presents the theory of level-ordering as part of Lexical Phonology to account for the phonological and morphological characteristics of a wide variety of derived forms. Secondly, addressing Kiparsky's (1982) account of the phonological characteristics of the derived words, Plag (1999) presents an alternative account based in Optimality Theory (OT). Then, focusing once more on English affix ordering, Fabb (1988) presents a selectional restriction explanation for why some affixes are never found with previously suffixed words, why again others are unrestricted in their ability to attach to suffixed words of the appropriate syntactic category, and why others are restricted to attaching to words containing a particular suffix. Fourth, Plag's (1999) account of affix ordering using more general and independently-motivated principles is discussed. Lastly, Hay (2000) proposes yet another alternative, more processing-oriented, to account for affix ordering, utilizing notions of relative frequency and phonological structure.

Kiparsky (1982) presents several morpho-phonological phenomena that had, up to that point, defied a unified explanation. The ones directly related to denominal verb formation are:

(2) a. Why are some affixes allowed to stack up on each other (e.g. *-(at)ion* + *-ize*, as in *revolutionize*, and *-ize* + *-(at)ion*, *standardization*) while others (e.g. *-ness*+ *-ize*, **happinessize*) are not? And when they are both attached, why must they often be in a particular order (e.g. *nonillegible*, but not **innonlegible*)?

b. Why can deverbal conversion nouns take a greater proportion of affixes that are compatible with noun bases (e.g., *blockage*, *affixal*, *bustled*, *defeatism*, *escapist*, *rebellious*) than denominal conversion verbs can affixes that are compatible with verb bases (e.g. *housage*, *placement*, *commissionable, riveter*, but **campaignal*, **balloonant*, **cementant*, **blockadance,* **effection*, **cocoonive*, **cascadory*)?

c. Why do the stress patterns of *-ate*, *-ify* and *-ize* verbs take the forms they do?

d. Why is there a difference in stress shift behavior between deverbal conversion nouns (e.g. *recórd*$_{V}$ → *récord*$_{N}$) and denominal conversion verbs (e.g. *páttern*$_{N}$ → *páttern*$_{V}$)?

To account for these and other morphological phenomena, Kiparsky (1982) utilizes the level ordering hypothesis. Essentially, with level-ordering, the morphological processes of a language are arranged in a series of levels, each one associated with certain phonological rules. The ordering of the levels constrains the possible order of application of the morphological processes, e.g. processes associated with earlier levels cannot apply after processes associated with later levels. Examples of Level 1 processes are irregular inflection, verb-to-noun conversion (Kiparsky prefers the notion of a deverbal zero-affix), and affixation of *-ate*, *-(at)ion*, *-ify*, *iN*[5]-, -*ize*, and most other affixes of Latinate origin. Examples of Level 2 processes are compounding, noun-to-verb conversion (Kiparsky's denominal zero-affix), and affixation of *-ed*, *-er*, *-ful*, -*ment*, *-ness*, *non-* and many other quite productive affixes. Although these affixes are often referred to as 'Level 1 affixes' or 'Level 2 affixes', that is not to say that Kiparsky (1982) presents these as actual lexical items. In fact, he proposes nearly the opposite: "affixes will then not be lexical entries and they will have no lexical features either inherently or by percolation" (134). According to this view, affixes are phonological elements inserted according to morphological rules. Lastly, Level 3 affixes/morphological processes consist mainly of regular inflection. According to the theory, the output of Level 1 morphological processes serve as input for other morphological and phonological processes at this same level and for the other two levels that follow as well. The products of Level 2 morphological processes are input for the other Level 2 and Level 3 morphological and phonological processes that follow, but crucially not for Level 1 processes.

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[5] *iN*- refers to the prefix *in*- and its allomorphs *il*-, *im*-, and *ir*-.

As a consequence of the level categorization of the specific affixes and processes, the phenomena listed in (2) above can be uniformly accounted for. Both (2a) and (2b) refer to affix ordering and can be explained by the assignment of certain affixes to different levels. The affixes -*(at)ion* and -*ize* are able to stack up on each other because they are both categorized as Level 1 affixes. The affix -*ness* is a Level 2 affix and a form such as *happiness* cannot serve as input to a Level 1 affix such as -*ize*. Similarly, *nonillegible* is acceptable since *iN*- is a Level 1 affix and the output of its attachment, *illegible*, can serve as input for the Level 2 affixation of *non*-. However, the output of *non*- affixation (*nonlegible*) cannot go back and serve as input for the affixation of *iN*- at a level that has already past. In much the same manner, the phenomena of (2b) can also be accounted for: deverbal noun conversion is a Level 1 process and can serve as input to both Level 1 and Level 2 derivational processes; denominal verb conversion, on the other hand, is a Level 2 process and can only serve as input to other Level 2 derivational processes. Thus a smaller proportion of compatible affixes can attach to denominal conversion verbs than to deverbal conversion nouns.

This theory of level-ordering also accounts for the stress patterns referred to in (2c) and (2d). At Level 1, English stress rules apply such that a binary foot (F) in the form of strong-weak (S-W) stress is assigned to the right most constituent, provided W is not a heavy syllable, in which case it is assigned as its own S foot. Thus, for *illustrate*, *falsify*, and *standardize*, instances of -*ate*, -*ify*, and -*ize* affixation, respectively, Level 1 phonological rules apply and the stress pattern for each is as shown in (3a-c) below.

F

3) a. illustrate

F

b. falsify

F

c. standardize

So, each of the affixes above are assigned strong stress on their (last) vowel. At Level 2, stress is again assigned in binary S-W feet, respecting existing foot structure on the affixes from Level 1, as shown in (4a-c) below.

S W
F F

S W

4) a. illustrate

S W
F F

S W

b. falsify

∧
**S W**
**F F**
∧ |
**S W** |
c. standardize

The monosyllabic affixes -*ate* and -*ize* show secondary stress with primary stress on the penultimate syllable of their base, thus providing an explanation of why so many verbs of these types are formed with trochaic bases. The disyllabic affix -*ify*, on the other hand, ends up with secondary stress on its last syllable, with the first syllable becoming the W branch of the S-W foot assigned at Level 2. This predicts the observation that -*ify* verbs are most often found with monosyllabic or iambic bases.

The same principles applied above also account for the shifting stress exhibited with deverbal conversion nouns but not with denominal conversion verbs. As (5a) shows, the base verb *record* displays the typical English iambic stress pattern for disyllabic verbs. The noun *pattern* (5b) on the other hand, displays the typical English trochaic pattern for disyllabic nouns.

∧
**W S**
5) a. record$_V$

∧
**S W**
b. pattern$_N$

At Level 1, the morphological process of conversion from a verb to a noun applies to form the noun *record* and stress is reassigned at this level again to achieve the more typical S-W pattern of other English nouns (6a). However, the noun *pattern* (6b) remains unchanged as noun-to-verb conversion does not occur at this level but at Level 2 (7b).

**S W**
6) a. [record$_V$]$_N$

**S W**
b. pattern $_N$

At Level 2, no stress changes are made to the noun *record* (7a), as the phonology at this level respects existing structure. No apparent changes are made to the verb *pattern* (7b) either, even after the morphological process of conversion from a noun to a verb is completed, as the stress rules at this level would assign this pattern regardless.

**S W**
7) a. [record$_V$]$_N$

**S W**
b. [pattern$_N$]$_V$

By assigning the two processes of conversion to two separate levels, verb-to-noun conversion at Level 1 and noun-to-verb conversion at Level 2, and by the interaction of phonological processes and morphological processes within the same level, the presence of stress shift for deverbal conversion nouns and the absence of stress shift for denominal conversion verbs is also accounted for.

The theory of level-ordering provides a unified explanation of both affix ordering behavior and stress behavior of derived verbs. Despite its elegance, much criticism of the theory has followed. Before the discussion of criticisms related to the affix-ordering phenomena (Fabb 1988; Plag 1999; Hay 2000 below) Plag's (1999) alternative analysis of the phonological characteristics of English denominal verbs is presented. Using Optimality Theory (OT), Plag accounts for the observations that the level-ordering hypothesis seeks to account for and more, and without the need to appeal to the concept of levels.

With an OT-type of analysis, rather than phonological rules, the emphasis is on multiple representations and well-formedness conditions. The representation that violates the fewest high-ranking constraints is the preferred representation. Using this type of framework, Plag begins his account of denominal verb phonology with the observation that *-ize*, *-ate* and *-ify* derivatives never exhibit ultimate stress (2c, above). Plag suggests a number of constraints are at work that ensure that feet are binary (FT-BIN) and trochaic (TROCH), and that the head foot of the prosodic word is not final (NONFIN). Along with this are a high-ranking constraint that requires that the prosodic head of the derived word is identical to the prosodic head of the base word (IDENT-HEAD) and a lower ranking constraint that aligns the right edge of the prosodic word with the right edge of the head of that word (R-ALIGN-HEAD). Crucially, it is the lower ranking of this last constraint that is responsible for the observation that *-ify*, *-ize* and *-ate* verbs do not attract final stress. The tableaux in examples (8)-(10) demonstrate how these constraints work to achieve the correct result for *randomize, fluorinate,* and *falsify* (adapted from Plag 1999, 171; 198).

(8) FT-BIN, TROCH, NONFINALITY, IDENT-HEAD>>R-ALIGN-HEAD

| *random-ize* | FT-BIN | TROCH | NONFIN | IDENT-HEAD | R-ALIGN-HEAD |
|---|---|---|---|---|---|
| a. ☞ (rándo)(mìze) | | | | | *σσ* |
| b. (ràndo)(míze) | | | *! | | |
| c. (ran)(dó)(mìze) | | | | *! | *σ* |
| d. (randó)(mìze) | | *! | | *! | *σ* |

(9) FT-BIN, TROCH, NONFINALITY, IDENT-HEAD>>R-ALIGN-HEAD

| *fluorine-ate* | FT-BIN | TROCH | NONFIN | IDENT-HEAD | R-ALIGN-HEAD |
|---|---|---|---|---|---|
| a. ☞ (flúori)(nàte) | | | | | *σσ* |
| b. (flùori)(náte) | | | *! | | |
| c. (fluo)(rí)(nàte) | | | | *! | *σ* |
| d. (fluorí)(nàte) | | *! | | *! | *σ* |

(10) FT-BIN, TROCH, NONFINALITY, IDENT-HEAD>>R-ALIGN-HEAD

| *false-ify* | FT-BIN | TROCH | NONFIN | IDENT-HEAD | R-ALIGN-HEAD |
|---|---|---|---|---|---|
| a. ☞ (fálsi)(fỳ) | | | | | σσ |
| b. (fàl)(sí)(fỳ) | *! | | | | σ |
| c. (fàlsi)(fý) | | | *! | | |
| d. (falsí)(fỳ) | | *! | | *! | |

In each case, the most preferred representation is the one that does not violate any of the high-ranking constraints, even though it violates the lower-ranked constraint more than the other forms. This same set of constraints plus one other also explain why *-ize* and *-ate* prefer to attach to trochaic bases and *-ify* prefers monosyllabic or iambic bases (examples (11)-(13) below, adapted from Plag 1999, 199).

(11) FT-BIN, TROCH, NONFINALITY>>R-ALIGN-HEAD

| *random-ize/ify* | FT-BIN | TROCH | NONFIN | R-ALIGN-HEAD |
|---|---|---|---|---|
| a. ☞ (rándo)(mìze) | | | | σσ |
| b. (rándo)mi(fỳ) | | | | σσσ! |

(12) *CLASH-HEAD>>R-ALIGN-HEAD

| *false-ify/ize* | *CLASH-HEAD | R-ALIGN-HEAD |
|---|---|---|
| a. ☞ fálsifỳ | | σσ |
| b. fálsìze | *! | σ |

(13) *CLASH-HEAD>>R-ALIGN-HEAD

| *bourgeois-ify/ize* | *CLASH-HEAD | R-ALIGN-HEAD |
|---|---|---|
| a. ☞ bourgeóisifỳ | | *σσ* |
| b. bourgeóisìze | *! | *σ* |

As seen in (11), the *-ize* representation is preferred over the *-ify* representation when the base is trochaic (e.g. *random*); as no high-ranking constraints are violated, it comes down to the *-ize* form encountering the least number of violations with the lower ranked constraint, R-ALIGN-HEAD. The *CLASH-HEAD constraint in (12) and (13) ensures that a stressed syllable is not adjacent to the head of the prosodic word, and this constraint is crucially higher-ranked than the R-ALIGN-HEAD constraint. For this reason, the *-ify* representation is preferred with monosyllabic bases (e.g. *false*) and iambic bases (e.g. *bourgeois*) as it does not violate the higher ranked *CLASH-HEAD constraint despite more violations of the lower-ranked R-ALIGN-HEAD constraint.

Although Plag (1999) does not address directly the stress shifts that are exhibited by deverbal conversion nouns but not by denominal conversion verbs (2d), presumably, the observed phenomena follow naturally from the same set of ranked constraints, with underived verbs (e.g. *recórd*$_{V}$) using a different ranking that allows for final stress by having NONFINALITY rank below R-ALIGN-HEAD (Plag 1999, 53).

In addition to the phonological phenomena observed in (2c) and (2d) above, Plag (1999) also accounts for several other observations related to *-ize*, *-ate*, and *-ify* verbs with an extended set of constraints. His analysis provides explanations for whether a final vowel is or is not deleted from the stem (e.g. *memorize* vs. *dandyize*) and why adjacent identical segments are rare (e.g. *feminize* and not **femininize*). In only a very few instances must Plag resort to notions of idiosyncrasy, exceptions, or lexicalization. As for the process of denominal verb conversion, Plag states that "phonological restrictions seem not to be operative at all" (Plag 1999, 221). Plag's account of the phonology-based constraints on specific affixation processes leads to the conclusion that phonology alone is able to eliminate much of the competition between affixes, a notion that will be returned to several times in the following chapters.

Returning now to the ordering of affixes, Fabb (1988) presents an alternative explanation for the affix ordering behavior of English suffixes. Although other criticisms of level-ordering had been aimed at its prediction that certain combinations should not be found that in fact do exist, Fabb points out that level-ordering predicts the possibility of certain combinations that in fact never appear in English. Fabb argues that with the 43 English suffixes, if no restrictions were in place at all, the number of possible combinations is 1849. By ruling out affixes that form bases belonging to incompatible syntactic categories, the number of possible combinations drops to 663. Another 49 combinations are ruled out because of stress incompatibilities. And, when the restrictions imposed by level-ordering are applied, the number of possible combinations becomes 459. However, Fabb states that only around 50 combinations of affixes are attested, and that therefore, some other restriction or restrictions must be at work. He proposes that the affixes each impose their own selectional restrictions. The affixes can be classified into four groups according to their type of selectional restriction: suffixes that only attach to underived words;

suffixes that attach to just one other particular suffix (and underived words); freely attaching suffixes, which attach to derived and underived words alike; and, the still "problematic" group. In terms of English denominal verb formation, the relevant affixes fall into only two of the categories as shown in (14a-b).

(14) a. Suffixes that never attach to suffixed words

- *-ate*
- denominal *-ify*
- deadjectival *-ify*
- denominal *-ize*
- *-en* (attaches only to monosyllables)

b. Problematic group

- deadjectival *-ize* (combines with *-ive*, *-ic*, *-al*, and *-an*)

Fabb (1988, 533) admits that "sporadic exceptions can be found", but that "exceptions seem to be extremely rare". (As will be shown shortly, the exceptions are not nearly as rare as Fabb suggests.) By proposing selectional restrictions upon the suffixes[6], Fabb claims to account for the 50 or so suffix combinations attested in English, and without appealing to level-ordering. As for the problematic group, Fabb suggests some type of Latinate constraint is at work such that some affixes select for Latinate bases only; however, he finds this explanation only partially satisfying. "While *-ize*, *-ism* and *-ist* select for latinate [sic] bases, this restriction is clearly inadequate to cover all the nonoccurring types of suffix pairs in this case, as it does not explain why *-ous, -able, -ant, -ary,* and *-ory* are not potential partners" (Fabb 1988, 537). Still, whatever

[6] Conversion from a noun to a verb is not explicitly discussed in Fabb (1988); one can only assume that Fabb does not consider this process to be a case of zero-suffixation.

problematic cases are left over for this account are also left over for level-ordering, and since this selection restriction account provides a more accurate portrayal of the affix ordering facts in English, Fabb proposes that the work done by level-ordering is redundant.

While agreeing with Fabb (1988) on his criticisms of the level-ordering hypothesis, Plag (1999) does take issue with Fabb's accounting for the nature of affix ordering with the use of selectional restrictions on the suffixes. He feels this approach is flawed both on theoretical and empirical grounds (Plag 1999, 63; 90): theoretically because it would be preferred if the same restrictions could be accounted for by independent mechanisms motivated elsewhere; empirically because the labels of the affix groupings are consistently found to be incorrect. Plag attempts to account for all of the attested data through more general principles involving phonological properties, semantic compatibility, etymological constraints and base-driven selectional restrictions.

Fabb's first group, suffixes that do not attach to previously suffixed words, consists of the largest number of suffixes, listed in Table 1.2 below:

Table 1.2 Suffixes not attaching to previously suffixed words, according to Fabb (1988)

| **Attach to V to <u>form N</u>** | **Attach to N to <u>form N</u>** | **Attach to V to <u>form ADJ</u>** | **Attach to N to <u>form ADJ</u>** | **Attach to N and <u>ADJ to form V</u>** |
|---|---|---|---|---|
| *-age* | *-age* | *-ant* | *-an* | *-ate* |
| *-al* | *-an* | *-ful* | *-ed* | *-ify* |
| *-ance* | *-hood* | *-ive* | *-ful* | *-ize* |
| *-an* | *-ism* | *-ory* | *-ish* | |
| *-ment* | *-ist* | | *-ly* | |
| *-y* | *-y* | | *-ous* | |
| | | | *-y* | |

Plag finds that, contrary to Fabb's claim, a number of these suffixes do indeed attach to previously suffixed forms: *-ment* does attach to verbs ending in *-en* (*enlightenment*, *disheartenment*); *-an* and *-ist* do attach to suffixed nouns (*salutatorian*, *barbarian*, *abortionist*, *consumerist*); *-ed, -ful*, *-ish*, *-ly, -ous*, and *-y* also attach to suffixed nouns (*conditioned*, *meaningful*, *toadyish*, *teacherly*, *treacherous*, *Japanesy*); and *-ize* attaches to many suffixed nouns as well (*computerize*, *christianize*, *preacherize, protestantize*).

Plag also states that many more restrictions on suffixation to already suffixed forms can be accounted for by more general (and independently-motivated) phonological constraints: *-al, -ance,-ant,* and *-ful* select for verb bases with final stress, and since none of the verb-forming suffixes (*-ate*, *-en*, *-ify*, *-ize*) attract final stress, *-al, -ance,-ant*, and *-ful* will not attach to suffixed verbs; -*ory* does attach to verbs as long as they end in consonant, so -*ify* is out but -*ate* is just fine (*acceleratory*, *calculatory*, *stipulatory*).

Plag also uses semantic incompatibility issues to account for the attested data: -*age*, -*hood*, -*ism*, -*y*, which form abstract nouns, do attach to suffixed nouns (*porterage*, *farmerhood*, *absenteeism*, *archery*) but the number of these forms is relatively small since most other noun suffixes form abstract nouns themselves and it would be odd to add an abstract noun-forming suffix to an already abstract noun; -*ate* attaches to suffixed nouns as long as the bases are chemical substances (*fluoridate*).

The Latinate Constraint is also used by Plag to account for some of the data: it was claimed above that for phonological reasons, -*ory* does not attach to -*ify* verbs to form relational adjectives; however, -*en* should be phonologically compatible for -*ory* to attach to, but -*en* is a Germanic suffix and if -*ory* adheres to the Latinate Constraint, i.e. requires a Latinate base, then -*en* verbs are also ruled out as potential bases; also, it seems that -*ive* does attach to suffixed verbs as long as they are Latinate and end in /d/, /t/, or /s/, which leaves -*ate* as the only potential verb suffix to attach to and indeed these forms are attested (*accelerative*, *complicative*).

Plag uses selectional restrictions, too; however, the selectional restrictions are base-driven rather than the affix-driven ones proposed by Fabb (1988). In Plag's account, verbs ending in -*ate*, -*ify*, and -*ize*, when deriving abstract nouns, select for -*ion* and its allomorphs -*cation* and -*ation*, thus ruling out the attachment of -*age*, -*al*, -*ance*, -*ment*, or -*y*; nouns ending in -*ion* select for -*al* to form relational adjectives (e.g. *relational*), thus ruling out the other relational adjective suffixes; similarly, -*ment* selects for -*al*/-*ary* (*governmental, testamentary*), -*ism* selects for -*ist*/-*istic* (*realist*, *realistic*), -*ist* selects for -*ic* (*opportunistic*).

There are some instances that Plag proposes are simply idiosyncratic and therefore lexically governed: deverbal -*age* (*steerage*) and -*y* (*assembly*) and deadjectival -*ly* (*deadly*) are claimed to be unproductive and must be listed individually in the mental lexicon, thus making any selectional restrictions redundant.

Plag also finds that Fabb's claims regarding the other groupings are contradicted by the attested data:  the group of suffixes that supposedly attach to just one other suffix (e.g., -*ary* to -*ion* as in *revolutionary*) are in fact found to attach to more than one (e.g. -*ate* as in *commendatary* and -*ment* as in *complementary*); the suffixes that are supposedly free to attach (e.g. -*able*) are found to be subject to constraints (-*able* does not attach to a verb that ends with a postconsonantal liquid as in **saddlable*); the last, so-called "problematic" group are no more or less problematic than the first group and Plag uses the same sort of more general constraints above to explain the affix-ordering behavior of this group as well.  Therefore, through the use of phonological, semantic, etymological, and base-driven selectional restrictions, Plag is able to account for more attested data than Fabb.

Hay (2000) provides yet another alternative to level-ordering and achieves an account of the affix-ordering data even more encompassing than Plag (1999) and with even more general principles, specifically involving how complex words are processed and the factors that affect and the consequences that follow that processing. Hay proposes that complex words may be processed as whole words, directly accessed in the lexicon much like simplex forms, or they may be parsed or decomposed into their relevant word formation components. Furthermore, the processing route is frequency-based: some words almost always directly accessed, some words almost always parsed, and some words variable between these two. Thus, the processing of complex words is gradient, with whole-word access at one end of the continuum and decomposition at the other end. Hay claims that most of the complex words that contain the putative Level 1 affixes are more often processed as whole words and most of the complex words that contain the putative Level 2 affixes are more often decomposed. A number of factors related to the complex word and its base influence the tendency to be directly accessed or to be parsed. For example, the degree of phonological transparency between the derived word and its base can affect whether a word is accessed whole or decomposed. Segmental changes (e.g. *sane*→ *sanity*; *horror*→ *horrify*), resyllabification (from *active* → *activate*), and/or stress shifts (*humid* → *humidify*; *person* → *personify*) can lead to less association with the base and more whole word processing. At the other end, the more consistent the phonology between the derived word and its base, the more likely the continued association with the base and processing via decomposition, especially when the junctural phonotactics, i.e. the sound segments on either side of the morpheme boundary, are combinations rarely found in simplex words. Also, the greater the semantic transparency between the complex word and its base, that is the more clearly related the two are in meaning, again the more likely the two will continue to be associated and the more likely the complex word is to be parsed. However, if the derived word has experienced semantic drift from the base, i.e. the meaning has developed so that the relation with the base is no longer clear or relevant, the more likely the derived word will be accessed via the direct route. Lastly, Hay found that relative frequency can greatly influence the type of processing. When the derived word exceeds its base in terms of token frequency, the less likely the derived word is to remain associated with the base and the more likely it will be accessed directly. Taken together, many of the observations regarding affixes that led to the level-ordering hypothesis in the first place follow quite naturally. Level 1 affixes are often vowel-initial (*-al*, *-ate*, *-ic*, *-y*), thus leading to resyllabification and junctural phonotactics consistent with simplex words, and multisyllabic (*-ity*, *-ify*, *-ory*), which often encourages stress shifts and sound changes. These features trigger less phonological transparency and more whole-word access. Greater whole word access feeds back into the system such that the derived word is more "free" to drift semantically, which in turn encourages more whole word access. Another consequence of semantic drift is that the meaning contributed by the affix across all its forms may become quite diverse and the semantic relationship between the base and the derived word much less consistent. This, in turn, may make the affix less useful, in a sense, and less productively applied in the language overall. The phonological characteristics of the prototypical Level 1 affixes themselves lead to the observations that they tend to trigger phonological changes on the base, they tend to contribute diverse meanings, and they tend to be less productive.

On the other hand, the phonological characteristics of the prototypical Level 2 affixes, especially being consonant-initial and monosyllabic, lead to the greater likelihood of decomposition, which in turn promotes its continuing phonological and semantic transparency with the base, more "regular" meaning contribution, and usefulness and productivity, the qualities usually associated with Level 2 affixes.

Being a gradient and frequency-sensitive phenomenon, it is fully expected that some forms of a given affix will be processed differently than other forms with the same affix, and that some affixes will find themselves in the middle of the continuum. These are the affixes that have proved problematic for previous accounts (e.g. -*ize*, which has sometimes been classified as Level 1 (Kiparsky 1982) and sometimes as Level 2 (Fabb 1988), or -*able*, which has been classified with both Level 1 and Level 2 forms). These affixes have been problematic because they display qualities typical of Level 1 affixes (e.g. trigger phonological changes on the base) while also displaying qualities typical of Level 2 affixes (e.g. productivity). But this type of behavior is entirely consistent with an account such as Hay (2000), who has managed to account for both attested and experimental data with a single mechanism that is independently motivated by the language system anyway.

Hay and Plag (2004) provide even greater explanatory power by combining both of their advocated hypotheses. Examination of attested combinations of several affixes finds that Hay's processing approach accounts for a large amount of the data, and then by applying the base-driven selectional approach of Plag, it is possible to account for the presence and absence of even more affix combinations.

The search for a unified explanation of the morpho-phonological characteristics of derived words has taken many paths, from the level-ordering hypothesis of Kiparsky (1982) to the affix-driven selectional restrictions of Fabb (1988) to the processing-based account of Hay (2000). Focusing on the phonology of derived verbs in English, Plag's (1999) OT-based analysis has been the most comprehensive to date and shows that well-formedness conditions on English phonology in general provides an independently-motivated explanation for much of the phonological behavior of the derived verbs, and especially why some affixes appear with certain bases rather than others. Still, an open question remains: what other non-phonological factors influence the choice of word formation process and to what extent? That is, are these other factors subordinate to phonology or can they override the phonological constraints? As suggested by the work presented in Hay (2000), frequency-based factors play quite a significant role in the production and comprehension of morphologically complex words. The central question that is addressed in this dissertation is whether and to what extent semantic category distribution of word formation processes, in other words the type frequency of semantic categories exhibited within a word formation process, affects the selection of one word formation process over another. Anticipating an affirmative answer to that question, a purely morpho-phonological account is not sufficient to describe the nature of native speaker competence in the formation of denominal verbs in English.

## 1.4 Syntactic Perspective

Rather than exploring the morpho-phonological properties of derived forms, the examination of denominal verbs from a syntactic perspective focuses on the interaction between the verb's argument structure and its syntactic form. Perhaps the most well-known work from the syntactic perspective is Hale and Keyser (1993) (see also Hale and Keyser 1998 and 2002). One of the major goals of Hale and Keyser (1993) is to provide a syntactic account for the variance in syntactic behavior of verbs with cognate nouns, specifically why some verbs may undergo causative/inchoative alternations, while others are always either transitive or intransitive. The authors propose that denominal verbs exhibit a syntactic structure projected at the level of l-syntax, the word level of syntax. In other words, a verb's argument structure, often considered to be essentially lexical-semantic, is in fact syntactic in nature and is subject to the same constraints as other levels of syntax, such as Unambiguous Projection[7] and the Empty Category Principle (ECP)[8]. The verbs are formed by a process of incorporation of particular internal arguments with an abstract verb. Hale and Keyser (1993) claim that the types of denominal verbs differ in syntactic behavior because they project different l-syntactic structures.

The group of verbs which are always intransitive consists of the so-called unergative verbs, such as *laugh*, *dance*, and *calve*, which are categorized in the current work as PERFORMATIVE and EFFECTIVE. Hale and Keyser claim that these verbs are necessarily so because of the structure they project at l-syntax, represented below in figure 1.1:

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[7] Unambiguous Projection: the requirement by the grammar that all projections be unambiguous (Hale and Keyser 1993, 67).
[8] Empty Category Principle: [e] (an empty category) must be properly governed (Hale and Keyser 1993, 58).

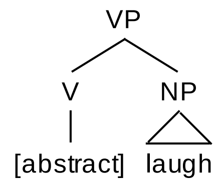


Figure 1.1 L-syntactic structure of the unergative verb *laugh*, adapted from Hale and Keyser (1993, 78)

An unergative verb, such as *laugh*, projects a V head with an NP sister. Since, according to Hale and Keyser, the NP is not a predicate, these verbs do not require an internal subject, and therefore no Specifier of VP position is projected, preventing the transitive structure. The verb is formed, in l-syntax, by moving and adjoining the base NP (*laugh*) to the abstract V (figure 1.2).

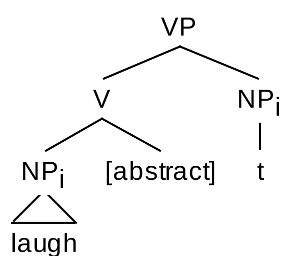


Figure 1.2 Incorporation of NP into abstract V for unergative verb *laugh*

At the level of s-syntax[9] (figure 1.3), the external subject NP, the *child* in the figure below, is in the Specifier position of the IP.

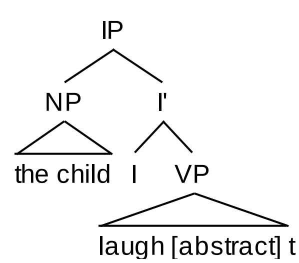


Figure 1.3 S-structure of *the child laughed*, taken from Hale and Keyser (1993, 78)

[9] Hale and Keyser use this "to refer to syntax in the sense of D-Structure or S-Structure, that is, syntax in the generally received sense, in contrast to syntax in the lexicon" (1993:105).

In Hale and Keyser's account, the middle construction is also unavailable at s-syntax because the middle construction requires a lexically projected internal subject, and these verbs do not project an internal subject.

Turning now to change-of-state verbs (which would be associated with the RESULTATIVE semantic type above) such as *thin* and *clear*, these verbs undergo the causative/inchoative alternation, and the structure Hale and Keyser claim these verbs project at l-syntax is shown below:

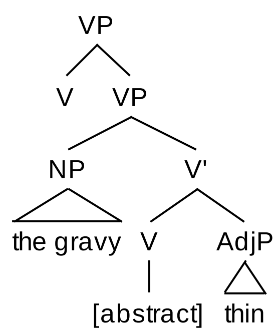


Figure 1.4 L-syntactic structure of causative/inchoative verb *thin*, adapted from Hale and Keyser (1993, 79)

A verb such as *thin* projects an abstract V head with an AdjP sister. Because an AdjP is a predicate, it requires an internal subject, which therefore requires a Specifier position to be projected as well. The verb is formed in l-syntax by adjoining the AdjP, in this example *thin*, to the abstract V, which then properly governs its trace (see figure 1.5 below).

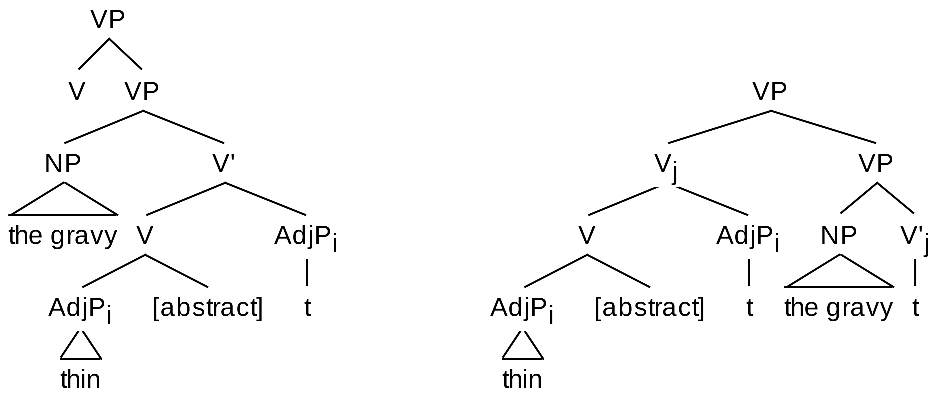


Figure 1.5 Incorporation of AdjP into V and then AdjP-V into matrix V position for causative/inchoative verb *thin*

Additionally, in Hale and Keyser's analysis, this verb is assigned a manner "tag" (1993, 90). It is not specified in exact terms how this tag is assigned, but it is this tag, on the inner VP specifically, that licenses the inchoative alternation. At the level of s-syntax, the internal subject may be raised to Specifier of the IP to create the inchoative interpretation, or alternatively, an external subject may be found in the Specifier of the IP, as represented in the figure below:

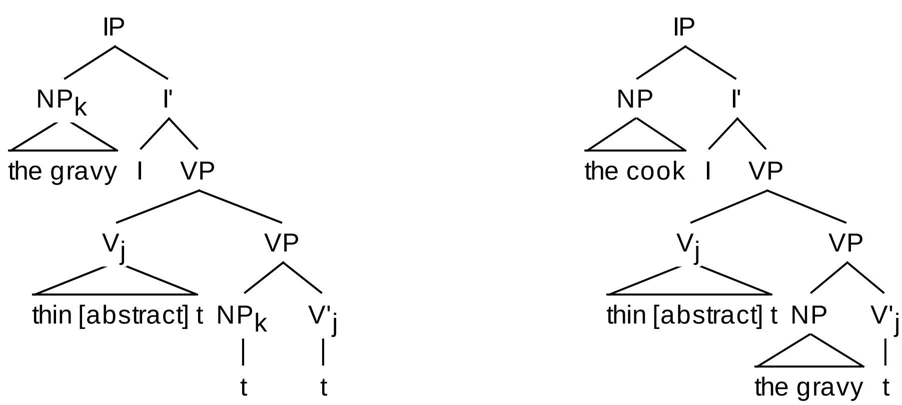


Figure 1.6 S-syntactic structure of *the gravy thinned* and *the cook thinned the gravy*

This configuration leads to the causative variant. Furthermore, according to Hale and Keyser, the middle construction is available for all verbs that have a lexically projected internal subject.

Therefore, since these verbs projected an internal subject, the middle construction is acceptable for verbs of this type as well.

As for denominal verbs of the locatum (ORNATIVE above) and location (LOCATIVE) type, these are always transitive[10]. Examples of these verbs are *saddle* and *shelve*, locatum/ORNATIVE and location/LOCATIVE respectively. The structure Hale and Keyser propose that these verbs project at l-syntax is illustrated below:

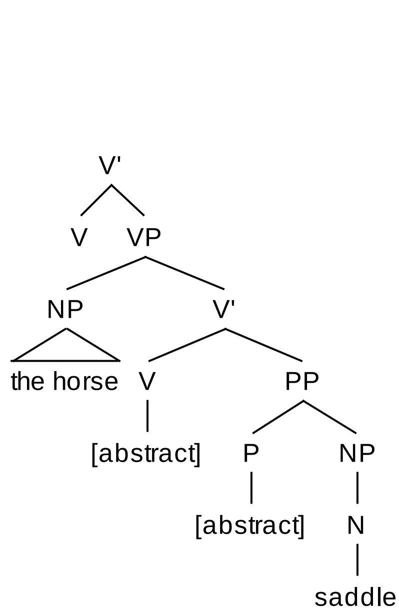


Figure 1.7 L-syntactic structures of locatum verb *saddle* and location verb *shelve*, adapted from Hale and Keyser (1993, 57; 62)

A head V is projected with a PP sister. Since a PP is a predicate, an internal subject is required and the Specifier position of the VP is also projected. In the formation of this verb, the NP adjoins to the abstract P, which is either one of central coincidence (most like 'with' in a

[10] If one considers the middle construction, discussed below, to be intransitive, it is the exception to this statement.

possessive sense) for locatum verbs or of terminal coincidence (most like ‘in/on’) for location verbs.

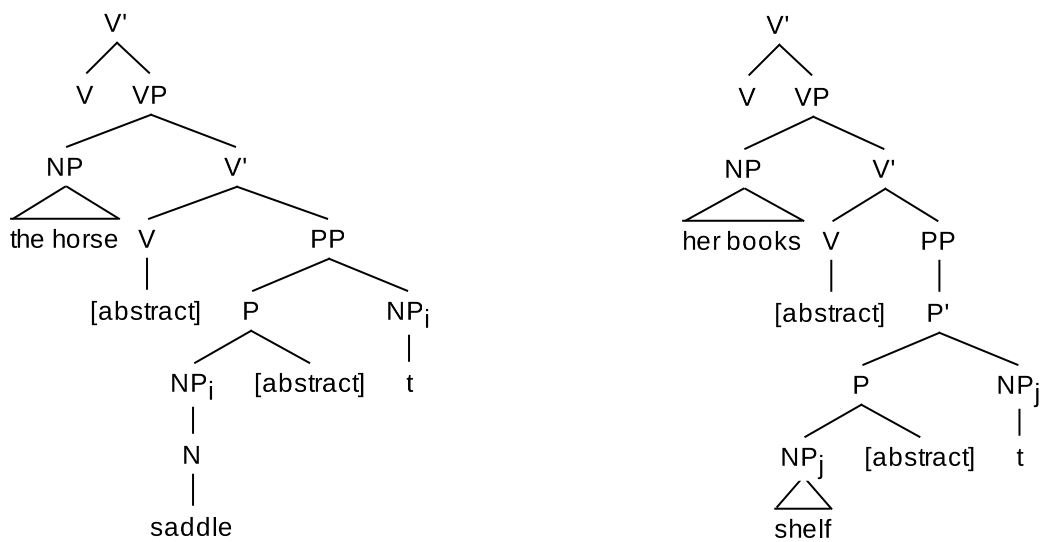


Figure 1.8 Incorporation of NP into P for locatum verb *saddle* and location verb *shelve*

This NP-P “compound” then adjoins to an abstract V, as shown in figure 1.9 below.

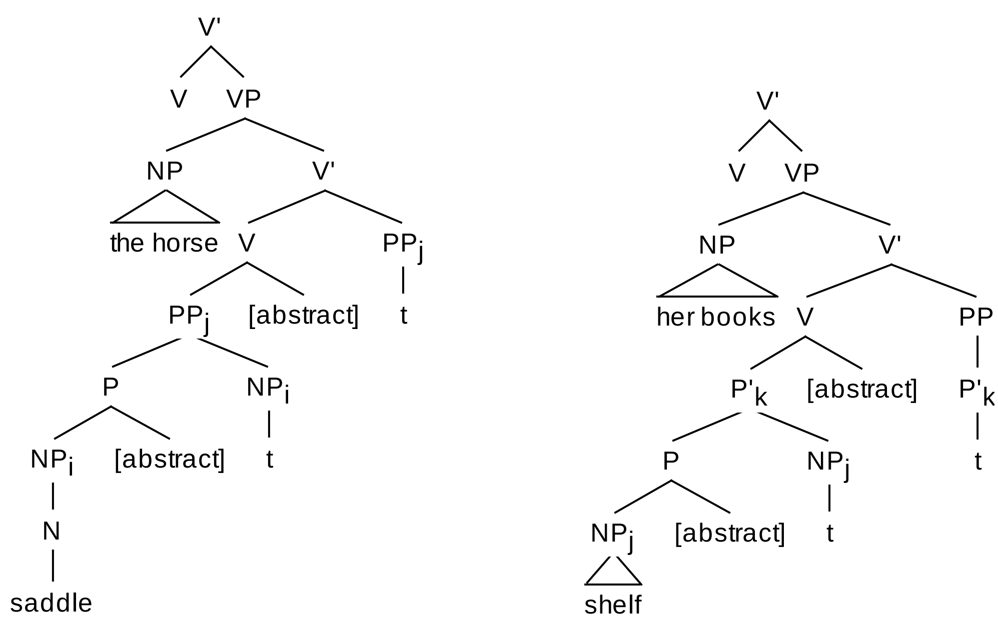


Figure 1.9 Incorporation of NP-P compound into V locatum verb *saddle* and location verb *shelve*

As figure 1.10 below shows, this NP-P-V compound is then moved into the matrix verb position before insertion into D-structure.

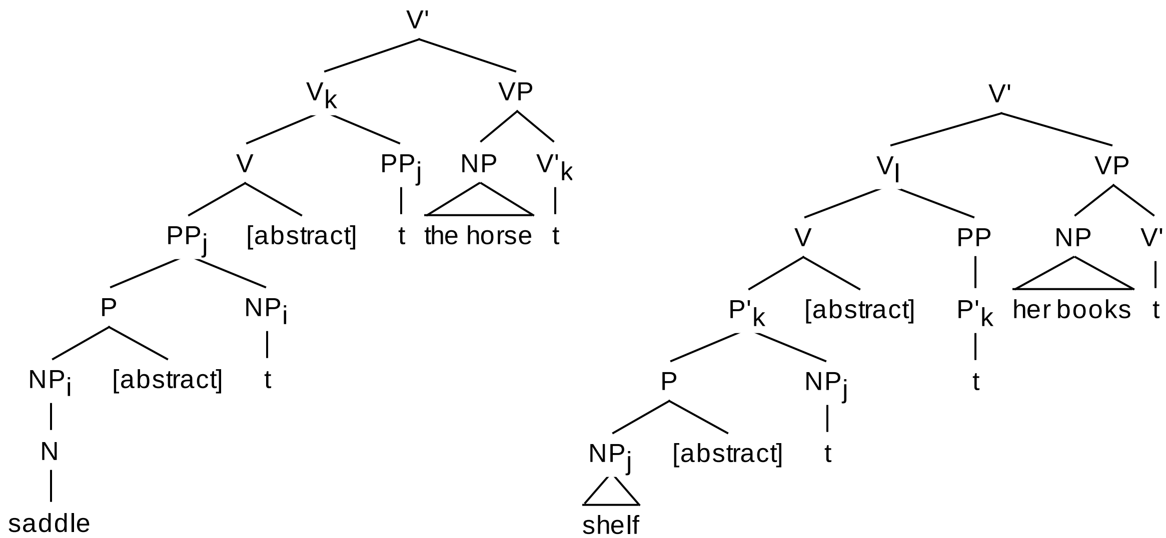


Figure 1.10 Movement of Incorporated NP-P-V compound into matrix V position

The external subject appears at the level of s-syntax (please refer to the figure below).

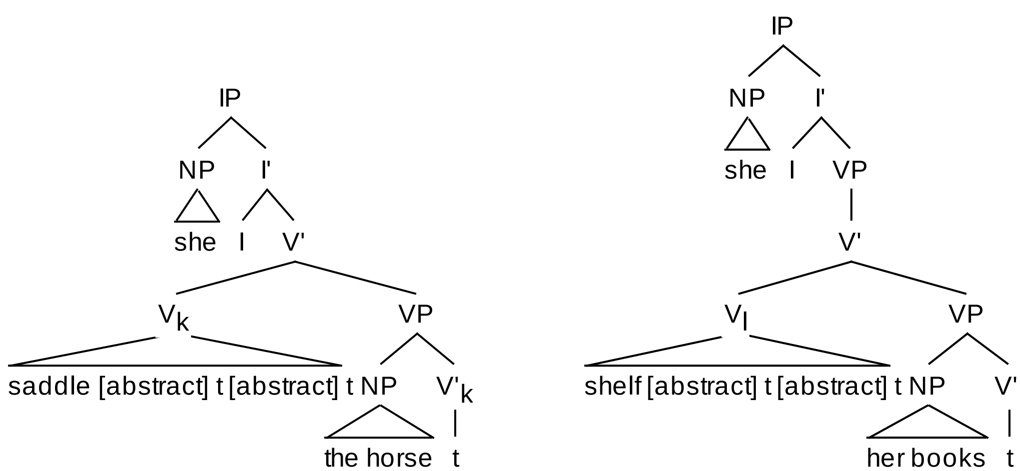


Figure 1.11 S-structure representation of *she saddled the horse* and *she shelved her books*

Again, according to Hale & Keyser's analysis, because these verbs lexically project an internal subject, the middle construction is acceptable for these verbs.  However, because these verbs lack the manner "tag" on the inner VP at the lexical level that the change-of-state verbs have, the inchoative alternation is not possible for the locatum and location verbs.

The overarching claim of Hale and Keyser (1993) is that much of what has been considered lexical is actually syntactic.  However, the authors are quick to point out that syntax is not everything.  Consistent with many other theories, Hale and Keyser claim that idiosyncratic properties belong to the lexicon.  What is lexical in their account is the particular l-syntactic construction to be projected, plus information regarding phonology, like the final consonant voicing of *shelve* for example.

Harley (2003) provides further support for Hale and Keyser's l-syntactic analysis by showing how the boundedness of both the incorporated Roots and the corresponding overt objects of their paraphrases determines identical Aktionsart properties.  Harley is apparently using 'Root' as an umbrella term for the bases of the denominal verbs, unspecified for syntactic category and 'boundedness' is to be understood here as a quality of the Root, its inherent delimitedness.  For example, the noun *foal* is inherently delimited, and when used as a direct object, thus provides a 'measuring-out' effect for the verb, that is a measure of when the action of the verb would be completed.  The nouns *drool*, *sweat*, and *blood*, on the other hand, are not inherently delimited, and when used as a direct object, do not provide the verb with a measuring-out effect.  Using the unergative verbs related to *foal* and *drool* to illustrate the role of boundedness on denominal verbs, Harley points out that when the ostensible Roots of these verbs are used as overt objects in paraphrases, they display different telic properties, as shown below:

(15) The mare bore a foal in 2 hours/#for 2 hours.

(16) The baby made drool #in 2 hours/for 2 hours

In Harley's (2003) analysis, it is the boundedness of the overt object that determines these facts. Since *foal* is inherently bounded, it invites a telic interpretation of the event; since *drool* is unbounded, it favors an atelic interpretation. When the corresponding denominal verbs are used, the same pattern of the telicity is achieved:

(17) The mare foaled in 2 hours/#for 2 hours.

(18) The baby drooled #in 2 hours/for 2 hours.

Harley (2003) suggests these facts provide evidence that these verbs are indeed formed by incorporation, as claimed in Hale and Keyser (1993) and demonstrates how Aktionsart patterns continue to hold for the other types of verbs and their corresponding paraphrases.

Also, the notion of manner incorporation used by Hale and Keyser (1993) to account for inchoative alternations in change-of-state verbs is extended by Harley (2003) to account for INSTRUMENTAL denominal verbs. She notes that the boundedness of the Root of an INSTRUMENTAL verb has no effect whatsoever on its telicity; for example, even though the noun *hammer* is inherently delimited, the corresponding denominal verb *hammer* is atelic (19).

(19) Sue hammered the metal #in two hours/for two hours.

Harley claims that the manner incorporation used to create INSTRUMENTAL denominal verbs involves a different type of process than the head-movement used to create the other denominal verb types; the process of manner incorporation involves incorporation from an adjunct argument of the VP. Harley (2003, 26) states:

> While I do not pretend to understand how this can happen, since it runs counter to the assumption that incorporation of Roots in l-syntax is governed by the same principles that restrict head-movement in the overt syntax, it seems clear that some mechanism must be proposed which has exactly this effect.

In order to formalize this somewhat mysterious process, Harley uses a "thought-balloon" where Hale and Keyser use a "tag", and rather than simply indicating "manner", her thought-balloon contains specific information about the manner. For example, in *Sue hammered the metal*, a "hammering" manner is applied to the abstract verb; this is shown in the figure below:

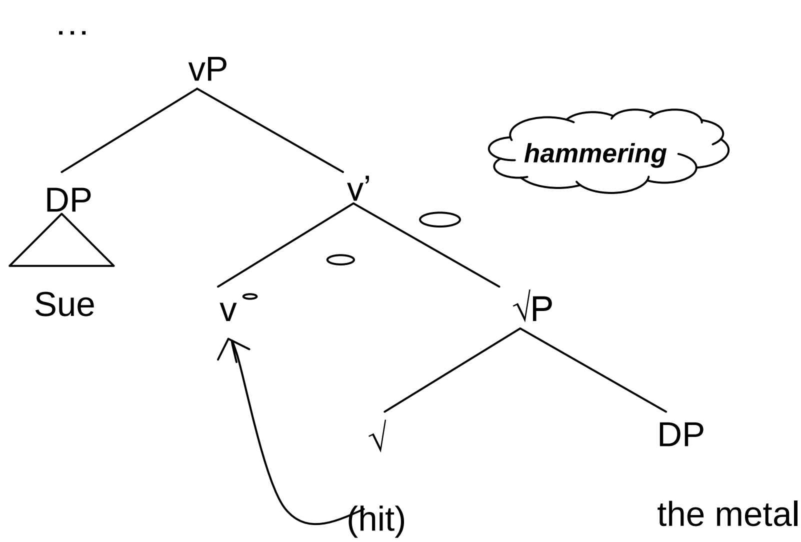


Figure 1.12 L-syntactic structure of *Sue hammered the metal*, taken from Harley (2003, 26)

Thus, in terms of the focus of the work here, the claim that follows from both Hale and Keyser (1993) and Harley (2003) is that syntactic information at the lexical level is also crucial information for the successful formation and interpretation of denominal verbs in English. The interplay between the semantic category of the denominal verb and its syntactic structure will be examined much more closely, not only for PERFORMATIVE, ORNATIVE, LOCATIVE, RESULTATIVE/CAUSATIVE and INSTRUMENTAL denominal verbs, but also for SIMILATIVE, PRIVATIVE, and ABLATIVE denominal verbs as well. There is an expectation that if the semantics of the denominal verbs are thus interpreted based upon distinct l-syntactic structures, then the syntactic behavior (always intransitive, always transitive, transitive/inchoative) should be the same for the entire semantic category class, and the syntactic behavior distributions of the denominal verb formation processes should correspond to their semantic category distributions.

## 1.5 Lexical-Semantic Perspective

Work that takes on a more lexical-semantic perspective of denominal verbs examines not only the argument structure of the verb but also other aspects of semantic structure. This section focuses on the following works: Kiparsky (1997); Plag (1999); and Lieber (2004). Kiparsky (1997) takes issue with the syntactic analysis presented in Hale and Keyser (1993) and points out the necessity of appealing to semantics to account for the data. Plag (1999) and Lieber (2004), through the formalism of lexical conceptual structures (LCS), demonstrate how the different meanings associated with the denominal verb can be derived through a unified structure of semantic atoms.

Kiparsky (1997) tackles issues presented in Hale and Keyser (1993) from much more of a semantic perspective. The major conclusion Kiparsky arrives at is that Hale and Keyser still need to appeal to semantic explanations to account for portions of their data. Kiparsky proposes, therefore, that an approach relying upon semantics rather than syntax might do a better job of accounting for all of the relevant data under a unified theory. In his analysis, word meaning is represented at two related but distinct levels: conceptual knowledge and Semantic Form. Semantic Form articulates conceptual knowledge in linguistic form with the use of semantic primitives, such as CAUSE, BEGIN, BECOME, BE-IN, HAVE-ON, et al. It is this level of Semantic Form that projects the argument and event structure that relate syntax and word meaning. According to this theory, then, "the syntactic properties of lexical items are in large measure predictable from their meaning" (Kiparsky 1997, 3), rather than the other way around.

According to Kiparsky, a crucial question that must be answered is "Plato's problem", which is, essentially, given the lack of explicit evidence, how is it that language learners consistently arrive at the appropriate meaning and extension of meaning for words? In relation to the types of denominal verbs discussed in Hale and Keyser (1993), how does a native speaker "know" that a given verb is a locatum/ORNATIVE verb, for example, rather than a location/LOCATIVE verb and vice versa? Hale and Keyser make use of an identical structure for both verbs but with one of two different types of abstract preposition, central coincidence or terminal coincidence. The interpretation of a locatum/ORNATIVE verb like *saddle* depends upon the presence of the central coincidence abstract preposition (roughly glossed as 'with') while the interpretation of a location/LOCATIVE verb such as *corral* depends upon the presence of the terminal coincidence abstract preposition ('in/on'). It may be argued that the proposal of two different types of preposition is a semantic explanation rather than a syntactic one. In providing a purely semantic account, Kiparsky suggests the following principle of conceptual interpretation accounts for the data equally well: "If an action is named after a thing, it involves a canonical use of the thing" (Kiparsky 1997, 9). It is the canonical use of saddles to be objects that are put on horses, and it is the canonical use of corrals to be locations where horses are put. Furthermore, according to Kiparsky, even Hale and Keyser must make use of conceptual knowledge to account for the unacceptability of, for example, *bush* as a location/LOCATIVE verb as in *I bushed some fertilizer*, meaning 'I put some fertilizer on the bush'. However, the same principle of canonical use can be applied to easily account for this as well; it is not a canonical use of bushes to be the location where things such as fertilizer are placed and therefore, the use of *bush* as a location/LOCATIVE verb is unacceptable. This principle also correctly predicts that if a base noun has more than one canonical use it may derive more than one type of denominal verb. The noun *shelf* is a good example: its canonical use as a location leads to the interpretation of the verb *shelve* as a location/LOCATIVE verb (*Terry shelved the books*), and its canonical use as an item to be installed leads to the interpretation of *shelve* as a locatum/ORNATIVE verb (*Terry shelved the closet*). The difference between these two types is reflected in Semantic Form by two different semantic primitives, BE-ON for location/LOCATIVE (as with *shelve* in *shelve the books*) and HAVE-ON for locatum/ORNATIVE (e.g. *shelve* in *shelve the closet*).

Kiparsky (1997) also addresses Hale and Keyser's use of the "manner tag" discussed above to account for the transitivity alternations of verbs like *smear* and *splash*. This manner tag may be perceived as ultimately a semantic solution as the verbs in question ostensibly have identical syntactic structures. Kiparsky again proposes that a purely semantic explanation can better account not only for this data but for the transitivity patterns of other verbs as well. Kiparsky's analysis is dependent upon the extent of the involvement of the entity assigned the theta-role AGENT, i.e. whether continued participation by the AGENT is required, and whether the role represented by the object is constitutive or not. He proposes another principle of conceptual interpretation: "Constitutive arguments are not omissible" (Kiparsky 1997, 23). To illustrate, when the AGENT's participation is needed to continue the event and the object's role is constitutive, the result is an obligatorily transitive verb:

(20) John smeared the paint. #John smeared. #The paint smeared.

(21) John brought the cart. #John brought. #The cart brought.

As (20) and (21) indicate, as the semantics of the verb (*smear*, *bring*) require the involvement of the AGENT (*John*) and the object's (*paint*, *cart*) role is constitutive, only the transitive syntactic form is acceptable.

However, in cases where the AGENT's participation is needed but the object's role is not constitutive, either the transitive or intransitive is acceptable, but not the inchoative form, as shown in (22):

(22) John pushed the cart. John pushed. #The cart pushed.

In this pushing event, semantically, only *John*'s participation is necessary to effect pushing, and thus must be present; however, the role of the object (*the cart*) is not a crucial participant here and thus may be omitted.

Finally, when the AGENT's participation is not needed but the object's role is constitutive, the causative/inchoative alternation is possible:

| | | | |
|---|---|---|---|
| (23) | John splashed water. | #John splashed. | The water splashed. |
| (24) | John rolled the cart. | #John rolled. | The cart rolled. |

For *splash* and *roll*, only the object (*water*, *cart*) is necessary to effect the splashing or rolling event. Therefore, the intransitive syntactic form omitting the object is determined to be unacceptable.

Other important work on denominal verb formation in English has been carried out that, like Kiparsky (1997), utilizes semantic primitives; Plag (1999) and Lieber (2004) are particularly noteworthy. As the title of his book, *Morphological Productivity*, suggests, the main focus of Plag (1999) is investigating the productivity of certain morphological processes. In doing so, he provides an analysis of English denominal verb formation that is quite relevant to the current discussion. In order to determine the most current state of productivity for each of the processes, Plag examines the 20th century neologisms evidencing these processes found in the Oxford English Dictionary (OED), and in combination with the Cobuild corpus, generates a productivity measure for the verb-forming processes. By his calculations, conversion is the most productive process, followed by *-ize* affixation, and then *-ify* and *-ate* affixation. These results are consistent with Marchand's (1969) claims above regarding which processes are still productive in the formation of denominal verbs in present-day English. Through examination of the structural properties of each verb-formation process, he proposes an analysis of how these potentially rival processes interact and comes to the conclusion that since they each have their own phonological and/or semantic domains, they rarely enter into any competition at all. However, where these domains do by chance overlap, doublets are expected, and indeed are attested (e.g. *to carbon* and *to carbonize*).

What are these phonological and/or semantic domains referred to above? The phonological characteristics are discussed in section 1.3. As for the semantic domains, Plag (1999) proposes that *-ize* and *-ify* share exactly the same domains and the same lexical conceptual structure (LCS), a term taken from Jackendoff, shown in (25) below, (from Plag 1999, 137; 195):

(25) LCS of *-ize* and *-ify* verbs
$[[\quad]_{Base}$ *-ize*/*-ify*$]_V$
$\{NP_i$ ______ NP $_{Theme}$, NP $_{Theme}$ ______ ,$NP_i$ ______$\}$
CAUSE ([ $\quad$ ])$_i$, [GO ([$_{Property, Thing}$ $\quad$ ]$_{Theme/Base}$;
[TO [$_{Property, Thing}$ $\quad$ ]$_{Base/Theme}$])])

The subscript labels represent the argument (the argument assigned the theta-role THEME or the argument that is the BASE WORD of the verb) or a major conceptual category associated with that argument (e.g. the THEME is a property or thing). The labels in all capital letters in the LCS represent semantic functions (e.g. CAUSE, GO, TO, BE) which operate on the arguments. The dashed line under CAUSE and its argument represents the optionality of the CAUSE function when the inchoative form is desired. What the LCS in (25) indicates is that *-ize* and *-ify* verbs denote either a transitive, inchoative, or intransitive event. For the transitive events, as illustrated by (26) and (27), the subject entity (i), in this case *the doctor*, causes the THEME (which is a Property or Thing), *the patient*, to go to a BASE WORD (which is a Property or

Thing), in (26) *hospital*, or alternatively, a BASE WORD, in (27) *anaesthesia*, to go to a THEME (again *the patient*).

(26) The doctor hospitalized the patient.

(27) The doctor anaesthetized the patient.

The inchoative is understood as an event where the THEME becomes the BASE WORD or the THEME has the BASE WORD applied to it. Example (28) is an instance of the former, with *the patient* as the THEME which becomes the BASE WORD of the verb, *stable*. Example (29) represents the latter, with *the patient* again as the THEME, to whom the verb's BASE WORD, *agony*, has been placed upon or applied.

(28) The patient stabilized.

(29) The patient agonized.

The intransitive is understood as an event where some entity, which remains unexpressed, becomes the BASE WORD (30) or has the BASE WORD applied to it (31).

(30) The doctor generalized.

(31) The doctor sympathized.

In example (30), *the doctor* makes something *general* (BASE WORD of the verb), but it is not specified what is made general. Similarly, in example (31), *the doctor* applies *sympathy* (BASE WORD) to someone, but again, it is not specified whom.

For all the examples above, the instances where the BASE WORD of the verb is the end state are interpreted as RESULTATIVE and CAUSATIVE. When the BASE NOUN is the end location rather than the end state, the verb is interpreted as LOCATIVE. The verb is interpreted as ORNATIVE when its BASE WORD is the entity becoming the end state or being moved to the end location. PERFORMATIVE (e.g. *apologize*, *philosophize*) and SIMILATIVE (e.g. *Marxize*, *Stalinize*) verbs, usually intransitive, are considered by Plag (1999, 138-140) to be subtypes of ORNATIVE verbs, with the BASE WORD being applied to an unexpressed entity. It should be noted that the LCS of *-ify*/*-ize* verbs does not include INSTRUMENTAL as a possible interpretation.

As for *-ate*, Plag claims that its semantic domain is more restricted than that of *-ize* or *-ify* above. From his study of the 20th century neologisms, Plag found that many *-ate* derivations were so varied in derivational history and in meaning that it was difficult to say they formed any type homogenous group. However, there were many *-ate* forms that appeared to form a cohesive subset, those whose BASE WORD was a chemical substance with only RESULTATIVE and ORNATIVE semantics. The LCS for this subset is provided in (32) below, taken from Plag (1999, 205).

(32) LCS of *-ate* verbs

$[[\text{`chemical substance}]_{\text{Base}}\ \textit{-ate}]_{\text{V}}$

$\{\text{NP}_{\text{i}}\ \_\_\_\_\_\ \text{NP}_{\text{Theme}},\ \text{NP}_{\text{Theme}}\ \_\_\_\_\_\ ,\text{NP}_{\text{i}}\ \_\_\_\_\_\}$

$\text{CAUSE}\ ([_{\text{Thing}}\ \ldots\ldots])_{\text{i}},\ [\text{GO}\ ([_{\text{Thing, Property}}\quad]_{\text{Base}};\ [\text{TO}\ [_{\text{Thing}}\quad]_{\text{Theme}}])])$

This LCS represents that the interpretation of an event denoted by an *-ate* verb is either a chemical substance goes to (or an entity (i) causes the chemical substance to go to) the THEME in the ORNATIVE case, or a chemical substance induces (or an entity (i) causes the chemical substance to induce) its property in the THEME (RESULTATIVE).

(33) The scientist nitrogenated the alloys.

(34) The scientist methanated the animal waste.

In example (33), the chemical substance *nitrogen* is the BASE WORD for the verb and in this event is applied to the THEME, *the alloys*. In (34), the THEME *the animal waste* becomes the chemical substance BASE WORD, *methane*. Considering this much more restrictive semantic domain of chemical substances, it becomes clear that *-ate* is not much competition for *-ize*, despite sharing so many of its phonological structural properties.

Turning now to conversion: as was mentioned above, Plag notes there do not seem to be any phonological restrictions on forming verbs by conversion; however, he claims there are indications of semantic or morphological restrictions (Plag 1999, 221). For example, present-day conversion usually does not occur with previously affixed nouns and appears to disprefer adjectival bases when compared to nominal or onomatopoetic bases. Furthermore, relational adjectives seem to be prohibited from undergoing conversion altogether. Unfortunately, the mechanisms that derive these restrictions have yet to be accounted for. Still, for all intents and purposes, it appears that the semantics of verbal conversion are so diverse as to be indeterminate, except what may be associated with verbs in general. As it is the case that there are no phonological restrictions on conversion and few semantic or morphological restrictions, conversion serves as competition to all of the overt verb-forming processes, particularly *-ize* as the most productive of the overt affixes. With so much productivity and utility associated with conversion, why would speakers choose to use the overt affix at all? Plag suggests that the overt affixes have a more specific meaning, and thus an interlocutor may arrive at the intended meaning more quickly than with the pragmatic context required for interpretation of conversion verbs. Other than this consideration, Plag predicts that one cannot predict, and the choice between conversion and an overt affix should be arbitrary where their domains truly overlap. The results of his corpus work on the 20$^{th}$ century neologisms find this to be the case; many conversion verbs are indeed found with an overtly affixed alternate (*gel*/*gelate*; *gas*/*gasify*; *pressure*/*pressurize*).

Similarly, although with a different formalism, Lieber (2004) proposes that the entry for -*ize* and -*ify* in the mental lexicon consists of a single, underspecified, LCS. She suggests the following formalization:

(35) [+dynamic ([$_{volitional\text{-}i}$ ], [$_{j}$ ])]; [+dynamic ([$_{i}$ ], [+dynamic, +IEPS ([$_{j}$ ], [+Loc ([ ])])]), <base>]

Essentially, what the LCS in (35) means is that ‘i’ (usually the subject) does something to ‘j’ (usually the object) that causes ‘j’ to be located (+Loc) in/on/at the BASE WORD or to become the BASE WORD (<base>). The verb is not stative (+dynamic), ‘i’ is volitional, and the verb involves a change of state or a change of location (+IEPS, ‘Inferable Eventual Position or State’). So, for example, the formation of the verb *randomize* involves the instantiation of the LCS of -*ize* as in (36) below:

(36) [+dynamic ([$_{volitional\text{-}i}$ ], [$_{j}$ ])]; [+dynamic ([$_{i}$ ], [+dynamic, +IEPS ([$_{j}$ ], [+Loc ([$_{k}$ ])])]), [-dynamic ([$_{k}$ ])]]

For a sentence such as *Chris randomized the data, Chris* is co-indexed as the volitional 'i' that does something to *the data,* co-indexed as 'j' such that *Chris* causes *the data* to change its state to the state denoted by the BASE WORD *random,* co-indexed as 'k'. The interpretation that follows is CAUSATIVE (when the BASE WORD is an adjective) or RESULTATIVE (when the BASE WORD is a noun). Similarly, for a LOCATIVE -*ize* verb such as *containerize*, the LCS would reflect the BASE WORD *container* and the interpretation would be one of change of location to the location denoted by the BASE WORD *container*. In all three of these cases, the BASE WORD is interpreted as a type of GOAL.

For the ORNATIVE interpretation of an -*ize* verb such as *initialize* as in *Chris initialized the data,* the LCS would be represented as in (37).

(37) [+dynamic ($[_{volitional\text{-}i}$ ], $[_{j}$ ])]; [+dynamic ($[_{i}$ ], [+dynamic, +IEPS ($[_{j}$ ], [+Loc ([ ])])]), [+material ($[_{j}$ ])]]

Here the co-indexing of the arguments is different: *Chris* is still co-indexed as 'i', but *Chris* does something to the BASE WORD *initial* ('j') such that *Chris* causes the *initial(s)* to change their location to the location denoted by *the data*. In this case, the BASE WORD is understood to be the THEME.

Lieber (2004) states that this skeletal structure covers the "core cases" for -*ify* and -*ize* verbs: RESULTATIVE, CAUSATIVE, ORNATIVE, and LOCATIVE. She calls SIMILATIVE and PERFORMATIVE non-core cases, deriving their meaning by paradigmatic extension; she describes this process thus:

> …when a language lacks a systematic derivational means for creating a particular semantic class of lexemes, and under pragmatic pressure-- the real-world need to coin a word belonging to that semantic class-- the closest productive derivational process may be put to use to fill the semantic gap.

In Lieber's analysis, to achieve the PERFORMATIVE and SIMILATIVE interpretations of -*ize* verbs, the part of the skeleton that denotes the end state or end location is dropped, leaving only the first subevent, essentially the skeleton for a simple activity verb, as shown in example (38), taken from Lieber (2004, 87).

(38) [+dynamic ([$_{\text{volitional}}$ ], [ ])], [±material ([ ])]]

The last element of this semantic skeleton represents the BASE WORD, and the interpretation of a PERFORMATIVE verb such as *philosophize* that follows from this skeleton is roughly "do philosophy" while the interpretation of a SIMILATIVE verb such as *hooliganize* is "hooligan-do" or more understandably, "do as a hooligan does". In this manner, Lieber accounts for the core and non-core cases of -*ify* and -*ize,* and again, Lieber (2004), like Plag (1999), does not list INSTRUMENTAL as a possible case of -*ify/-ize* verbs at all.

Lieber (2004) does address the relative productivity of these semantic categories for -*ify*/-*ize* verbs. In her analysis, LOCATIVE interpretations of -*ize* verbs are unremarkable; they have the same status as the other 'goal-oriented' categories of RESULTATIVE and CAUSATIVE, and she makes no prediction that this category should be underrepresented in terms of productivity. ORNATIVE interpretations, on the other hand, would involve a "less preferred indexing pattern" and "we should find fewer items in the ornative class than in the causative, resultative, or locative classes" (Lieber 2004, 85). She supports this assertion with the corpus work performed by Plag (1999), above, and states that "the most robust patterns are the causative, resultative, and locative patterns, with the ornative being somewhat less robust, and the performative and similative the least robust of all" (Lieber 2004, 78). This statement is somewhat ambiguous, however: is the intended meaning of this statement that each of the goal-oriented categories resulted in more *-ize* forms than the ORNATIVE, or is it the combination of all three that is more than ORNATIVE? This may seem like a small point, but as will be seen from the work presented in the following chapters, the two interpretations do not imply the same predictions. As for PERFORMATIVE and SIMILATIVE, Lieber considers them to be the most marked derivatives and are therefore expected to display the least productivity (2004, 88).

As for conversion, Lieber proposes that it is not at all like affixation in the sense that there is no "semantic skeleton" to be assigned to it, as there is for *-ize*. Instead, she agrees with Clark and Clark (1979) (see section 1.6 below) in claiming that verbal conversion is a type of innovative coinage, governed by pragmatic principles.

The work described above from the lexical-semantic perspective lays the groundwork for much of what follows in this dissertation. Kiparsky's (1997) suggestion that the syntactic forms of English denominal verbs are predictable from their semantics and from other general cognitive principles will be returned to several times in the following chapters. Also his use of semantic primitives to describe the verbs' semantic structure is a very useful formalism that has been extended in the Lexical Conceptual Structures (LCS) used by both Plag (1999) and Lieber (2004). Their attempts to provide a unified LCS for the denominal verb affixes also plays a prominent role in the work that follows. The exact nature of the LCS involved in denominal verb formation will be explored, but the notion that the semantic structure of denominal verb formation processes is a unified one will be upheld here. Also, Lieber's predictions about the relative productivity of the rival word formation processes makes predictions about semantic category distributions. Her claim is that the nature of the semantic skeleton of *-ify*/*-ize* verbs and a more unusual co-indexation pattern leads ORNATIVE, PERFORMATIVE, and SIMILATIVE interpretations to be less preferred than RESULTATIVE, CAUSATIVE, and LOCATIVE ones. Since this preferred pattern is a result of semantic considerations, we should see the same pattern for <u>all</u> verb formation processes that share this type of semantic skeleton: RESULTATIVE, CAUSATIVE, and LOCATIVE interpretations should be more frequent than ORNATIVE interpretations, which should in turn be more frequent than PERFORMATIVE and SIMILATIVE interpretations, with INSTRUMENTAL interpretations non-existent. If, however, semantic category distributions are influenced by other morphological, pragmatic, and extra-grammatical factors, as this dissertation will argue they are, then there is no expectation that the word formation processes should display the exact same pattern of semantic category distribution.

### 1.6 Pragmatic Perspective

As the previous paragraph indicates, it will be argued here that pragmatic factors influence the nature of semantic category distributions, and so work on denominal verb formation from the pragmatic perspective is necessarily relevant. Most of the other authors mentioned above point out that pragmatic factors play a significant role in verb formation as well. In addition to Lieber's (2004) comment regarding the interpretation of denominal conversion verbs, Marchand also states, "the verbal morpheme is a categorial marker while the actual syntactic relation and the semantic content of the transposition depends on the semantic class of the noun **and on the speech context**. The only basic condition is that in an underlying sentence the noun is one of the possible kinds of verbal complements…" (1969, 214; emphasis added). During the discussion of the rivalry between conversion and overt affixation, Plag (1999, 231) states, "the interpretation of converted items relies on the linguistic and extra-linguistic context to an even greater extent than the interpretation of, say, *-ize* derivatives", implying that both processes do rely upon pragmatic information. Clearly, work from the pragmatic perspective is crucial, and nearly all of the authors above make reference to Clark and Clark (1979) specifically.

For Clark and Clark (1979), the main question is how the meanings of denominal conversion verbs, which they refer to as 'innovations', are determined in cases where there are no "rules of composition" (Clark and Clark 1979, 767) as there are with affixed forms (e.g. the interpretation of *ritualness* involves the combination of the meanings of *ritual* and *-ness*). The authors claim that denominal conversion verbs have a shifting sense and denotation; that is, they are dependent upon the time, place, and circumstance of their use for their interpretation. This is what separates them from, of course, purely denotational expressions like *bachelor*, but also indexical expressions like *he*; both of these other types have a fixed sense and denotation. Furthermore, denominal conversion verbs are characterized by having, like indexicals, an indefinitely large number of senses, dependence on the context, and crucially, requiring cooperation between speaker and listener. The authors choose to analyze both novel and established denominal conversion verbs; Clark and Clark view these as being on two ends of the same continuum, just with the established verbs being farther along in time.

Clark and Clark (1979) provide the following categories of denominal conversion verbs (with examples in parentheses). Included are the corresponding semantic category labels used in this dissertation.

- locatum (*blanket*) - ORNATIVE
- location (*kennel*) - LOCATIVE
- duration (*summer*) - LOCATIVE
- agent (*butcher*) - SIMILATIVE
- experiencer (*witness*) - RESULTATIVE or LOCATIVE
- goal (*powder*) - RESULTATIVE
- source (*piece*) - RESULTATIVE
- instrument (*bicycle*) - INSTRUMENTAL or PERFORMATIVE
- miscellaneous (*lunch, fish, rear-end, rain*) - PERFORMATIVE, PRIVATIVE, LOCATIVE, PERFORMATIVE, respectively

It is important to note that Clark and Clark do not claim that these are the ‘right’ categories or the only categories, and they claim that these labels often fail to capture all the content involved with the verb.

Clark & Clark (1979, 787) present a theory of the interpretation of these denominal conversion verbs, closely related to Grice's Cooperative Principle (1975):

> "The Innovative Denominal Verb Convention. In using an innovative denominal verb sincerely, the speaker means to denote
>
> (a) the kind of situation
>
> (b) that he has good reason to believe
>
> (c) that on this occasion the listener can readily compute
>
> (d) uniquely
>
> (e) on the basis of their mutual knowledge
>
> (f) in such a way that the parent noun denotes one role in the situation, and the remaining surface arguments of the denominal verb denote other roles in the situation."

To illustrate, Clark and Clark (1979) provide the example of a news agent trying to convince them that *the boy porched the newspaper*. By using this expression, the news agent is referring to (a) the kind of situation ('situation is used here for states, events, and processes) (b) he feels (c) they would be able to identify (d) uniquely (e) based upon their mutual knowledge of (f) porches and how they relate to newspapers, paper boys, and their current conversation, i.e. delivering a newspaper. The (f) part of this convention is what applies specifically to denominal verbs.

A critical part of this convention is mutual knowledge. As they put it, "from our mutual knowledge, we are warranted in inferring only the ordinary manner of delivery. The kind of situation denoted has to be the most salient one under the circumstances; and the ordinary manner is the most salient unless there is good reason to think otherwise" (Clark and Clark 1979, 788). However, what exactly mutual knowledge consists of is not entirely clear. The authors propose that a theory of what people know about concrete objects is crucial. As a starting point, they outline what has to be determined before we can achieve a real understanding of the interpretation of these verbs.

To begin with, the authors point out that world knowledge consists of two parts: generic knowledge and particular knowledge.

- generic knowledge-- what we all tacitly know about time and space, physical laws, natural kinds, artifacts and their functions, etc; this type of knowledge is mostly considered to be shared by all
- particular knowledge-- what we tacitly know about particular or individual entities, i.e., particular objects, events, states and processes; this type of knowledge is not shared by all or maybe even any, as it is dependent on each person's history

Since, according to Clark and Clark (1979, 792), the most common denominal verbs rely upon generic knowledge, it is very important to figure out what this type of knowledge is like. The theories people use to generate generic knowledge about concrete objects identify three basic aspects: its physical characteristics, its ontogeny (how it came into being), and its potential roles. For a particular object and the category it belongs to, some characteristics will be more central, be of more import, than others. These characteristics the authors term *predominant features*. These predominant features form categories of concrete nouns. In order for the speaker to believe the listener will correctly interpret the intended meaning of these verbs, s/he will expect the listener to be able to identify the predominant feature or features of the noun base and apply the one appropriate to the situation in relation to the other entities involved.

Clark and Clark (1979) come to the same conclusions Plag (1999) and Lieber (2004) later arrive at: since denominal verbs can be interpreted as having any type of relationship with their bases as long as the pragmatic factors will support that interpretation, denominal verbs cannot be said to display unified semantics and they are not derived from nouns in the same manner as affixation.

Why create denominal verbs in the first place? One suggestion given in Clark and Clark (1979) is economy of expression. For example, *Margaret 747'd to London* is more economical that *Margaret flew to London on a 747* while at the same time being more specific than *Margaret flew to London*. However if the verb would be too cumbersome, e.g., too long (*we Fourth-of-July'd at Lake Tahoe*) or already inflected (*John United'd to Los Angeles*, based on the noun *United Airlines*), then it will be avoided. Clark and Clark also discuss other types of possible constraints, e.g. those due to blocking effects, as is the case with the pre-existing verb *dodge* blocking the novel, *we Dodge'd to New York*, from the car make.

In summary, the sections above present previous work that has identified several important factors in English denominal verb formation. Phonological characteristics of the potential denominal verb forms contribute much to determining which word formation process will lead to the most successful form (Plag 1999). Hale and Keyser (1993) and Harley (2003) demonstrate the importance of syntactic form in the interpretability of denominal verbs. The role of semantics also cannot be ignored: it is crucial that the roles of the base noun and the other participants in the event are able to be identified in order for successful interpretation of the verb's meaning to occur. Finally, Clark and Clark (1979) and their Denominal Verb Convention point out the necessity for the speaker to perform calculations based upon the particular context and mutually-shared general and specific knowledge in order to determine the likelihood that the listener will successfully interpret the verb's meaning as the speaker intends.

### 1.7 Semantic Category Distribution Effect Hypothesis

As the previous paragraph points out, factors related to morpho-phonology, syntax, semantics and pragmatics have been identified as significant to the formation of denominal verbs in English. What other factors could possibly be left to identify? Plag draws an important distinction between the possibility of using a word formation process and the probability of its use. Plag's model of word formation is one that is output-based, with the structural properties of the processes themselves determining their potential to be used for a given lexical item, i.e. the possibility of using a process. As for the probability of use, Plag appeals to notions of semantic transparency, phonological transparency, and proportion of low frequency items (Plag 1999, 38).

The processes with the highest application rate are those that are semantically transparent, phonologically transparent and are found with a high proportion of low frequency types. “In this perspective, the application rate is a property of morphological rules that cannot be derived from linguistic structure, but only from language usage” (Plag 1999, 37). And, as seen in section 1.3 above, Hay’s (2000) work makes a very strong case for the importance of frequency factors upon the processing of complex lexical items. Moreover, there has been quite a bit of evidence that probability plays a significant role in many areas of language. Bod, Hay, and Jannedy (2003) is devoted to exploring in the influence of probability upon language change (Zuraw 2003), sociolinguistics (Mendoza-Denton, Hay, and Jannedy 2003), phonology (Pierrehumbert 2003), syntax (Manning 2003), and semantics (Cohen 2003). Simply put, “probabilities permeate the linguistic system” (Bod et al. 2003, 7).

In the same volume, Baayen (2003) focuses on the role of probability in morphology. Not only does Baayen arrive at the same conclusion as Hay (2000) that morphological decomposability is affected by the relative frequency of derived words and their bases and that morphological productivity is gradient, but also that affix competition in particular is another area in which probability plays a significant role (Baayen 2003, 263). For example, compounds in Dutch can be linked by the elements *-en-* (*schaapenvlees* ‘mutton’), *-s-* (*schaapskooi* ‘sheepfold’), or nothing (*schaapherder* ‘shepherd’). Although no set of rules have been determined that condition the choice between elements, the use of these linkers is nonetheless productive and “there is substantial agreement among speakers about which linking element is most appropriate for a given pair of immediate constituents” (Baayen 2003, 243). Baayen finds that this apparently random phenomenon can be predicted when taking into account probabilities based upon certain properties, in this case analogies based upon the head (*vlees*, *kooi*, *herder*) and the modifier (*schaap*). By using a paradigmatic approach that compares the chosen linking elements for all compounds containing the given heads and all compounds containing the given modifier, calculations using a similarity metric[11] consistently (92% of the time) arrive at the attested form (Baayen 2003, 248). In other words, analogical comparisons upon the distributional properties of the entire paradigm of the constituents can determine with great accuracy the choice of linking element. Baayen discusses another apparently idiosyncratic phenomenon, the voicing properties of Dutch syllable final obstruents. In Dutch, some morpheme final obstruents alternate in their voicing (/rat/ 'council'-SINGULAR vs. /raden/ 'council-PLURAL) while others do not (/rat/ 'honeycomb-SINGULAR' vs. /raten/ 'honeycomb-PLURAL). In Ernestus and Baayen (2003), a list of 192 phonologically-legal pseudoverbs was created and subjects were asked to produce the past tense of these fake verbs. Producing the past tense form was crucial, as the choice of suffix indicates whether the subject considered the pseudoverb to contain a final obstruent that was alternating or not: *-de* is used when the obstruent alternates voicing; *-te* is used when the final obstruent does not alternate. What is most interesting is that the distribution of subjects' responses for words with particular final obstruents according to a short vowel-sonorant-obstruent rime structure matched the distribution (according to CELEX) of existing words with particular final obstruents according to a short vowel-sonorant-obstruent rime structure. This matching pattern was seen with the other two types of rime structure (long vowel-obstruent and short vowel-obstruent) as well. Furthermore, when the data were compared to several models,

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[11] Please refer to Baayen (2003, 245-247) for details.

models that produced the past tense for the same list of pseudoverbs using the three phonological properties of vowel length, coda structure, and type of obstruent entered for existing lexical items, the results for an analogical model, Analogical Modeling of Language (AML), which bases its predictions upon existing exemplars, matched the subjects' results for 89.6% of the pseudoverbs, the best performance of all five models and without any givens aside from the exemplars themselves.

The work discussed in Baayen (2003) lays the foundation for much of what follows in this dissertation. First of all, Baayen demonstrates just how important distributions related to type, not just token or relative, frequency can be. Also, since this approach uses analogies based upon entire paradigms, all forms of a given morphological process should be included, no matter how "irregular" they seem. And, when speaking of competition between processes, the distributions of all the processes must be taken into consideration, not just one under focus. Lastly, and perhaps most importantly, native speaker subjects may be sensitive to these distributions and use this information when choosing between processes.

Applying similar notions to the role of semantic probabilities upon word formation process selection in the creation of English denominal verbs, the central hypothesis of this dissertation is the following:

**The Semantic Category Distribution Effect Hypothesis**

> Native speakers are sensitive to the semantic category distribution of existing lexical items derived by the denominal verb formation processes and use this information when creating novel denominal verbs.

In other words, the extent to which a particular word formation process is used with RESULTATIVE, ORNATIVE, LOCATIVE, INSTRUMENTAL meanings, etc. in comparison to the extent to which other particular word formation processes are thus used is something native speakers are sensitive to. Furthermore, in order for the interpretation of a novel denominal verb to be successful, a speaker must believe that the listener will be able to readily compute uniquely based on their mutual knowledge, **including how likely a given process is to be associated with a given semantic category**, what role each entity in the situation plays as intended by the speaker.

Clearly, the intention here is to adapt Clark and Clark's (1979) denominal verb convention to all denominal verb constructions, not just those produced by conversion, and to extend the notion of mutual knowledge to include information related to frequency, in this case, semantic category type frequency. A model, therefore, is postulated under this type of pragmatic umbrella: assuming the speaker wants to be understood (i.e., they are not intending to be deceptive or facetious), the speaker determines which role in the event/situation he/she wants to incorporate into the verb and then performs calculations based upon what he/she believes to be mutual knowledge about both the phonological and semantic probabilities related to the potential forms.

Based on the results of these calculations, the speaker chooses the form he/she believes the listener will most likely interpret as the speaker intends.

If this hypothesis is correct, then certain expectations follow:

1. looking at each denominal verb formation process diachronically, evidence should be found that there has been a significant correlation between the semantic category distribution of existing forms and the distribution of newly created forms within any given time period in English language history; and,
2. looking at each denominal verb formation process synchronically, evidence should be found that when native speakers form novel denominal verbs of particular semantic categories, they will tend to choose the processes that match the semantic category distributions of the familiar, existing forms derived by such processes.

## 1.8 Outline of Dissertation

This dissertation is divided into two main parts. The first part of the current research, as discussed in chapter 2, involves a corpus analysis similar to that carried out by Plag (1999). Whereas Plag concentrated on 20th century neologisms, denominal verbs created from Old English to the present are examined in this dissertation. The patterns of each process' development, particularly in terms of semantic category distributions, are investigated, both separately and in relation to each other. In this manner, the following questions may be explored: what have been and continue to be the processes involved in denominal verb formation? what are the characteristics that define them? in what ways do these processes interact in their development? The corpus study discussed in this chapter found that most denominal verb formation processes that have been in use in the past are still being used today, albeit some very rarely. The semantic category distributions of the processes themselves have changed over the centuries and these changes seem to trigger other changes in other processes. There is also indirect evidence that native speakers of the past have been sensitive to the semantic category distributions of each denominal verb formation process and have used this information in the creation of novel denominal verbs.

As a consequence of this research carried out in chapter 2, certain predictions will naturally follow, predictions that are tested by experimental data presented in chapter 3. The experiments are designed to investigate the question: what must be included in the morphological competence of native speakers for them to believe they will successfully create a novel denominal verb in English? Specifically targeted is evidence of native speaker sensitivity to the semantic category distributions of the denominal verb formation processes involved. The semantic category distributions of the responses of native speaker subjects are compared to the semantic category distributions of a subset of denominal verbs found in the CELEX database. This subset was identified as being more likely to represent the denominal verbs present in the mental lexicons of today's native speakers of English. The results of the experiments show that the semantic category distributions of the experimental data mirror those of the corpus subset data, suggesting that not only does a sensitivity to semantic category distribution exist, but also that native speakers use this type frequency information when creating and interpreting novel denominal verbs. Moreover, the experimental data reflects the willingness of speakers to override some of the phonological constraints identified by Plag (1999), raising the question whether semantic transparency can trump phonological transparency.

The last chapter integrates the results of both the corpus work and the experiments, thus providing a more complete picture of what native speakers, both past and present, evidently know implicitly and take advantage of when forming English denominal verbs. Implications for theories of morphology and lexical semantics are also discussed in chapter 4, as well as suggestions for further study.

# 2. Corpus Analysis of English Denominal Verbs

## 2.1 Introduction

Several issues regarding denominal verb formation were discussed in the previous chapter. Out of these issues, four questions have arisen that comprise the central concerns of this dissertation:

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Q3. What factors condition that probability?

Q4. What is the nature of the interaction between the verb formation processes?

To anticipate the results, the response to the last two questions is hypothesized to directly involve the Semantic Category Distribution Effect, i.e., the influence of the type frequency distribution among semantic categories such as RESULTATIVE, ORNATIVE, LOCATIVE, etc. for a given verb formation process upon the probability of its use in forming a novel denominal verb. While the next chapter addresses the above questions with support from experimental data, this chapter focuses upon the answers to the questions achieved by a different type of empirical technique: analysis based upon corpus data.

### 2.1.1 Choice of a Corpus

To answer the questions above, the most ideal data would come from all of the written and spoken English sources from the time of Old English to the present. All of the denominal verbs could be examined in terms of when they entered the language and with what meaning or meanings. To do so, it must be possible to identify the denominal verbs and clearly determine how each verb is used semantically. It would also be best if all of the data came from one corpus rather than several corpora; with several different corpora, it could not be ensured that the methods used in collecting and coding the data are sufficiently similar to make claims across all the data. This one ideal corpus would also need to be electronically searchable in order for the investigation to be completed in a reasonable amount of time. Lastly, and most obviously, this corpus would need to be easily accessible, not just to the author, but to any others wishing to verify the results presented here.

One corpus that is well-suited to all of these needs is the Oxford English Dictionary (OED). The OED is an historical dictionary begun in 1857 by several members of a London philological society. It took over 70 years to complete the first edition which included 10 volumes with over 400,000 words and phrases. Today, the OED, available online and with its own search engine, contains over 600,000 words and phrases taken from over 2.5 million quotations from all types of sources. The dictionary is continually updated with 1,800 new and revised entries every three months. Its intent is to be a descriptive authority of English words, with, among other features, all words attested by quotations, the etymology of the words, all meanings with their earliest cited quotations and how they are/were used. All denominal verbs, once identified, can be assembled in a list along with their etymology, their earliest cited date of entry into the language[12], all of their meanings, and the earliest cited date of each meaning.

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[12] It should be noted that this would only be an approximation of when the word entered the language. All that can be certain is that the word was used by the date of the given quotation; it could have been used earlier but is not, or has not yet been, attested to have done so.

What the OED cannot provide, however, is an indication of frequency of use. There are no means of determining which meanings were the most or least popular across time. Also, if a word or meaning has become obsolete, there is no indication in the OED when it became obsolete. Although hundreds of people have contributed to the development of the OED over the last 150 years, subjective decisions still must have been and continue to be made in writing the definitions. Moreover, most of these decisions have been made from the British perspective, and despite great care taken with noting any special use, the information may not always match the American experience with these words. Also, continual revisions of the OED mean that even within the next three months some entries will be added or changed, and the results of this study are unlikely to ever be able to be repeated exactly. Even with these caveats, it is clear that the OED is an excellent source of information to use for the purposes of the work presently discussed.

### 2.1.2 Type of Evidence a Corpus of English Denominal Verbs May Provide

The central hypothesis here is that native speakers are sensitive to distribution information regarding the semantics of denominal verbs, and that they make use of this information when creating and interpreting new denominal verbs. If this is so, it certainly would not be expected that it only be the case for the current generation of native speakers of English; rather, the expectation is that this information has been relevant to speakers across time. The corpus of English denominal verbs provides indirect evidence for this claim if the pattern of semantic distribution for verbs entering the lexicon at a particular time parallels that of the verbs that already exist in the lexicon and changes accordingly when the existing pattern changes. If, however, the pattern of the new entries is not found to be correlated at all with that of the older entries, then the hypothesis would not be supported. Also, if the pattern of the new entries does correlate with the existing pattern, but the pattern is identical across verb formation processes, then it may suggest a case of matching the pattern of general verb making rather than a sensitivity to a particular process of verb formation.

A related hypothesis is that decisions regarding denominal verb formation are based on information not just for one process but on information for rival processes as well. For example, when choosing between -*ize* affixation and conversion when forming a new denominal verb, one would take into account not just the semantic distribution characteristics of -*ize* affixation but those of conversion as well. Let us suppose for a moment that ORNATIVE interpretations form the second largest group of -*ize* denominal verbs in the existing lexicon, second only to RESULTATIVE meanings; based on this information alone, one might say that -*ize* affixation would be a very good choice for a new ORNATIVE denominal verb. However, let us also suppose that more conversion denominal verbs are ORNATIVE in interpretation than any other semantic category. When considering which process will lead to the most successful interpretation of a new ORNATIVE verb, conversion would make an even better choice than -*ize* affixation. If the corpus reveals that the semantic category distribution of these processes differs from one another and across time, then it is possible to compare how newly created forms within a given time period match up to the distributions of the processes' existing forms. If the new forms reflect only distribution patterns of their respective processes, then no further claims can be made about sensitivity to the interaction of the distributions. If, on the other hand, the new forms are consistent with the patterns of all processes, this would lend support to the hypothesis that native speakers take into account the semantic distributions of all processes when deciding between competing processes.

Furthermore, the distributions in the corpus may help identify more central verb meanings and less central ones. Are there some semantic categories that are fairly well represented across processes? Are there some categories that have consistently low type frequencies across processes? Also, examination of the obsolete entries and definitions may reveal some interesting information. If the semantic distribution of the obsolete items mirrors that of the still existing items, then the conclusion to be drawn is that it is a general characteristic of all entries and meanings that some become rare or obsolete over time. However, if the semantic distribution among the obsolete items shows an overrepresentation of one or more categories, especially those with low type frequency across processes, this would suggest that there is something about the category or categories themselves that compels their lack of usefulness as a verb meaning.

### 2.1.3 The Nature of This Corpus Study

An important issue to address is what is included in the corpus and what is not. A discussion of what is included follows shortly, but to begin with, what this corpus does not include is examination of processes that have long ceased to be productive and those that are actually deriving verbs, not from nouns, but from some other syntactic category.

Processes that ceased to be productive in English involve affixation. One such Old English affix is the suffix *-en*. Most of the derived *-en* forms in use in today's English have adjective bases (e.g. *darken*) with a CAUSATIVE meaning of 'make (the quality denoted by) the adjective'. However, there are quite a number of *-en* verbs with noun bases, such as *frighten*, *hearten*, *lengthen*, *strengthen*, and *threaten*, with a more or less ORNATIVE interpretation of 'add (the quality denoted by) the noun'. The affix developed from an Old English ending *-nian* for verbs derived from nouns ending in /n/, and achieved separate suffix status by the 13th century (Marchand 1969, 271). This suffix was never very productive in the formation of denominal verbs (Marchand 1969, 272); the data from the OED confirm this as they provide only 146 entries in total containing this suffix and only 29 of them from noun bases. Marchand (1969, 272) also claims that *-en* does not participate in present day English denominal verb formation; this, too, is borne out by the OED with just 27 new entries in the last 200 years and only 2 of them denominal.

Also not included in the corpus are entries with the suffixes *-er* (as in *chatter*, *patter*) and *-le* (as in *sniffle*, *sparkle*), often associated with a continuous or reiterative meaning. In fact, Marchand does not even consider these to be "proper" suffixes as their putative bases as separate words are rare at best, and many of the ones that do exist (e.g. *chat*), actually entered the English lexicon much later than their supposed derivation (Marchand 1969, 273; 322-323). In any case, these two are no longer productive in present day English. There are no examples of *-le* forming verbs in the last 150 years and only 4 examples of *-er* forming verbs in the last 100 years (*snooter*, *stonker*, *yikker*, and *yacker,* none of which would have much familiarity for native speakers of American English.)

Other affixes with questionable status, not as present-day productive elements, but as forming verbs directly from nouns are *re*-, *un*-, and *dis*- when used to represent REPETITIVE and REVERSATIVE meanings. Instead, according to Marchand, these should be understood as cases of a prefix attaching to a verb that has itself been converted, or using his terms, zero-derived from a noun (Marchand 1969, 134-137). For example, the meaning of the verb *unbutton* is more the reversal of the event denoted by the verb *button*, rather than a direct reference to the noun *button*. It is important to note that the prefixes when having these interpretations are also found with verbs without cognate nouns (e.g. *rewrite, unfasten, disconnect*), while PRIVATIVE *de*- (e.g. *defrost*), LOCATIVE *eN*- (*encage*), and ABLATIVE *un*- (*unsaddle*) are not. With this in mind, verbs formed with the prefixes *re*-, *un*- and *dis*- are not included in the corpus.

The process of compounding deserves particular mention. There are many compound verbs and many of those have a noun element. However, the noun is the non-head, a participant that further specifies the event denoted by the verb head; for example, with the compound verb *spoonfeed*, the event denoted by the verb is specific kind of feeding event, feeding (the verb element) with the use of a spoon (the noun element), but it is fundamentally a feeding event. In these instances, the verb element of the compound, not the noun element, would be considered the base. Other compound verbs containing noun elements are actually instances of conversion (e.g. *spotlight*; *pickpocket*; *pigeonhole*) or backformation (e.g. *stagemanage* from *stagemanager*) where a compound noun was created first and is considered the base. In actuality, truly denominal compound verbs are extremely rare in English (Marchand 1969, 100-106). Therefore, the only verb compounds in the corpus are those identified as instances of conversion and they participate in the analysis as denominal verbs formed by conversion.

Let us now turn to what types of verbs are included in the analysis. The prefix *be*- productively formed denominal verbs in Old English and Middle English, the unstressed form of Old English *by*- (Marchand 1969, 146), reflecting that particle's meaning of 'by, around, about, near'. The affixation of *be*- created denominal verbs with LOCATIVE (*betrap*), ORNATIVE (*bejewel*), PRIVATIVE (*behead*), and even RESULTATIVE (*befriend*) interpretations. However, as *be*- also served the function of making intransitive verbs transitive (e.g. *bemoan*), it is not entirely clear how many of the denominal *be*- verbs were indeed derived directly from nominal bases or were instead derived from verbal bases that were themselves derived from nouns or derived from the same root as the associated nouns. Moreover, of the nearly 600 entries provided by the OED, only 23 are listed with an earliest quotation date in the last 200 years, and none since 1894, supporting Marchand's claim that *be*- no longer participates in English verb formation. Still, considering all of the semantic functions *be*- fulfilled, it would be very interesting to examine its development and use, especially in relation to the other denominal verb formation processes of English, and thus data related to *be*- affixation are included.

The affixes *eN-*[13] and *-ate* are also considered to result in denominal verbs and hence contribute to the analysis here. The prefix *eN-* entered the language in the Middle English period with forms borrowed from French, and very early on was perceived as associated with or identical to the native English prefix *in-* (Marchand 1969, 162-163). The LOCATIVE use of *eN-* (e.g. *encage*) has been briefly mentioned above; other common uses include RESULTATIVE (*enslave*) and ORNATIVE (*encrown*) meanings. As for the suffix *-ate*, Marchand (1969) discusses the development of *-ate* as beginning with borrowings in the Middle English period of Latin and French participles with the ending *-atus*, but being greatly reinforced by the process of backformation (discussed below) of deverbal nouns ending in *-ation*. By the 15th century, *-ate* had become productive as a separate suffix, and by the 16th century had “a mere functional value” in deriving verbs from Latinate nouns. That is to say, no particular meaning was associated with the suffix; it was used simply to form verbs from particular Latinate bases (Marchand 1969, 258). Today, it is used productively in scientific terminology with the ORNATIVE meaning ‘combine, impregnate, treat with’, and derivation from non-Latinate bases is extremely rare.

Also contributing to the corpus is the suffix *-ify*, which entered English through borrowings of verbs in French ending in *-efier* and *-ifier* with the CAUSATIVE or RESULTATIVE meaning of ‘make, convert into, bring into the state of’. From the 16th century, new verbs were derived from both Latinate and native nominal and adjectival bases, again with the CAUSATIVE and RESULTATIVE interpretations. Many derivations with *-ify* (e.g. *ladify, monkeyfy, russify*)

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[13] The use of *eN-* here is meant to encompass the prefix *en-* and its allomorphs *em-, in-, im-*.

further suggested a negative or facetious connotation. Other derivations with a learned quality (e.g. *nullify, acidify, objectify*) have continued to be productive and exhibit no such negative tinge in meaning (Marchand 1969, 300-301).

The most productive of the denominal verb-forming affixes is -*ize* and no corpus on English denominal verbs would be complete without it. The affix -*ize* can trace its origin all the way back to Ancient Greek -*izein*, which developed into Latin -*izare* and finally into French -*iser*. The earliest -*ize* verbs in English were borrowings from French and many taken from the ecclesiastical sphere (e.g. *baptize, canonize*, *evangelize*). Beginning near the end of 16th century new verbs were formed with -*ize* as a separate affix, including a great deal of terminology for literature, medicine, natural science, and theology. Scientific terms continue to be a productive source of new terms in today's English. Verbs formed with -*ize* may be derived from nouns and adjectives, and from either Latinate (*equalize, humanize*) or native (*standardize*, *tenderize*) bases (Marchand 1969, 318-319). The principal meanings found with -*ize* verbs are CAUSATIVE (glossed as 'render, make' by Marchand) as in *legalize*, RESULTATIVE ('convert into, put into the form of, give the character or shape of') as in *dramatize*, ORNATIVE ('impregnate, treat, combine with') as in *alcoholize*, PERFORMATIVE ('do as, act in a way characterized by') as in *botanize*, and SIMILATIVE ('imitate the manner or style of') as in *Platonize*. Marchand provides two more categories of meaning with -*ize* verbs that do not fit as neatly into the others: 'subject to the action, treatment, or process of' as in *propagandize* and *hospitalize*, and 'subject to a special (technical) process connected with' as in *weatherize* and *galvanize*.

Another process to be included and perhaps best related to affixation is backformation or backderivation. These terms describe the phenomenon whereby a lexical item comes to be analyzed as having participated in a word formation process, such as affixation, that, in an historical sense, it actually did not. An example of backformation was previously discussed in section 1.2, using the example of the pair *peddle* and *peddler*. In fact, many speakers may be surprised to discover that in addition to *peddle*, *automate*, *aviate*, *eavesdrop*, *edit*, *emote*, *escalate*, *extradite*, *extrapolate*, *legislate*, *pre-empt*, *psychoanalyze*, *resurrect*, *scavenge*, *stoke*, *swindle*, *televise*, and *upholster* were all backformations. “The term backformation, backderivation therefore has diachronic relevance only” (Marchand 1969, 391). The semantic relationship between the two related items may be useful information in reinforcing existing patterns of the word formation process they are presumed to have participated in, but the actual direction of derivation is irrelevant in these cases.

Lastly is the word formation process of conversion, or as Marchand prefers ‘zero-derivation’. In this process, a word of one lexical or syntactic category, in the case of denominal verb formation a noun, begins to be used as a member of another category, in the present case a verb, without any overt marking on the newer form. For example, the noun *butter* can be used to form the verb *butter*, again without any overt marking on the derived verb. Marchand’s view is that the use of the term ‘conversion’ is acceptable in cases where the relevant change is purely grammatical or syntactic, which for him, is not part of word formation, which involves changes of word class or lexical class. For example, *government* of *government official* still retains its nominal characteristics and fails to adopt all of the (syntactic) characteristics found with adjectives

(Marchand 1969, 360). However, the verb *butter* behaves as a full-fledged verb, leaving all nominal characteristics behind; this is, therefore, an instance of zero-derivation and not conversion. Also, according to Marchand, not to be included as zero-derivation are cases like *hopeful* to mean 'hopeful candidate'. Marchand sees these as clippings and like all other clippings are elliptical; the speaker has the sense that something is omitted and this is just a shortened form of something longer. However, once the clipped word, such as *musical* or *van*, has been reanalyzed without the clipped sense, synchronically it is still not perceived as a derived form and therefore, for Marchand, not part of word formation. The fact that it was originally a clipping is of diachronic interest only (Marchand 1969, 361).

It has often been noted that denominal verb conversion or zero-derivation has been much more productive in English than in other Romance and Germanic languages (Marchand 1969, 364). Marchand explains that in terms of native (i.e. from Old English) denominal verb forming processes, "English **be-** has never played a serious role in denominal derivation. Nor has the type **en-cage** ever become productive to any great extent" (1969, 364; emphasis as in original text). This would leave zero-derivation as the only productive option during this time. Once borrowing from French began on the large scale, there seemed to be reluctance at first to use zero-derivation on these loan words, but the process was helped along by the borrowing of noun-verb cognate pairs such as *anchor*, *blame*, *change*, and others that existed in French. Consequently, from the 14$^{th}$ century zero-derivation was as productive with French borrowings as it was with native words. At the same time, French denominal verbs containing affixes were also borrowed and anglicized. Eventually the affixes, particularly -*ate*, -*ify*, and -*ize*, were analyzed out of the borrowed forms and were used productively as separate affixes as well. However, according to Marchand, in today's English, these affixes "have a restricted range of derivative force: **-ate** is latinizing [sic] and learned, **-ify** is learned while **-ize** is chiefly technical" (Marchand 1969, 365; emphasis as in original text). This again leads to conversion as the more productive choice in forming new verbs from nouns, and therefore, a necessarily large part of the corpus of English denominal verbs.

Thus, table 2.1 below summarizes the affixes and processes that are the focus of this corpus study on English denominal verb formation as well as those not included.

Table 2.1 Verb formation processes included in the corpus study

| **Verb formation processes included** | **Verb formation processes not included** |
|---|---|
| *-ate* | *dis-* |
| *be-* | *-en* |
| conversion | *-er* |
| *eN-* | *-le* |
| *-ify* | *re-* |
| *-ize* | *un-* |

## 2.2 Method

The development of the corpus consisted of three main stages: collection, culling, and coding. The procedures applied for each are discussed in turn below.

### 2.2.1 Collection Procedure

A list of over 20,000 potentially denominal verbs was collected from the OED Online. The method of collection was modeled after that employed by Plag (1999) with modifications appropriate to the goals of the present research. The list of potential denominal verbs was extracted from the OED Online using the query language of the "Advanced Search" page, which allows for the search of various parts of the entries (e.g. the entry word (lemma), the etymology, the definition) and/or particular types of entries (e.g. verbs only, nouns only). For the prefixed denominal verbs (i.e. those beginning with *be-* and *eN-*), only verbs were searched and all verbs that contained the given affix in their etymology were extracted. For the suffixed denominal verbs, different types of searches were necessarily carried out. For the list of *-ize* verbs, all entries (lemmas) ending in the strings 'ize', 'ized', 'izing', and 'ization' were extracted. All forms were necessary as they all represent an *-ize* verb, whether previously existing or implicit. Similarly, for the *-ify* verb list, all entries ending in 'fy', 'fied', 'fying', and 'fication' were pulled out. For *-ate*, however, only verbs ending in the string 'ate' were extracted, as the number of other entries ending in 'ated', 'ating', and 'ation' would be too numerous and contain too many duplicates and/or mishits.

Searching for a list of conversion verbs derived from noun bases was a bit less straightforward. Every reasonable attempt was made to find as many as possible, but any type of programming is sure to miss some. Again using the query language provided, only verbs were searched and all verbs were extracted that contained, in their etymologies, the string '#from#' (recognized by the

OED Online search program as the symbol ‘<’ used by the OED Online to abbreviate ‘from’ in the newly revised entries). For the entries not yet revised, verbs with the exact string ‘f.’ (used by the OED Online to abbreviate ‘from’ in the Second Edition) and the exact string ‘n.’ (noun) or ‘prec.’ (preceding) within 2 words in their etymologies were pulled out. Also, all entries, regardless of syntactic category, containing the strings ‘hence’ and ‘v.’ (verb) within 2 words of each other were extracted; this pulled out entries that contained a notation that a verb was derived from the main entry. This search identified not just conversion verbs but also affixed verbs that might have been missed in the previous searches on lemmas only.

Using this list of words, a computer script was created that could search the OED Second Edition on CD and pull out the given entries and as well as their earliest attested quotation date, part of speech, etymology, any special notation (e.g. obsolete, regional, slang, technical language), and all definitions. Any words on the list not found in the Second Edition, or revised since the Second Edition, were looked up individually on the OED Online and the relevant information taken directly from there.

### 2.2.2 Culling Procedure

At this point, it was necessary to “clean up” the list of potential denominal verbs by eliminating duplicate entries and entries that were simply orthographical variants of another. Further eliminated were entries that, while ending with the appropriate string, were not instances of affixation. For example, the verbs *size, defy* and *hate* were included in the original list, as they end with the strings ‘ize’, ‘fy’ and ‘ate’. Clearly, however, *size*, *defy* and *hate* were not derived by *-ize*, *-ify* or *-ate* affixation, respectively.

Also, entries that were further derivations, inflectional or derivational, of previously derived forms already listed were excluded. For example, a related adjective or noun form (for example, one ending in *-ized*, *-izing* or *-ization*) was retained if and only if no corresponding verb form was listed separately. Also, verbs like *mischaracterize* or *Pagano-Christianize* were eliminated, as the etymology indicated that the prefix or compound element was added to a verb found elsewhere on the list. However, the etymological information listed in the OED for the verb *dehydrogenize* indicates that it was formed by the affixation of both *de-* and *-ize* to the noun *hydrogen*; these instances of parasynthesis, i.e. instances where, according to the OED, the verb was formed by the simultaneous affixation of both prefix and suffix, were retained. This is a variation from the method employed in Plag (1999), who excluded parasynthetic forms under the conditions that the suffixed form was attested earlier and the derivative was phonologically and semantically transparent. Plag’s logic is the same as that relied upon for the decision here to eliminate inflectional forms when the verb form is already listed; however, for the purposes of this corpus, if the OED determined that the formation of the parasynthetic verb (e.g. *dehydrogenize*) was not based upon the related verb (*hydrogenize*), but instead had a separate genesis directly from the noun (*hydrogen*), the parasynthetic verb was retained in the corpus as a separate instance of denominal *-ize* formation.

Also retained, and consistent with Plag's method, were seemingly affixed forms that were, according to the etymology given by the OED, derived by backformation. It will be remembered from above that backformations arise from the reinterpretation that a given form is a case of affixation, for example, from a putative related form, even though no such form previously existed. It is this putative form that results from the process of backformation. To illustrate, *divisionalize* was formed by backformation from *divisionalization* and *micronize* from *Micronizer*; these entries were retained on the list since the reanalysis or reinterpretation involved in the backformation would still imply *-ize* affixation at some point.

As for the conversion verbs, the goal was to locate as many verbs as possible that were unambiguous instances of conversion from nouns in English. If the OED indicated a definite lack of certainty in the entry's etymology, that entry was deleted from the list. If the OED indicated that the verb was in fact a borrowing from another language, even if in that language the verb was an instance of denominal conversion, the entry was eliminated. Many other entries were based in Old English, but only came to be formally identical to a semantically related noun after the loss of the majority of inflection in English. Whether native speakers now view these as cases of conversion cannot be determined; furthermore, the type of semantic relation between the verb and (accidentally) identical noun may be entirely different than the types seen with conversion. Therefore, these, too, were not retained in the list of denominal conversion verbs. Of the over 12,000 entries collected before the culling stage and identified as potentially conversion, nearly half were eliminated from the list as not being clear instances of denominal verb formation by the process of conversion. Other deletions were simply mishits: cases where the initial search pulled out entries that were verbs converted from other syntactic categories or were actually affixations.

Moreover, unlike the overt affixation verbs, potential conversion forms that were listed as backformations were all eliminated unless the original form ended in *-ed* or *-ing*. So, for example, the verb *scapegoat* is listed in the OED as having been derived from the verbal noun *scapegoating* (derived from the noun *scapegoat*) and the verb *wrinkle* from the past participle adjective *wrinkled* (from the noun *wrinkle*). Both of these verbs are retained on the list as the reinterpretation of their derivational relationship still implies a process of noun-to-verb conversion for the verb reanalyzed as the source of the actual original form. On the other hand, the verb *choreograph*, from the noun *choreography*, was eliminated because the reinterpretation involved in the backformation process does not imply conversion from any noun; rather, *choreograph* would more likely be assumed to have entered the lexicon as a verb by borrowing from another language or formed by some other (i.e. non-conversion) process altogether.

Another problem with many of the potential conversion forms was compounding. Quite a number of the entries on the list were of a type exemplified by *pistolwhip*; this verb was formed by the combination of the noun *pistol* and the verb *whip*. As discussed above, although this type is derived from a noun in the sense that the first element is the noun (*pistol*), it is the second element, the verb (*whip*), that determines the syntactic category of the compound and the essential meaning as a type of whipping event that is further described as involving a pistol. Furthermore, there is no noun **pistolwhip* that the compound could have been derived from, and so items of this type are not considered to be conversion from a noun base and are eliminated from the list. Similar cases are of the sort illustrated by the verb *hemstitch*, a compound formed from the noun *hem* and the verb *stitch*. Situations of this type are complicated by the existence of the noun *hemstitch*; however the noun was, in fact, derived from the compound verb. Again, entries displaying this pattern were not considered the result of conversion from a noun and were removed from the list. The kinds of compounds that were considered denominal verb conversions were those such as the verb *honeycomb*, which the OED lists in its etymology as being derived directly from the compound noun *honeycomb*.

One last note about the culling procedure relates to the handling of obsolete items. Many entries had a special notation provided by the OED as being obsolete, rare, archaic, or nonce words, or had definitions thus marked. Since one of the main goals is to determine what is possible in the patterns related to newly entered forms, these items were kept in as they were, at the time of entry, obviously, new forms. Also, the OED does not indicate when they became obsolete, etc. Therefore, for the analysis of items across time, these were left in. However, for the analysis of items in current usage (results to be discussed later), the obsolete entries and definitions were eliminated.

### 2.2.3 Coding Procedure

The last phase in the development of the corpus before the data can be analyzed was the coding of the verbs according to certain features. Where relevant, the verbs were coded for whether they entered the language as borrowed (e.g. from French) or were created in English, and the semantic category associated with each use as indicated by the definitions provided by the OED. As the crux of the work discussed here involves the distribution of semantic category types across denominal verbs, it was absolutely essential to find a method of coding such that the appropriate category could be consistently determined for each definition. As mentioned in chapter 1, quite a bit of subjective interpretation is possible in the analysis of the semantic category of each definition. Most of the semantic categories used are relatively well-established: RESULTATIVE ('turn into N, make (more) like N'); ORNATIVE ('add N'); PRIVATIVE ('take N away'); LOCATIVE ('locate in/on N'); ABLATIVE (remove from N); SIMILATIVE ('act like N'); PERFORMATIVE ('do N'); and INSTRUMENTAL ('use N'), but a consensus has yet to be reached regarding the Lexical Conceptual Structure (LCS) related to each semantic category. In the discussion of the results (section 2.3) a proposal is made for a unified structure underlying all the denominal verb semantic categories; however, for coding purposes, a decision was made to use a separate LCS for each category.

The LCSs used in determining the coding of the definitions of the denominal verbs are described below. For RESULTATIVE, the LCS is CAUSE [x BE [noun base]], where the semantic primitive CAUSE signifies a causative, creative, or performative event, x is one of the internal arguments, BE represents a stative relationship, and [noun base], the argument that provides the base for the denominal verb. It is important to note that the LCS allows for both a literal and figurative interpretation, so that the internal argument can become the base noun or can become like the base noun. To illustrate with a familiar RESULTATIVE verb, *victimize*, the LCS of this particular verb is CAUSE [x BE [victim]], glossed as 'cause x to be (like) a victim'.

Consequently, the idea that identity and similarity should be treated equivalently was maintained not just for RESULTATIVE but across all semantic categories. Examples of phrases often used by the OED to indicate RESULTATIVE interpretations include *change into, convert into, declare as, establish, form into, give the appearance of, make into, make like, produce, represent as, treat as,* and *turn into*. Some verbs eventually coded as RESULTATIVE were not defined by the OED with such phrases; examples of these are shown in table 2.2 below.

Table 2.2 RESULTATIVE entries defined by OED with less common phrases

| **Entry word** | **Definition** |
|---|---|
| *acclimatize* | To habituate or inure to a new climate |
| *computerize* | To prepare for operation by a computer |
| *winterize* | To adapt or prepare (something) for operation or use in cold weather |
| *storm* | To make (seed-hay) storm-proof by piling the sheaves in small stacks |
| *tune* | To adjust the tones (of a musical instrument) to a standard of pitch |
| *wing* | To incline to a particular wing, side, or party |

Entries such as *acclimatize*, *computerize, winterize*, *storm*, *tone*, and others with an interpretation of changing in order to become accustomed to the base noun were coded here as RESULTATIVE as they best fit the LCS for RESULTATIVE. The LCS for *winterize*, for example, is CAUSE [x BE [(ready for) winter]]. Similarly, entries with an interpretation indicating the favoring of the base noun have LCSs most like that of RESULTATIVE; the LCS proposed here for *wing* is CAUSE [x BE [(inclined towards) wing]].

The LCS for SIMILATIVE is essentially the inchoative version of RESULTATIVE, with no CAUSE portion: BE [noun base]. The verb *gossip* is a familiar example of a SIMILATIVE verb. The exact LCS for *gossip* is BE [gossip], 'be (like) a gossip'. Common phrases used by the OED to indicate a SIMILATIVE meaning include *act as, act like, be, become, behave as, imitate, live as, play,* and *work as*.

In a way, PERFORMATIVE is the mirror image of SIMILATIVE; the LCS for PERFORMATIVE, unlike SIMILATIVE, does have the CAUSE portion, but not the BE portion. For PERFORMATIVE verbs, the base noun is the only internal argument: CAUSE [[noun base]]. For example, with *fox-trot*, the LCS is CAUSE [[fox-trot]], glossed as 'do (like) a fox-trot'. As was mentioned above in reference to the LCS for RESULTATIVE, the semantic primitive CAUSE is interpreted here to encompass not just a causative relation, but also a creative (MAKE) and performative (DO) relation. Phrases commonly found in the OED definitions for the verbs coded as PERFORMATIVE are *carry out, celebrate, commit, conduct, do, engage in, indulge in, perform, play, practice, pronounce, pursue, sing, study, utter,* and *write*. Less obvious are phrases such as *consort with, associate with*, and *have to do with*, as in *womanize, wench*, and *whore*. These were determined to be PERFORMATIVE, again based upon the LCS of CAUSE [[noun base]]. Using *womanize* as a specific example, the LCS for this verb is CAUSE [[(what is typically done with) woman]], with the gloss 'do what is typically done with women'[14]. Another group of verbs that were determined to be PERFORMATIVE based upon a similar LCS were those that involve searching for, hunting, gathering, or seeking

[14] It is unfortunate, from a feminist perspective, that all such verbs involve females as the base noun and there are no examples of attested verbs that denote consorting with males.

out the base noun, as with *fossilize*, *clam*, and *crop*. The LCS for *fossilize* is CAUSE [[(what is typically done with) fossil]], 'do what is typically done with fossils'.

ORNATIVE, LOCATIVE, PRIVATIVE, and ABLATIVE have very similar LCSs. The basic structure for ORNATIVE and LOCATIVE is CAUSE [GO x TO y]; for ORNATIVE, x is the [noun base], and for LOCATIVE y is the [noun base]. These LCSs contain the primitives GO and TO, which represents the change of location relation between the two arguments, x and y. The LCS for the ORNATIVE verb *water* is CAUSE [GO [water] TO y], 'cause water to go to y', and the LCS for the LOCATIVE *box* is CAUSE [GO x TO [box]], 'cause x to go to a/the box'. Phrases commonly used to denote an ORNATIVE interpretation are *add*, *affect with*, *apply*, *attribute*, *confer*, *cover with*, *dress in*, *endow with*, *fill with*, *furnish*, *give*, *have*, *imbue with*, *impart*, *impose*, *increase*, *infect with*, *install*, *introduce*, *mix with*, *provide with*, *put forth*, *saturate with*, *subject to*, *supply*, and *treat with*. Phrases used for LOCATIVE verbs are *bring under control of*, *celebrate in*, *contain in*, *convey in*, *divide into*, *envelop within*, *frequent*, *house in*, *hit on the*, *insert in*, *locate in*, *place in*, *put into*, and *record in*. Also included as LOCATIVE were those interpretations that involved ascertaining or determining of the noun base. For verbs with this interpretation, the noun base is the entity with which the other internal argument is associated. The denominal verb *date*, as in 'to ascertain the date of an event', is a representative example; the event may be assigned to one date or another, but the dates themselves are invariable and so may best be considered a type of location. The LCS, therefore, is CAUSE [GO x TO [date]], 'cause x to go to the date'.

PRIVATIVE and ABLATIVE are identical to ORNATIVE and LOCATIVE, respectively, except that the change of location relation is one that is away or from the y argument, represented by the primitives GO and FROM. The LCSs for these two categories are exemplified by PRIVATIVE *bone* (CAUSE [GO [bone] FROM y], 'cause the bone to go away from y') and ABLATIVE *shell* (CAUSE [GO x FROM [shell]], 'cause x to go away from its shell'). Phrases used by the OED that are associated with the PRIVATIVE interpretations are *deprive of*, *destroy*, *make less like*, *reduce from rank of*, *remove*, and *take away*, and often associated with ABLATIVE are the phrases *remove from* and *take away from*.

Lastly, the LCS for INSTRUMENTAL is more variable than the others; however, there is one necessary constant the others lack-- the WITH [noun base] portion. What is special about INSTRUMENTAL is that the interpretation of the role of the base noun focuses upon its status as an instrument. The base noun may, in fact, be something created (as with the base noun of RESULTATIVES, e.g. *dovetail*, or SIMILATIVES, e.g. *screen*), the action performed (PERFORMATIVES, e.g. *camouflage*), an added entity (ORNATIVE, e.g. *hyphenate*), a location (LOCATIVE, e.g. *cart*), and even something removed (PRIVATIVE, e.g. *fingerprint*). Therefore, it is proposed here that the LCS for this semantic category can be any of the ones listed above, with the addition of the WITH primitive preceding the [noun base], potentially realized as CAUSE [x BE y WITH [noun base]] (as with *dovetail*); BE y WITH [noun base] (e.g. *screen*); CAUSE [x WITH [noun base]] (*camouflage*); CAUSE [GO x TO y WITH [noun base]] (*hyphenate* or *cart*); and, CAUSE [GO x FROM y WITH [noun base]] (*fingerprint*). Instrumental verbs are often signaled as such by the OED with phrases such as *add by way of*, *arrange by*, *confirm by*, *destroy with*, *employ*, *express by*, *influence by*, *mark with*, *predict from*, *produce by*, *represent by*, *test by*, *unite with*, and, of course, *use*.

Table 2.3 below presents a summarized version of the semantic categories and their LCSs, as proposed above.

Table 2.3 Lexical conceptual structures of semantic categories

| **Semantic category** | **Lexical conceptual structure** |
|---|---|
| RESULTATIVE | CAUSE [x BE [noun base]] |
| SIMILATIVE | BE [noun base] |
| PERFORMATIVE | CAUSE [[noun base]] |
| ORNATIVE | CAUSE [GO [noun base] TO y] |
| LOCATIVE | CAUSE [GO x TO [noun base]] |
| PRIVATIVE | CAUSE [GO [noun base] FROM y] |
| ABLATIVE | CAUSE [GO x FROM [noun base]] |
| INSTRUMENTAL | CAUSE [x BE y WITH [noun base]]<br>CAUSE [GO x TO y WITH [noun base]]<br>CAUSE [GO x FROM y WITH [noun base]] |

When the base noun was not mentioned in the given definition and the relationship to the base noun was not obvious, it was often necessary to find out the exact meaning of the base noun, especially for obsolete items or obsolete definitions, in order to determine the semantic category. Even so, there were some definitions for which the relationship between the base noun and the internal argument of the verb simply could not be determined. Table 2.4 provides a few examples.

Table 2.4 Examples of meanings coded as OTHER

| **Entry word** | **Definition** |
|---|---|
| *temporize* | To let time pass, spend time, ‘mark time’ |
| *organize* | To make arrangements or preparations for (an event or activity) |
| *symbolize* | To mix, combine, unite (elements or substances, esp. those of similar qualities) |
| *recognize* | To acknowledge by admission, confession, or avowal |
| *rubber* | To listen or listen in (on a party telephone line) |
| *snooker* | To place in an impossible position; to balk, ‘stymie’ |
| *total* | To damage beyond repair (esp. a motor vehicle, in an accident) |

None of these are similar enough to each other to potentially form a subcategory; therefore, these uses were coded with the label OTHER. However it may be that a regular relationship between the base noun and the verb’s internal argument exists but has not yet been determined. Perhaps for some, new words or meanings will be created in the future that will be semantically similar, and at that time the appropriate categorization will become clear.

All affixed entries were also coded for how they entered the lexicon, either as a borrowing directly from another language or as a form created or constructed within the language. This is especially important for affixation because if the hypothesis that sensitivity to semantic distribution patterns exists proves to be correct, the effect of borrowed items, particularly the items that entered the language and were used to analyze out the affix before the affix was used to create new items within English, should become evident. The determination of borrowed/created status was based upon the etymological information given by the OED. If the status could not be determined for an entry, the entry was not coded and was not used for this part of the analysis.

In addition, entries that are also found in the CELEX[15] database were coded as such; this allows for a separate analysis of those items that are more likely to be found in a typical present-day speaker's mental lexicon, with the additional benefit of having available token frequency information. As many others have suggested, type and token frequency play significant roles in the notion of productivity (e.g. Bybee 1995; Hay and Baayen 2001). If a verb is also found in the CELEX database, the verb was coded as such and the token frequency recorded.

## 2.3 Results and Discussion

The discussion of the results of the corpus study that follows is organized according to the four questions listed in the introduction section, repeated here for convenience.

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Q3. What factors condition that probability?

Q4. What is the nature of the competition between the verb formation processes?

[15] CELEX is a database of over 17 million words using the COBUILD corpus of spoken and written texts of British and American English.

First, section 2.3.1 provides the overall count of collected denominal verbs in terms of raw numbers for each of the denominal verb formation processes. In sections 2.3.2 and 2.3.3, Q1 and Q2 are addressed by examining each of the denominal verb formation processes individually in terms of semantic category participation. In section 2.3.4, the response to Q3 is achieved by investigating the verb formation processes individually, providing evidence of the Semantic Category Distribution Effect. Lastly, in section 2.3.5, the processes are examined in relation to each other in order to characterize the nature of the competition among them (Q4).

### 2.3.1 Total Number of Denominal Verbs Collected for Each Verb Formation Process

Of the nearly 9,000 denominal verbs selected for this corpus study, table 2.5 provides the distribution in terms of overall type frequency, regardless of semantic category.

Table 2.5 Distribution of corpus study denominal verbs by verb formation process

| Verb formation process | Number of verbs | Percentage |
|---|---|---|
| conversion | 5,897 | 66.3% |
| *-ize* | 1,525 | 17.1% |
| *-ate* | 777 | 8.7% |
| *eN-* | 318 | 3.6% |
| *-ify* | 271 | 3.0% |
| *be-* | 112 | 1.3% |
| total | 8,900 | 100% |

Although there are many characterizations of the notion of productivity, from qualitative descriptions in terms of regularity of application to more quantitative measures of absolute frequency of application (refer to Plag 1999 for a more thorough discussion), the results attained in the corpus study presented here provide some perspective of the relative productivity of these verb deriving processes in terms of overall type frequency. As the results in the table above indicate, conversion has been used for an overwhelming majority of denominal verbs, with 66.3% of the total. Affixation with *-ize* is the second highest in terms of type frequency, *-ate* affixation third, followed by *eN-* and *-ify*, and *be-* affixation the least of all. Although these are verbs with only denominal bases, these results mirror those presented in Plag (1999, 104) for 20th century derived verbs regardless of the syntactic category of the base: conversion deriving the greatest number of 20th century verbs, then *-ize*, *-ate*, *-ify*, *eN-*, and finally *be-* with no occurrences at all for this time period. The similarity between these results begs the question: has this order of relative productivity always been the case across the history of English? In order to address this question, what follows is a closer examination of overall type frequency of the denominal verb processes in English across time, from 725 through the 20th century.

Figure 2.1 below is a representation of the number of verbs for each denominal verb process with an earliest attested quotation date within a given decade. Although the details of the graph are obscured by its size, there are a couple of noteworthy observations that are quite clear.

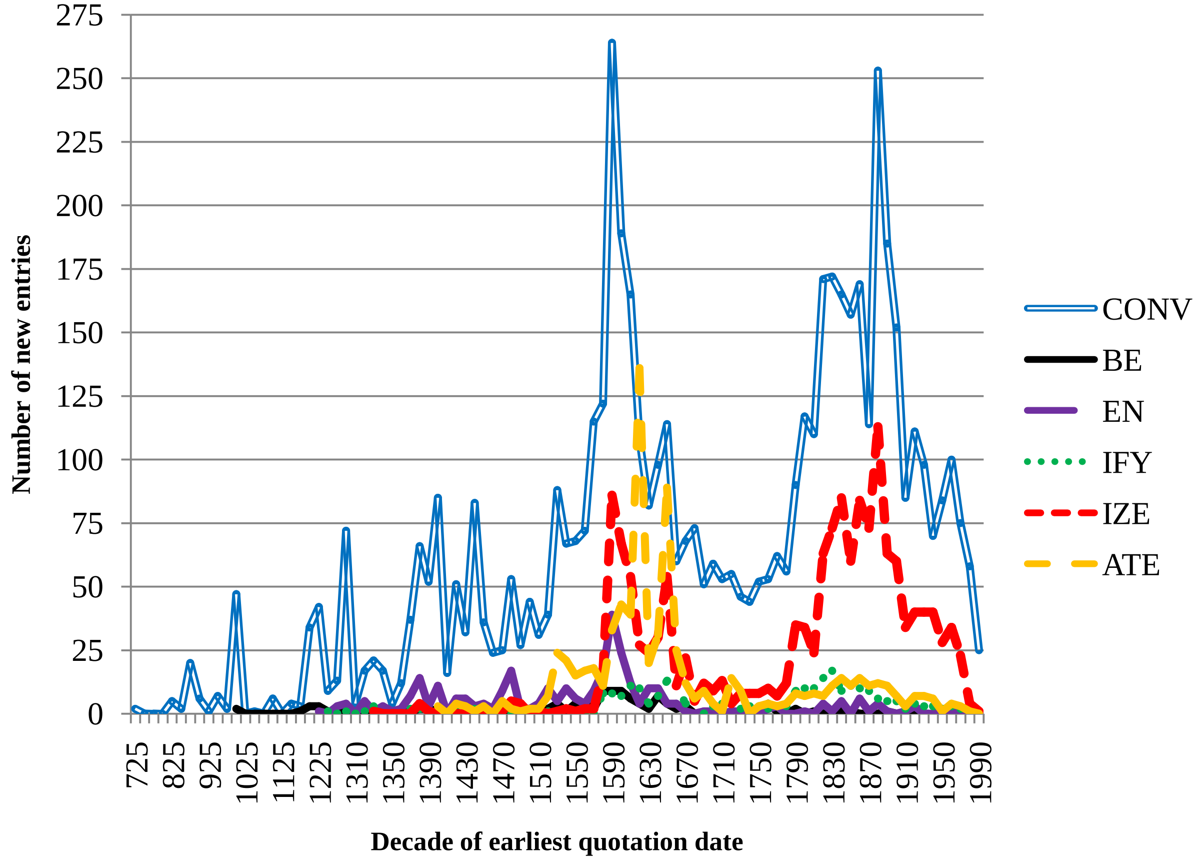


Figure 2.1 Number of new entries by decade for each denominal verb formation process

To begin with, one observation that is rather obvious is that conversion usually swamps the other denominal verb processes in terms of new verbs by decade, but not always. At some points, the number of new *-ate* verbs and the number of new *-ize* verbs comes quite close to that of the number of new conversion verbs, suggesting that the order of relative productivity might have varied over time. Secondly, figure 2.1 shows that the processes display corresponding peaks and valleys. That is, when one process, such as conversion, increases in number of new verbs, many of the other processes also display an increase. Likewise, where one process shows a decrease, many of the others do as well. One might hypothesize a couple of explanations why this should be the case. It may be that at certain times, for whatever reason, new verbs of all semantic category types were needed, hence the increase all around. Alternatively, it may be that new verbs of a certain semantic category were needed and that competition between the processes generated several different verb forms with the same meaning. The expectation is that, over time, to avoid complete synonymy, only one will survive with the original meaning and the others will either become obsolete or encourage interpretations with a different semantic category. I will return to this issue in section 2.3.5.

The details of the new verb type frequency data may be further examined in terms of these peaks and valleys, as they represent naturally occurring time periods in English language history. The period in English before the first borrowings of denominal verbs from French is one such time period. From 725, the earliest attested date given in the OED for a denominal verb, until 1249 (the first French denominal verb borrowings begin at around 1250), there are 191 total denominal verbs: 182 conversion, 9 *be-* affixation verbs (see table 2.6). Comprising 95.3% of the total number, conversion is clearly the overwhelming winner in terms of type frequency for this time period, and this result is also consistent with Marchand's (1969, 364) statement that *be-*, even in Old English, has never played much of a role as a denominal verb forming affix in English.

Table 2.6 Number of new verbs by verb formation process during the pre-borrowing period (prior to 1250)

| **Verb formation process** | **Number of new verbs** | **Percentage** |
|---|---|---|
| conversion | 182 | 95.3% |
| *be*- | 9 | 4.7% |
| total | 191 | 100% |

It is important to be clear that there were likely to be many more such denominal verbs during this time; we can only say for sure that there were at least this many attested with quotations in the sources accessible to the OED. Still, there is no reason to believe the proportions displayed by this sampling should be dramatically different than that of the actual forms.

The next time period is between that of the first borrowings from French and that of the first peak in the number of new verbs. Table 2.7 below shows the number of new verbs from 1250-1529.

Table 2.7 Number of new verbs by verb formation process during the Early Borrowing period (1250-1529)

| **Verb formation process** | **Number of new verbs** | **Percentage** | **Total number of verbs** | **Percentage of total** |
|---|---|---|---|---|
| conversion | 870 | 80.8% | 1,052 | 83.0% |
| *eN*- | 120 | 11.1% | 120 | 9.5% |
| -*ate* | 33 | 3.1% | 33 | 2.6% |
| -*ize* | 19 | 1.8% | 19 | 1.5% |
| *be*- | 18 | 1.7% | 27 | 2.1% |
| -*ify* | 17 | 1.6% | 17 | 1.3% |
| total | 1,077 | 100% | 1,268 | 100% |

As the table above indicates, conversion is still the denominal verb process for the highest number of new verbs, but of the verbs with overt affixation, *eN*- is clearly number one, -*ate* a distant second, and -*ize*, *be*- and -*ify* contributing nearly identically low numbers during this time period. It should be noted at this point that the order of relative productivity in terms of type frequency is not the same order as seen with the overall numbers in Table 2.5 above, which was -*ize*, -*ate*, *eN*-, -*ify*, and *be*-, therefore demonstrating that, for example -*ize* was not always the most frequently used overt affix nor *eN*- one of the least.

The next period from 1530 to 1679 is referred to here as the First Peak. In this span of 150 years, 2,929 new denominal verbs entered the language, thus bringing the total number of denominal verbs in English to triple what it had been previously (1,268). The distribution of the new verbs is provided in table 2.8 below.

Table 2.8 Number of new verbs by verb formation process during the First Peak (1530-1679)

| **Verb formation process** | **Number of new verbs** | **Percentage** | **Total number of verbs** | **Percentage of total** |
|---|---|---|---|---|
| conversion | 1,680 | 57.4% | 2,732 | 65.1% |
| *-ate* | 534 | 18.2% | 567 | 13.5% |
| *-ize* | 399 | 13.6% | 418 | 10.0% |
| *eN-* | 159 | 5.4% | 279 | 6.6% |
| *-ify* | 87 | 3.0% | 104 | 2.5% |
| *be-* | 70 | 2.4% | 97 | 2.3% |
| total | 2,929 | 100% | 4,197 | 100% |

During the First Peak, all of the denominal verb formation processes are shown to participate in creating new verbs. The number of denominal conversion verbs attested in English up to this point is 1,052; in the 150 years of this period alone, 1,680 new denominal conversion verbs are found. In fact, each of the denominal verb formation processes increased its type frequency by 100% or more: *eN-* 133%; conversion 161%; *-ify* 512%; *-ate* 1618%; *-ize* 2100%; even the relatively unproductive denominal *be-* generated 70 new denominal verbs during the First Peak, a 260% increase from the 27 attested to that point.

The majority of the near 3,000 new denominal verbs entering English during the First Peak are conversion verbs; however, at 57.4% of the total, this is the smallest majority witnessed for denominal verb-forming conversion before or since, suggesting much greater competition from the other denominal verb formation processes at this time. As for the rest of the distribution, *-ize* is still not the most frequently used; in this time period -*ate* is, again revealing an order of relative productivity different from that seen with the overall numbers as well as from that of the previous time period.

The period of time that follows this peak, beginning at 1680 and ending at 1789, sees a significant drop, a lull, in the number of denominal verbs entering English. Only 809 new denominal verbs are attested during this time period, the lowest number since the entry of the French affixes. Details are shown in table 2.9 below.

Table 2.9 Number of new verbs by verb formation process during the Lull (1680-1789)

| **Verb formation process** | **Number of new verbs** | **Percentage** | **Total number of verbs** | **Percentage of total** |
|---|---|---|---|---|
| conversion | 604 | 74.7% | 3,336 | 66.6% |
| -*ize* | 96 | 11.9% | 514 | 10.3% |
| -*ate* | 57 | 7.0% | 624 | 12.5% |
| -*ify* | 33 | 4.1% | 137 | 2.7% |
| *eN*- | 10 | 1.2% | 289 | 5.8% |
| *be*- | 9 | 1.1% | 106 | 2.1% |
| total | 809 | 100% | 5,006 | 100% |

The number of new verbs has dropped for each one of the denominal verb formation processes for this 110 year span as compared to the First Peak: conversion and -*ify* down 62%; -*ize* 76%; *be*- 87%; -*ate* 89%; and with *eN*- displaying the most dramatic drop in new verb type frequency, from 159 new denominal verbs during the First Peak to only 10 during the Lull Period, a decrease of 94%.

As for relative productivity, again in terms of type frequency, conversion is once more far and away the most frequently used process in the formation of denominal verbs, numbering virtually three-fourths of the total. Of the overt affixes, the order is closer to that seen with the overall count, with *-ize* and *-ate* following conversion; however, here *-ify* demonstrates a higher new verb type frequency than *eN-*, which as aforementioned has witnessed a major decline in use with only one more new denominal verb attested than *be-*.

The next span of 110 years, from 1790 to 1899, is referred to here as the Second Peak. Table 2.10 shows that the total for this time period is 2,663 new denominal verbs, nearly as many as the First Peak and increasing the existing denominal verb total (5,006 verbs) by over 50%.

Table 2.10 Number of new verbs by verb formation process during the Second Peak (1790-1899)

| **Verb formation process** | **Number of New Verbs** | **Percentage** | **Total number of verbs** | **Percentage of total** |
|---|---|---|---|---|
| conversion | 1,703 | 64.0% | 5,039 | 65.7% |
| *-ize* | 707 | 26.5% | 1,221 | 15.9% |
| *-ate* | 114 | 4.3% | 738 | 9.6% |
| *-ify* | 110 | 4.1% | 247 | 3.2% |
| *eN-* | 23 | 0.9% | 312 | 4.1% |
| *be-* | 6 | 0.2% | 112 | 1.5% |
| total | 2,663 | 100% | 7,669 | 100% |

The First Peak generated a new verb type frequency boost, if you will, for each of the denominal verb formation processes; however, this Second Peak does practically nothing for *be-*, which is nearly dead as a denominal verb process at this point.

The details regarding the number of new verbs in the 20th century, 1900-1999, are provided in table 2.11 below.

Table 2.11 Number of new verbs by verb formation process during the 20th century (1900-1999)

| **Verb formation process** | **Number of new verbs** | **Percentage** | **Total number of verbs** | **Percentage of total** |
|---|---|---|---|---|
| conversion | 858 | 69.7% | 5,897 | 66.3% |
| *-ize* | 304 | 24.7% | 1,525 | 17.1% |
| *-ate* | 39 | 3.2% | 777 | 8.7% |
| *-ify* | 24 | 1.9% | 271 | 3.0% |
| *eN-* | 6 | 0.5% | 318 | 3.6% |
| *be-* | 0 | 0.0% | 112 | 1.3% |
| total | 1,231 | 100% | 8,900 | 100% |

The total of new denominal verbs with attested quotation dates in the 20th century is much less than that of the previous century, but labeling this period as another lull is perhaps premature. While there are indeed many fewer new verbs listed as appearing since 1980, this result could be, for one, a reflex of a type of "wait-and-see attitude" adopted by the OED in order to determine the status of certain lexical items, as unremarkable, rare, humorous, technical jargon etc.

Still, it is noteworthy that the relative productivity order is the same as it has been since the Lull Period of 1680-1789. Also, there were no denominal *be-* verbs attested as entering English over the last century, and it appears that *eN-* may be nearly dead as well. Furthermore, a quick glance at the numbers of new denominal *-ate* and *-ify* verbs reveals that their productivity in terms of new verb type frequency has significantly dropped as well. With conversion and *-ize* verbs comprising 94.2% of the 20th century total, it appears that these two processes are emerging as the only two truly productive ones in terms of the formation of novel denominal verbs. Obviously, time will tell if these trends continue to hold for the 21st century and beyond.

Having characterized the relative productivity of denominal verb processes over the various periods in English, we will turn to the central goal of this dissertation, which is to examine whether the relative order of novel type frequency for a given time period is proportionately the same across all semantic categories (e.g. RESULTATIVE, ORNATIVE, LOCATIVE, etc.). In section 2.3.2 below, the question of which semantic categories are possible for each denominal verb formation process is addressed. This is followed by section 2.3.3, which examines which semantic categories are more or less probable for each process. Finally, sections 2.3.4 and 2.3.5 explore the interaction between processes and semantic category probability, which will concurrently provide a response to the above question of relative productivity across semantic categories.

### 2.3.2 What Semantic Categories are Possible for Each Denominal Verb Formation Process in English?

In order to explore what is possible in denominal verb formation in English, each denominal verb formation process is examined to see for which semantic categories it has been attested to have been used. The results are discussed in order of the process' entry into the language, starting with *be-* prefixation and conversion, and then *-ify*, *eN-*, *-ize*, and *-ate* affixation.

2.3.2.1 *be-*

An example of a *be-* affixation verb with a RESULTATIVE meaning is *besot,* whose earliest attested quotation date is 1581 and is used to mean 'to cause someone to become foolish or to dote on someone else'. The base noun *sot* is defined by the OED as "a foolish or stupid person, a fool, blockhead, dolt", a now obsolete usage. The RESULTATIVE interpretation is CAUSE [x BE [sot]], glossed as 'cause x to be a sot'.

A *be-* verb with a SIMILATIVE interpretation is obsolete or rare *bemean* (1459) used to mean 'to mediate or intercede' and with the LCS BE [mean], 'be a mean', reflecting the obsolete use of the base noun *mean* as 'a person who acts as a mediator'. The LCS for a PERFORMATIVE *be*-verb such as *berain* (1420), now obsolete, when used to mean 'to sprinkle or pour in drops' reflects the LCS CAUSE [[rain]], 'make rain'.

The verb *bejewel* (1557), 'to adorn with jewels', is representative of an ORNATIVE interpretation: CAUSE [GO [jewel] TO y], 'cause jewel(s) to go on y'. A LOCATIVE interpretation is provided to *befog* (1663) 'to envelope in fog', with an LCS of CAUSE [GO x TO [fog]], 'cause x to go into fog'. A PRIVATIVE interpretation is represented by the verb *behead* (1000), which is used to mean 'take the head off or decapitate'. The PRIVATIVE LCS is claimed here to be CAUSE [GO [head] FROM y], glossed as 'cause the head to go away from y'.

An example of a *be*- affixation verb with an INSTRUMENTAL reading is *beclaw* (1603). The OED proposes "to scratch or tear all over with claws or nails" to indicate the meaning of the verb in its earliest citation. The INSTRUMENTAL LCS for *beclaw* is CAUSE [GO x TO y WITH [claw]], 'cause claws to go to y for a specific purpose'.

This subsection provides evidence that *be*- affixed verbs have been attested with interpretations from all the major semantic categories: RESULTATIVE, ORNATIVE, LOCATIVE, INSTRUMENTAL, SIMILATIVE, PERFORMATIVE, and even PRIVATIVE. As the following subsections demonstrate, this becomes a very familiar result for all of the denominal verb formation processes.

2.3.2.2 Conversion

Like *be*- affixation, the process known as zero-affixation or conversion was used in Old English to form verbs from nouns, and examples of verbs with interpretations from all of the semantic categories are attested. A RESULTATIVE conversion verb is exemplified by *cripple* (1300), 'to make a cripple of'. Again, using the proposed RESULTATIVE LCS, the LCS for this interpretation is CAUSE [x BE [cripple]], 'cause x to be a cripple'. The verb *lacquer* (1688), 'to coat with lacquer', is a good example of an ORNATIVE conversion verb, with the ORNATIVE LCS filled in as CAUSE [GO [lacquer] TO y], 'cause lacquer to go onto y', and *husk* (1562), 'to remove the husk from', is a good example of a PRIVATIVE conversion verb with the LCS CAUSE [GO [husk] FROM y], 'cause the husk(s) to go away from y'. A LOCATIVE conversion verb is evidenced by *beach* (1840), 'to force onto a beach', with the LCS associated with LOCATIVES: CAUSE [GO x TO [beach]], 'cause x to go onto the beach'. The verb *plough* (1423), 'to use a plough' is representative of an INSTRUMENTAL interpretation of a PERFORMATIVE LCS: CAUSE [x WITH [plough]], 'do a plough for a special purpose'. An illustration of a conversion verb with a SIMILATIVE interpretation is *gossip* (1590), 'to act like a gossip'. The LCS for this particular verb is BE [gossip], 'be a gossip'. And finally, *fox-trot* (1916), 'to dance the fox-trot' is a good example of a PERFORMATIVE conversion verb, with the LCS CAUSE [[fox-trot]], 'do a fox-trot'.

In the subsections that follow, the denominal verb formation processes that were borrowed from French, or perhaps more appropriately described as developing from denominal verbs borrowed from French, are discussed in order of entry into the English language, beginning with *-ify* verbs, then *eN-*, *-ize*, and *-ate*.

#### 2.3.2.3 *-ify*

Of the overt denominal verb affixes under discussion here, the first attested borrowing of a clearly denominal verb from French was an *-ify* verb in 1250: *signify*. The interpretation is a SIMILATIVE one, 'to be a sign of' with the LCS BE [sign], glossed as 'be a sign'. Like the other verb formation processes detailed thus far, *-ify* verbs can also be attested with uses indicating interpretations from all of the other semantic categories as well:

- RESULTATIVE: *mummify* (1628), 'to make into a mummy' with the LCS CAUSE [x BE [mummy]], 'cause x to be a mummy'

- ORNATIVE: *zincify* (1801), ‘to coat with zinc’; CAUSE [GO [zinc] TO y], ‘cause zinc to go on y’
- PRIVATIVE: *mercurify* (1680), ‘to extract the mercury from’ [OBS. RARE] where the base noun *mercury* is used in its now obsolete sense of an elemental property thought to be part of every metal; CAUSE [GO [mercury] FROM y], ‘cause the mercury to go away from y’
- LOCATIVE: *classify* (1779), ‘to arrange into classes’; CAUSE [GO x TO [class]], ‘cause x to go into a class/classes’
- INSTRUMENTAL: *mobbify* (1734), ‘to drive out by mob violence [OBS. RARE]; BE y WITH [mob], ‘be a mob for a specific purpose’
- PERFORMATIVE: *speechify* (1723), ‘to make a speech or speeches’; CAUSE [[speech]], ‘make speech(es)’

2.3.2.4 *eN*-

Denominal verbs containing the prefix *en*- and its allomorphs *em*-, *in*-, and *im*- began entering English in the late 13th century, and as with -*ify* above, *eN*- is attested with uses from all of the major semantic categories:

- RESULTATIVE: *enslave* (1656), ‘to make a slave of’; with the LCS CAUSE [x BE [slave]], glossed as ‘cause x to be a slave’
- ORNATIVE: *encourage* (1490), ‘to give courage or hope to’; CAUSE [GO [courage] TO y], ‘cause courage to go to y’
- PRIVATIVE: *embowel* (1521) ‘to remove the bowels from’; CAUSE [GO [bowel] FROM y], ‘cause bowels to go away from y’

- LOCATIVE: *entomb* (1578), ‘to put in a tomb’; CAUSE [GO x TO [tomb]], ‘cause x to go into a tomb’
- INSTRUMENTAL: *enforce* (1325), ‘to use force on’; CAUSE [GO x TO y WITH [force]], ‘cause force to go to y for a specific purpose’
- SIMILATIVE: *endenizen* (1598), ‘to become a citizen’ [OBS.]; BE [denizen], ‘be a denizen’
- PERFORMATIVE: *endeavor* (1400), ‘to try’; CAUSE [[devoir]], ‘do devoir’, where the base noun *devoir* means ‘effort’, now obsolete

2.3.2.5 -*ize*

The first unambiguously denominal -*ize* verb borrowed into English is attested by the OED to be *prophetize* in 1330, and this verb formation process, like those already discussed, is found with interpretations from all of the semantic categories:

- RESULTATIVE: *summarize* (1871), ‘to make a summary of’; CAUSE [x BE [summary]], ‘cause x to be a summary’
- ORNATIVE: *emphasize* (1828)’ to put emphasis on’; CAUSE [GO [emphasis] TO y], ‘cause emphasis to go on z’
- PRIVATIVE: *sectionize* (1896), ‘to cut sections from’; CAUSE [GO [section] FROM y], ‘cause sections to go away from z’
- LOCATIVE: *hospitalize* (1901), ‘to put in the hospital’; CAUSE [GO x TO [hospital]], ‘cause x to go into the hospital’
- INSTRUMENTAL: *catheterize* (1881) ‘to employ a catheter on’; CAUSE [GO x TO y WITH [catheter]], ‘cause a catheter to go into y for a specific purpose’

- SIMILATIVE: *despotize* (1799) ‘to rule as a despot’; BE [despot], ‘be a despot’
- PERFORMATIVE: *apologize* (1597), ‘to make an apology’; CAUSE [[apology]], ‘do an apology’

2.3.2.6 -*ate*

Denominal verbs ending with -*ate* are the last to be attested entering into English, beginning with *congregate* in 1400, and, what should by now be of no surprise, are found to be used for all of the denominal verb semantic categories.

- RESULTATIVE: *granulate* (1666), ‘to form into granules’; CAUSE [x BE [granule]], ‘cause x to be a granule’
- ORNATIVE: *fumigate* (1781), ‘to apply fumes to’; CAUSE [GO [fume] TO y], ‘cause fumes to go to y’
- PRIVATIVE: *decimate* (1663), ‘to reduce by a tenth’; x CAUSE [GO [*decimus* (a tenth)] FROM y], ‘cause a tenth to go away from y’
- LOCATIVE: *repatriate* (1611), ‘to restore (someone) to his/her native country’; CAUSE [GO x TO [*patria* (native land)]], ‘cause x to go to the native land’
- INSTRUMENTAL: *flagellate* (1623), ‘to whip’; CAUSE [GO x TO y WITH [flagelle]], ‘cause a flagelle to go to y for a specific purpose’. The base noun *flagelle* refers to a scourge or whip and is now obsolete in modern usage
- SIMILATIVE: *pontificate* (1818), ‘to perform the functions of a pontiff’; BE [pontiff or pontifex], ‘ be a pontiff’

- PERFORMATIVE: *gesticulate* (1613), 'to make gestures'; CAUSE [[gesture]], 'do gesture(s)'

Table 2.12 below summarizes the results described above, listing examples of each denominal verb formation process with each major semantic category.

Table 2.12 Examples of denominal verbs by verb formation process and semantic category

| **Verb formation process** | **RESUL-TATIVE** | **ORNA-TIVE** | **LOCA-TIVE** | **INSTRU-MENTAL** | **SIMILA-TIVE** | **PERFOR-MATIVE** | **PRIVA-TIVE** |
|---|---|---|---|---|---|---|---|
| *-ate* | *granulate* | *fumigate* | *repatriate* | *flagellate* | *pontificate* | *gesticulate* | *decimate* |
| *be-* | *befoul* | *bejewel* | *befog* | *beguile* | *befriend* | *besprinkle* | *behead* |
| *eN-* | *enslave* | *encourage* | *entomb* | *enforce* | *endenizen* | *endeavor* | *embowel* |
| *-ify* | *mummify* | *zincify* | *classify* | *mobbify* | *signify* | *speechify* | *mercurify* |
| *-ize* | *summarize* | *emphasize* | *hospitalize* | *catheterize* | *despotize* | *apologize* | *sectionize* |
| conversion | *cripple* | *lacquer* | *beach* | *plough* | *gossip* | *fox-trot* | *husk* |

In response to Q1 above, the attested denominal verbs indicate that all major semantic categories are possible. The fact that each denominal verb formation process covers the same semantic territory suggests that they all share the same underlying semantic structure. It is proposed here that the same underlying semantic structure is as follows in (1) below:

(1) CAUSE [x BE y LOC z]

In this structure, the verb has three arguments x, y, and z and makes use of the semantic primitives CAUSE, BE, LOC. CAUSE and BE have been discussed above; LOC is a primitive that indicates an underspecified location relation between two arguments; it may be instantiated as LOC-TO in which one argument is placed in, on, at, to or towards another. Alternatively, the LOC primitive may be instantiated as LOC-FROM, indicating a location relation in which one argument is placed away from or is extracted from another. One might ask why LOC is chosen as the primitive rather than the GO primitive used in the coding procedure above. The rationale is that the use of GO would imply definite movement; however, the use of LOC in the proposed LCS in (1) above implies only that an entity has been caused to be in a location, whether moved there, created there or existing there. The type of underspecification allowed by LOC is more desirable here.

How different denominal verbs receive their particular semantic interpretations depends upon which argument, x, y or z, is filled by the noun base and the extent to which the LCS is fully expressed. To illustrate, a RESULTATIVE interpretation is achieved when the y argument is filled by the noun base, as in (2):

(2) RESULTATIVE

CAUSE [x BE [noun base] LOC-TO z]

In this instance, the gloss is ‘cause x to be the noun base (located in/on/to z)’; the location relation is optional, as indicated by a dotted underline. An example of a denominal verb with this interpretation is *the scientist crystallized the solution (in the farthest right test tube)*, where *the scientist* is an externally projected argument, *the solution* is the x argument, the noun base *crystal* is the y argument and *the farthest right test tube* is the z argument.  For an INCHOATIVE/SIMILATIVE interpretation, the noun base is again the y argument but the CAUSE x portion is not realized, as in (3) below.

(3) INCHOATIVE/SIMILATIVE

BE [noun base] LOC-TO z

An utterance such as *the solution crystallized (in the farthest right test tube)* receives an INCHOATIVE interpretation, while *Jody burglarized the house*, with an animate subject, receives a SIMILATIVE interpretation.  Context and real world knowledge ensures that an overt preposition representing the LOC primitive may be omitted in *Jody burglarized the house*, as it is clear that the RESULTATIVE interpretation is semantically unlikely.  The same cannot be said for *the solution crystallized in the farthest right test tube*; without the overt preposition *in*, a RESULTATIVE interpretation is semantically more likely.

A PERFORMATIVE interpretation results from the realization of just the CAUSE x portion of the structure, as shown in (4).

(4) PERFORMATIVE

CAUSE [[noun base]]

The verb *fox-trot*, for example, is usually interpreted as PERFORMATIVE as the argument structure is usually realized with just the one internal argument becoming the verb.

ORNATIVE interpretations arise from the full expression of the structure with the noun base as the x argument co-indexed with the y argument (please refer to (5) below).

(5) ORNATIVE

CAUSE [[noun base]$_i$ BE $y_i$ LOC-TO z]

The structure leads to the interpretation ‘cause [noun base] to be [noun base] in or on location z’, as with *Terry watered the plants*, *Terry*, the external argument, caused *water*, the x argument, to be *water*, the y argument that is the same as the x argument, that is located on *the plants*, the z argument. LOCATIVE interpretations are those achieved when the base noun is the z argument:

(6) LOCATIVE

CAUSE [$x_i$ BE $y_i$ LOC-TO [noun base]]

With *the doctor hospitalized the patient*, *the doctor* is the external argument that caused *the patient* (the x argument) to be a *patient* (co-indexed y argument) that is located in the *hospital* (z argument). PRIVATIVE and ABLATIVE are interpreted similarly as ORNATIVE and LOCATIVE, respectively, except that LOC-FROM is the instantiation of the LOC primitive indicating the location relation, as shown in (7) for PRIVATIVE and (8) for ABLATIVE.

(7) PRIVATIVE

CAUSE [[noun base]$_i$ BE $y_i$ LOC-FROM z]

(8) ABLATIVE

CAUSE [$x_i$ BE $y_i$ LOC-FROM [noun base]]

In (7), like (5) above, the noun base of PRIVATIVE interpretations is the x argument, co-indexed with the y argument, and in (8), like (6) above, the noun base of ABLATIVE interpretations is the z argument. English denominal verb examples of these interpretations are *behead*, as in *the executioner beheaded the traitor*, where *the executioner* caused the *head* to be a *head* that is located away from *the traitor*, and *shell*, as in *Francis shelled the peas*, where *Francis* caused the *peas* to be *peas* that are located away from their *shells*.

Having thus responded to the first question of what is possible in English denominal verb formation, the next logical question relates to whether the denominal verb formation processes exhibit the same pattern of type frequency among the semantic categories; in other words, what is probable in English denominal verb formation?

### 2.3.3 What Semantic Categories are Probable for Each Denominal Verb Formation Process in English?

As the previous section illustrates, each of the denominal verb formation processes has been attested to have been used for each of the major semantic categories (RESULTATIVE, ORNATIVE, INSTRUMENTAL, PERFORMATIVE, etc.) The evidence demonstrates that the processes are identical in terms of possibility, but the question remains: are they similar in terms of probability for each of the semantic categories? As a start in determining what semantic category or categories are probable, all of the uses of all the verbs of each denominal verb process in English were examined. There are several questions related to the relationship between the underlying semantic structure and probability of use, and the response to each leads to different expectations of the results; these questions are schematized in figure 2.2 below.

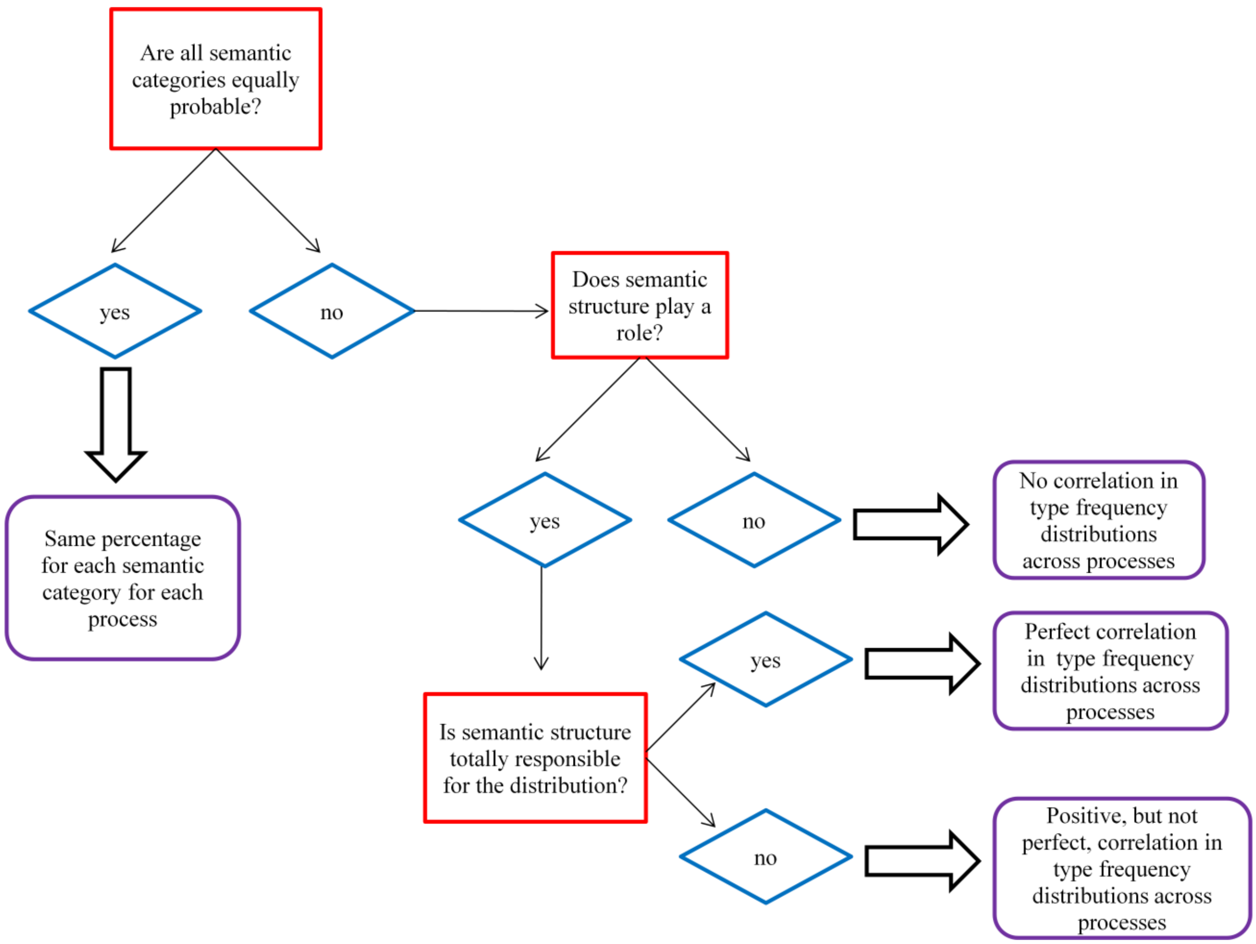


Figure 2.2 Questions, potential responses, and conclusions to be drawn from the corpus study data

The first question to be asked is, are all of the semantic categories equally probable for each of the denominal verb formation processes? If so, then the corpus data should reveal that each of the eight semantic categories should comprise 12.5% of the total number of forms for each process. If, on the other hand, all of the semantic categories are not shown to be equally probable, then one must ask whether the underlying semantic structure of the processes plays a role in the nature of the distribution. If the response to this question is no, then the analysis should reveal that the semantic category distributions in terms of type frequency should be quite different from one process to another. For example, RESULTATIVE might comprise the greatest number of denominal verb forms for -*ify* but the least number of forms for -*ate*. However, the notion that underlying semantic structure dictates type frequency among semantic categories has already been proposed by Lieber (2004), as discussed in chapter 1. In her analysis, the semantic structure of -*ify*/-*ize* leads to a preference, and therefore higher type frequency, for RESULTATIVE, CAUSATIVE, and LOCATIVE interpretations over ORNATIVE interpretations. Although the underlying semantic structure is conceived of differently here than in Lieber (2004), the idea that this structure does indeed play a role in the semantic category distributions is still quite feasible. And if so, then the next question becomes, how much of a role? Is the underlying semantic structure wholly or just partially responsible for the nature of the distributions? If the semantic structure is wholly responsible, then the data should show an identical pattern for each process in terms of semantic category distribution, i.e., all processes display the exact same ranked order of type frequency. But, if the semantic structure is only partially responsible, then the semantic category distributions should be similar enough across the denominal verb formation processes to reveal a pattern, but also differ in such a way that semantic structure alone cannot account for the exact nature of the data. Thus, investigation of other potential influences must then be conducted.

The results of the analysis of type frequency for each semantic category for each denominal verb process are found below. For consistency purposes, the order of presentation of the data follows that from sections 2.3.1 and 2.3.2 above, *be*-, conversion, -*ify*, *eN*-, -*ize*, and -*ate*. At the end of this section is table 2.13, which summarizes the data and demonstrates that the pattern of the results is most consistent with the underlying semantic structure being only partially responsible for the nature of semantic category distribution and is thus suggestive of another variable contributing to the nature of the distributions.  In section 2.3.4, this variable is identified as the Semantic Category Distribution Effect.

Figure 2.3 below shows the percentage of interpretations with each of the semantic categories for all the unambiguously denominal *be-* verbs in English as listed in the OED.

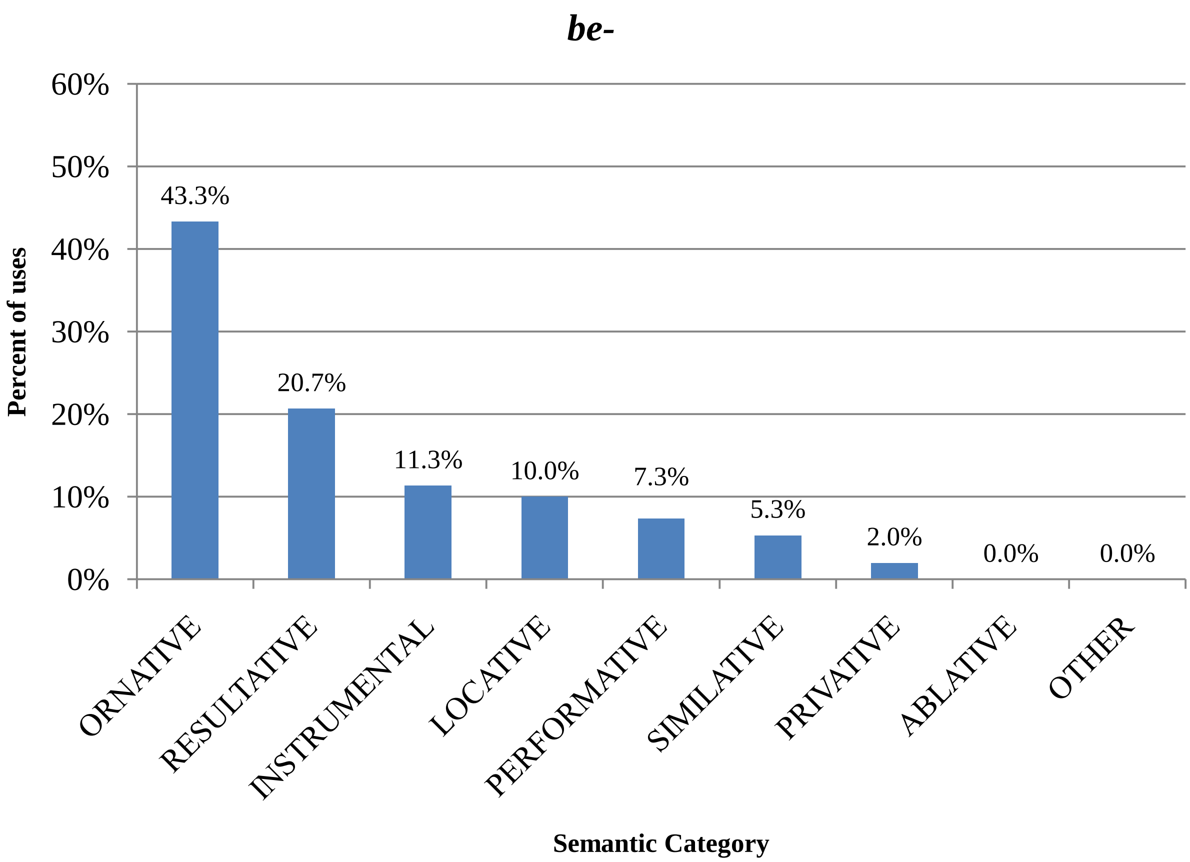


Figure 2.3 Semantic category distribution of denominal *be-* uses identified by the OED

Just to be absolutely clear, the total that the percentages are derived from consists of all the uses of all the denominal *be-* verbs attested in English, including those still in use as well as those that have become rare or obsolete or are specialized. At 43.3% of the total, ORNATIVE interpretations comprise nearly half of the uses of the denominal *be-* verbs, suggesting greater probability as a denominal verb with an ORNATIVE interpretation than any other semantic category. RESULTATIVE interpretations are the second most frequent, but at only 20.7% of the total, clearly much less often than ORNATIVE. INSTRUMENTAL and LOCATIVE interpretations follow in terms of frequency of use, then PERFORMATIVE, SIMILATIVE, and PRIVATIVE, all around 10% or less of the total. ABLATIVE and OTHER interpretations were not attested at all for the denominal *be-* verbs listed in the OED. A chi-square "goodness-of-fit" statistic performed on this data demonstrates that the frequencies of the semantic categories are significantly different, that is, not equally probable ($\chi^2$(7df) = 109.29; $p < 0.0001$).

The data from denominal *be-* also provide a benchmark for comparison with the data from the other denominal verb formation process to determine whether there is something about the semantic categories themselves that would dictate that ORNATIVE and RESULTATIVE interpretations be more basic, in a sense (and therefore more numerous), then INSTRUMENTAL, LOCATIVE, PERFORMATIVE, SIMILATIVE and PRIVATIVE clustering together as less basic (and therefore less frequent), and then ABLATIVE and OTHER so far from basic as to be relatively rare.

The percentage of English denominal conversion verbs with interpretations from each semantic category is displayed in figure 2.4 below.

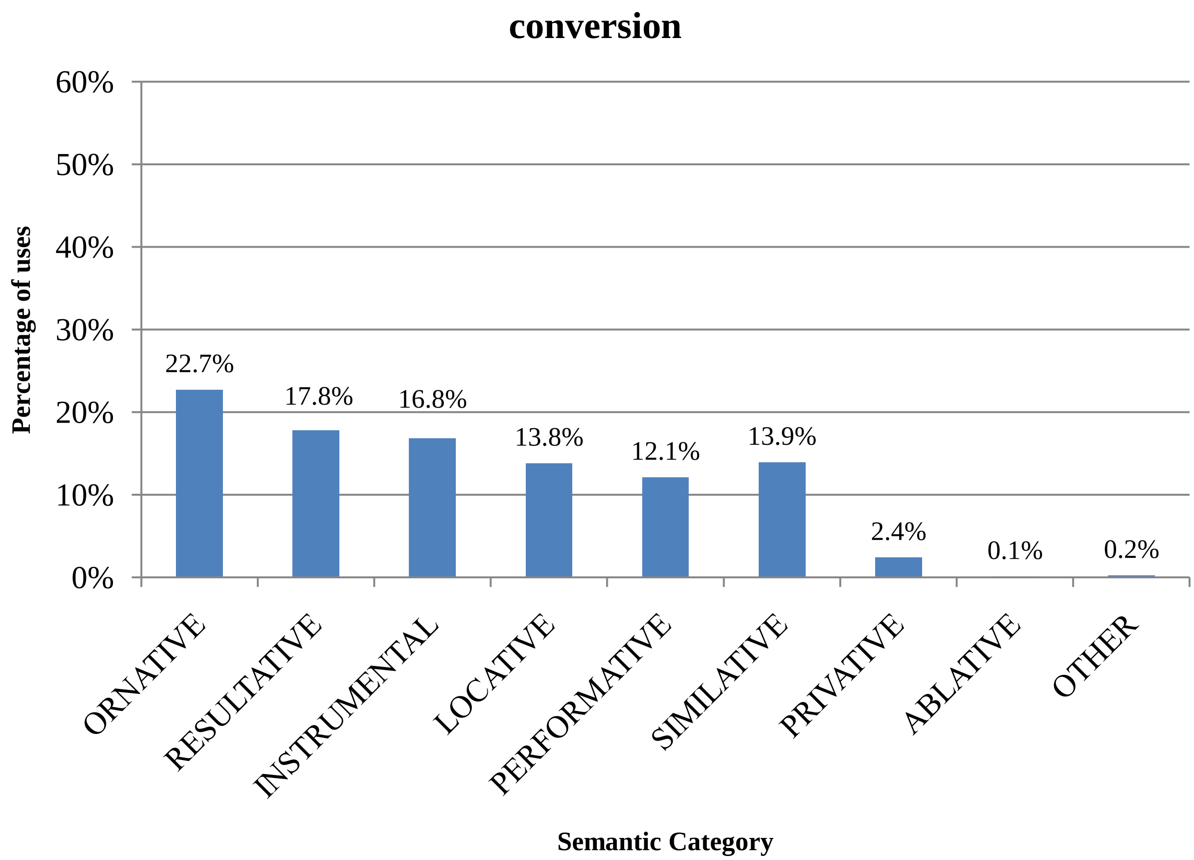


Figure 2.4 Semantic category distribution of denominal conversion uses identified by the OED

Let us return immediately to the question posed above, is this the same distribution pattern found for denominal *be-* verbs? The answer is both "yes" and "no". "Yes" because the order in terms of frequency of use with a given semantic interpretation is indeed very similar to that of *be-* above, with ORNATIVE with the greatest percentage, then RESULTATIVE, followed by INSTRUMENTAL, SIMILATIVE, LOCATIVE, and PERFORMATIVE, and finally PRIVATIVE, ABLATIVE, and OTHER much less well represented by type frequency. "No" because, as a quick comparison of figure 2.4 with figure 2.3 reveals, the semantic category type frequency distribution for denominal conversion verbs is much flatter across all the categories than is the case for denominal *be*- verbs, although still not equally probable ($\chi^2$(7df) = 32.49; p < 0.0001). For *be*-, ORNATIVE interpretations comprise nearly half of the total, then RESULTATIVE at 20%, and the rest around 10% or less. For conversion, ORNATIVE comprises only a little over 20% (22.8%) of the total, RESULTATIVE, INSTRUMENTAL, SIMILATIVE, LOCATIVE, and PERFORMATIVE all between 10% and 20%, and then PRIVATIVE, ABLATIVE, and OTHER at 2.4%, 0.1%, and 0.2% respectively.

Still, the other denominal verb processes must be looked at from this perspective as well. If there is a semantic basis for preference among categories, then we would expect the same order of distribution pattern to repeat itself over and over again.

The data related to -*ify* denominal verbs are given in figure 2.5. It may be perceived rather quickly that RESULTATIVE interpretations have a much greater type frequency for -*ify* denominal verbs than any other semantic category. In fact, with 54.9% of the total, RESULTATIVE interpretations number more than all the other semantic categories combined.

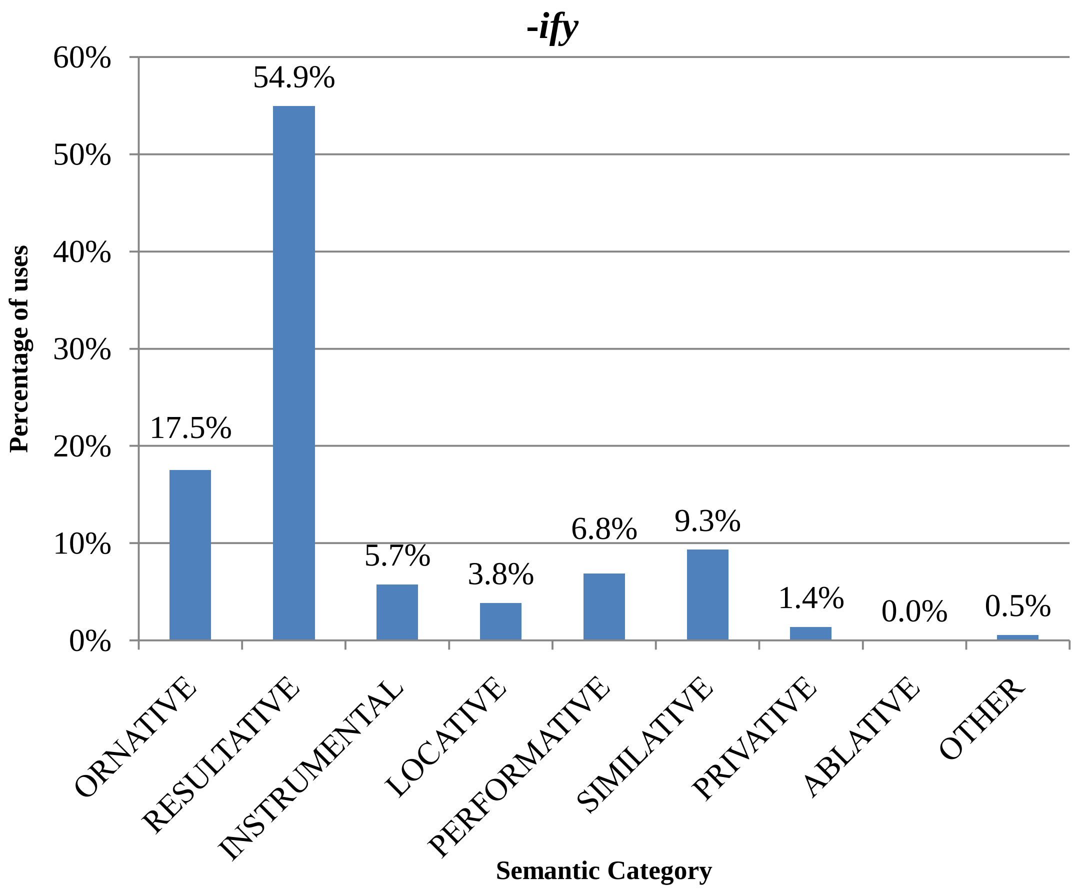


Figure 2.5 Semantic category distribution of denominal *-ify* uses identified by the OED

However, yet again, ORNATIVE and RESULTATIVE seem to stand a bit apart from the others as the top two categories. And a pattern similar to the *be-* and conversion results continues with INSTRUMENTAL, LOCATIVE, PERFORMATIVE and SIMILATIVE clustering together and less frequent than RESULTATIVE and ORNATIVE, between 3.8% and 9.3%, and PRIVATIVE, ABLATIVE and OTHER barely represented by types at all (1.4% or less). Again, a chi-square performed on the data demonstrate that each semantic category is not equally probable ($\chi^2$(7df) = 180.55; $p < 0.0001$).

The data from the *eN*- denominal verbs (figure 2.6 below) again show that the semantic categories are not all equally probable ($\chi^2$(7df) = 93.28; $p < 0.0001$).. However, the data also present a slight break from the pattern described thus far.

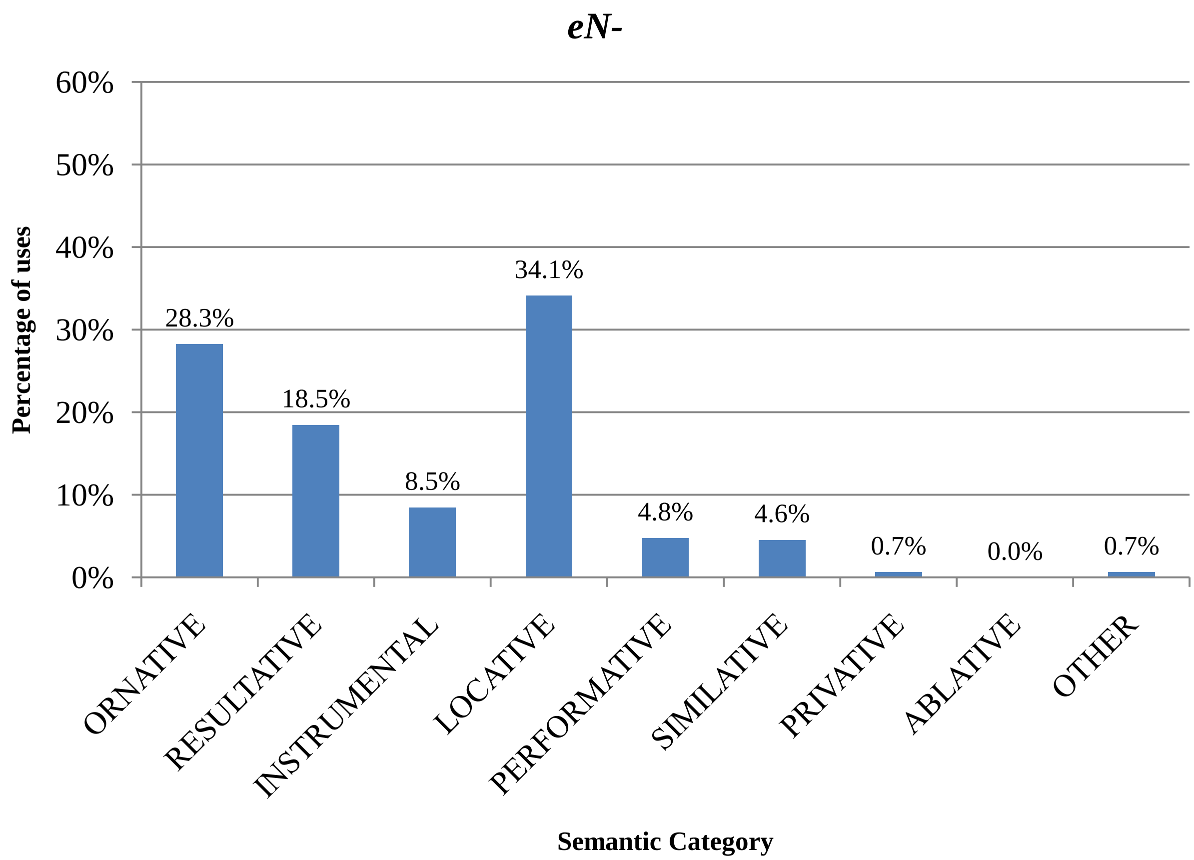


Figure 2.6 Semantic category distribution of denominal *eN*- uses identified by the OED

Although ORNATIVE (28.3%) and RESULTATIVE (18.5%) are indeed much more represented than INSTRUMENTAL (8.5%), PERFORMATIVE (4.8%), and SIMILATIVE (4.6%), which are again clustered together at 10% or less, and PRIVATIVE, ABLATIVE, and OTHER very little (0.7% or less), LOCATIVE stands out as the number one category for denominal *eN*- verbs at 34.1%. This is an unexpected result from the perspective of the working hypothesis above that there must be something about LOCATIVE that would make it less preferred as a denominal verb semantic category than ORNATIVE and RESULTATIVE. However, further analysis is required to determine if this result does indeed contradict the hypothesis or whether there is another explanation for this particular finding. Still, the results here are consistent with another pattern that is becoming more evident. One can perceive, reviewing the figures above once more, that for *be*-, -*ify*, and *eN*-, one semantic category stands out from the others in terms of percentage: for *be*- it is ORNATIVE at 43.3%; for -*ify* RESULTATIVE at 54.9%; and, for *eN*- LOCATIVE at 34.1%. In addition to this semantic category "spike", ORNATIVE and/or RESULTATIVE is still well-represented, but the rest of the semantic categories exhibit percentages around 10% or less of the total in each case.

The results from the -*ize* denominal verbs (shown in figure 2.7 below) demonstrate a return to the original pattern seen with *be*-, conversion, and -*ify*: ORNATIVE and RESULTATIVE with the greatest type frequency, followed by PERFORMATIVE, SIMILATIVE, INSTRUMENTAL, and LOCATIVE, and then PRIVATIVE, ABLATIVE, and OTHER contributing much, much less. The differences in frequency among the semantic categories is again significant ($\chi^2$(7df) = 50.000; $p < 0.0001$).

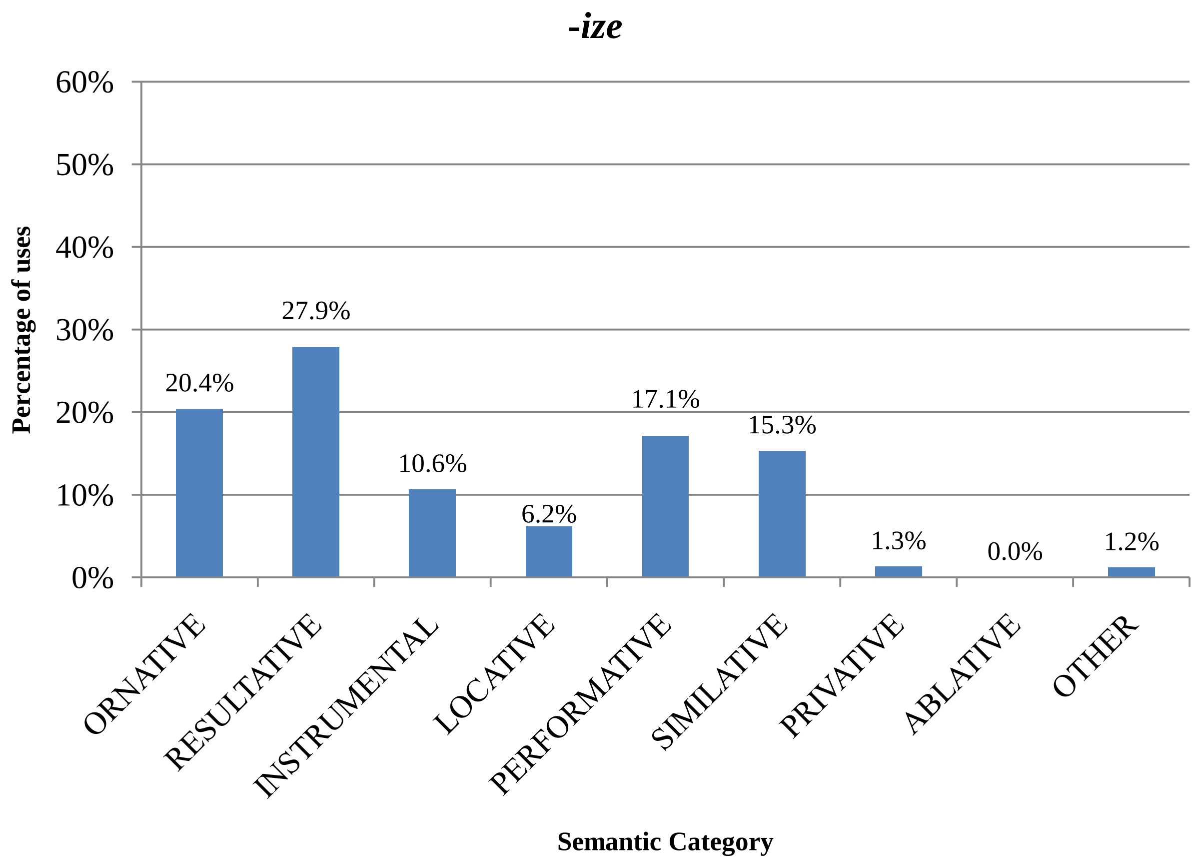


Figure 2.7 Semantic category distribution of denominal -*ize* uses identified by the OED

Unlike *be*-, -*ify*, and *eN*- and more like conversion, the distribution seen for the -*ize* denominal verbs is somewhat flatter. Although RESULTATIVE (at 27.9%) carries a greater percentage than ORNATIVE (20.4%), the difference is not as great as with the other overt affixation processed discussed in this section thus far. And like conversion, no semantic category "spike" is evident and the other categories do not display the 10% or less pattern seen with *be*-, -*ify*, and *eN*-. In fact, PERFORMATIVE and SIMILATIVE achieve a percentage closer to ORNATIVE than their usual cluster-mates INSTRUMENTAL and LOCATIVE.

The results related to *-ate* denominal verbs show an even flatter distribution than that witnessed with *-ize* (figure 2.8 below), although still with a significant difference in frequency among the semantic categories ($\chi^2$(7df) = 24.23; $p < 0.001$).

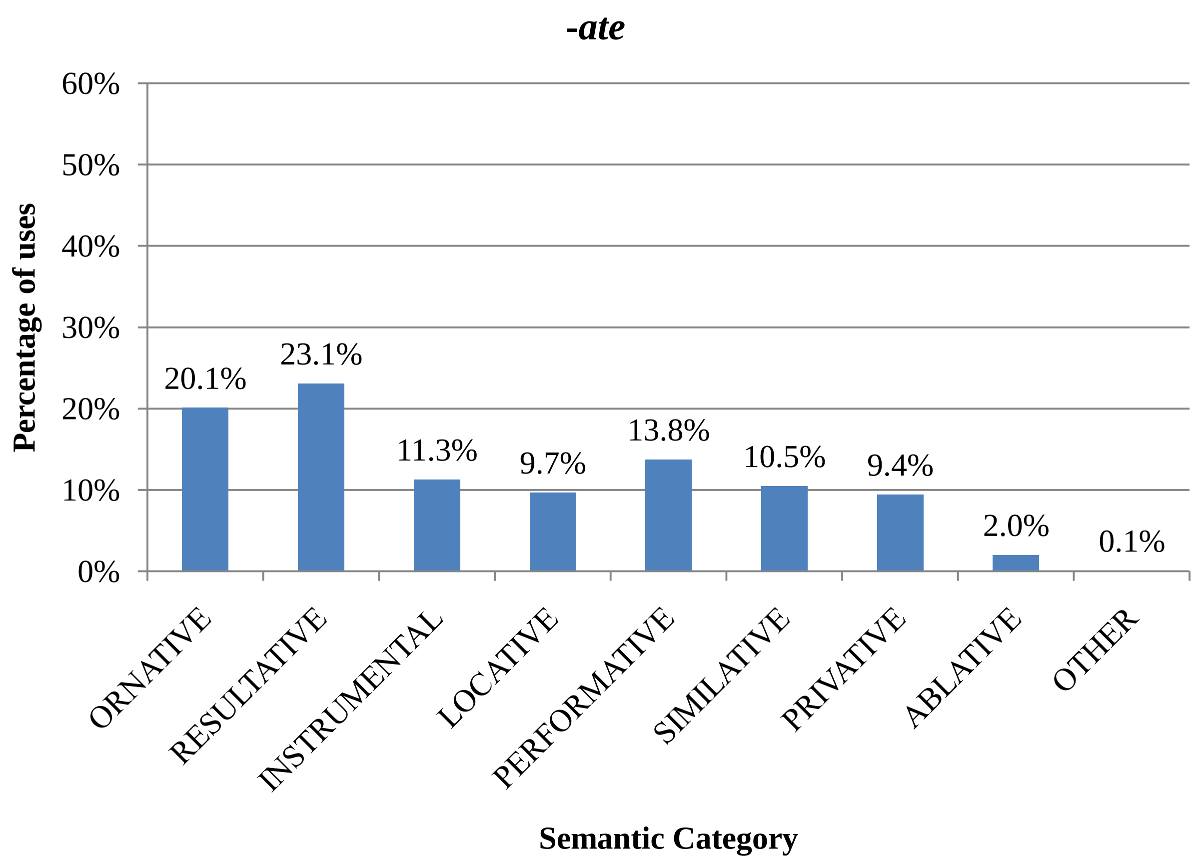


Figure 2.8 Semantic category distribution of denominal *-ate* uses identified by the OED

RESULTATIVE (23.2%) and ORNATIVE (20.1%) are again the top two most frequently represented semantic categories, this time with only a couple of percentage points between them. Following them, all around 10%, are INSTRUMENTAL, LOCATIVE, PERFORMATIVE, SIMILATIVE, and even PRIVATIVE. In fact, there is even a higher proportion of ABLATIVE interpretations (2.0%) than witnessed for any other denominal verb formation process in English. Despite these differences, the *-ate* denominal verbs still maintain the distribution order seen repeated thus far. The results for all the denominal verb formation processes are summarized in table 2.13 below, which shows the order of the semantic categories for each process, from greatest percentage of the total to least.

Table 2.13 Type frequency rank order of semantic categories for each denominal verb formation process

| **rank** | ***be-*** | **conversion** | ***-ify*** | ***eN-*** | ***-ize*** | ***-ate*** |
|---|---|---|---|---|---|---|
| **1** | ornative | ornative | resultative | locative | resultative | resultative |
| **2** | resultative | resultative | ornative | ornative | ornative | ornative |
| **3** | instrumental | instrumental | similative | resultative | performative | performative |
| **4** | locative | similative | performative | instrumental | similative | instrumental |
| **5** | performative | locative | instrumental | performative | instrumental | similative |
| **6** | similative | performative | locative | similative | locative | locative |
| **7** | privative | privative | privative | privative | privative | privative |
| **8** | ablative | other | other | other | other | ablative |
| **9** | other | ablative | ablative | ablative | ablative | other |

As alluded to earlier, the data from this portion of the corpus study is much more consistent with the notion of the underlying semantic structure contributing only partially to the nature of the semantic category distributions, suggesting the need for further exploration of other factors influencing the specific properties of the distributions for each process.

However, before doing so, it is also worthwhile to look at the semantic category distribution of obsolete items. Some might argue that the data above have been confounded with the particular status of lexical items as rare, obsolete, or nonce word formations. If so, then perhaps certain semantic categories are more likely to be found with these items and as such, create artificially low or artificially high percentages of the total. Using the data from the two most productive (as defined by type frequency) processes, figure 2.9 below of the comparison between the obsolete, rare, and nonce word *-ize* entries and the other *-ize* entries and figure 2.10 of the comparison between the obsolete, rare, and nonce word conversion entries and the other conversion entries reveal at a glance that the semantic category distribution of the obsolete entries is not different from that of the other entries.

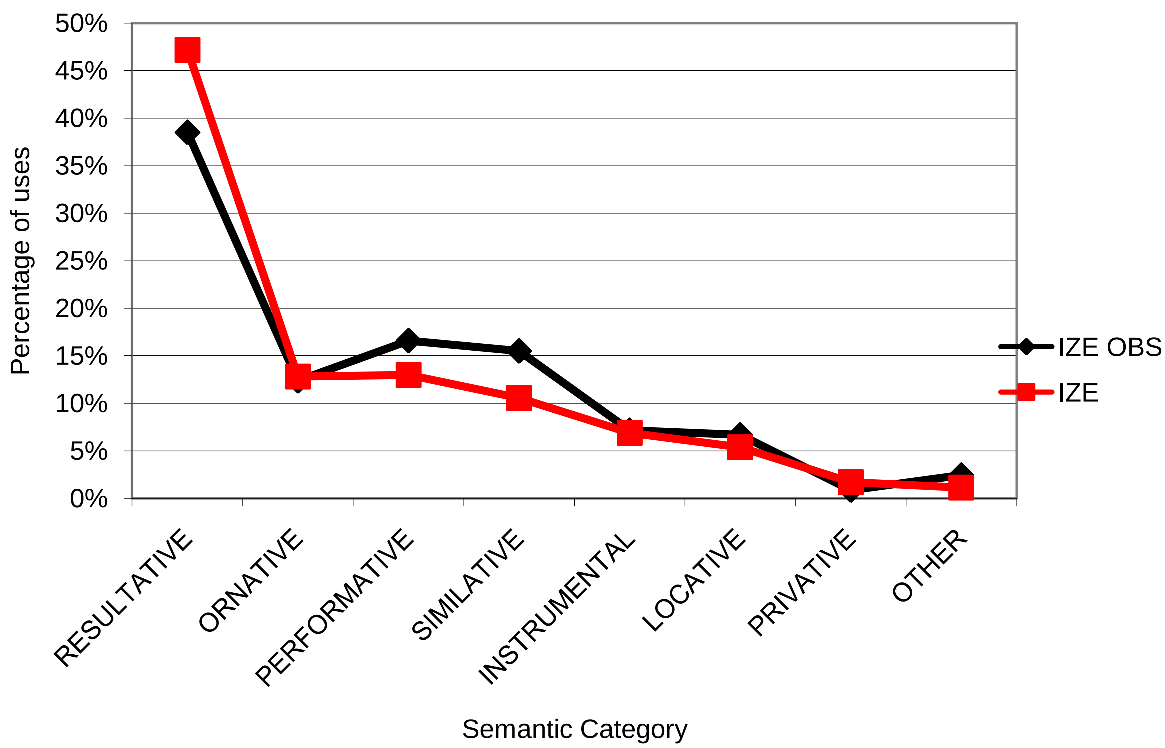


Figure 2.9 Comparison of semantic category distribution of obsolete, rare and nonce word *-ize* entries with semantic category distribution of all other *-ize* entries

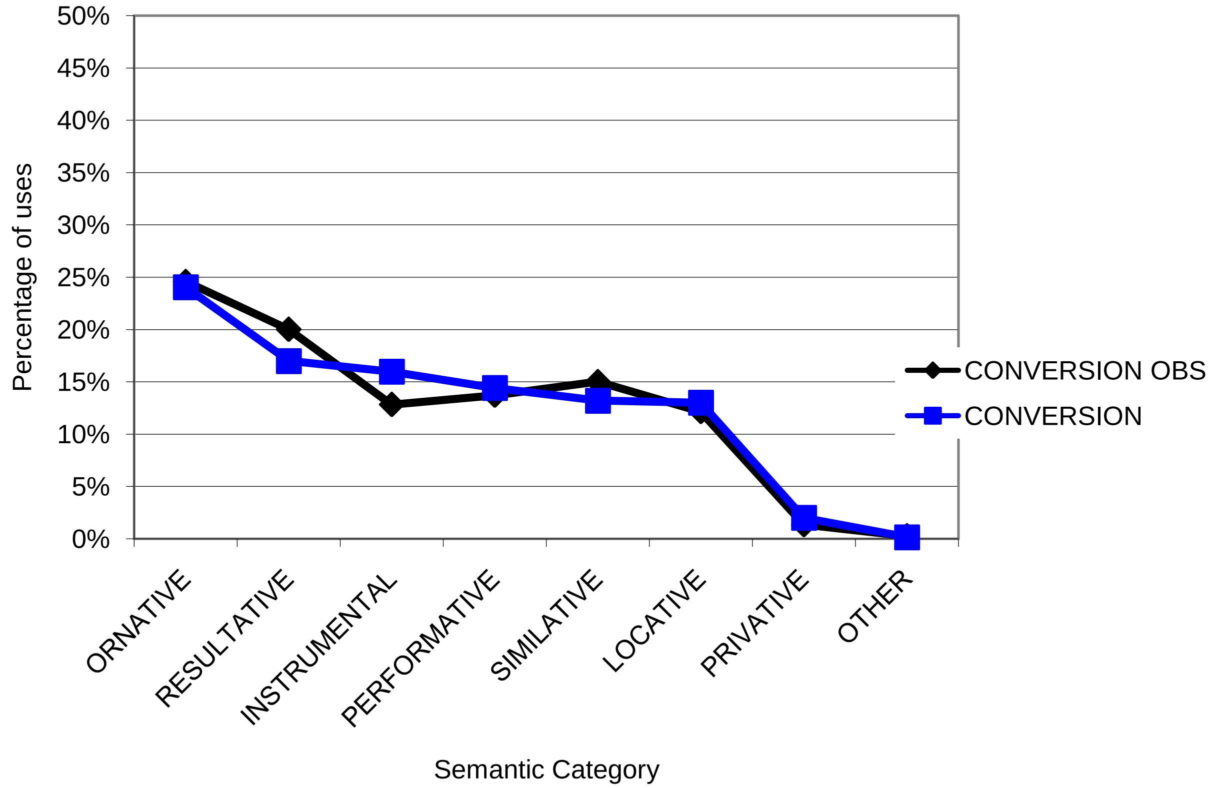


Figure 2.10 Comparison of semantic category distribution of obsolete, rare and nonce word conversion entries with semantic category distribution of all other conversion entries

In fact the distributions are remarkably similar; Pearson Correlation Coefficients for both are highly significant: -*ize* $r = 0.976$, $t(6) = 10.978$, $p < .0001$; conversion $r = 0.975$, $t(6) = 10.748$, $p < .0001$. Clearly, the idea that specific semantic categories are simply more likely to be nonce words or become rare or obsolete has found no support here. Instead, it appears that, regardless of semantic category, some entries remain in the lexicon and some fall away, and they do so in proportions similar to each other.

Assuming, then, that the pattern of corpus study data shown in table 2.13 above is a valid one and that the underlying semantic structure is partially responsible for the type frequency distributions across semantic categories in denominal verb formation in English, the question remains what it is about the underlying semantic structure (repeated as (9) below) that would encourage ORNATIVE and RESULTATIVE to be usually represented by the greatest number of types, with PERFORMATIVE, SIMILATIVE, and LOCATIVE forming a mid-level cluster, and PRIVATIVE and ABLATIVE comparatively rare.

(9) CAUSE [x BE y LOC z]

One suggestion is that the best exemplars of a denominal verb display a number of properties: use of the more typical LOC-TO instantiation of the location relation (rather than LOC-FROM); full expression of the semantic structure; and the noun base as the topmost or least embedded (i.e., x) argument.  Let us now revisit the realizations of the structure for each of the semantic categories, as shown in examples (2)-(8) above, to see how the relative type frequency productivity of the categories might be accounted for.  First of all, ORNATIVE (and its subtype INSTRUMENTAL) interpretations arise from the realization of the structure as exemplified in (10) below.

(10) ORNATIVE

CAUSE [[noun base]$_i$ BE y$_i$ LOC-TO z]

Here, the location relation is represented by the more typical LOC-TO relation, the structure is represented by its fullest expression, and the noun base replaces the topmost (x) argument.  In other words, ORNATIVE interpretations possess all of the qualities of a prototypical denominal verb, and thus it is unsurprising that ORNATIVE interpretations should be so frequently encountered and created.

As for RESULTATIVE interpretations, their surface realizations possess all but one of the prototypical qualities (the noun base replaces the y argument rather than the x argument), and RESULTATIVE interpretations are also quite frequently found for denominal verbs. PERFORMATIVE, LOCATIVE, and SIMILATIVE interpretations, on the other hand, possess qualities even farther from the prototype: PERFORMATIVE is realized without the BE and LOC portions of the structure; LOCATIVE is realized with the noun base replacing the z argument, rather than the x or y argument; and SIMILATIVE is missing the CAUSE portion and its noun base replaces the y argument. These three, then, are even less frequently created than both RESULTATIVE and ORNATIVE. Finally, both PRIVATIVE and ABLATIVE interpretations require the use of the more marked LOC-FROM instantiation for the location relation instead of LOC-TO. One variation of this quality is apparently enough to relegate PRIVATIVE to being represented much less commonly as a denominal verb than the other semantic categories, and this variation coupled with the noun base as the z argument accounts for the relative rarity of ABLATIVE interpretations for denominal verbs in English.

Now, why exactly the three qualities discussed above should be so crucially involved in the creation of the denominal verb prototype is not entirely certain. One might propose that it is a property of the grammar that it is the fullest realization of a given semantic structure that becomes the best exemplar of the relevant output form, and variations thereof are perceived as less prototypical. In this case, then, it is the nature of the semantic structure that dictates the prototype. Alternatively, one might suggest that the need to express certain relationships between an event and a particular participant in that event (e.g. CHANGE OF LOCATION EVENT-ENTITY LOCATED or CHANGE OF STATE EVENT-RESULTING ENTITY) are simply more often encountered in the real world than others (e.g. CHANGE OF LOCATION-LOCATION), and the prototype develops out of this. In this instance, then, it is real world knowledge that dictates the nature of the prototype. Whether and how these two hypotheses might be teased apart and tested is an open question and beyond the scope of the present research, but a look at the semantic category distributions of the deverbal noun formation processes might lead to some promising results, as they encode event-participant relationships similar to those encoded by denominal verbs.

In any case, as the analysis of the corpus study data above has shown, the exact shape of the distributions varies from process to process. Thus, while the degree of adherence to these proposed prototypical properties might be able to account for the general pattern of the distributions, they alone are insufficient to account for the nature of the semantic category distributions. The next logical question, then, is: what are the other factors that influence the semantic category distributions of the denominal verb formation processes in English? The response to this question is the focus of the next section.

### 2.3.4 What Factors Condition a Process' Probability of Application for a Particular Semantic Category?

In this section, Q3 above is addressed: what factors condition whether a particular denominal verb formation process is used for a particular semantic category? As a beginning towards the response of this question, it is important to identify which factors previously described as influencing denominal verb formation are not proposed to affect the particular semantic category distributions. Morphophonological factors upon denominal verb formation were discussed in chapter 1, including those related to level-ordering (Kiparsky 1982), selectional restrictions on the affix (Fabb 1988) or the base (Plag 1999), and phonological constraints on potential realizations from an Optimality Theoretic perspective (Plag 1999). However, all of these apply to the relevant word formation process as a whole, or the base as a whole, and thus cannot explain why there should be differences in semantic category distribution within the same denominal verb formation process. And, as discussed in the previous section, a purely semantic account is not sufficient. A lexical-syntactic approach, of the type put forward by Hale and Keyser (1993) and Harley (2003), is promising, as it is proposed that different semantic categories necessarily correspond with different l-syntactic structures. Perhaps transitive structures are preferred over intransitive ones for denominal verbs; therefore transitives like RESULTATIVE and ORNATIVE would be preferred over intransitives like PERFORMATIVE and SIMILATIVE. However, such a proposal cannot explain why other transitive structure-forming semantic categories like LOCATIVE, PRIVATIVE, and ABLATIVE should differ from each other in terms of type frequency and all of these should be less preferred than ORNATIVE.

The Semantic Category Distribution Effect is the factor proposed here to account for the nature of the data. This factor, perhaps best described as an extragrammatical one, is the influence of the semantic category type frequency distribution of existing verbs formed by a particular denominal verb process upon the probability of application to verbs of corresponding semantic categories newly created by that same process. What the Semantic Category Distribution Effect, then, predicts should be found in the corpus study data is that for each process, the semantic category type frequency distribution of newly created forms should significantly correlate with the distribution of already existing forms. What follows is an analysis of the corpus study data for each of the denominal verb formation processes in English, comparing the semantic category distributions of newly created forms for each time period with the existing forms from the previous time period or periods. First to be discussed is the influence of the Semantic Category Distribution Effect upon *eN-* denominal verbs. This is followed by similar discussions of denominal verbs containing *-ify*, *-ate*, conversion, and-*ize* [16].

2.3.4.1 *eN-*

The data related to *eN-* denominal verbs in English provides a good illustration of how the Semantic Category Distribution Effect can lead to the development of an association between an affix and a particular semantic category, in this case, LOCATIVE. The data also demonstrate how, despite the association, an affix may become obsolete if it is not accompanied by a high enough type frequency overall.

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[16] Unfortunately, there are not enough denominal verb *be-* types throughout all of the time periods to be sure that any related statistics would be valid; therefore, *be-* affixation data is not included here.

Figure 2.11 below shows the comparison between the semantic category distribution of the denominal *eN*- verbs borrowed in during the Early Borrowing period from 1250-1529 and the semantic category distribution of the denominal *eN*- verbs, labeled here as “newly created”, with earliest attested citation dates during this time and identified by the OED as being formed with a pre-existing English base.

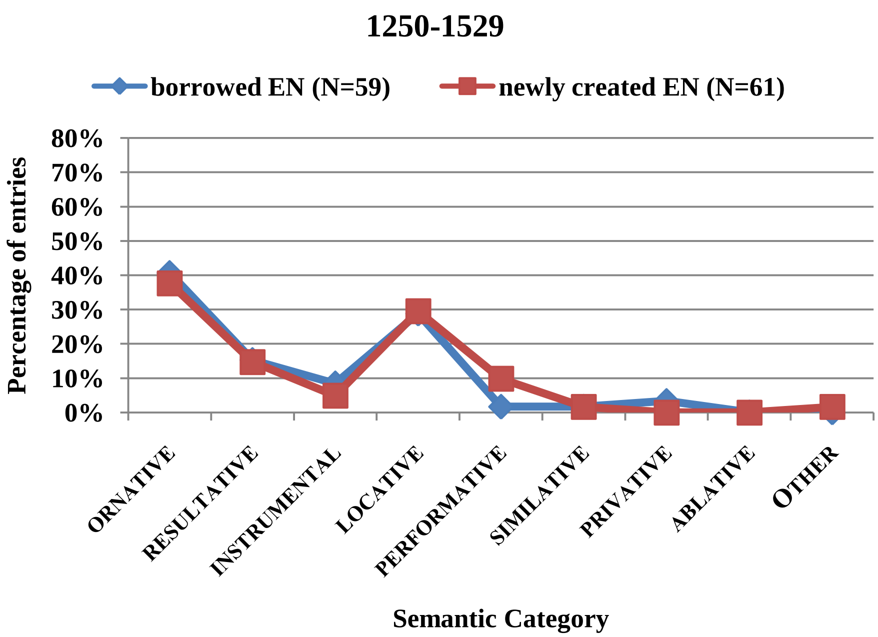


Figure 2.11 Comparison of semantic category distribution of newly created *eN*- denominal verbs with borrowed *eN*- denominal verbs from 1250-1529

The Semantic Category Distribution Effect predicts that the semantic category type frequency distribution of the newly created *eN*- forms will be significantly correlated with the semantic category distribution of the existing *eN*- forms, which, during the Early Borrowing period, are precisely those borrowed in.  As predicted, the semantic category distributions mimic each other and these similarities are reflected in the statistical analyses[17]. The Pearson Moment Correlation Coefficient, showing the relation between the actual percentage points of the newly created verbs and the borrowed verbs, is highly significant ($r = 0.963$; $t(5) = 8.017$, $p < 0.001$), suggesting the two significantly parallel each other in type frequency. However, as there are several categories displaying similar percentage points, the Spearman Rank statistic might be more appropriate as it tests whether the semantic category rank order in terms of type frequency of the newly created forms significantly matches that of the previous time period. The result ($r = 0.795$; $Z = 1.946$) hovers just above the $p < .05$ level of significance at $p = 0.052$. These results lend support to the hypothesis that the Semantic Category Distribution Effect is indeed a factor that affects the probability of a particular denominal verb formation process being applied to a particular semantic category.

Coming out of this Early Borrowing period, the distribution contains two spikes in type frequency: one at ORNATIVE and one at LOCATIVE. If the Semantic Category Distribution Effect hypothesis is correct, then the expectation is that these same spikes will also be found for the newly created *eN*- verb distribution of the next time period as newly created *eN*- verbs will with greater probability be ORNATIVE and LOCATIVE verbs.

[17] The data from the ABLATIVE and OTHER categories have not been included in these, or in fact, any of the statistical analyses of this section or the next, as their inclusion might continually skew the results towards significance.

This prediction is borne out as the data in figure 2.12 below reveal. In this First Peak time period from 1530 to 1679, the semantic category distribution of *eN-* verbs newly created matches that of the verbs existing before this period began, with peaks at ORNATIVE and LOCATIVE.

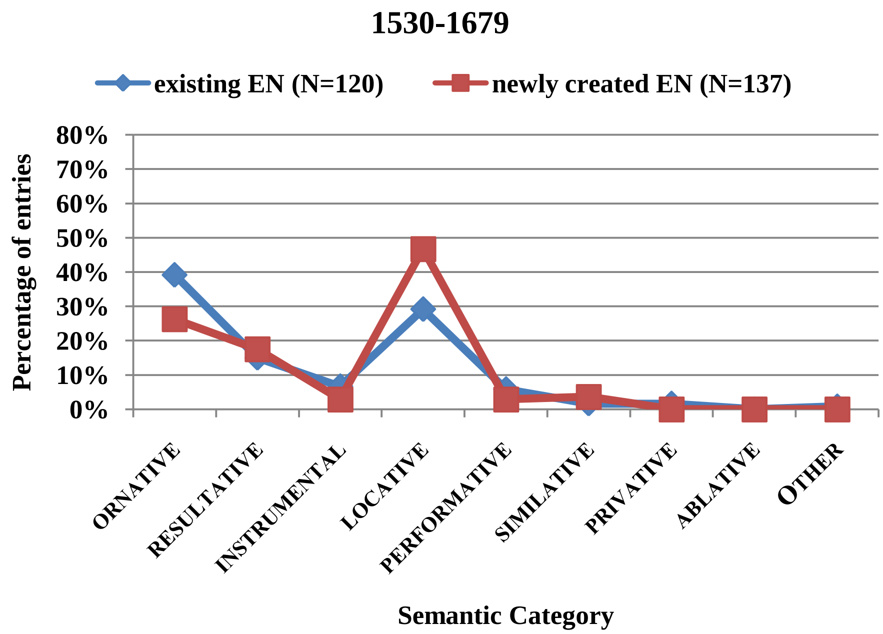


Figure 2.12 Comparison of semantic category distribution of newly created *eN-* denominal verbs with existing *eN-* denominal verbs from 1530-1679

The Spearman Rank Order correlation of r = 0.804 (Z = 1.968, p = 0.049) now reaches significance at the $p < .05$ level. What is interesting to note, however, is that unlike the existing forms, for which ORNATIVE was number one in terms of type frequency and LOCATIVE number two, the ranking is reversed for the newly created forms. Why should this be the case? Either the hypothesis regarding the Semantic Category Distribution Effect is wrong, or there is some other factor at work; to anticipate the discussion that follows in the next section, that other factor is claimed to be the interaction of the other word formation processes during this First Peak period. Another important observation is that nearly half of the 137 newly created forms are verbs with a LOCATIVE interpretation. Combined with the total of LOCATIVE *eN*- verbs from the previous time period, this suggests an even stronger association between *eN*- and LOCATIVE will be developed by the next time period.

This is indeed found to be the case for the next time period from 1680 to 1789, the Lull Period. Not only do the semantic category distributions of newly created and existing *eN*- verbs match significantly (Spearman Rank r = 0.875; Z = 2.143, p = 0.032), but the percentage of newly created LOCATIVE *eN*- verbs, at 57.1%, is the highest of this time period (please refer to figure 2.13 below) or any time previous period.

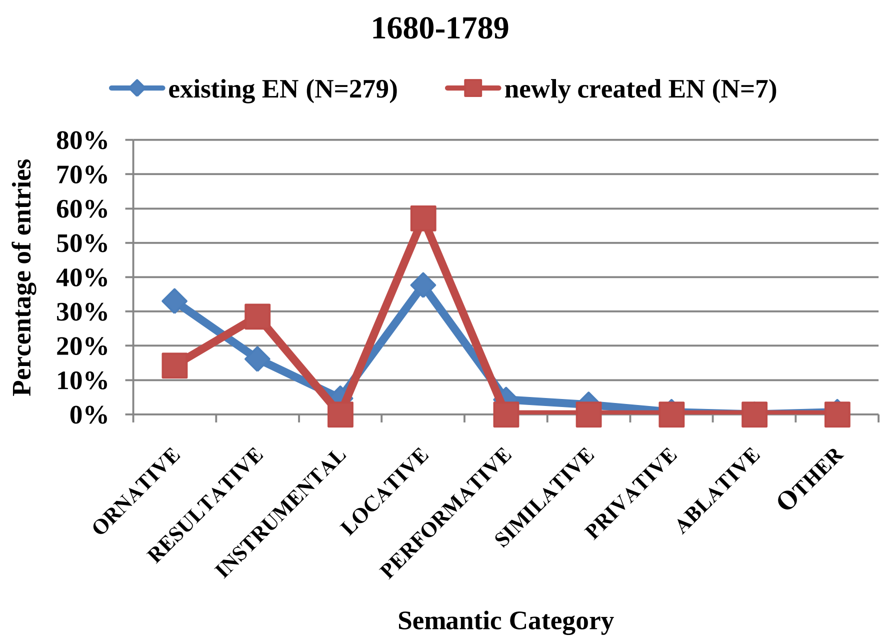


Figure 2.13 Comparison of semantic category distribution of newly created *eN*- denominal verbs with existing *eN*- denominal verbs from 1680-1789

These results may again be interpreted as providing support for the Semantic Category Distribution hypothesis, as the nature of the semantic category type frequency distribution of the existing forms is a significant factor in predicting the nature of the semantic category distribution of the newly created forms, and indirect evidence that a distinct spike in the distribution influences the strength of association between a word formation process and a particular semantic category.

However, one must apply some caution in the interpretation of the results as the newly created *eN*- verbs of the Lull period number only 7, as compared to 137 newly created forms of the First Peak period. In fact, as figures 2.14 and 2.15 below show, the pattern seen during the Lull period is repeated thereafter during the Second Peak period and the 20th century period.

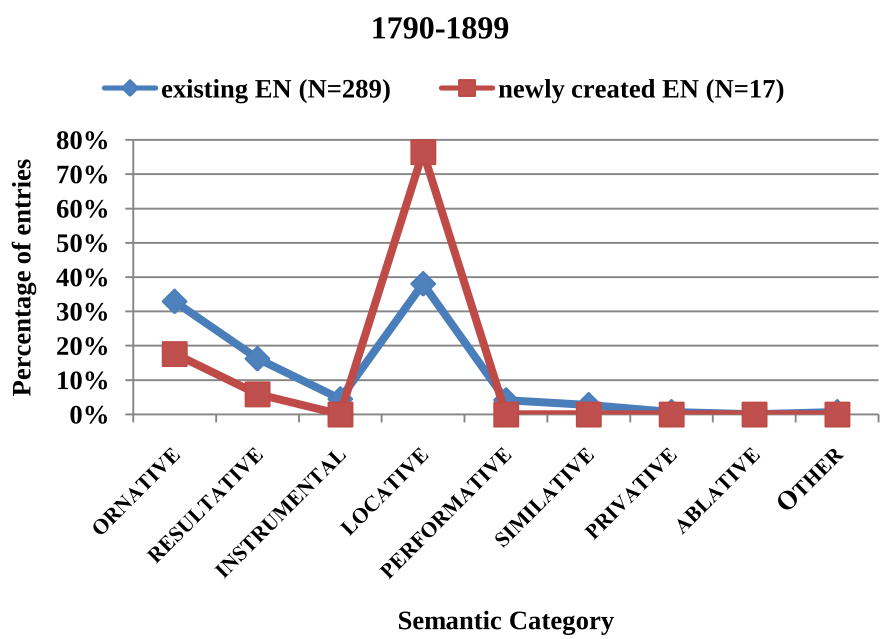


Figure 2.14 Comparison of semantic category distribution of newly created *eN*- denominal verbs with existing *eN*- denominal verbs from 1790-1899

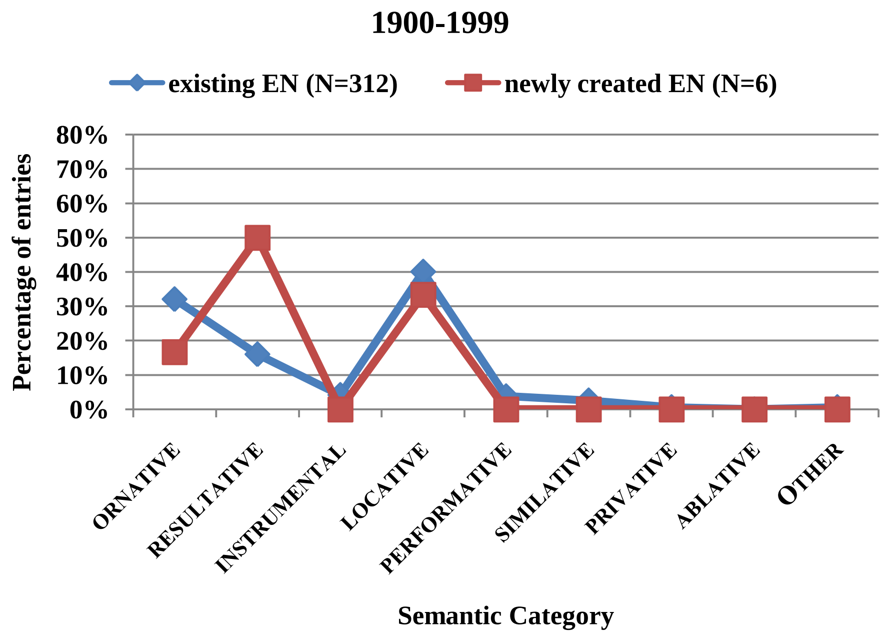


Figure 2.15 Comparison of semantic category distribution of newly created *eN*- denominal verbs with existing *eN*- denominal verbs from 1900-1999

In both instances, the semantic category distribution of the newly-created forms is significantly correlated to the distribution of the existing forms (Spearman Rank r for Second Peak = 0.911; Z = 2.231, p = 0.026, and Spearman Rank r for 20$^{th}$ century = 0.804, z = 1.968, p = 0.049) and LOCATIVE interpretations continue to be highly probable, as the Semantic Category Distribution Effect hypothesis predicts. However, the overall type frequency of newly created *eN*- verbs continues to be low: only 23 new denominal *eN*- verbs since 1790. Why this drop in overall type frequency productivity? After all, the greater semantic transparency encouraged by a strong association with LOCATIVE interpretations should have helped *eN*- maintain its status as <u>the</u> LOCATIVE verb-making affix. In searching for a potential explanation for this result, it is necessary to return to Hay (2000). She states "affixes which consistently create highly decomposable forms are much more likely to be productive than affixes which create less decomposable words" (Hay 2000, 283). To relate directly to the data here, is *eN-* an affix that consistently creates highly decomposable verbs or less decomposable verbs? It is proposed here that *eN-* is an affix that creates verbs that are less likely to be accessed via a decomposable route, mainly because it is a prefix. As Hay (2000) points out, prefixes tend to lead to more of a whole-word processing route due to the left-to-right nature of speech processing. Thus, it is theorized here that consistent processing of *eN-* verbs less by a decomposition route led to the lower overall productivity of *eN-*, despite the greater semantic transparency created by the association with LOCATIVE interpretations due to the Semantic Category Distribution Effect.

#### 2.3.4.2 -*ify*

In many ways, the evolution of -*ify* in English over the last eight centuries parallels that of *eN-*: despite a strong association with one semantic category, in this case RESULTATIVE, the number of new denominal -*ify* verbs drops significantly in the 20$^{th}$ century.

Using the Early Borrowing period from 1250 to 1530 as a starting point, figure 2.16 shows that right from the beginning, -*ify* is more likely to be a RESULTATIVE denominal verb than any other semantic category.

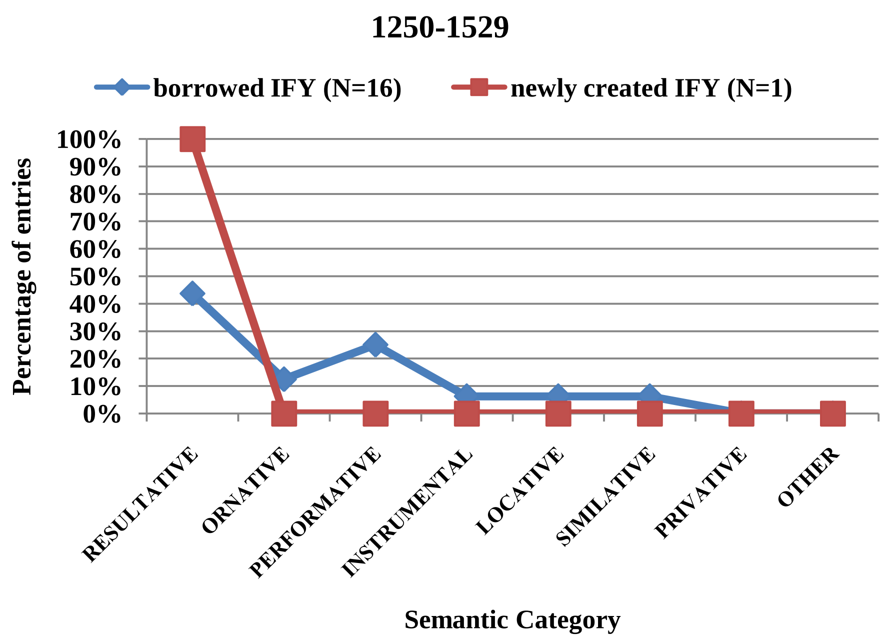


Figure 2.16 Comparison of semantic category distribution of newly created *-ify* denominal verbs with borrowed *-ify* denominal verbs from 1250-1529

The results of the Spearman Rank statistic comparing the semantic category distribution of newly created *-ify* denominal verb forms with that of the borrowed denominal *-ify* verbs is not significant at this point (r = 0.723; Z = 1.772, p = 0.077); however, a qualitative description is much more appropriate as there is only 1 newly created *-ify* denominal verb during this time period. One can easily observe from figure 2.16 above that the majority of *-ify* verbs borrowed from French are RESULTATIVE in interpretation, and the newly created *-ify* verb in English follows this trend in maintaining a RESULTATIVE interpretation as well. Interestingly, this also occurred with the first two denominal *en-* verbs created in English: the distribution of the borrowed forms showed two spikes at ORNATIVE and LOCATIVE and the first two verbs were an ORNATIVE and a LOCATIVE. Furthermore, this is also the case with *-ize* and *-ate*: the majority of early denominal *-ize* borrowings were PERFORMATIVE and the first denominal *-ize* verb created in English is PERFORMATIVE; the majority of denominal *-ate* verbs first borrowed in were ORNATIVE and the first *-ate* verb formed in English is ORNATIVE. Although not exactly a “smoking gun”, these results, too, point to the influence of the Semantic Category Distribution Effect upon the probability of using a particular affix for a particular semantic category.

As for the next time period, the First Peak, from 1530 to 1679, the Semantic Category Distribution Effect hypothesis predicts the results should show a significant correlation between the existing semantic category distribution for the *-ify* denominal verbs existing before 1530 and the distribution of the *-ify* denominal verbs newly created during the First Peak. Figure 2.17 represents these results, as predicted. Nearly half of the denominal *-ify* verbs prior to this period have a RESULTATIVE interpretation, and over half of the newly created *-ify* verbs are RESULTATIVE, and both of the distributions are significantly correlated with each other (Spearman Rank r = 0.813; Z = 1.990, p = 0.047).

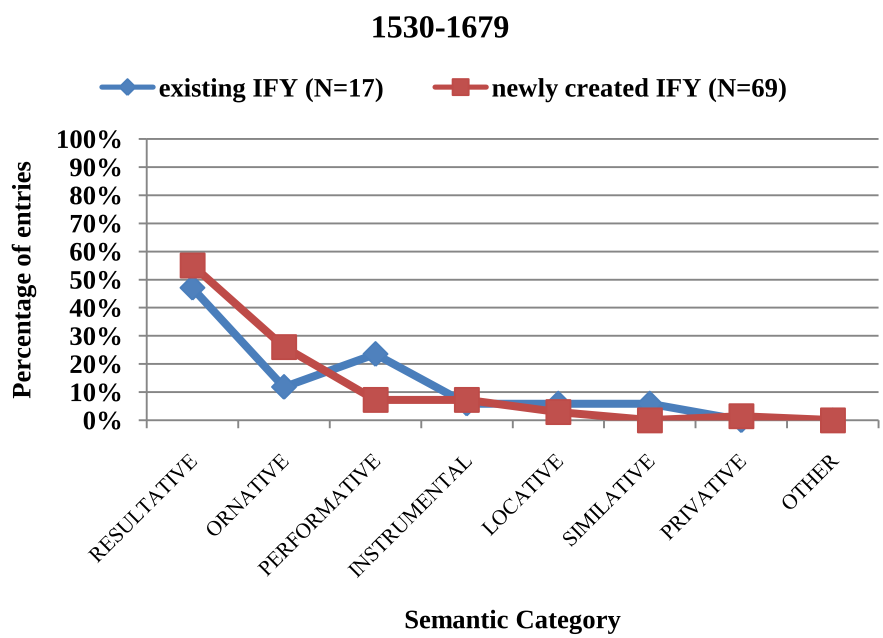


Figure 2.17 Comparison of semantic category distribution of newly created *-ify* denominal verbs with existing *-ify* denominal verbs from 1530-1679

This same, significant, pattern continues through the Lull (figure 2.18; Spearman Rank r = 0.884; Z = 2.165 p = 0.030) and the Second Peak (figure 2.19; Spearman Rank r = 0.884; Z = 2.165, p = 0.030) and with continuing type frequency.

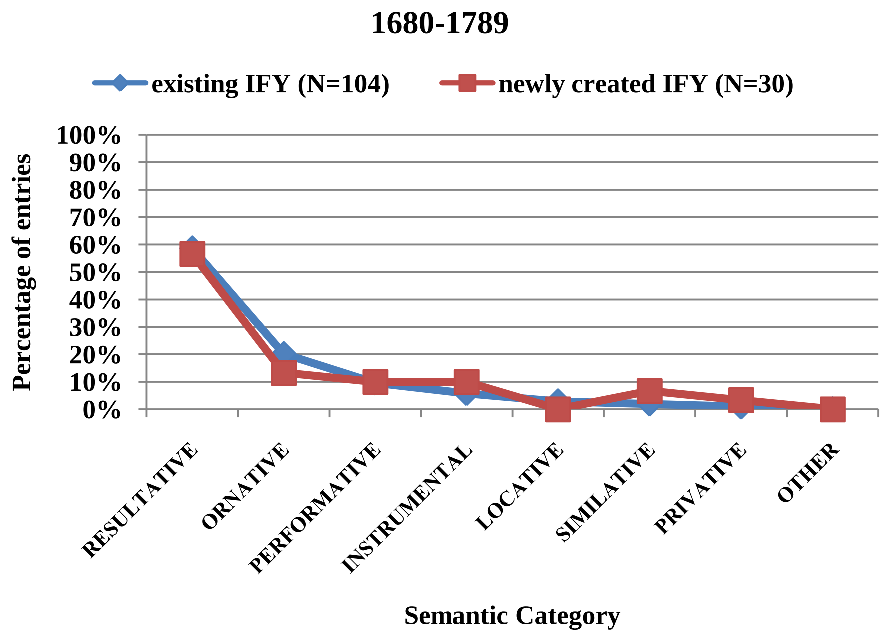


Figure 2.18 Comparison of semantic category distribution of newly created -*ify* denominal verbs with existing -*ify* denominal verbs from 1680-1789

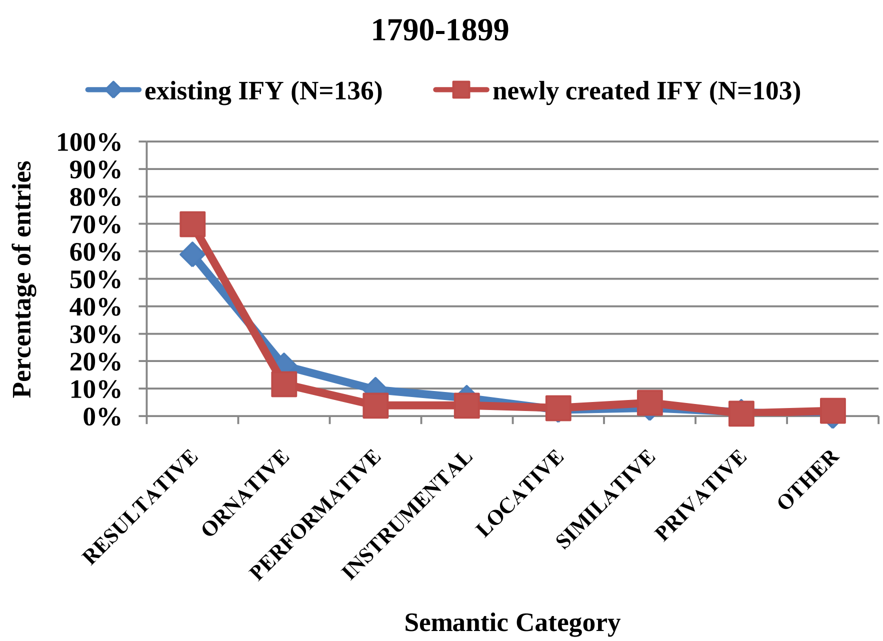


Figure 2.19 Comparison of semantic category distribution of newly created -*ify* denominal verbs with existing -*ify* denominal verbs from 1790-1899

By the 20th century, it appears as if so many of the newly created -*ify* verbs have been RESULTATIVE that there is very little distribution room left for the other semantic categories. The result of this is that during the 20th century, although the Pearson Moment Correlation Coefficient is highly significant ($r = 0.991$; $t(5) = 16.163$, $p < 0.001$), the Spearman Rank Correlation is not ($r = 0.643$; $Z = 1.575$, $p = 0.115$). However, as can be seen from the distributions represented in figure 2.20, the lack of significance is due to the slight variances in rank among all the low percentage semantic categories, rather than a failure to maintain a high type frequency for RESULTATIVE interpretations.

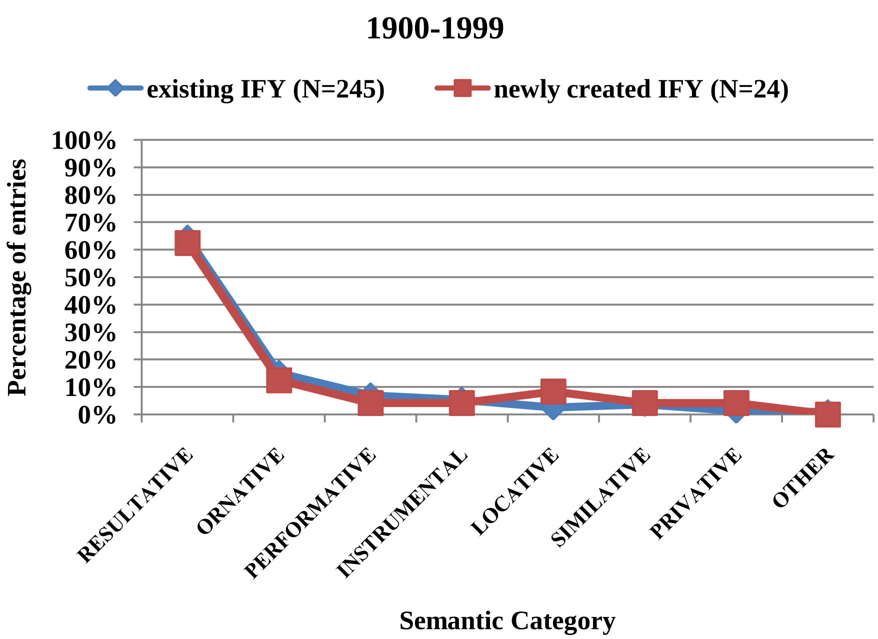


Figure 2.20 Comparison of semantic category distribution of newly created -*ify* denominal verbs with existing -*ify* denominal verbs from 1900-1999

But again, the number of newly created -*ify* denominal verbs, 24, is much lower for the 20th century compared to the century just before, when 103 new -*ify* denominal verbs were created.

Why the suddenly lower type frequency? The explanation proffered here cannot be the same as the one for *eN-*, since *-ify* is certainly not a prefix. However, *-ify* displays some features associated more with whole word processing than decomposition. For one, *-ify* begins with vowel, which should not signal any illegal junctural phonotactics which would promote a decomposition route; rather, beginning with a vowel should usually lead to syllable restructuring, with the coda of the final syllable of the base becoming the onset of the first syllable of the affix, which in turn, promotes less processing by decomposition. And, as Hay (2000) points out and as discussed in relation to *eN-* above, the less often processing by decomposition occurs, the less productive an affix tends to become. Furthermore, since the stress rules associated with *-ify* (Plag 1999) require monosyllabic or iambic bases, it may be the case that potential bases of this sort are now in short supply or would involve truncation, which Plag has identified as a less preferred strategy. However, considering the very strong association *-ify* has with RESULTATIVE interpretations, one wonders if this affix will actually continue, albeit in its current low type frequency form when the noun base is monosyllabic or iambic, as these sorts of bases are not favored by the other RESULTATIVE-associated affix: *-ize*, to be discussed later in this section.

2.3.4.3 *-ate*

Whereas *en-* and *-ify* display spikes, which help associate them to LOCATIVE and RESULTATIVE interpretations, respectively, they have not maintained enough type frequency to sustain their probability of application as <u>the</u> LOCATIVE or RESULTATIVE verb-making affix. The situation with *-ate* is perhaps even worse off as far as its continued usefulness; for most of its history in English, -*ate* has not had much of a semantic category spike and its type frequency for the 20th century is barely above that seen with -*ify*. Moreover, as will be discussed just below, the degree of -*ate* borrowing has been more intense and lasted longer than any of the other borrowed affixes presented here, making it even more difficult for -*ate* to establish an identity, so to speak, as a denominal verb formation process associated with a particular semantic category.

The data related to denominal verb -*ate* during the Early Borrowing period from 1250 to 1529 is illustrated in figure 2.21 below. Even though there were only three denominal -*ate* verbs newly created in this period, they do fulfill the prediction that their semantic categories will match that of the early borrowings; the semantic category distribution of the early borrowings shows that ORNATIVE and RESULTATIVE are the top two categories for -*ate* at this time, and consistent with this, the newly created -*ate* verbs number two ORNATIVE and one RESULTATIVE.

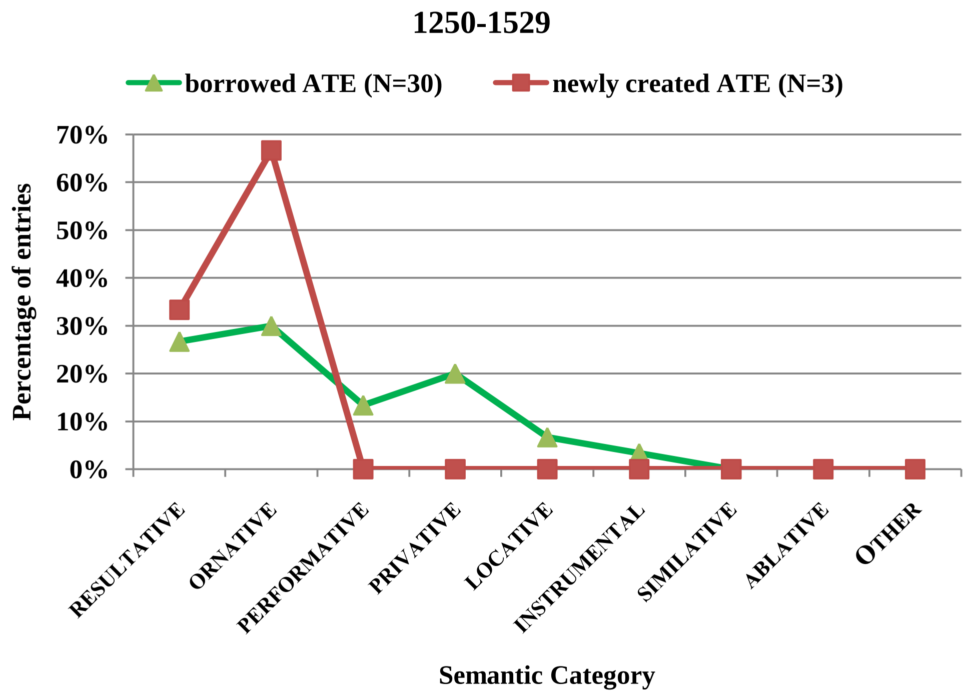


Figure 2.21 Comparison of semantic category distribution of newly created *-ate* denominal verbs with borrowed *-ate* denominal verbs from 1250-1529

The Spearman Rank Correlation statistic comparing the two distributions does yield a significant result (r= 0.821; Z = 2.012, p = 0.044); however, again, caution should be applied in interpreting this result as there are, as aforementioned, only three newly created verbs participating in the comparison.

The next time period, the First Peak, from 1530 to 1679, witnesses a huge increase in the number of denominal *-ate* verbs entering English; however, unlike the other borrowed affixes by the First Peak, the vast majority of *-ate* verbs are still borrowings (405 of the 534 total). Thus, the semantic category type frequency distribution of the borrowed *-ate* verbs is also provided in figure 2.22, below, and the rest of the figures for *-ate* that follow.

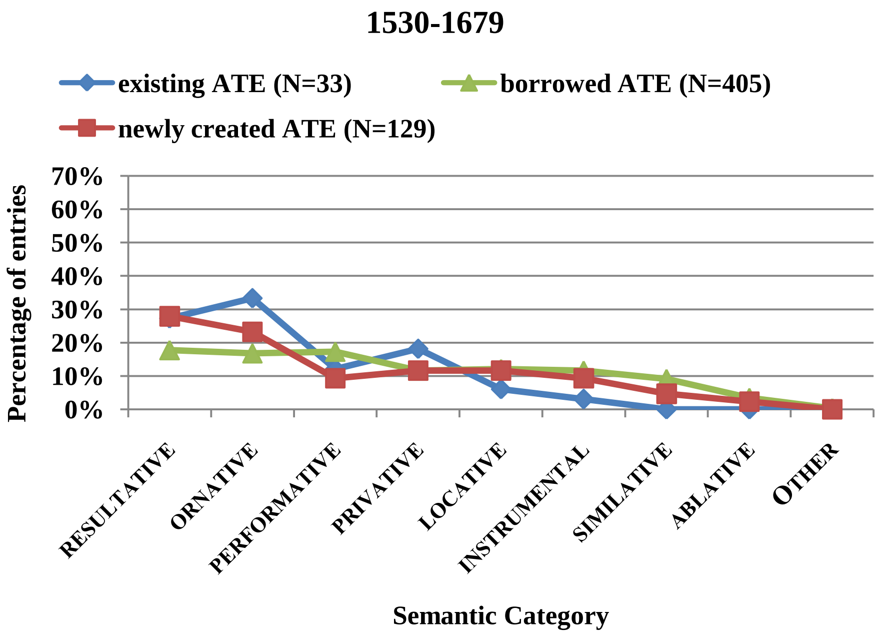


Figure 2.22 Comparison of semantic category distribution of newly created -*ate* denominal verbs with borrowed and existing -*ate* denominal verbs from 1530-1679

Quite a number of observations can be made at this point. First, while the existing -*ate* distribution has relative spikes at ORNATIVE and RESULTATIVE, the borrowed -*ate* distribution is very flat; only ABLATIVE and OTHER are not between 10% and 20% in their type frequency. The newly created -*ate* verb distribution, on the other hand, appears to be intermediate. Like the existing distribution and unlike the borrowed distribution, the newly created -*ate* distribution has spikes at RESULTATIVE and ORNATIVE, although the newly created ORNATIVE spike is not as obvious as the existing ORNATIVE spike. But like the borrowed distribution and unlike the existing distribution, the newly created distribution ranks RESULTATIVE over ORNATIVE in terms of type frequency. Considering these results, as well as the overwhelming number of borrowed -*ate* verbs during this time, the Spearman Rank Correlation statistic was performed comparing the newly created denominal -*ate* verbs and the rank order created by the percentages averaged from each corresponding semantic category of the existing and the borrowed distributions. This comparison is found to be positively correlated below the $p < .05$ level of significance ($r = 0.875$; $Z = 2.143$, $p = 0.032$). What this suggests is that, unlike the other affixes, whose number of further borrowings is relatively negligible, for -*ate*, the semantic category distribution of the continued high number of borrowings does contribute to the Semantic Category Distribution Effect.

Turning now to the next time period, the Lull between 1680 and 1789, the number of newly created -*ate* verbs drops quite a bit from the previous period, from 129 during the First Peak to only 29 during the Lull. Even more dramatic is the drop in the number of borrowed -*ate* verbs, from 405 during the First Peak to 28 during the Lull. Also the ratio between borrowed and newly created -*ate* verbs is essentially 1:1. The semantic category distributions for the denominal -*ate* verbs existing before 1680, the borrowed -*ate* verbs, and the newly created -*ate* verbs are shown in figure 2.23 below.

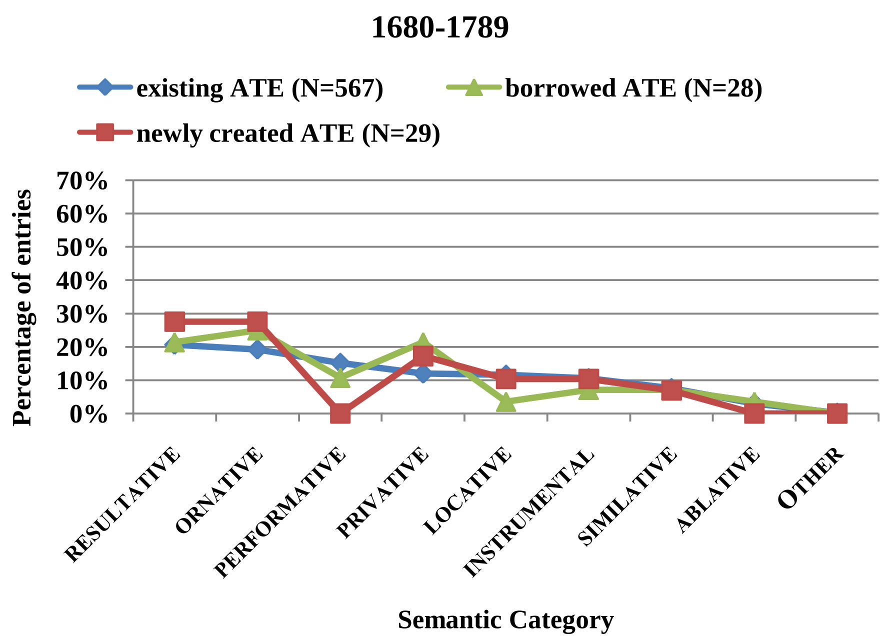


Figure 2.23 Comparison of semantic category distribution of newly created *-ate* denominal verbs with borrowed and existing *-ate* denominal verbs from 1680-1789

What may be observed immediately is that for all three distributions, all of the percentage of the semantic categories are 30% or less, quite suggestive of a flat distribution. It certainly does not appear as if the existing and borrowed distributions contain any discernable spikes. The Semantic Category Distribution Effect predicts, then, that the newly-created distribution should not contain any discernable spikes either. Yet, the percentages for RESULTATIVE and ORNATIVE are around 10% higher than the next highest category. Moreover, the Spearman Rank Correlation between the average of the existing and borrowed distribution and the newly-created distribution is not quite significant ($r = 0.768$; $Z = 1.881$, $p = 0.060$). These results suggest that, although the Semantic Category Distribution Effect seems to be contributing somewhat, some other factor is promoting the existence of the potential spikes at

RESULTATIVE and ORNATIVE. And this factor is also at work at the next time period, the Second Peak, from 1790-1899, as illustrated in figure 2.24 below.

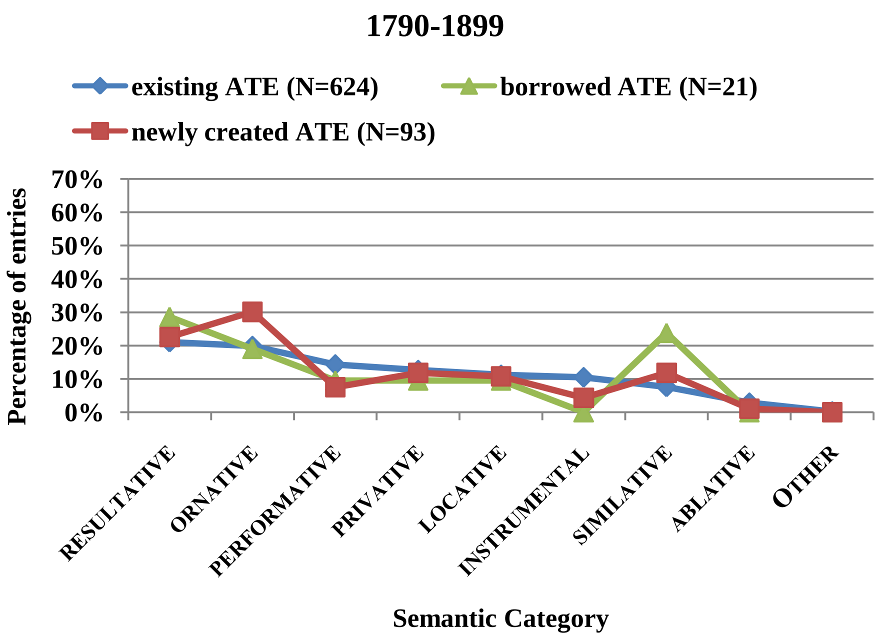


Figure 2.24 Comparison of semantic category distribution of newly created -*ate* denominal verbs with borrowed and existing -*ate* denominal verbs from 1790-1899

The pattern of results seen with the data for -*ate* during the Lull is paralleled during this time period as well. This time, however, the number of newly-created denominal -*ate* verbs is now much greater than that of the borrowed -*ate* verbs. Still, 21 borrowed -*ate* verbs at this time cannot be considered negligible, and the influence of its distribution is still reflected in the statistics (Spearman Rank Correlation r = 0.830, z = 2.034, p = 0.042), which is once more just below the $p < .05$ level of significance. And again, while all of the semantic categories of the distributions in figure 2.24 above are 30% or less of the total, the newly-created distribution shows RESULTATIVE and ORNATIVE interpretations widening the gap between them and the other categories. It is proposed here that the other factor responsible for this is the interaction of the distributions of the other denominal verb formation processes, as will be discussed further in section 2.3.5.

The gap between RESULTATIVE and ORNATIVE -*ate* verbs and the other semantic categories is even wider during the next time period, that of the 20th century, as seen in figure 2.25.

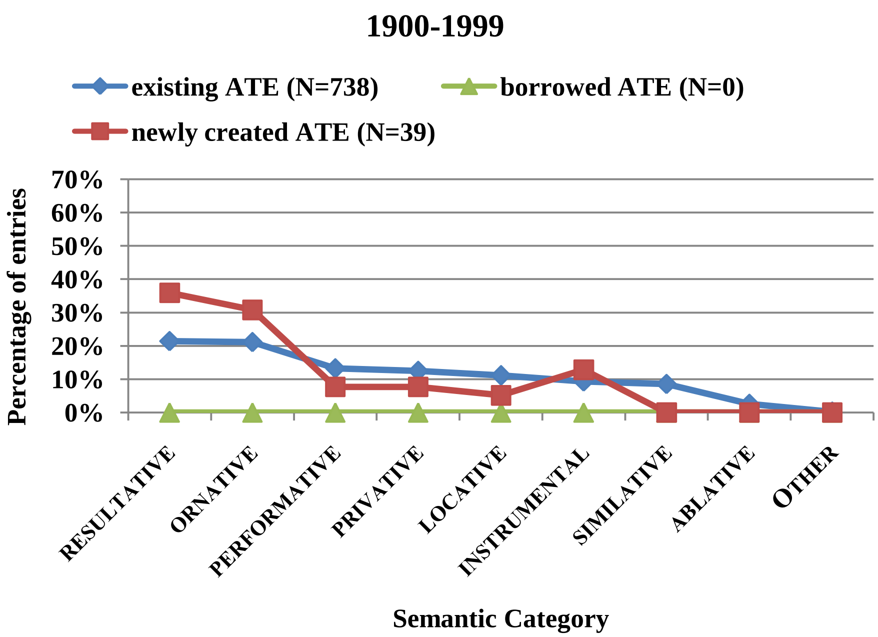


Figure 2.25 Comparison of semantic category distribution of newly created -*ate* denominal verbs with borrowed and existing -*ate* denominal verbs from 1900-1999

There are no borrowed denominal -*ate* verbs during this time, now much more in line with the other borrowed in affixes. Therefore, the only relevant comparison, statistically, is that between the existing and newly created distributions; the Spearman Rank Correlation for this comparison is not quite significant ($r = 0.777$; $Z = 1.903$, $p = 0.057$), hypothesized here to be due, as with the two previous time periods, to the influence of the distributions of the other word formation processes. As figure 2.25 above shows, the newly created -*ate* forms now display clear spikes at

RESULTATIVE and ORNATIVE, but with only 39 newly created denominal *-ate* verbs in total, this may be too low of a type frequency to establish an association between *-ate* and these two semantic categories. This issue will be returned to in section 2.3.5, which focuses on the interaction factor.

2.3.4.4 Conversion

Unlike the other processes discussed thus far, type frequency productivity has definitely not been a problem for denominal verb conversion in English, but, as the following discussion shows, the flattening out over time of the semantic category distribution makes it more unlikely for an association with a particular semantic category to develop, and the Semantic Category Distribution Effect predicts that the flat distribution will continue from one time period to the next such that over time, conversion achieves more of a default status.

The semantic category distribution data for conversion for the years from the earliest sources used by the OED until the start of the French borrowings containing the overt affixes, from 725 to 1249, are shown in figure 2.26 and provide a starting point for comparison.

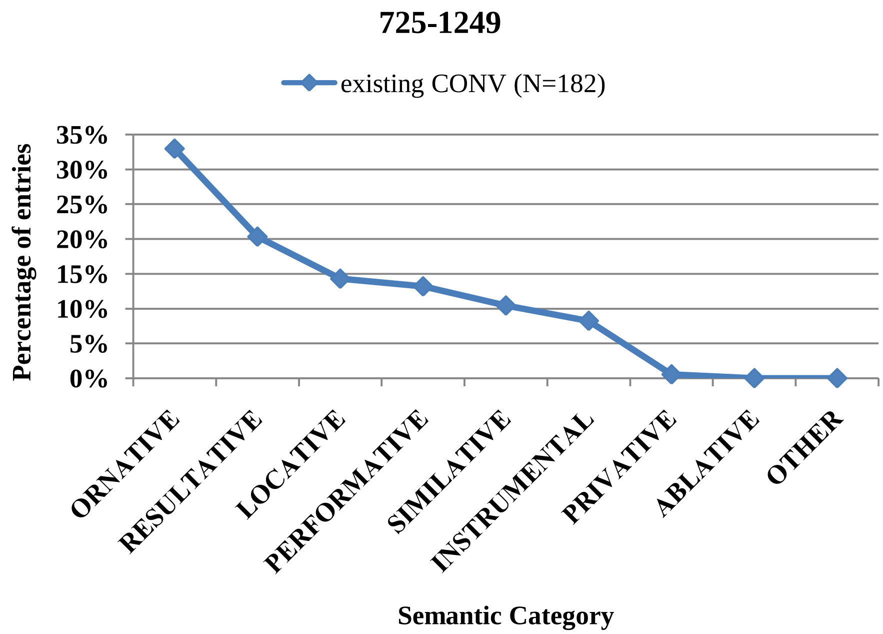


Figure 2.26 Semantic category distribution of conversion denominal verbs from 725-1249

It is important to observe that at this time, the semantic category distribution for denominal conversion verbs is not flat: there is an obvious spike of type frequency percentage for ORNATIVE interpretations (33.0%). Based upon this data, the Semantic Category Distribution Effect predicts that the next time period will show a similar spike at ORNATIVE for the newly created denominal conversion forms.

Figure 2.27 below shows the comparison between the semantic category distribution of the denominal conversion verbs in existence before 1250 and the semantic category distribution of the denominal conversion verbs newly created in the Early Borrowing period, 1250-1529.

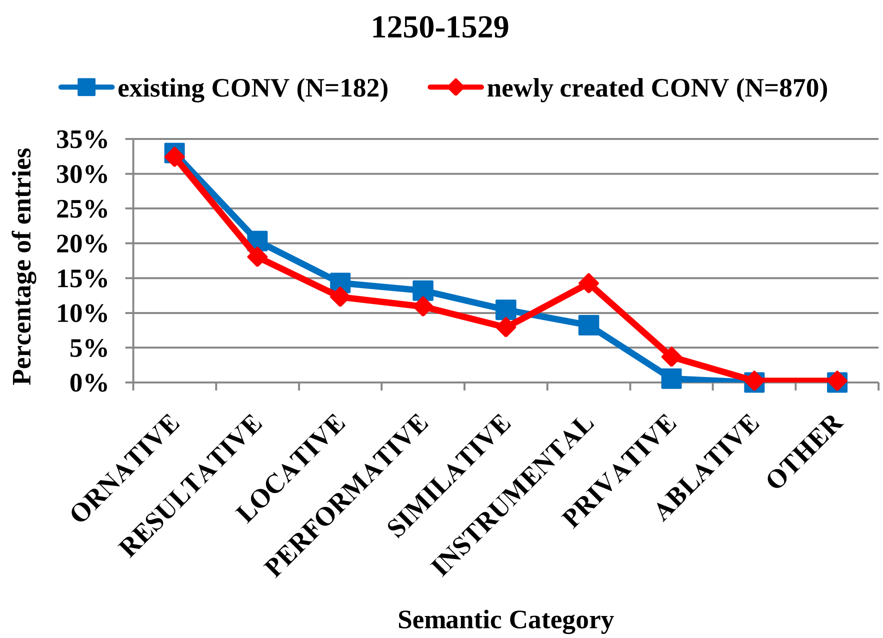


Figure 2.27 Comparison of semantic category distribution of newly created conversion denominal verbs with existing conversion denominal verbs from 1250-1529

As predicted, there is again a spike at ORNATIVE for the newly created verbs, mimicking the pre-existing verb pattern. The Spearman Rank statistic result ($r = 0.786$; $Z = 1.925$), however, is just above significance at $p = 0.054$. It should be noted that, at this point, conversion looks much like the overt denominal verb formation processes in terms of following a pattern dictated by the proposed underlying semantic structure: ORNATIVE and RESULTATIVE with the majority of the type frequency percentage (32.4% and 18.0%, respectively), followed by the grouping of LOCATIVE, PERFORMATIVE, SIMILATIVE, and INSTRUMENTAL (around 10%-15% each), and the last grouping of PRIVATIVE, ABLATIVE, and OTHER showing little to no type frequency.

And, as with the previous time period, the separation between ORNATIVE and the other semantic categories leads to the Semantic Category Distribution Effect prediction that the next time period, the First Peak, will also reveal a spike for ORNATIVE.

The comparison between all of the denominal conversion forms existing in English prior to 1530 and those newly created during the First Peak (1530-1679) is shown in figure 2.28 below.

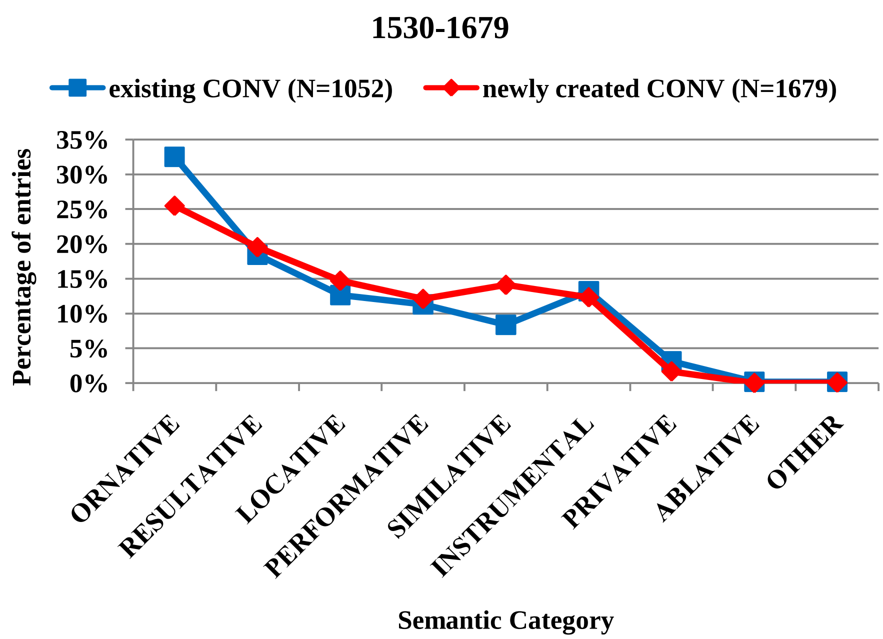


Figure 2.28 Comparison of semantic category distribution of newly created conversion denominal verbs with existing conversion denominal verbs from 1530-1679

Although the figure above shows that ORNATIVE is again the number one semantic category in terms of type frequency percentage, it is to a much lesser degree (25.5%) than the previous time period and not a clear spike as predicted. Furthermore, although the Spearman Rank statistic shows the rank order comparison between the newly created forms and the existing forms is now significantly similar ($r = 0.821$; $Z = 2.012$, $p = 0.044$), both ORNATIVE and RESULTATIVE are becoming less distinct from the other semantic categories in terms of type frequency distribution. The explanation for this result is proposed to be the interaction of the much greater use of the newer affixes, *-ify*, *eN-*, *-ize*, and *-ate* during this First Peak period, as will be discussed shortly in section 2.3.5.

As for the predictions for the next time period, the expectation based upon the Semantic Category Distribution Effect is that the distribution will continue to flatten out as the more evenly-distributed newly created denominal conversion verbs from this time period are added to the existing totals of the next.

The results for the Lull Period from 1680-1789 (figure 2.29 below) show that this prediction does prove to be an accurate one: the distribution is flatter across the major semantic categories.

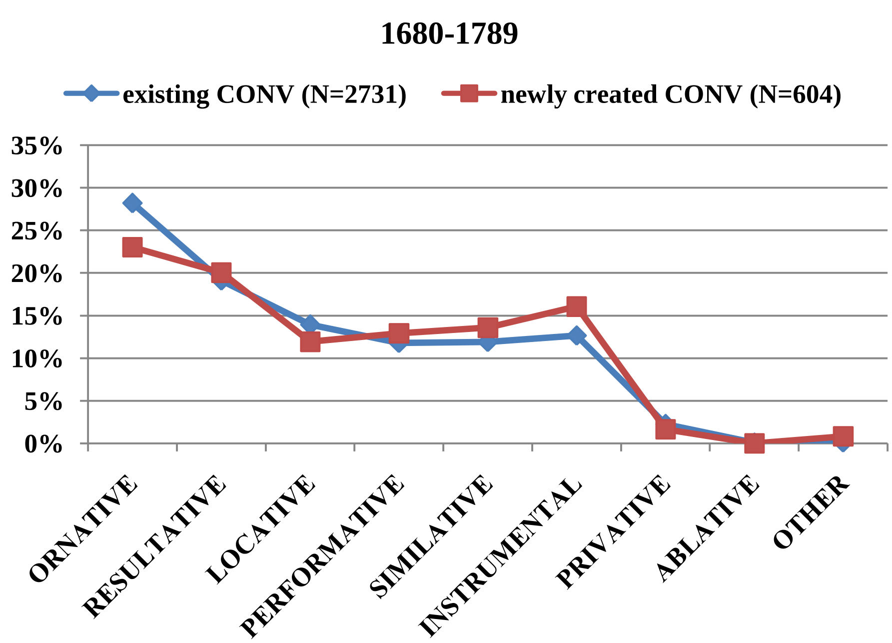


Figure 2.29 Comparison of semantic category distribution of newly created conversion denominal verbs with existing conversion denominal verbs from 1680-1789

Although the data are still following the underlying semantic structure pattern of ORNATIVE and RESULTATIVE first, then the LOCATIVE, PERFORMATIVE, SIMILATIVE, and INSTRUMENTAL group, followed by the PRIVATIVE, ABLATIVE and OTHER group, the type frequency percentage difference among the major semantic category distribution is only around 10 percentage points, from ORNATIVE at 23.0% to LOCATIVE at 11.9%. Moreover, the Spearman Rank statistic showing the Semantic Category Distribution Effect is once more just above significance ($r= 0.786$; $Z = 1.925$, $p = 0.054$). The prediction for the next time period coming out of this data is an even flatter distribution, in accordance with the Semantic Category Distribution Effect.

The data in figure 2.30 demonstrate that the prediction holds: the distribution of the denominal conversion verbs newly created during the Second Peak (1790-1899) is flatter, the major semantic categories ranging in type frequency by less than 10 percentage points.

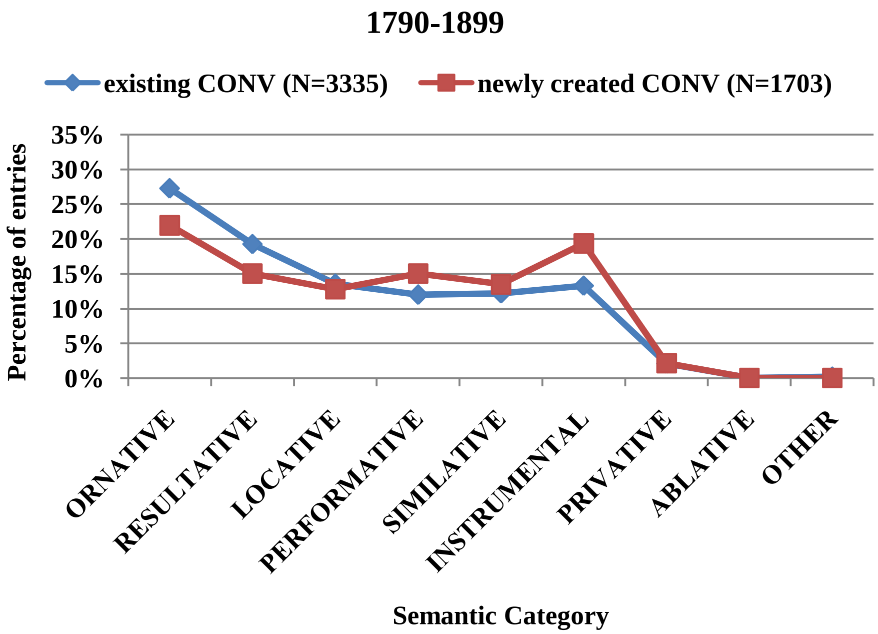


Figure 2.30 Comparison of semantic category distribution of newly created conversion denominal verbs with existing conversion denominal verbs from 1790-1899

The flattening out trend is also evident in the comparison of the shape of the newly created distribution with the existing distribution. As the figure above shows, the newly created line is below the three highest existing semantic categories and above the three lowest (of the major categories), leading, of course, to a flatter distribution for existing conversion verbs for the next time period. Not surprisingly, this result translates into a Spearman Rank Correlation that is even farther from significance (r = 0.616; Z = 1.509, p = 0.131). It should also be noted that RESULTATIVE, which has consistently been the second ranked semantic category for newly created denominal verbs for all previous time periods, has been surpassed in type frequency percentage by INSTRUMENTAL and is now tied for third with PERFORMATIVE. The flattening out of the distribution in and of itself would not predict this result; however, if conversion has, by this Second Peak time period, truly achieved default status, then the unexpected rise a particular category might be a reflex of filling in a gap, so to speak, left by the other denominal verb formation processes concurrently in use. The discussion of this issue continues for the next time period, the 20th century, and in section 2.3.5 below.

Figure 2.31 represents the data related to denominal conversion in the 20th century. As can easily be seen, the newly created distribution is now very different from the existing conversion distribution, at least in terms of the major semantic categories, so much so, in fact, that it appears as if the Semantic Category Distribution Effect is not even in operation for conversion anymore.

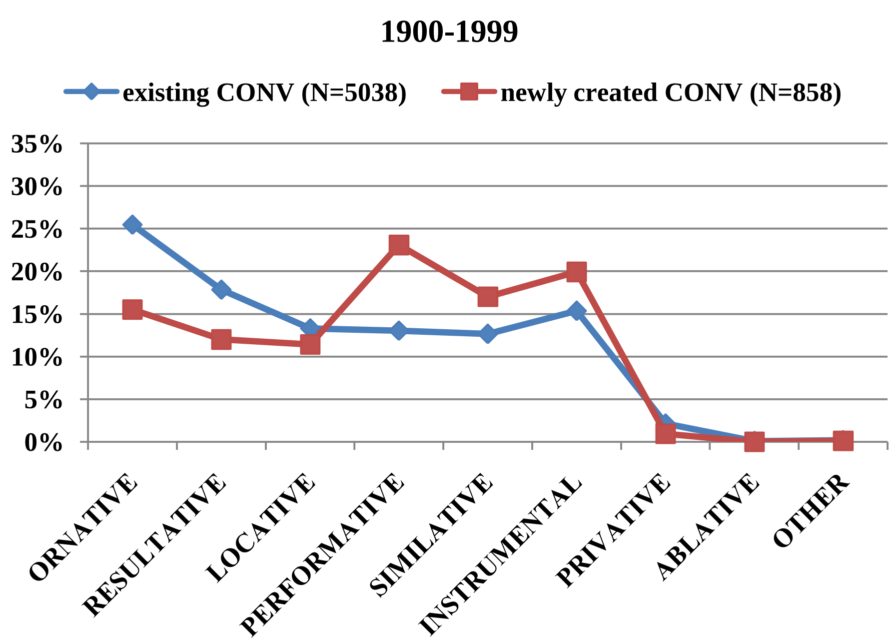


Figure 2.31 Comparison of semantic category distribution of newly created conversion denominal verbs with existing conversion denominal verbs from 1900-1999

The result of the Spearman Rank statistics is not even close to significant ($r = 0.143$; $Z = 0.350$, $p = 0.726$). Clearly there is some factor other than the Semantic Category Distribution Effect that is determining the probability of conversion use for a particular category. It is proposed here that it is conversion's status as a default denominal verb formation process that is primarily responsible for the results seen here. As will be discussed again in section 2.3.5, conversion is now used less often for ORNATIVE and RESULTATIVE because another productive process, namely *-ize*, is more closely associated with ORNATIVE and RESULTATIVE. Correspondingly, conversion, as a default, is used more often for PERFORMATIVE, INSTRUMENTAL and SIMILATIVE contexts, as no other process is associated with these particular categories.

### 2.3.4.5 *-ize*

As with *eN-* and *-ify*, the distributions associated with *-ize* show a spike in type frequency percentage for a certain semantic category, but unlike the other two, *-ize* has been able to retain and even increase its productivity in terms of type frequency over the last few centuries. Also, the evolution of *-ize* has not been as neat and tidy as the other two either. The start of *-ize* in the English language began with the Early Borrowing period, and as can be seen from figure 2.32, three semantic categories seem to be higher in type frequency percentage than the others: RESULTATIVE, ORNATIVE and PERFORMATIVE.

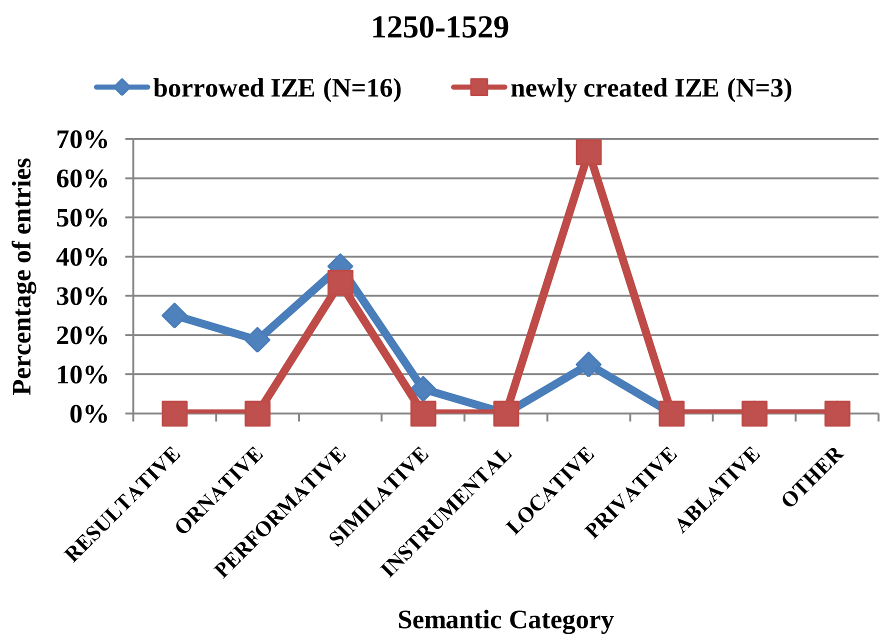


Figure 2.32 Comparison of semantic category distribution of newly created *-ize* denominal verbs with borrowed *-ize* denominal verbs from 1250-1529

At this point, denominal *-ize* is not reflecting any of the word formation process patterns discussed thus far. For one thing, the borrowed *-ize* verbs are not distributed, at least for the major semantic categories, according to the pattern predicted by the underlying semantic structure, i.e. mostly RESULTATIVE and ORNATIVE, then less frequent and clumped together PERFORMATIVE, SIMILATIVE, INSTRUMENTAL, and LOCATIVE. Then again, these verbs are borrowed in and many, many factors can affect which forms get borrowed in and which do not (Haspelmath, forthcoming). And although the first *-ize* denominal verb created in English, *warrantize* (now obsolete), is of the same semantic category as the highest percentage one among the borrowed *-ize* verbs (PERFORMATIVE), the semantic category distribution of the newly created *-ize* verbs does not even come close to matching the distribution of the borrowed verbs (Spearman Rank r = 0.509; Z = 1.247, p = 0.213). This result, too, is not predicted by the Semantic Category Distribution Effect hypothesis. Moreover, LOCATIVE is the interpretation for two of the three newly created *-ize* denominal verbs. This is not at all a result predicted here, considering that borrowed *-ize* verbs with a LOCATIVE meaning only number two themselves at this point, much less than the number for each RESULTATIVE, ORNATIVE, and PERFORMATIVE.

The *-ize* data of the next period from 1530 to 1679, i.e. the First Peak, (figure 2.33 below) is a little more in line with predictions consistent with the underlying semantic structure pattern and the Semantic Category Distribution Effect, but still not at a level of significance (Spearman Rank r = 0.607; Z = 1.487, p = 0.137).

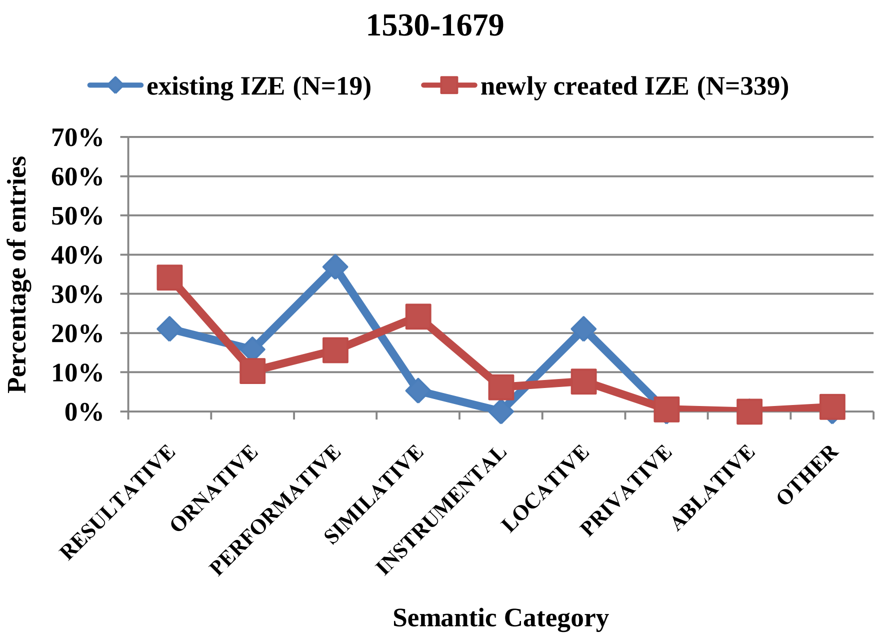


Figure 2.33 Comparison of semantic category distribution of newly created *-ize* denominal verbs with borrowed *-ize* denominal verbs from 1530-1679

The number of newly created *-ize* denominal verbs with a LOCATIVE interpretation is no longer unexpectedly high, and the category with the largest type frequency percentage is RESULTATIVE. However, the underlying semantic structure pattern would predict that ORNATIVE would be higher than the PERFORMATIVE, SIMILATIVE, INSTRUMENTAL, and LOCATIVE group, but it is in fact lower in percentage than both PERFORMATIVE and SIMILATIVE. The Semantic Category Distribution Effect predicts that the spikes of the newly created *-ize* forms should correspond to the spikes of the existing forms, at this stage LOCATIVE and PERFORMATIVE. But, instead of ranking 1 and 2 in the newly created *-ize* distribution, they rank 5 and 3 respectively. And with 339 newly created *-ize* verbs during this First Peak, the particular shape of the semantic category distribution, especially the higher percentage of SIMILATIVE interpretations, could not be due to just a few verbs skewing the result. Does this mean that the hypotheses presented here should be discarded? Or that the relevance of the proposed underlying semantic structure and the Semantic Category Distribution Effect only apply to the lower type frequency denominal verb formation processes? The *-ize* data from the next time periods suggest that drawing these types of conclusions would be premature.

During the Lull period from 1680 to 1789, the shape of the newly created *-ize* verb distributions (see figure 2.34 below) changes and becomes very much like that expected from both the underlying semantic structure and the Semantic Category Distribution Effect. For one thing, the correlation between the semantic category distribution of the existing *-ize* verbs and that of the newly created ones is now definitely significant, with the Spearman Rank Correlation r = 0.955; Z = 2.340, p = 0.019.

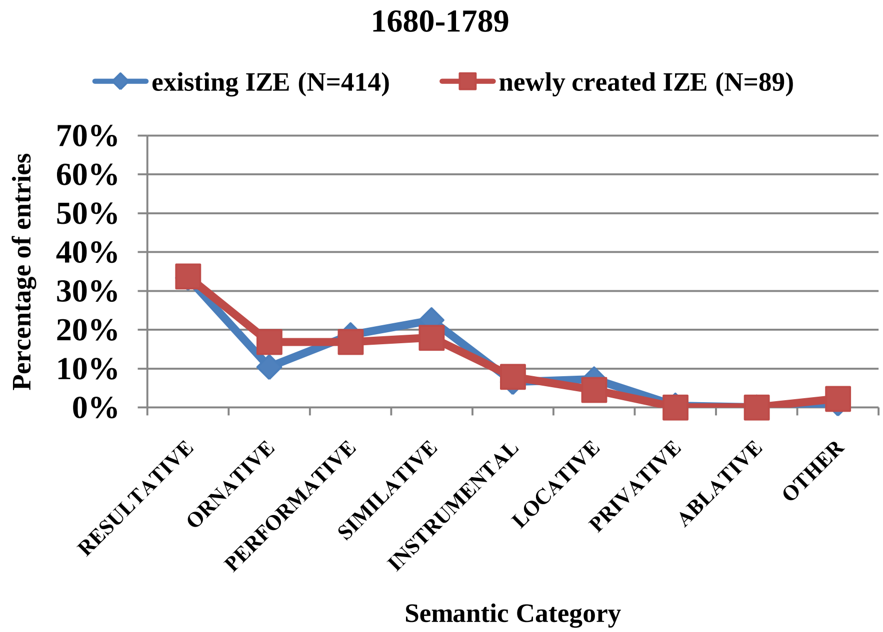


Figure 2.34 Comparison of semantic category distribution of newly created -*ize* denominal verbs with borrowed -*ize* denominal verbs from 1680-1789

For another thing, the semantic category distribution of the newly created -*ize* verbs of this period is much closer to what is expected from the proposed underlying semantic structure. One should be hesitant at this point to conclude that the pull towards the expected pattern is stronger than the Semantic Category Distribution Effect (after all, the Spearman Rank statistic was significant); however, the data here indicate the importance of exploring the interplay between the two.

Lastly, the type frequency percentage for the number one semantic category, RESULTATIVE, continues to be high for the -*ize* verbs created during the Lull; however, the percentage for the

SIMILATIVE category is less than it was in the previous time period, now under 20%. It appears that coming out of this time period, RESULTATIVE will be represented by a spike, clearly separated from the other semantic categories.

This prediction turns out to be correct. For the Second Peak, the type frequency of the RESULTATIVE interpretations for the existing denominal *-ize* verbs is 33.3%, over 10 percentage points higher than the next highest category (see figure 2.35 below).

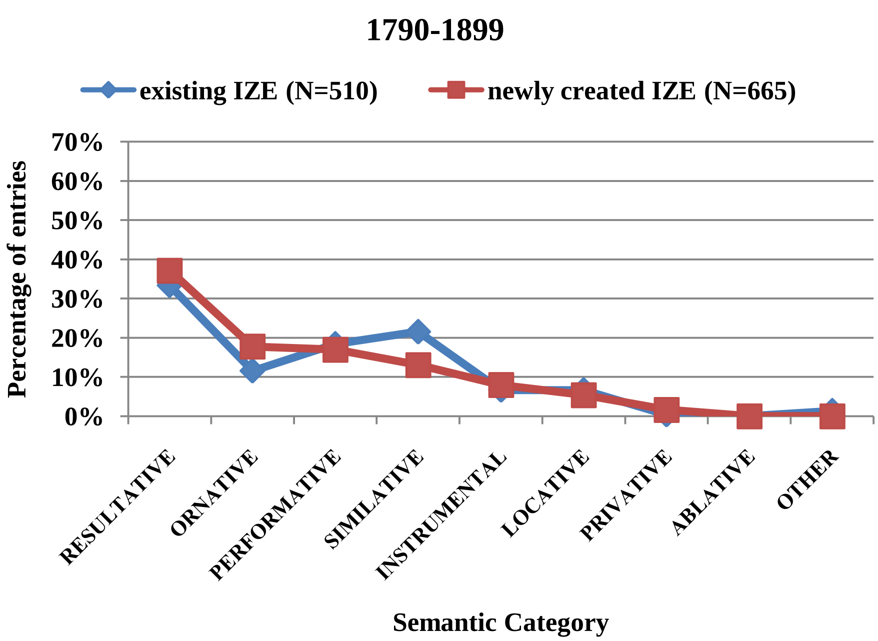


Figure 2.35 Comparison of semantic category distribution of newly created *-ize* denominal verbs with borrowed *-ize* denominal verbs from 1790-1899

And again, consistent with the Semantic Category Distribution Effect hypothesis, the distribution of the newly created *-ize* verbs is significantly correlated with the distribution of the existing forms (Spearman Rank $r = 0.848$; $Z = 2.078$, $p = 0.038$). The number of new denominal *-ize* verbs entering the language during the Second Peak (665) is actually more than the previous total

(510); obviously, then, coming out of this period and into the 20th century, the shape of the distribution of the existing forms will be much more in line with the distribution of these new forms. As the new form distribution has an even higher percentage of RESULTATIVE and ORNATIVE forms than the existing distribution, while the percentages for the PERFORMATIVE and SIMILATIVE categories are lower, RESULTATIVE should yet again display a spike and ORNATIVE as well should begin pulling away from PERFORMATIVE and SIMILATIVE. This being the case, the expectation based upon the Semantic Category Distribution Effect Hypothesis is that the semantic category distribution for the *-ize* verbs newly created in the 20th century should have RESULTATIVE as the number one ranked category, ORNATIVE number two, then the group of PERFORMATIVE, SIMILATIVE, LOCATIVE, and INSTRUMENTAL clustered together, with PRIVATIVE, ABLATIVE, and OTHER at very low type frequency, which, perhaps not incidentally, matches the pattern of the proposed underlying semantic structure.

This is exactly what is found for the *-ize* data from 1900 to 1999 (figure 2.36 below).

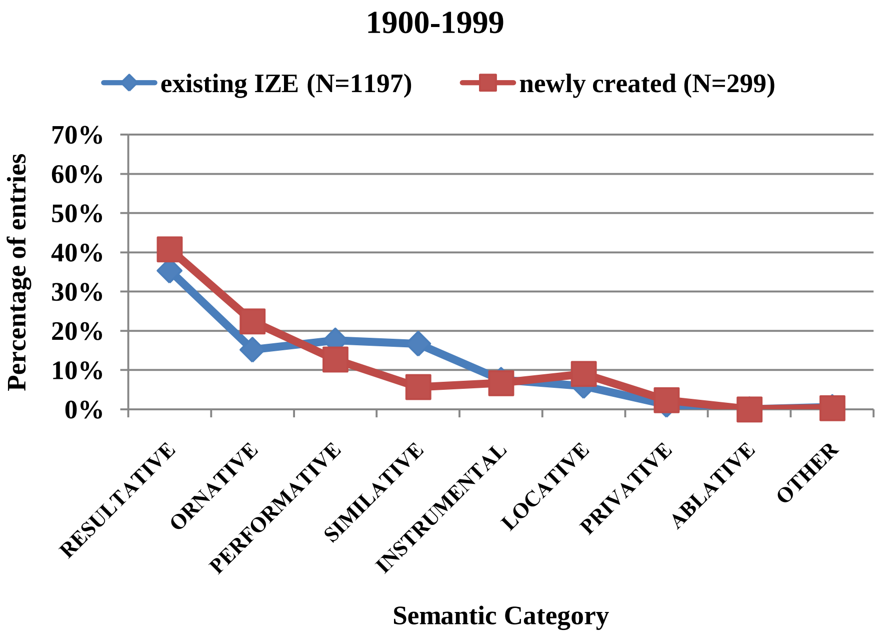


Figure 2.36 Comparison of semantic category distribution of newly created *-ize* denominal verbs with borrowed *-ize* denominal verbs from 1900-1999

As predicted, RESULTATIVE interpretations represent the highest percentage of newly created denominal *-ize* verbs in the 20th century at 40.8%, with ORNATIVE next highest at 22.4%. These two are followed by the grouping of PERFORMATIVE, SIMILATIVE, INSTRUMENTAL, and LOCATIVE, all around 10% of the total. PRIVATIVE, ABLATIVE, and OTHER interpretations are much less frequent for the newly created *-ize* verbs than all the other semantic categories. However, the correlation between this distribution pattern and the semantic category distribution of the existing *-ize* forms is no longer significant (Spearman Rank $r = 0.679$; $Z = 1.662$, $p = 0.097$). This result might again force the questioning of the validity of the Semantic Category Distribution Effect Hypothesis. Yet, as will be discussed in section 2.3.5, it is proposed that the Semantic Category Distribution Effect is still in operation but that another factor-- the interaction of the other denominal verb formation processes-- is in play at this time and, in fact, also accounts for the apparent lack of the Effect during the First Peak period as well. It is further hypothesized that as long as *-ize* at least retains the type frequency productivity it currently demonstrates, and as *-ize* becomes more and more associated with RESULTATIVE and ORNATIVE interpretations, this next century should show a return to a significant correlation between newly created and existing *-ize* forms dictated by the Semantic Category Distribution Effect.

To summarize the results of this section, the evidence presented here supports the hypothesis that the Semantic Category Distribution Effect influences the probability that a particular denominal verb formation process will apply to a particular semantic category. The Semantic Category Distribution Effect is in operation when the distribution displays a clear spike or spikes and when the distribution is relatively flat. It has also been shown that overall type frequency productivity interacts with the Semantic Category Distribution Effect. When the word formation process maintains or increases its level of type frequency and the semantic category distribution demonstrates a spike or spikes, then an association between that process and the category spike can develop, as it has done for *-ize* affixation with RESULTATIVE and possibly now ORNATIVE. When the type frequency remains high, but the distribution shows no spikes, as with conversion, no particular association develops and the process becomes very useful as a default. When an association has developed, but overall type frequency drops dramatically, the process may well become obsolete (as with *be-* and now likely *eN-*) unless there is some other factor that helps maintain its use, e.g. monosyllabic and iambic bases prolonging the use of *-ify*.

When no association has developed and the type frequency has also dropped dramatically, death for the process is imminent unless some other motivation develops to maintain it, perhaps in a smaller semantic domain as with mathematical or scientific bases and -*ate* affixation. However, a prediction that follows from the hypotheses thus far is that as this smaller, science-based semantic domain becomes more and more associated with -*ate*, new -*ate* verbs may become part of only particular jargon or jargons rather than what might be used by the typical native speaker of English.

### 2.3.5 What is the Nature of the Interaction Between the Denominal Verb Formation Processes?

The preceding sections have provided evidence that addresses three of the four questions posed in the beginning of this chapter. The analysis of the corpus data has shown that all major semantic categories are possible interpretations of each denominal verb process in English; however, not every semantic category is equally probable, and the underlying semantic structure and the Semantic Distribution Category Effect have been shown to account for much of that probability. The underlying semantic structure is proposed here as being responsible for the general pattern of the distributions, with ORNATIVE and RESULTATIVE usually the most frequently represented interpretations, followed by the clustering of PERFORMATIVE, SIMILATIVE, and LOCATIVE, and PRIVATIVE and ABLATIVE relatively rare, while the Semantic Category Distribution Effect, that is, the influence of the distribution of the existing forms upon the probability of use with the newly created forms, is proposed to account for the exact nature of the semantic category distributions of a given process from one time period to the next. However, if these two factors were the entire story, then the expectation is that the semantic category distributions for each denominal verb formation process would be essentially the same throughout that process' history in English. Clearly, the data in the previous section have shown this not to be the case. So, the obvious question is: why do the semantic category distributions exhibit changes from one time period to the next? The relevant factor to be proposed here has already been alluded to above: the role of the interaction between the denominal verb formation processes. This is, in fact, the last of the four questions presented in the introduction and is the main concern of this section.

The most logical place to start any discussion involving time is at the beginning; however, there is not much point in examining the period before the borrowing of the French affixed verbs began (i.e. from 725-1250) nor is there much that can be determined about the nature of the interaction between processes during the Early Borrowing period (1250-1529), as most potential competition relates to the borrowed forms. Thus, the discussion begins with the semantic category distribution of each of the processes by the start of the First Peak, with the distribution of the verbs existing by 1530, as shown in figure 2.37 below.

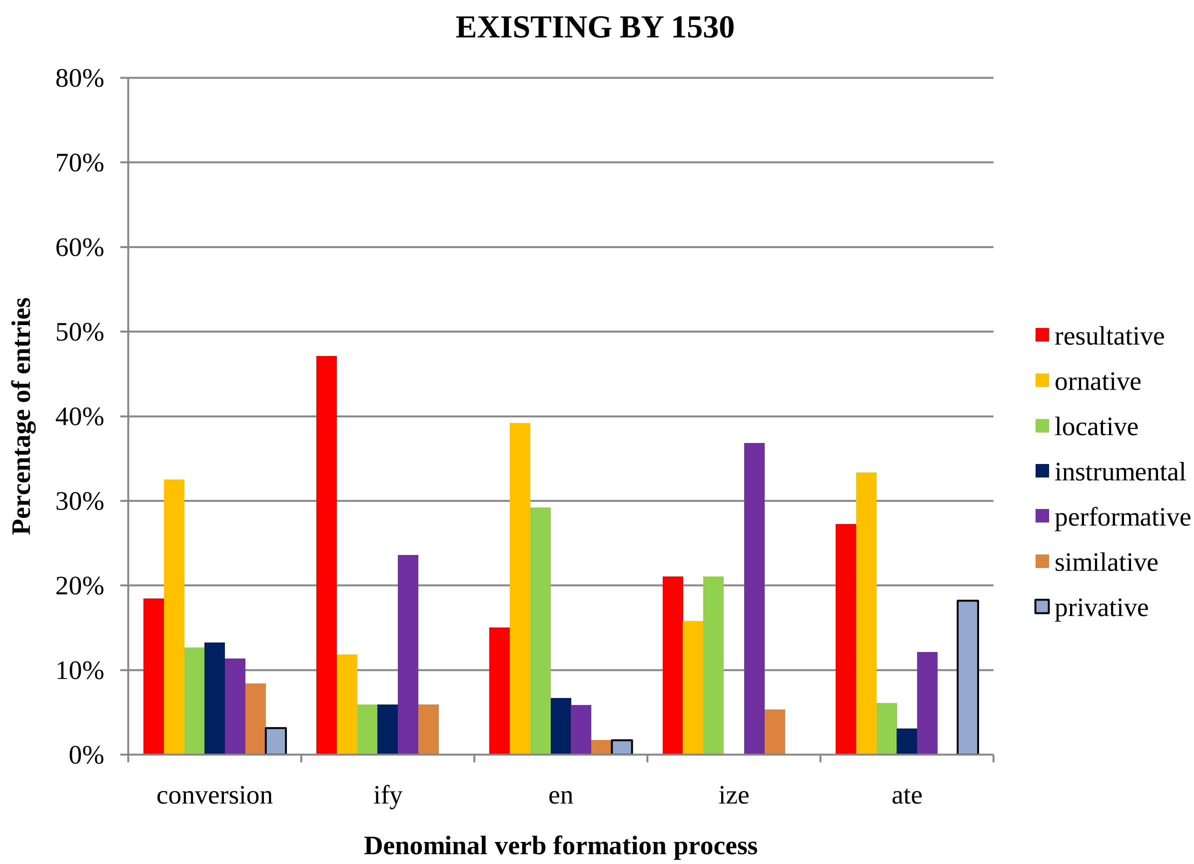


Figure 2.37 Semantic category distributions of each process' existing forms by 1530

Essentially, this figure is a compilation of distributions already presented in the previous section. Just to be clear, the data related to conversion, for example, is the distribution of semantic categories just for conversion and totals 100%. The same applies to the data shown for -*ify*, *eN*-, -*ize*, and -*ate*. What may be observed about the existing verb distribution upon entering the First Peak period (1530-1679) is that for -*ify*, RESULTATIVE maintains the highest percentage compared to the other -*ify* semantic categories and compared to the corresponding RESULTATIVE percentages for the other verb formation processes. This suggests that going into the First Peak, -*ify* may already have developed a very strong association with this particular semantic category, which may interact with the other processes such that when a

RESULTATIVE denominal verb is to be created, processes other than -*ify* will be less likely to apply.

Figure 2.37 also reveals that for LOCATIVE, *eN*- shows the highest percentage compared to the percentages of the other denominal verb formation processes.  However, LOCATIVE does not comprise the majority of existing *eN*- verb interpretations: ORNATIVE does.  But, ORNATIVE is also the highest percentage for conversion and for -*ate*.  This would appear to promote a more competitive interaction between the three processes during the First Peak.

The effects of this competition can be seen in the semantic category distributions of the newly created denominal verbs of the First Peak (1530-1679), provided in figure 2.38 below.

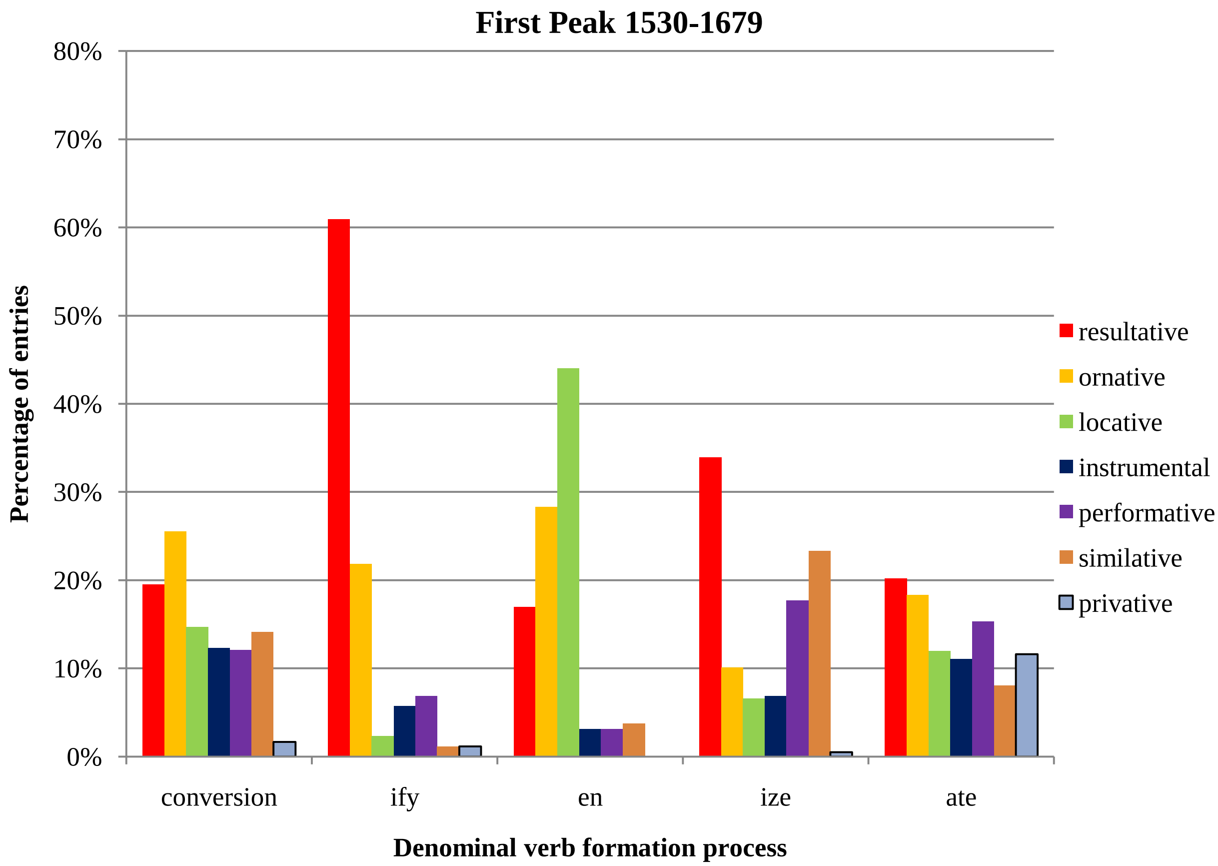


Figure 2.38 Semantic category distributions of newly created forms for each process from 1530-1679

It is difficult to make claims regarding *-ate* at this point, as so many more *-ate* forms were borrowed into English at this time than were created. Therefore, the focus of the ORNATIVE competition lies between conversion and *eN-*. Apparently, the potential for competition has affected both of their distributions. For conversion, the percentage for ORNATIVE is lower than expected for the newly created forms based upon the Semantic Category Distribution Effect. For *eN-*, the percentage for ORNATIVE has also dropped and the percentage for LOCATIVE has increased among the newly created forms. The lower than expected percentages for ORNATIVE are claimed to be a direct result of the competition between the two processes. This also frees up *eN*-, so to speak, to take over even more of the LOCATIVE "jobs", although there may not be as much need for these interpretations overall as there is for ORNATIVE.

As for the newly created -*ify* distribution, as predicted by the Semantic Category Distribution Effect, RESULTATIVE takes up an extremely large percentage of the distribution, over 60%. However, as has been previously discussed, -*ify* does not apply equally well to all bases, preferring monosyllables and iambs. As it happens, both -*ate* and -*ize* prefer the very bases dispreferred by -*ify*: disyllable trochees. While -*ate* is still in the borrowing stage, -*ize* affixation is not participating in the ORNATIVE competition as conversion and *eN*- are, and the associations -*ize* is most likely to form at this point are those with SIMILATIVE and PERFORMATIVE, apparently not categories that are needed as much as RESULTATIVE. Thus, -*ize* becomes the best candidate to perform the task of forming RESULTATIVE denominal verbs from disyllabic trochaic bases. This may explain the lack of a significant Semantic Category Distribution Effect for -*ize* during the First Peak, as witnessed in section 2.3.4.5 above. Entering into the First Peak, PERFORMATIVE comprised the majority of the existing -*ize* distribution (figure 2.37 above), but the interaction of the distributions of the other processes promoted a much higher percentage of RESULTATIVE than the Semantic Category Distribution Effect would have predicted.

Coming out of the First Peak, the semantic category distributions for each of the denominal verb formation processes are as shown in figure 2.39 below.

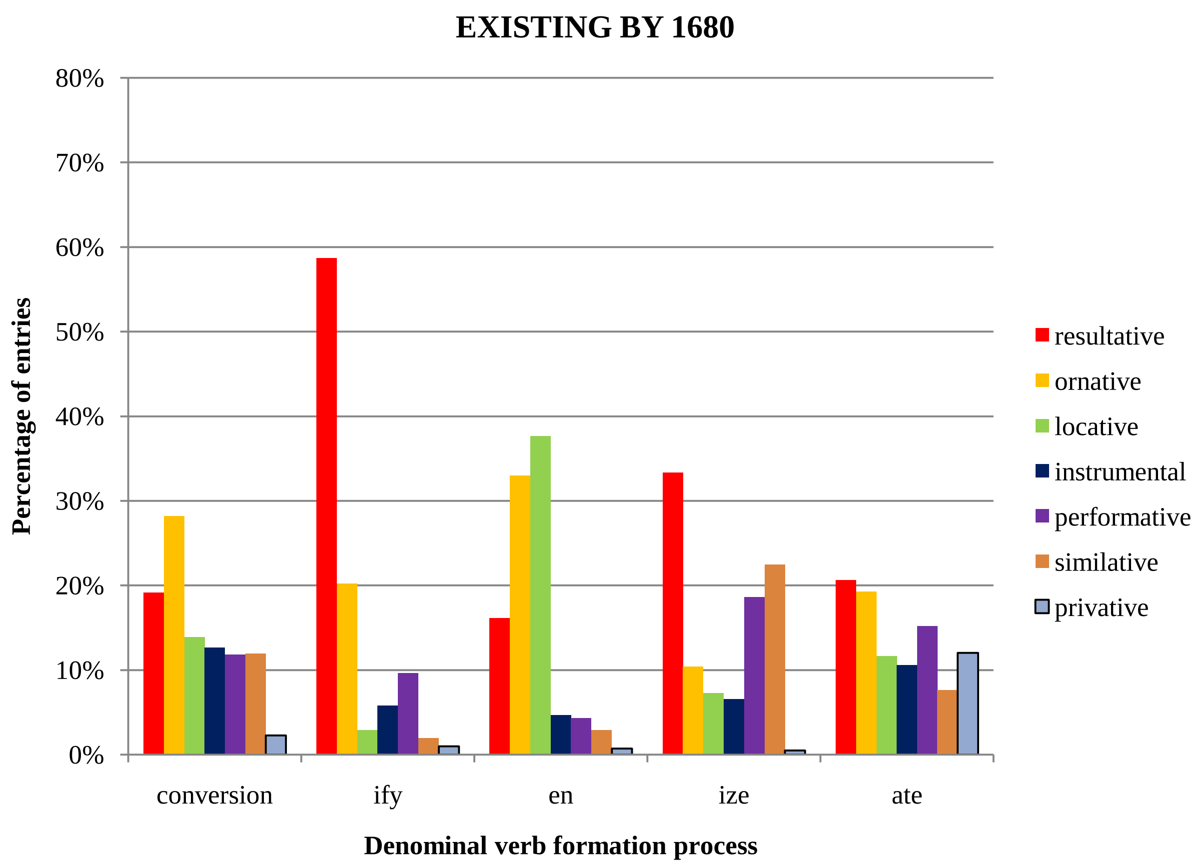


Figure 2.39 Semantic category distributions of each process' existing forms by 1680

Based upon these distributions of existing denominal verbs just before the Lull period (1680-1789), the Semantic Category Distribution Effect predicts a greater probability of *-ify* and *-ize* applying to RESULTATIVE interpretations and *eN-* applying to LOCATIVE interpretations than to any other semantic categories. As for ORNATIVE, conversion looks like the best candidate at this point, as it is not clear, with all of the continued borrowing if *-ate* has even been able to be analyzed out very much yet.

Figure 2.40 below represents the semantic category distributions of the newly created denominal verbs during the Lull period between 1680 and 1789.

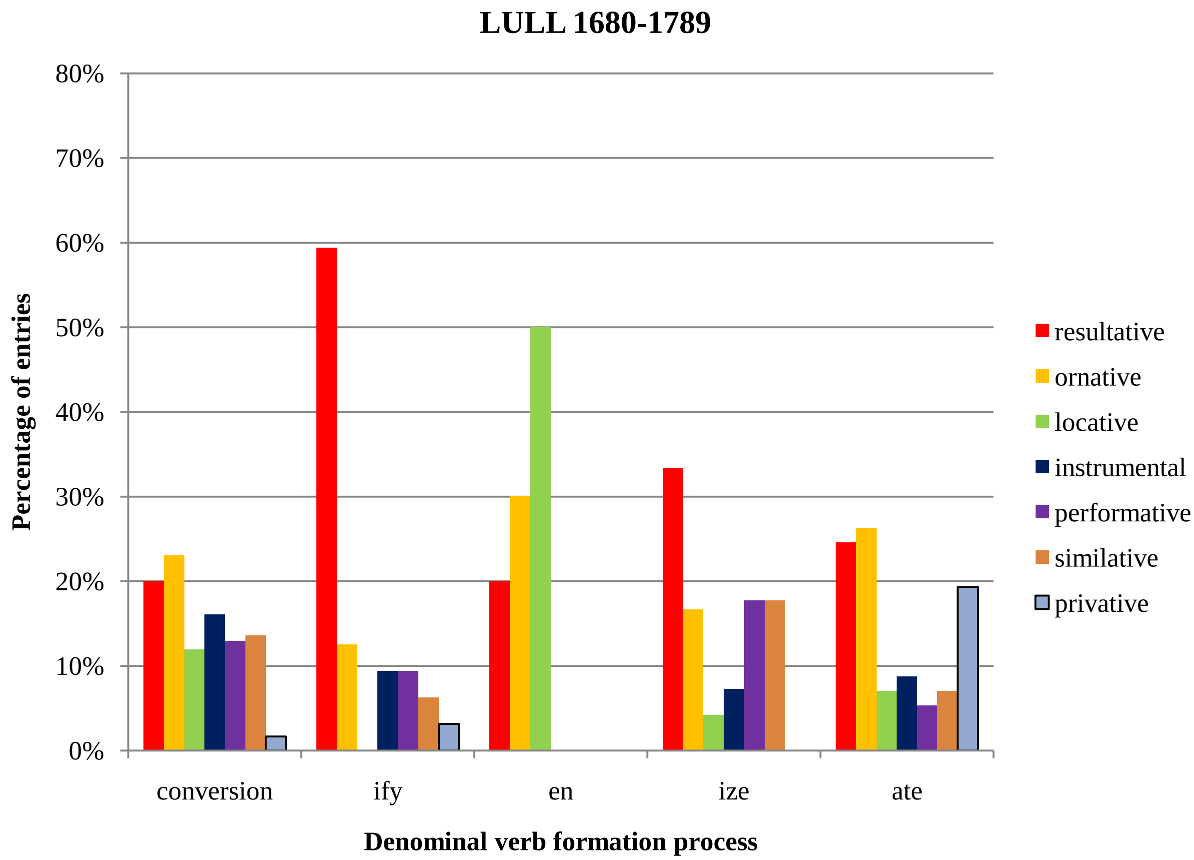


Figure 2.40 Semantic category distributions of newly created forms for each process from 1680-1789

As predicted by the Semantic Category Distribution Effect, -*ify* and -*ize* have RESULTATIVE and *eN*- has LOCATIVE as the majority of their interpretations. Unfortunately for *eN*-, it appears that the stronger association with the less frequently used LOCATIVE interpretations has encouraged the start of a drop in overall type frequency for this denominal verb formation process. As such, *eN*- no longer proves to be much competition for conversion in applying to ORNATIVE denominal verbs during this time. As for -*ate*, there is still quite a bit of borrowing, about half of the total of new -*ate* verbs entering the language at this time. Still, the distribution for -*ate* suggests it might have begun to compete for the ORNATIVE and RESULTATIVE interpretations of newly created forms.

As the data during the Lull is quite consistent with the distributions going into that period, it is not surprising to find that the distributions coming out of the Lull look very much like they did going in.  Figure 2.41 below provides the semantic category distributions of the existing denominal verbs by 1790.

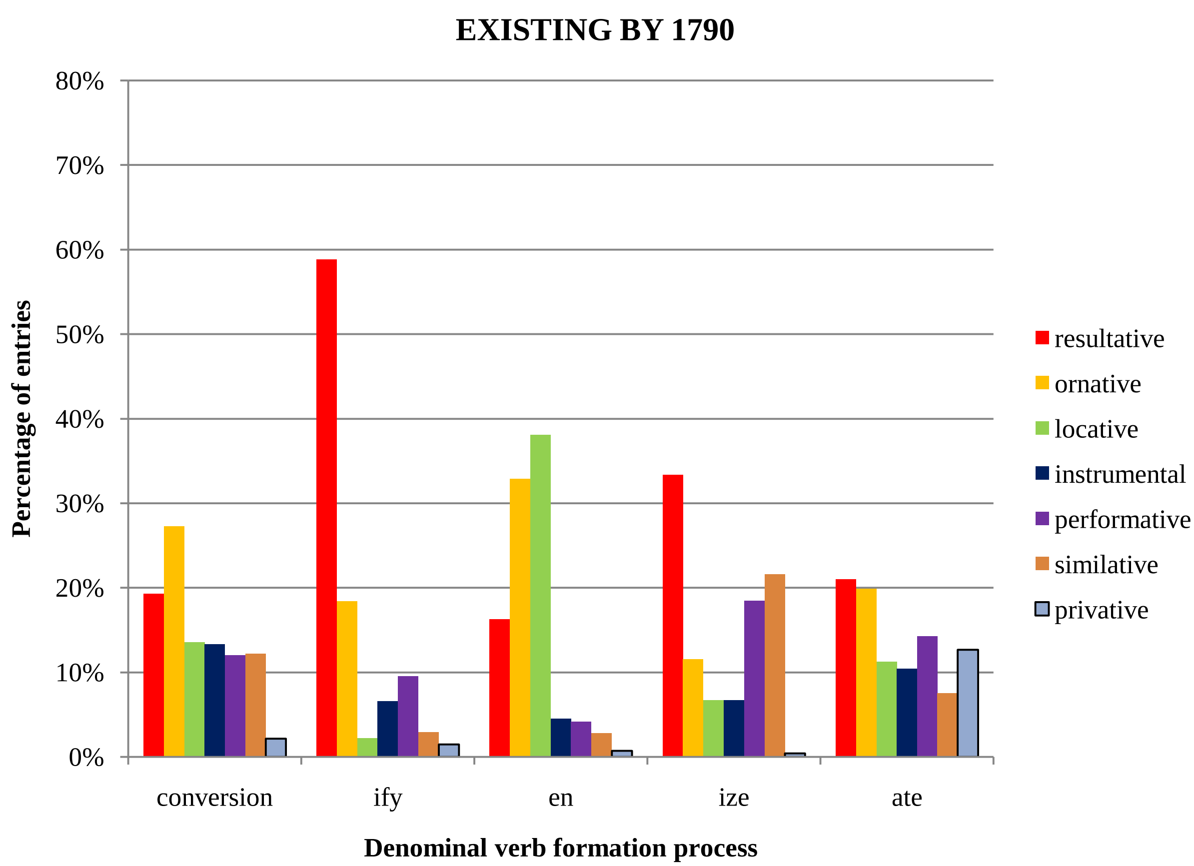


Figure 2.41	Semantic category distributions of each process' existing forms by 1790

Again, based upon these distributions just prior to the Second Peak (1780-1899), the Semantic Category Distribution Effect predicts a greater probability of -*ify* and -*ize* applying to

RESULTATIVE interpretations. The prefix *eN-* may be losing its probability of application for LOCATIVE interpretations as its overall type frequency is dropping. The interaction between the processes suggests that either *-ate* or conversion may take over this role for *eN-*.

The semantic category distributions of the forms newly created in the Second Peak are shown in figure 2.42 below.

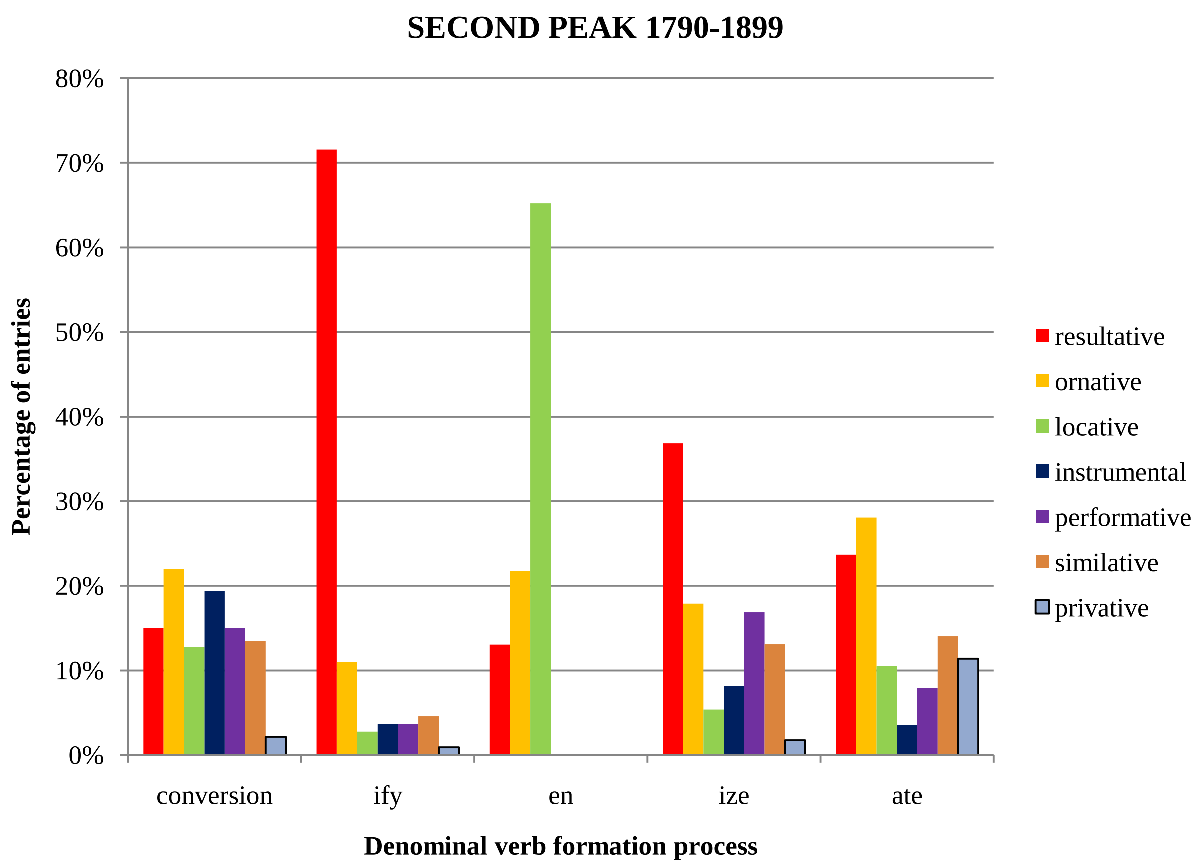


Figure 2.42 Semantic category distributions of newly created forms for each process from 1790-1899

As expected, *-ify* and *-ize* continue to be associated with RESULTATIVE and *eN-* with LOCATIVE; however, with only 23 new forms created during this Second Peak, it is clearly on its way to becoming obsolete as a denominal verb formation process. During the Second Peak, borrowed -*ate* forms have finally decreased in number and it appears as if the newly created -*ate* forms may be beginning an association with RESULTATIVE and ORNATIVE interpretations. Unfortunately, this may be entirely too late in the game for RESULTATIVE as -*ify* has been associated with this semantic category very soon after its entry into English. Furthermore, -*ate* and -*ize* are very similar in terms of phonological constraints, and as -*ize* seems to have successfully been associated with RESULTATIVE as well, there does not seem to be much justification for switching to -*ate* now. As for ORNATIVE, conversion is still doing the majority of the work here, both in terms of percentages and in terms of type frequency. Still, as *eN*- is dying out as a productive process, conversion is behaving much more like a default for LOCATIVE interpretations. Moreover, there seems to be no other process well-associated with INSTRUMENTAL, SIMILATIVE, and PERFORMATIVE, and conversion seems to be the prevailing default verb formation process for these semantic categories as well.

Coming out of the Second Peak at the turn of the last century, the semantic category distributions of the existing verbs for each process are as represented in figure 2.43 below.

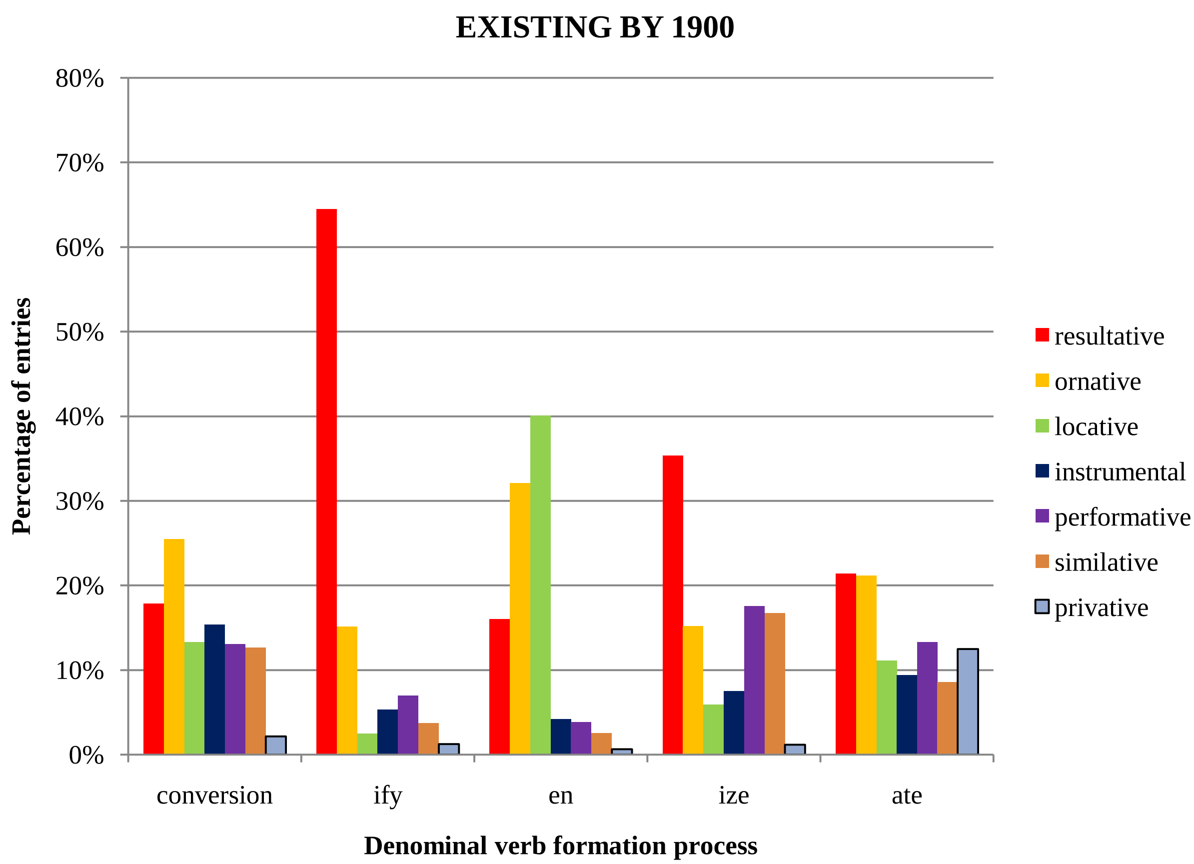


Figure 2.43 Semantic category distributions of each process' existing forms by 1900

This is the semantic category distribution situation as new denominal verbs are created in the 20th century. The majority of the existing *-ify* and *-ize* denominal verbs are RESULTATIVE in interpretation. The majority of the existing *eN*- verbs are LOCATIVE and ORNATIVE, but this affix is also losing its status as a productive denominal verb formation process. Existing denominal conversion verbs are now fairly well distributed across all the major semantic categories, although ORNATIVE still maintains the highest percentage. The status of *-ate* as a RESULTATIVE or ORNATIVE associated verb formation process is still tenuous.

Figure 2.44 below provides the distributions of the newly created denominal verbs in the 20th Century. The character of the distribution of new *eN-* verbs is unexpected; however, it should be remembered that the number of new *eN-* verbs entering the language during this period is only 6.

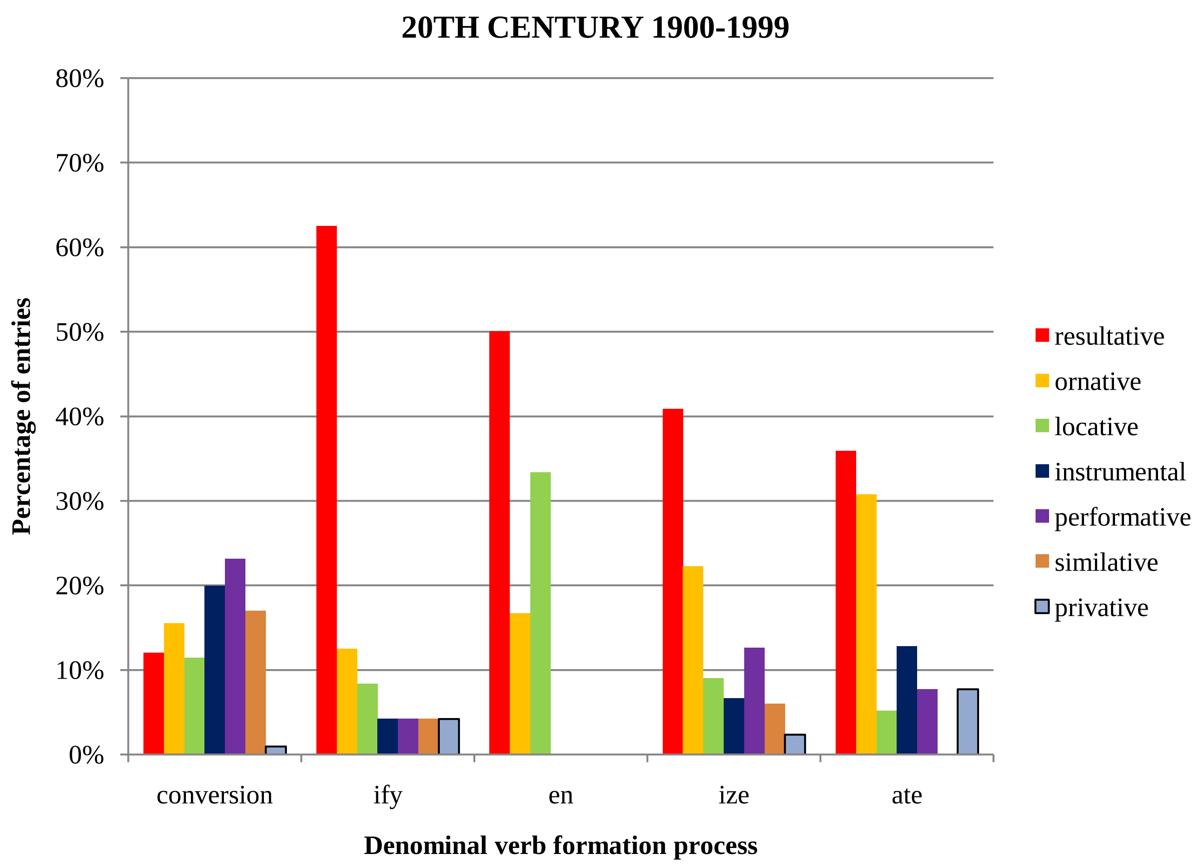


Figure 2.44 Semantic category distributions of newly created forms for each process from 1900-1999

As for *-ify* and *-ize*, the distributions continue to be as expected, dominated by RESULTATIVE interpretations. Although the percentages for ORNATIVE and RESULTATIVE are quite high for *-ate*, suggesting associations will develop, the figure does not tell the whole story. It appears that by the time *-ate* was truly analyzed out as an affix of English, it was simply too late to associate with general ORNATIVE and RESULTATIVE interpretations and by the 20th century,

-*ate* has become restricted in the semantics of its noun bases to those with a mathematical, chemical, or other scientific denotation. All 12 of the newly created ORNATIVE -*ate* verbs have chemical bases and 10 of the 14 RESULTATIVE have bases that are either chemical, mathematical or otherwise scientific. These results are entirely consistent with the findings of both Marchand (1969) and Plag (1999) in terms of the status of -*ate* as a denominal verb formation process in present day English.

The two main competitors left in this century, then, are conversion and -*ize* affixation. Conversion no longer seems to carry any particular association with ORNATIVE in its current role as a default denominal verb formation process. Now, the distribution shows that the new conversion verbs consist mostly of INSTRUMENTAL, PERFORMATIVE, and SIMILATIVE interpretations, none of which are associated with any other denominal verb formation process. What is interesting is that with the relative drop in ORNATIVE interpretations for conversion, the percentage of ORNATIVE has increased for -*ize*. Perhaps as conversion begins to drop out of the competition, it is now left to -*ize* to develop this association. Although one can only hypothesize at this point, continuing to monitor the data of the next century will certainly clarify this situation.

The discussion thus far appeals to a notion of constant competition to describe the interaction among the denominal verb formation processes. So, when a verb of particular semantics needs to be created, what exactly does happen? Do the processes compete in the mind of the speaker with the result of one clear "winner", which then may or may not be adopted by a larger and larger group of speakers? Or, are derivational forms from each process created and then the rest die out as one "wins" over time? A prediction naturally follows depending upon the answer to the above questions. If the nature of the interaction is more characteristic of a competition, then multiple verbs derived from different processes but with the same noun base and, crucially, the same meaning should be attested quite frequently.

From the corpus study data, verbs that are derived from the same noun base but from different verb formation processes have been analyzed. Over 900 sets of such multiples have been identified and examined specifically for which of the multiples is attested first. Then, the meanings of the related verbs that followed are compared to those of the original verbs. If the first attested meaning of the later verb is identical to one of the meanings of the original verb, attested before the first attestation of the later verb, then the set is classified as having the same meaning. For example, two verbs are found with the base noun *stone*, the conversion verb *stone* and the *-ify* affixation verb *stonify*. Of these two, *stone* is attested first in 1200 with the meaning 'to throw stones at' but its fifth meaning, 'to turn into stone' is attested in 1604, 6 years before the original meaning of *stonify*, 'to turn into stone', first attested in 1610. This set of multiples, then, is classified as displaying the identical meaning and could be a case of one verb being created to compete with another, existing verb. However, for the verbs *winter* and *winterize*, derived from the noun *winter*, the verb *winter* is first attested in 1382 with the meaning 'to spend the winter' and the verb *winterize* attested in 1926 with the meaning 'to adapt or prepare for use in the cold weather'. This set is classified as having different meanings. Slightly more complicated is the situation for the verbs *grace* and *begrace*, derived from the noun *grace*. The verb *grace* is attested first in 1440 with the meaning 'to be gracious to' and the verb *begrace* is attested first in 1530 with the meaning 'to address as "your grace"'. Although the verb *grace* does have a meaning that is the same meaning as *begrace*, it is not attested until 1610, much later than the introduction of *begrace* into English. Whether this later meaning of *grace* was created to compete with the existing *begrace* or if it was a natural meaning extension of the original 'to be gracious to' cannot be determined; therefore, this set of multiples is also classified as having different meanings.

Of the 936 sets of multiples, 698 are sets whose later verbs are first attested with an identical meaning of the original verbs, while 238 are sets whose later verbs are first attested with a meaning that differs from those of the original verbs preceding them. This result is suggestive once again of competition. Moreover, most of the "same" set multiples are within the same time period, often within 50 years of each other, nearly 20% of the sets within 10 years of each other. In fact, the median year difference between the first verb created and the second for the 698 "same" sets lies at 53 years. Also, there is nearly a 50-50 split in the number of "same" sets (345) with a second verb whose first attested is dated from the First Peak or earlier (i.e., through 1679) and the number of "same" sets (348) whose second verb enters after the First Peak (after 1680), suggesting that competition is a characteristic of the interaction between denominal verb formation processes throughout their history in English. The same cannot be said for the "different" sets of multiples. As table 2.15 below demonstrates, a much larger number of "different" set second verbs entered English after the First Peak.

Table 2.15 Number of multiples by entry date of second verb for SAME and DIFFERENT sets

| | **Before 1679 (through First Peak)** | **After 1680 (from Lull through 20th Century)** | **Total** |
|---|---|---|---|
| **Entry date of 2nd verb of SAME sets** | 345 | 348 | 693 |
| **Entry date of 2nd verb of DIFFERENT sets** | 90 | 148 | 238 |
| **Total** | 435 | 496 | 931 |

A Chi-square statistic performed on this matrix is highly significant ($\chi^2$ = 10.194; 1*df*; p = 0.0014), suggesting that the two types of sets are differentially associated by entry date. The number of "same" sets before 1679 is indeed slightly higher than the expected value and the number of "same" sets after 1679 is slightly lower than expected; however, the effect of the entry date upon the "different" sets is much more responsible for the significant result. Furthermore, whereas the median year difference for the "same" sets is 53 years, the median for the "different" sets is 148 years. Why should so many more verbs with the same noun base enter the language with a different meaning than the existing verb after the First Peak rather than before? It is hypothesized here that it is not until after the First Peak that the associations for *-ify* and *-ize* had fully developed. Of the "same" sets with a year difference greater than the median of 53 years, by far the largest percentage (26.4%) have a first verb first attested in the First Peak and the second verb first attested in the Second Peak. If the nature of the interaction is competition, why such a long gap between so many verb pairs with the exact same meaning? The response, it is claimed here, is that the second verbs are introduced in the Second Peak in order to have a form which signals more current associations. The Semantic Category Distribution Effect prediction that follows from this is that the second verbs should display a distribution similar to that of their denominal verb formation process' existing verb distribution. For most processes, there were not enough verbs to attain valid statistical results, but tables 2.16-2.20 below provide the opportunity for more qualitative comparisons of the distributions of the second verbs of this First Peak-Second Peak group with the distributions of the relevant process going into the Second Peak.

Table 2.16 Comparison of semantic categories of *-ate* second verbs created during Second Peak with semantic category distribution of existing *-ate* forms prior to Second Peak

| **Semantic Category** | **Number of 2nd Verbs (n=7)** | **Percent** | **Existing by Second Peak** |
|---|---|---|---|
| LOCATIVE | 3 | 42.9% | 11.2% |
| ORNATIVE | 2 | 28.6% | 19.9% |
| RESULTATIVE | 1 | 14.3% | 21.0% |
| SIMILATIVE | 1 | 14.3% | 7.5% |
| PERFORMATIVE | 0 | 0% | 14.3% |
| PRIVATIVE | 0 | 0% | 12.7% |
| INSTRUMENTAL | 0 | 0% | 10.4% |

As table 2.16 shows, there are only 7 *-ate* verbs that were newly created during the Second Peak with the same meaning of an existing verb based upon the same noun. As such, not much can be expected in the way of correlation with the semantic category distribution of *-ate* verbs existing before the Second Peak, especially as that distribution is dictated mostly by borrowed verbs.

Better results are seen in table 2.17, which provides the data related to the *eN*- second verbs newly created in the Second Peak.

Table 2.17 Comparison of semantic categories of *eN*- second verbs created during Second Peak with semantic category distribution of existing *eN*- forms prior to Second Peak

| **Semantic Category** | **Number of 2nd Verbs (n=4)** | **Percent** | **Existing by Second Peak** |
|---|---|---|---|
| LOCATIVE | 3 | 75.0% | 38.1% |
| RESULTATIVE | 1 | 25.0% | 16.3% |
| ORNATIVE | 0 | 0% | 32.9% |
| INSTRUMENTAL | 0 | 0% | 4.5% |
| PERFORMATIVE | 0 | 0% | 4.2% |
| SIMILATIVE | 0 | 0% | 2.8% |
| PRIVATIVE | 0 | 0% | 0.7% |

There are even fewer verbs here (only 4) to use for comparison, but at least the semantic category distribution of the verbs existing before the Second Peak is not mostly from borrowed forms. Although the actual percentage points are not close, the number one category for the existing verbs (LOCATIVE) is also the number one category for the newly created second verbs. The situation is even better with conversion (table 2.18 below) as there are more second verbs to use for comparison.

Table 2.18 Comparison of semantic categories of conversion second verbs created during Second Peak with semantic category distribution of existing conversion forms prior to Second Peak

| **Semantic Category** | **Number of 2nd Verbs (n=23)** | **Percent** | **Existing by Second Peak** |
|---|---|---|---|
| ORNATIVE | 6 | 26.1% | 27.3% |
| RESULTATIVE | 5 | 21.7% | 19.3% |
| PERFORMATIVE | 5 | 21.7% | 12.0% |
| LOCATIVE | 3 | 13.0% | 13.6% |
| INSTRUMENTAL | 2 | 8.7% | 13.3% |
| SIMILATIVE | 2 | 8.7% | 12.2% |
| PRIVATIVE | 0 | 0% | 2.1% |

In this case, the actual percentage points of the second verbs created in the Second Peak are fairly close to the percentage points of the same categories existing before the Second Peak. A very similar set of results is achieved in relation to *-ify* second verbs, shown in table 2.19 below.

Table 2.19 Comparison of semantic categories of *-ify* second verbs created during Second Peak with semantic category distribution of existing *-ify* forms prior to Second Peak

| **Semantic Category** | **Number of 2nd Verbs (n=19)** | **Percent** | **Existing by Second Peak** |
|---|---|---|---|
| RESULTATIVE | 13 | 68.4% | 58.8% |
| INSTRUMENTAL | 3 | 15.8% | 6.6% |
| ORNATIVE | 2 | 10.5% | 18.4% |
| SIMILATIVE | 1 | 5.3% | 2.9% |
| PERFORMATIVE | 0 | 0% | 9.6% |
| LOCATIVE | 0 | 0% | 2.2% |
| PRIVATIVE | 0 | 0% | 1.5% |

Again, the two distributions are fairly close in actual numbers, especially with the *-ify* associated category of RESULTATIVE. This result is very consistent with the expectations of the Semantic Category Distribution Effect and of a cooperative type of interaction: second verbs are created with the same meaning, not out of competition, but in order to supply a form that is now better able to trigger the desired semantic association. The best illustration of this effect is perhaps found with the 41 second *-ize* verbs (table 2.20).

Table 2.20 Comparison of semantic categories of *-ize* second verbs created during Second Peak with semantic category distribution of existing *-ize* forms prior to Second Peak

| **Semantic Category** | **Number of 2nd Verbs (n=41)** | **Percent** | **Existing by Second Peak** |
|---|---|---|---|
| RESULTATIVE | 11 | 26.8% | 33.3% |
| SIMILATIVE | 9 | 22.0% | 21.6% |
| ORNATIVE | 7 | 17.1% | 11.6% |
| PERFORMATIVE | 6 | 14.6% | 18.4% |
| LOCATIVE | 4 | 9.8% | 6.7% |
| INSTRUMENTAL | 3 | 7.3% | 6.7% |
| PRIVATIVE | 1 | 2.4% | 0.4% |

Here, the distributions match very well, with only the third and fourth ranked categories switched between distributions. This again reinforces the impact of the Semantic Category Distribution Effect upon the probability of a denominal verb formation processed applying to a particular category or categories. The Effect should also be seen in the multiples of the “different” verb sets. The first created verbs should match the semantic category distributions of their time period of entry and the second created verbs should match the distributions of their entry. Unfortunately, there are too few verbs from each time period to make any worthwhile comparisons for each verb formation process.

This section has provided evidence that supports the notion that the interaction between the denominal verb formation processes is characterized by constant competition. The sets of multiples with the exact same meanings most clearly demonstrate this competition, especially as the competitors usually appear soon after one another.

### 2.4 General Discussion and Summary

This chapter began with four questions:

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Q3. What factors condition that probability?

Q4. What is the nature of the interaction between the verb formation processes?

Section 2.3.2 has shown that all denominal verb formation processes in English have been attested in the OED with interpretations from all of the major semantic categories; thus all semantic categories are possible when forming denominal verbs in English with all of the processes, suggesting a common underlying semantic structure. That structure has been proposed to be the following, repeated here as (11):

(11) CAUSE [x BE y LOC z]

In this structure, the different semantic interpretations are achieved, first, by which argument, (x, y or z) the verb's noun base stands for, second, by the degree to which the expression is realized (i.e., what is present or absent), and third, whether the semantic primitive LOC indicating the location relation is instantiated as the more common LOC-TO or the more marked LOC-FROM.

The semantic categories and their proposed semantic structure realization are given in table 2.21 below.

Table 2.21 Proposed lexical conceptual structures of semantic categories

| **Semantic Category** | **Lexical Conceptual Structure** |
|---|---|
| RESULTATIVE | CAUSE [x BE [noun base] LOC-TO z] |
| SIMILATIVE | BE [noun base] LOC-TO z |
| PERFORMATIVE | CAUSE [[noun base]] |
| ORNATIVE | CAUSE [[noun base]$_i$ BE y$_i$ LOC-TO z] |
| LOCATIVE | CAUSE [x$_i$ BE y$_i$ LOC-TO [noun base]] |
| PRIVATIVE | CAUSE [[noun base]$_i$ BE y$_i$ LOC-FROM z] |
| ABLATIVE | CAUSE [x$_i$ BE y$_i$ LOC-FROM [noun base]] |

However, section 2.3.3 has provided evidence that not all semantic categories are equally probable for all denominal verb formation processes. Taking into account all attested meanings over the available history of English, *be*- and conversion are more likely to participate in ORNATIVE interpretations, -*ify* and -*ize* are more probable as RESULTATIVE, *eN*- is more likely to be either LOCATIVE and ORNATIVE, and -*ate* ORNATIVE or RESULTATIVE. In fact, a pattern emerged again and again, ORNATIVE and RESULTATIVE the top categories in terms of type frequency, PERFORMATIVE, SIMILATIVE, and LOCATIVE less frequently represented and clustered together, and PRIVATIVE and ABLATIVE the least frequent of all. Consequently, it has been proposed above that the nature of the underlying semantic structure and exactly how it is realized plays a significant part in the probability of particular semantic category as denominal verb meaning. A “good” denominal verb is one that is fully expressed with the noun base as the topmost (x) argument and LOC-TO as the location relation; such a realization leads to an ORNATIVE interpretation. Slightly less “good” is one that is fully expressed with the noun base as the second topmost (y) argument and LOC-TO as the location relation, as with RESULTATIVE. From there, any realization that is not a full expression and/or with the noun base not as the topmost argument leads to even less “good” denominal verbs: PERFORMATIVE (not full expression); LOCATIVE (noun base as z argument, two deeper than the x); SIMILATIVE (not full expression and y argument). Lastly, if the realization utilizes the LOC-FROM instantiation of the primitive (PRIVATIVE), and especially with the noun base as the z argument (ABLATIVE), the resulting interpretation is less preferred for a denominal verb.

Still, as section 2.3.4 demonstrated, this semantic basis is not the only factor influencing the probability of a certain denominal verb formation process applying to a certain semantic category. The semantic category distributions in terms of type frequency of the existing forms of a denominal verb formation process are significantly correlated with the semantic category distributions of the newly created forms, what has been termed here the Semantic Category Distribution Effect. The Semantic Category Distribution Effect was found to be in operation for each denominal verb formation process in English and from nearly every time period to the next, at times to the degree that the underlying semantic structure preferences were clearly overridden. However, the predictions following from the Semantic Category Distribution Effect Hypothesis were not always accurate for every denominal verb process at every time period and distributions did change over time; it has been proposed that this is due to the interaction of the semantic category distribution effects upon the other denominal verb formation processes, leading to the discussion in section 2.3.5.

In section 2.3.5, evidence was provided that suggested that the denominal verb formation processes interact with one another in a competitive fashion. The comparisons of sets of multiples, that is, two or more verbs derived by different processes but from the same base, were classified as either having the exact same meanings or different meanings. Examination of the "same" sets of multiples revealed that competition is endemic to the denominal verb formation processes. The vast majority of multiples were those that appeared with the exact same meaning, usually very close in earliest attestation dates, and throughout every time period in verifiable English language history. It is this type of interaction that can produce results that override the Semantic Category Distribution Effect: as the two or more denominal verb formation processes involved create meanings from the same semantic category, and the processes rarely share the same semantic category distribution of existing forms, at least one of them may easily result in a Semantic Category Distribution Effect mismatch.

The results of the corpus analysis presented in this chapter can be positioned within the larger scope of the nature of denominal verb formation processes. The corpus study has highlighted the question of what comprises a denominal verb formation process. In other words, what information is relevant to the successful application and interpretation of a denominal verb formation process? As discussed in the previous chapter, there has already been much in the way of proposals of what native speaker competence in word formation consists of. Plag (1999) and Hay (2000) both point out the crucial role of phonological information in the creation of novel words. Hale and Keyser (1993) discuss the need for syntactic information in order to ensure accurate interpretation. Clearly, the semantics of the process is important-- what contribution does the addition of the affix, for example, make to the meaning of the derived form? We need to know the semantics of the affix to understand its contribution. Plag (1999) and Lieber (2004) both make attempts at defining the semantics of verb-forming processes. Hay (2000) addresses this as well in terms of the relevance of semantic transparency. Clark and Clark (1979) also demonstrate the role pragmatics plays in word formation; by adherence to certain principles of conversation, a speaker is more likely to be successful when using a novel word.

This chapter has provided evidence that another, frequency-related factor is quite relevant to the probability of a particular denominal verb formation process applying when the desired verb is of a particular semantic category: the Semantic Category Distribution Effect. What determines the probability of use of a denominal verb formation process is the degree to which that affix has become associated with a particular semantic interpretation based upon the distribution of its forms among the semantic categories. Through investigation of this effect, two other factors have been reinforced as to their importance: the underlying semantic structure and overall type frequency. All three are part and parcel of the development of a semantic prototype for each denominal verb formation process. By maintaining a sensitivity to the type frequency of semantic categories for *-ize*, for example, the native speaker begins to associate *-ize* more and more with its most frequent interpretations, i.e. RESULTATIVE and ORNATIVE, and less so with its less frequent interpretations, i.e. LOCATIVE and SIMILATIVE. As long as the overall type frequency of *-ize* remains the same or increases, the prediction is that these associations will follow through to the next time period. Prior to the 20th century, it is hypothesized based upon the corpus study results that native speakers would have prototypically associated conversion denominal verbs with an ORNATIVE interpretation and less so with PERFORMATIVE. However, as the history for this denominal verb formation process demonstrates, the prototypical associations may change as the type frequency counts of semantic categories change. As the distribution among the semantic categories flattened out for this process, no particular prototype has been discernable for the current generation of native speakers, thus leading to conversion attaining more of a default status, especially as its overall type frequency is so high relative to the other processes. Further, if a process is associated with a less "good" (as dictated by the underlying semantic structure) semantic category for denominal verbs, such as *eN-* with LOCATIVE, overall type frequency may drop and the process begins to die out as one used to form newly created denominal verbs.

As for the nature of word formation process competition, Plag (1999) concludes there really is very little competition: the decision of which verb formation process to use is determined mostly by phonological constraints and semantic domain restrictions. There is the expectation that when the domains by chance do overlap, doublets should be found, and indeed doublets are attested (Plag 1999, 230; 233). However, the suggestion based upon the results of the corpus study described in this chapter is that the denominal verb formation processes are <u>always</u> in competition, unless of course the process is all but dead and gone for English (e.g. *be-*

affixation). Multiples with the same meaning are commonly created, although one or more may not survive into present day English and multiples with different meanings are not exactly rare either, usually with meanings that are consistent with the most likely semantic category for their denominal verb formation process, as dictated by the Semantic Category Distribution Effect.

The notion that morphology is another area susceptible to frequency effects of many different types, including the Semantic Category Distribution Effect, is most consistent with a mental lexicon that contains lexical entries, both derived and underived, and a conception of the related word formation processes. As such, the evidence presented here provides support for the ideas that the mental lexicon is extremely dynamic, and rules, whether real or apparent, cannot be divorced from the relevant entries. Furthermore, the interplay between phonological, syntactic, semantic, and pragmatic factors and the morphological processes discussed in this dissertation also promotes a morphology that closely interacts with all other aspects of language.

What has been implicit in the conclusions of this chapter is that native speakers of English are sensitive to the Semantic Category Distribution Effect, and they make use of this information when making decisions about which word formation process to apply in creating and interpreting a novel denominal verb. The significant correlations between semantic category distributions across time provide indirect evidence that native English speakers have been sensitive to the Semantic Category Distribution Effect and have made use of this information when making decisions regarding which verb formation process to use for which semantic category. As a consequence, it is this effect that makes a substantial contribution in determining which denominal verb formation processes are more probable for which semantic categories. Still, this type of diachronic evidence can only assume the sensitivity to the Effect. Ideally, one would also like to witness the Semantic Category Distribution Effect at work synchronically. The goals of the experiments discussed in the next chapter are to address yet again the four questions that opened this chapter (reiterated below) with a different type of empirical evidence:

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Q3. What factors condition that probability?

Q4. What is the nature of the interaction between the verb formation processes?

And along the way, the experiments also make available more direct evidence of the sensitivity to the Semantic Category Distribution Effect for the present day native speaker of English.

# 3. Novel Denominal Verb Experimental Tasks

## 3.1 Introduction

The goals of this chapter overlap considerably with the goals of the last chapter. Specifically, the experimental tasks discussed in this chapter seek to address the following four questions:

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Q3. What factors condition that probability?

Q4. What is the nature of the interaction between the verb formation processes?

These same questions were responded to in the last chapter involving a corpus study of attested denominal verb forms across the history of English. From this more diachronic perspective, evidence was presented that showed that all major semantic categories are possible for all denominal verb formation processes, but not all equally probable. The probability of a process applying to a specific semantic category was found to be influenced by the nature of the underlying semantic structure and of the interaction between processes, and importantly, the Semantic Category Distribution Effect, i.e., the influence of the semantic category distribution of existing forms upon the distribution of newly created forms. In this chapter, these same questions are examined from a much more synchronic perspective and with a different type of empirical evidence: experiments. It is anticipated that the experiments provide more direct evidence of native speaker sensitivity to the Semantic Category Distribution Effect by using a subset of the corpus data, those denominal verbs listed in the CELEX database, to identify the existing denominal verbs more likely to be part of native speaker mental lexicon and their semantic category distributions. These existing verb distributions lead to testable predictions regarding native speaker sensitivity and use of the Semantic Category Distribution Effect when creating new verbs. And these predictions were tested by the experiments, which required native English speaker subjects to create denominal verbs by asking them to produce or interpret a novel verb based upon a given noun. Subjects were presented with a brief contextual passage, or scenario, with a salient noun highlighted and a blank where a verb should go. The scenarios differed in terms of the semantics of the verb to be created, specifically whether a given context called for a RESULTATIVE ('turn into BASE NOUN'), ORNATIVE ('add/attach BASE NOUN'), LOCATIVE ('place in/on/at BASE NOUN'), or INSTRUMENTAL ('use BASE NOUN') verb[18]. The two experimental tasks differed in that the first task is an open-ended response task focusing on production of novel denominal verbs: subjects were prompted to provide a novel denominal verb using any word formation process they felt appropriate for the given scenario. The second task is a forced-choice response task focusing on interpretation: subjects were asked to determine whether the conversion version of the novel denominal verb or the -*ize* affixation version of the denominal verb, as they interpret them, would be most appropriate for the blank. One of the main purposes of these experiments was to identify patterns in subjects' preferences in terms of word formation process competition according to the semantics of the novel verb. These patterns could then be compared to the patterns predicted from the results of the CELEX subset of the corpus study of English denominal verbs (discussed in detail immediately below). If the patterns correspond to one another, then the hypothesis that

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[18] As will be discussed in more detail in the methodology section, these four semantic categories were chosen over the others because they are more frequent and familiar (unlike PRIVATIVE and ABLATIVE) and all commonly found in transitive structures (the structure utilized in all experimental items here), unlike PERFORMATIVE and SIMILATIVE, which are more commonly found in intransitive structures.

native speakers of English are sensitive to semantic category distribution information and use this information in the creation of novel denominal verbs would be supported.

## 3.2 CELEX Subset

It might be remembered from the methodology section of the previous chapter that some of the denominal verbs collected, culled, and selected from the OED Online were tagged for membership in the CELEX corpus. These were singled out as more representative of existing forms in present day English and thus more likely to be part of the native speaker's mental lexicon. Following the evidence from chapter 2 of the Semantic Category Distribution Effect upon the denominal verb processes across various time periods of English, the hypothesis is that today's native speakers will be sensitive to this Effect and make use of the semantic category distributions of the verbs already present in their mental lexicons when forming or interpreting novel denominal verbs in the experimental tasks.

### 3.2.1 Method

The denominal verbs marked as being also included in the CELEX database were collected into a separate subset, termed here the CELEX subset. These verbs had already been coded for entry date, etymological origin, and semantic category of each OED provided definition. The meanings were reexamined and any that were indicated as being obsolete, rare, nonce words, or part of a specialized vocabulary (e.g. metallurgical term) were eliminated. By doing so, it was anticipated that the CELEX subset would be even closer to the likely set of denominal verbs found in the mental lexicon of a typical native speaker.

### 3.2.2 Results

The CELEX subset consists of 1580 denominal verbs: 1197 conversion; 198 *-ate*; 110 *-ize*; 45 *eN*[19]-; and, 30 *-ify*. The semantic category distributions (the percentage of meanings from each category) for each of the processes are enumerated in table 3.1 below, and in figure 3.1 the distributions for each of the processes for just the four semantic categories used in the experimental tasks.

Table 3.1 Semantic category distributions of each denominal verb formation process in CELEX subset

| **Semantic Category** | **conversion** | ***-ate*** | ***-ize*** | ***eN-*** | ***-ify*** |
|---|---|---|---|---|---|
| RESULTATIVE | 17.9% | 23.2% | 32.0% | 13.7% | 40.4% |
| ORNATIVE | 22.6% | 21.4% | 17.0% | 20.0% | 13.4% |
| LOCATIVE | 14.8% | 10.3% | 9.7% | 41.3% | 9.6% |
| INSTRUMENTAL | 18.2% | 7.8% | 15.5% | 13.7% | 5.8% |
| PERFORMATIVE | 9.9% | 17.6% | 14.1% | 1.3% | 7.7% |
| SIMILATIVE | 13.4% | 8.6% | 9.7% | 10.0% | 23.1% |
| PRIVATIVE | 2.6% | 7.3% | 1.0% | 0.0% | 0.0% |
| ABLATIVE | 0.3% | 3.8% | 0.0% | 0.0% | 0.0% |
| OTHER | 0.3% | 0.0% | 1.0% | 0.0% | 0.0% |
| **Total** | 100% | 100% | 100% | 100% | 100% |

[19] Again, *eN-* is used to represent *en-* and all its allomorphs, including *em-*, *in-*, and *im-*.

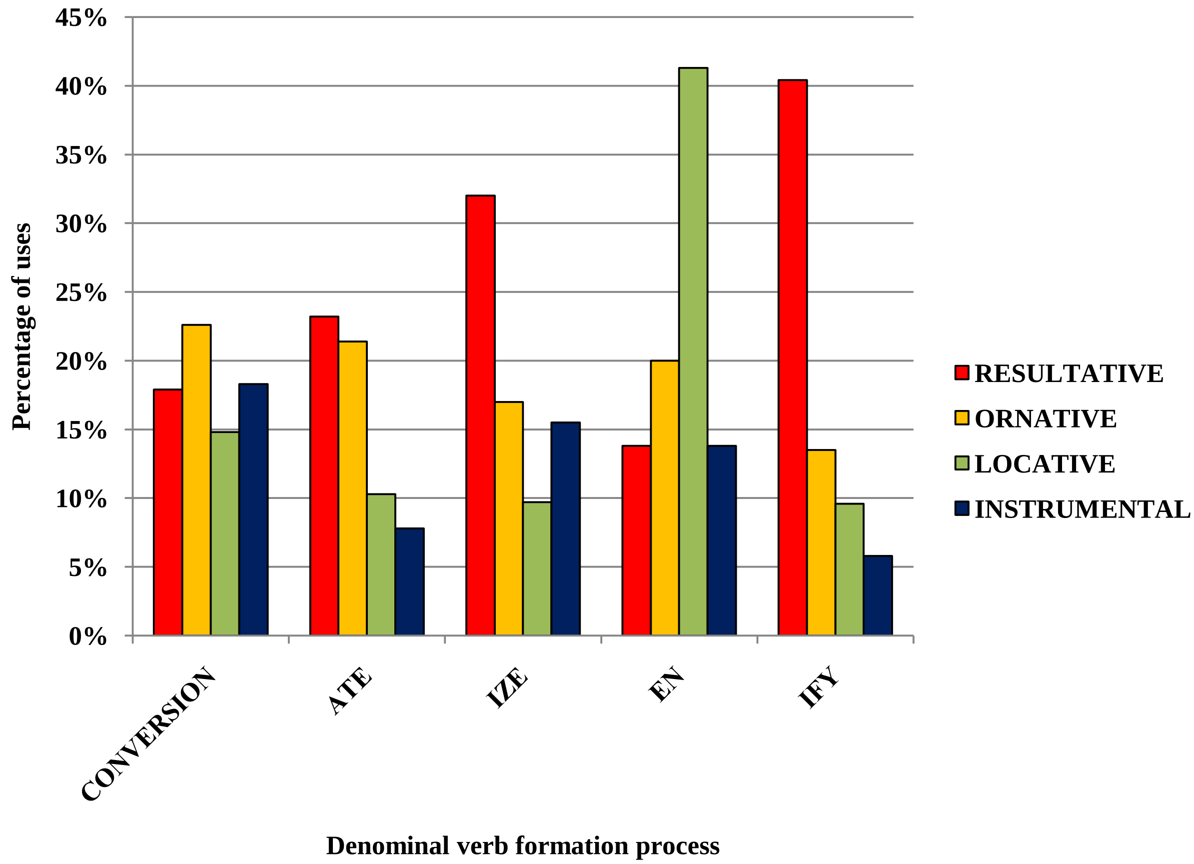


Figure 3.1 Semantic category distributions of each denominal verb formation process in CELEX subset

The results indicate that existing conversion denominal verbs might be more associated with ORNATIVE interpretations, but not overwhelmingly so, as the other major semantic categories take up nearly the same proportions. RESULTATIVE and ORNATIVE seem to be much more likely interpretations of -*ate* denominal verbs than the other categories. RESULTATIVE also takes up by far the largest percentage of currently existing -*ize* and -*ify* interpretations, while *eN*-verbs have mostly LOCATIVE meanings.

### 3.2.3 Predictions

What is shown above in figure 3.1 is an approximation of the semantic category distribution for denominal verbs that a native speaker is more typically exposed to in present day English. If semantic category distributions of forms existing in the mental lexicon have no influence on the creation of new forms, contra the hypothesis presented here, then the expectation is that, all other factors being equal, the four semantic categories used in the experiments should be equally distributed among each of the denominal verb processes. If, on the other hand, the Semantic Category Distribution Effect Hypothesis is correct, then the prediction is that the use of the processes will differ depending upon the semantic category of the verb to be created. Furthermore, if the hypothesis is correct that native speakers take into account the whole picture of all the interacting processes' semantic category distributions, then very specific predictions follow.

- If the new verb is to be RESULTATIVE, then *-ize* and *-ify* should be consistently preferred over the other processes, as this category takes up a much larger portion of the distribution for these two. More *-ize* should be used as all of the potential noun bases in the experiments are disyllabic trochees (see experimental method sections below for details); however, if and when the subjects choose to truncate the stem, *-ify* might be selected instead.
- If the new verb is to be ORNATIVE, there should be real competition: conversion does have ORNATIVE as its number one category; however, all the other processes have ORNATIVE as their number two.

- If the new verb is to be LOCATIVE, then *eN-* should be the denominal verb formation process of choice; however, as discussed in the corpus study of chapter 2, *eN-* is no longer considered very productive in present day English. If a native speaker does not consider the process of *eN-* affixation to be available, then the prediction is that conversion will be chosen, not only as its LOCATIVE percentage is the next highest compared to the other three processes in figure 3.1 but also because of its potential as a default process (see chapter 2).
- If the new verb is to be INSTRUMENTAL, conversion should be selected more often as this category ranks second for this process, and a greater percentage than INSTRUMENTAL is for the other processes.

In the following section, 3.3, the first experiment using the open-ended response production task is discussed. In section 3.4, Experiment 2 is presented, the forced-choice task between novel *-ize* and novel conversion verbs, specifically. The chapter then concludes with section 3.5, a general discussion of the results of both experiments and further implications for the nature of word formation processes, morphology and the lexicon.

### 3.3 Experiment 1: Novel Denominal Verb Task - Open-Ended Response

Experiment 1 involves a task where subjects were presented with a scenario with a salient noun highlighted and a blank where a verb should go. The scenarios differ in terms of the semantics of the verb to be created, specifically whether a given context called for a RESULTATIVE ('turn into Base Noun', ORNATIVE ('add/attach Base Noun'), LOCATIVE ('place in/on/at Base

Noun'), or INSTRUMENTAL ('use Base Noun') verb. The subjects were asked to provide a novel verb based upon the salient noun using whatever word formation process they felt was most appropriate considering the scenario. The results of this task are intended to address the four questions listed in the beginning of this chapter: what denominal verb formation processes are possible for which semantic categories; which denominal verb formation processes are more or less probable for which semantic category; what factors influence that probability; and, what is the nature of the interaction between the denominal verb formation processes. Specific predictions regarding the Semantic Category Distribution Effect, one of the proposed influences upon probability of application, have been identified based upon the data in the CELEX subset described in the section above. These are briefly repeated here for convenience:

- If the new verb is to be RESULTATIVE, then *-ize* and *-ify* should be consistently preferred over the other processes, and more-*ize* should be used than *-ify*, except in those instances when the subjects choose to truncate the stem.
- If the new verb is to be ORNATIVE, there should be no clear "winner".
- If the new verb is to be LOCATIVE, then *eN-* should be the denominal verb formation process of choice; however, if a native speaker does not consider the process of *eN-*affixation to be available, then the prediction is that conversion will be chosen.
- If the new verb is to be INSTRUMENTAL, conversion should be selected more often.

After a discussion of the methodology involved in Experiment 1, the results are presented along with a discussion in terms of the relevant questions and predictions, and finally a brief summary of the findings before moving on to section 3.4 and Experiment 2.

### 3.3.1 Method

Previous literature describing experimental data specifically on denominal verb formation is not very extensive, most of it related to the inflection (e.g., Kim, et al. 1991; Marcus, et al. 1995), the acquisition (e.g., Al-Qadi 1992; Berman 1995; Bushnell and Maratsos 1984) or the accessing/processing (e.g., Alegre and Gordon 1999) of denominal verbs. Some notable works that have performed experiments which focus directly upon the production and/or comprehension of denominal verbs are Kelly 1998, Dovetto, Thornton, and Burani 1998, and Kaschak and Glenberg 2000, and their methods are potential models for the experiments conducted here. The experiments in Kelly 1998 investigate the ease with which native speaker subjects produce and comprehend novel denominal conversion verbs of particular semantic types. Kelly identifies two classes of denominal verbs: rule-derived denominals and idiosyncratically-derived denominals. Rule derived (RD) denominals are verbs whose base nouns come from a semantic category which usually derives verbs of similar meanings. For example, the nouns *bicycle*, *jet*, and *sled* are all vehicles and their corresponding conversion verbs share the interpretation of ‘to travel/convey by Base Noun’. Denominal verbs whose base nouns come from semantic categories which do not produce verbs of similar interpretations are termed idiosyncratically-derived (ID) denominals. For example, the semantic category of animals, to which the nouns *fish*, *dog*, and *monkey* belong, create denominal verbs that do not share a common meaning: *to fish* is understood to mean ‘to try to catch fish’; *to dog* ‘to follow closely’; *to monkey (with)* ‘to touch, use, or examine without skill’. In order to test the hypothesis that RD denominals are easier to produce and perceived as being easier to comprehend than ID denominals, Kelly conducts four experiments, two focusing on the production of these two denominal types and two focusing on the comprehension. To examine the production of the two types, subjects were asked to write on paper or type on the computer a sentence containing a novel verb derived from one of two given nouns, an RD noun and an ID noun. The paper results were looked at in terms of which type of noun was selected for the sentence most frequently, and the computer results in terms of how fast subjects could come up with a sentence for the RD nouns versus the ID nouns. In the comprehension tasks, subjects were provided with pairs of RD denominal sentences and ID denominal sentences and were asked either to indicate which of the two sentences they felt was easier to understand (or if both sentences seemed equally easy or hard to understand) or to paraphrase the sentences. The paraphrase responses were then tabulated for the number of identical words shared among all the subjects' paraphrases for a given sentence. One of the most important points to take away from Kelly (1998), and one the author explicitly makes himself, is that hypotheses related to creative uses of language can be tested with experimental methods. The studies described in Kelly (1998) provide a model of how to identify semantic restrictions on what appears to be a mostly pragmatic phenomenon: the formation of denominal conversion verbs.

Dovetto, Thornton, and Burani (1998) also use experimental methods to test their hypotheses. In their study focusing on novel Italian denominal verbs derived by affixation, the authors predict that formations that violate known semantic/syntactic constraints will be harder to comprehend. Subjects in this study were provided with novel verbs of three types: one containing denominal suffixes with verb bases, a clear violation of the constraint that the given suffixes be found with noun bases; another with the same denominal suffixes and with nominal bases, only the nominal bases are not of the syntactic/semantic type normally found with the given suffix; and lastly, the same denominal suffixes with syntactically/semantically appropriate, although non-existent, noun bases. The subjects were asked to rate the novel verbs on a seven-point rating scale of interpretability, the worse the violation the lower the interpretability score. The results support the notion that native speakers are aware of the gradient nature of semantic/syntactic restrictions upon certain affixes and use this information when attempting to interpret novel verbs containing these affixes. In terms of methodology, the study demonstrates subjects' willingness to interpret novel verbs, no matter how odd they might first appear to be.

Kaschak and Glenberg (2000) use data from four experiments to explore how both syntactic structure and real world knowledge of properties of the entities associated with a novel denominal verb's base noun and the event participants are necessary elements of interpretation. Their experiments are designed to test the hypothesis that to successfully interpret a novel denominal verb, such as *to crutch*, one must identify which object is indexed with the noun *crutch*, the ways in which individuals can interact with that object, and the constraints provided by the event and the syntax such that the appropriate interaction or interactions are highlighted. In the first experiment, subjects were presented with pairs of sentences involving the same participants, but one sentence utilizes a transitive structure (*Lyn crutched her apple so Tom wouldn't starve*) and the other a double-object construction (*Lyn crutched Tom her apple so he wouldn't starve*). The sentences were followed by an inference statement either consistent with an 'X acts upon Y' interpretation (*Lyn acted on the apple*) or consistent with an 'X transfers Y to

Z' interpretation (*Tom got the apple*). Subjects were asked to identify which one of the paired sentences they felt most strongly implied the truth of the inference statement. Another group of subjects in this experiment were given each of the above sentences individually and provided with two definitions ('to act on using a crutch' and 'to transfer using a crutch') from which to choose as the most appropriate meaning for the novel denominal verb in the sentence. The results from this experiment support the idea that syntax constrains interpretation of novel denominal verbs and native speakers are sensitive to this. In the second experiment, rather than provide the subjects with interpretations, Kaschak and Glenberg wanted to elicit interpretations from the subjects themselves. In this task, a written context was provided that establishes a transfer scenario before presenting one of the pair of novel denominal verb sentences used in the first experiment as the last sentence. For the double-object *crutch* sentence above, the following context was provided (example (1) below, taken from Kaschak and Glenberg 2000, 516):

(1) Tom and Lyn made a bad miscalculation. Because they are U.S. citizens they thought they could protest civil rights abuses in the dictatorship. But now they were being held incommunicado in a prison dungeon. Lyn was beaten so badly that she needed a crutch to help her walk. Because the mortar between the bricks was crumbling, Tom and Lyn were able to create a long, narrow crevice in the three-foot wall separating the cells. Lyn learned that Tom was being deprived of food in an effort to get him to reveal other members of their human rights group. Lyn tried [to] shove a piece of apple through the crevice, but the wall was too wide, and her arm couldn't reach through it. Then she got an idea. Lyn crutched Tom the apple so he wouldn't starve.

Subjects were either asked to provide a paraphrase for the last sentence or define the verb of the last sentence. The responses were scored for whether the subjects' paraphrases or definitions conveyed transfer and whether the paraphrases or definitions used a verb known to take the double-object construction. The results were that subjects were more likely to give a paraphrase or definition with a higher 'transfer' score when the last sentence was a double-object construction, an indication again of sensitivity to meanings associated with particular syntactic structure. In the third and fourth experiments, the authors' intent is to show that constraints provided by syntax are not sufficient for successful novel denominal verb interpretation; the constraints related to the intrinsic properties of the participants must also be appropriate for the given situation. For the third experiment, contexts establishing a transfer event were once more created. Within the context, one of two sentences was provided: one that sets up a transfer using the base noun object as easy, or one that changes some property of the base noun object such that a transfer using the object is still possible, but clearly not easy. The example provided by Kaschak and Glenberg (2000, 518) is given in example (2) below:

(2) Rachel worked for a scientist in a research firm. As part of her duties, she was required to bring the scientist's mail to his office so he could open it after lunch. On this particular day, Rachel encountered three large boxes among the mail address to the scientist. The boxes were way too big for her to carry. In the corner of the room, though, Rachel noticed an office chair with four *good/missing* wheels. Rachel chaired the scientist his mail.

Subjects used a computer to read the passages sentence by sentence. In this manner, reading times of the last sentence could be determined. In the fourth and last experiment, subjects read the contexts of Experiment 2 on the computer and then were asked to respond 'yes' or 'no' to two of three "probes". One probe always asked about a property of the base noun that was important to the interpretation of the denominal verb, the other one was either a probe that asked about a property of the base noun that was not important to the interpretation or a probe that asked about the most frequently associated, albeit non-relevant, property of the base noun. The probes used for the context given in example (1) above are provided in example (3) below:

(3) The crutch is long
The crutch is sturdy
The crutch can help with injuries

The results were calculated as reaction times to the probes. Through the series of tasks, the authors conclude that certain syntactic structures are associated with certain meanings, subjects seem to be aware of and make use of these associations, syntactic structure alone is not enough to ensure interpretation of denominal verbs, and the context serves to highlight certain properties of the base noun that are necessary to facilitate comprehension denominal verbs. From the standpoint of methodology, Kaschak and Glenberg (2000) demonstrate how using contextual passages can make denominal verbs that under non-experimental circumstances might be very difficult to interpret quite comprehensible.

Each of these studies has informed the method of experimentation used here. Following Kelly (1998), subjects were asked to produce novel denominal verbs and the same noun bases were used throughout to discourage differences based upon the semantics of the nouns themselves.

From Kaschak and Glenberg (2000) and Dovetto, Thornton, and Burani (1998), scenarios were used to set up contexts without which the novel denominal verbs might be extremely difficult to interpret or consistently interpreted in one way. Care was also taken to maintain a transitive structure for the novel denominal verb sentences, as their studies have shown how subjects' sensitivity to syntactic structure can influence interpretation.

#### 3.3.1.1 Subjects

Subjects were 49 undergraduate students, 38 females and 11 males, all undergraduate students enrolled in introductory level linguistics courses at Northwestern University, participating in the study in order to fulfill experimental requirements for their particular course. Subjects were not paid for their participation and all subjects are monolingual speakers of American English.

#### 3.3.1.2 Materials

For this study, eight versions of a questionnaire were created. Each questionnaire presented the subject with items consisting of a brief scenario containing a blank space where a verb (derived from a salient noun) is required. For example:

> Belinda has been an environmental activist all her life. When she was only 10 years old, while other girls were using electricity for their easy-bake **ovens**, she took a few household items and turned them into a solar-powered oven. With a roll of aluminum foil, some black spray paint, a plastic bag and some glue, she was able to ___________ two cardboard boxes in only one afternoon. The little chocolate cake she made with it was pretty good, too!

Of the items, sixteen were test items, which required the subject to supply a novel verb form, and the remaining items were filler items, which presented the subject with a scenario suggestive of a previously existing, familiar denominal verb as the missing verb. For example, the scenario of the filler item below sets up the verb *imprison* as the most appropriate for the blank.

> Edward is a very clever criminal, eluding several attempts to put him in **prison**.
> He had been caught and charged many times, but they had to keep letting him go
> due to some technicality or another. However, last year, his luck finally ran out.
> It took 20 long years, but at last the authorities were able to ___________ him.
> He is still trying to appeal, but it looks like his conviction is rock solid.

The filler items remained the same across all eight versions, as well as all the test item noun bases; however, the scenarios for each of these test item nouns were different in each version. The four semantic category context types (RESULTATIVE, ORNATIVE, LOCATIVE and INSTRUMENTAL) were represented in the sixteen test item scenarios, four of each. Previous versions of this study also suggested that the factor of affectedness or significant change to the internal argument of the verb may be an important one in terms of predicting subjects' responses. Therefore, it was necessary to create scenarios that would, at the very minimum, provide balance and might even be able to systematically test for the effect of this Affectedness factor. Thus, the four scenarios for each of the context types were further divided into two scenarios that set up an event with a significant change to the direct object of the novel verb and two scenarios that set up an event with no significant change to the direct object. Please refer to figure 3.2 below:

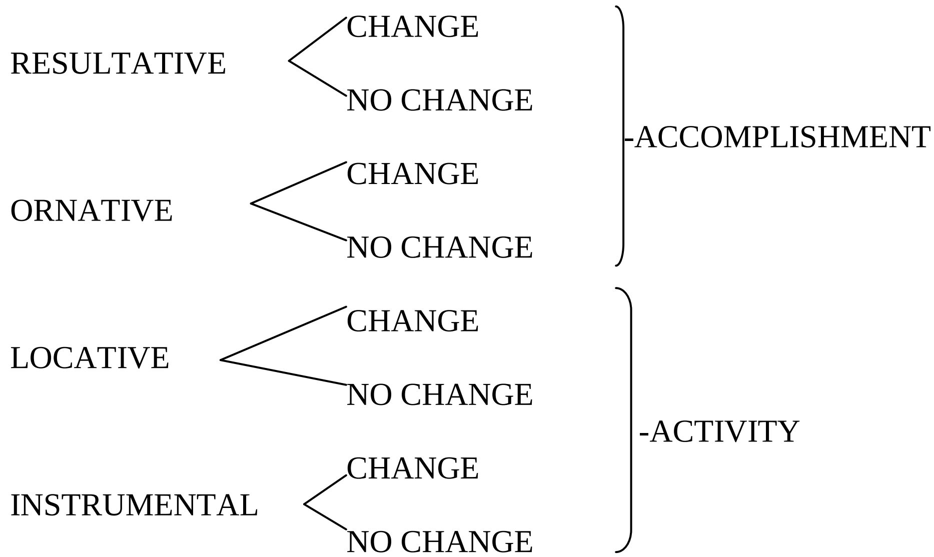


Figure 3.2 Breakdown of Experiment 1 test items by semantic and aspectual type

Moreover, the RESULTATIVE and ORNATIVE contexts utilized an accomplishment verb frame through the use of phrases such as *it took X time* and *in X time*, to be more consistent with the aspectual type of the existing RESULTATIVE and ORNATIVE verbs. Likewise, the LOCATIVE and INSTRUMENTAL contexts were written with an activity verb frame, using phrases such as *for X time*, to be more consistent with the aspectual type of their existing verbs. In order to further exemplify the distribution of the various test items, the table below includes each of the individual contexts created for the test noun OVEN[20]:

[20] The scenarios for all of the test item noun bases are given in the Appendix.

Table 3.2 Test item scenarios for OVEN

| | |
|---|---|
| RESULTATIVE-CHANGE | Belinda has been an environmental activist all her life. When she was only 10 years old, while other girls were using electricity for their easy-bake ovens, she took a few household items and turned them into a solar-powered oven. With a roll of aluminum foil, some black spray paint, a plastic bag and some glue, she was able to ___________ two cardboard boxes in only one afternoon. The little chocolate cake she made with it was pretty good, too! |
| RESULTATIVE-NO CHANGE | When Belinda was little, her family didn't have a lot of money, but it didn't matter to her because she had a great imagination. For example, she took a cardboard box and some crayons and made it look like the easy-bake ovens some of the other kids had. It only took a few minutes to ___________ the box, and she spent hours pretending she was making little cakes, with the bonus that <u>she</u> didn't get sick eating what she baked! |
| ORNATIVE-CHANGE | Belinda was very excited about opening her first restaurant, an upscale pizzeria. They had already finished construction of the space and had nearly finished decorating the dining room. The kitchen still needed a lot of work, with most of the pizza ovens and other appliances still needing to be installed. The contractor said it would take at least two days to ___________ the kitchen, but as soon as they did, she could begin training her staff on them. She could hardly wait to begin. |
| ORNATIVE-NO CHANGE | Belinda was delighted with being given the opportunity of teaching a course in "cowboy cooking", cooking over a campfire. Her students had all assembled outside, each with their own fire started and their first recipe "buttermilk cornbread" prepared. They were just waiting for the Dutch ovens to be placed over their coals. It only took Belinda's staff a few minutes to ___________ everyone's fires. Most people's cornbread turned out really well, and everybody said they learned a lot and had a great time. |
| LOCATIVE-CHANGE | Belinda was baking bread for the first time. The recipe said that she should let the dough rise in a warm place, suggesting keeping it in an oven that had been turned on and then off. So, she decided to ___________ the dough as recommended. Unfortunately, the recipe didn't say what temperature to warm it up to before turning it off and Belinda had turned it way up. After an hour, the dough had risen too much, completely overflowing its container and making a huge mess. |
| LOCATIVE-NO CHANGE | Belinda loved buying birthday gifts for her twins, but they always seemed to find her hiding places and spoil the surprise. Belinda wanted this year to be different, but she just couldn't think of a good spot. Suddenly, she remembered the old oven up in the attic. It was the perfect size and the twins never went up there because of all the cobwebs. She made the decision right then and there to ___________ the presents for the two and a half weeks until their birthday. |
| INSTRUMENTAL-CHANGE | Belinda just loved her super large dollhouse. Unfortunately, the only place to keep it was in the basement, which was full of centipedes, her most feared insect. One time, she caught sight of one right next to her and before she could think, she grabbed the dollhouse oven and used it to kill the hated insect. Thereafter, whenever she spotted a centipede, she would ___________ it for a few seconds until she was sure it was dead. |
| INSTRUMENTAL-NO CHANGE | Belinda just loved playing with her large dollhouse. The only problem was that her big brother would turn up his music so loud that she just couldn't concentrate properly on the scene she was imagining. She used her fist to pound on the wall, but it just didn't seem loud enough. So she grabbed the heavy metal oven from the dollhouse kitchen and began to ___________ the wall for a few minutes. It did the trick; he turned down his music and she could focus once again. |

So, for example, all of the eight versions of the questionnaire included an item with the test noun base OVEN; however, each version included a different scenario for OVEN, thereby allowing for examination of the effect of semantic category context while controlling for any effect of semantic contribution of the noun base itself.

The creation of the test items was crucially dependent upon the selection of the noun bases. For the sixteen test items, the noun bases were subject to several criteria:

1. A test item noun must be two syllables with a trochaic (strong-weak) stress pattern. As semantic characteristics are the focus here, any dispreference for a particular form based on phonology alone was to be avoided at all costs; monosyllabic noun bases or disyllabic iambs (weak-strong stress) would not have satisfied the phonological restrictions on the formation of *-ize*, *-ate*, and *eN-* verbs and may have forced subjects to choose another, perhaps less semantically appropriate form. Therefore, all the test item noun bases are disyllabic trochees.
2. A test item noun base must end in /l/, /n/, /r/, /rd/, or /t/. Again to avoid dispreference of the novel forms based on phonology, all test items nouns end in one of the above consonants in order to be consistent with existing *-ize* verbs in particular.
3. A test item noun must have no corresponding established verb form. As the goal of the test items is to create novel verb forms, previously existing verb forms in the lexicon

would most certainly interfere. Therefore, all the test item noun bases lack a corresponding verb form, according to the Mirriam-Webster Dictionary Online[21].

4. A test item noun base must be of low to mid frequency according to both the Kucera-Francis (1967) and CELEX databases (<85/million), or according to either if only one lists the given noun. Differences in token frequency among the test nouns may lead to some unwanted effects in terms of subject behavior; therefore, by keeping the frequency of the nouns within the same range, any potential effects of frequency on selection can be controlled for.
5. A test item noun must be familiar (>6.5/7.0 according to the Hoosier Mental Lexicon (Nusbaum et al. 1984)). As with token frequency, the same degree of familiarity was required in order to control for any potential effects of great differences in familiarity. Furthermore, highly familiar nouns are desirable to ensure that subjects are able to respond to the task without distraction related to unfamiliarity with a given noun.
6. A test noun base must also be of high concreteness and imageability (>500/700 according to the MRC database), again, in order to control for potential effects of the differences on these dimensions.
7. Lastly, exactly half of the test item noun bases are Latinate in origin and half Germanic. As has been mentioned previously in the literature (Fabb 1988), the Latinate Constraint suggests that the etymology of the base noun has an effect on the choice of verb form.

[21] Only one noun base, HELMET, is listed in the American Heritage Dictionary: Fourth Edition (2001) as having a verb form (HELMET). Furthermore, several other noun bases are listed in the Oxford English Dictionary (OED) Online as having corresponding verb forms, but these are listed as nonce-words, rare, obsolete, or specialized domain terms (e.g. nautical). None of these verb forms appear to be part of the general American lexicon.

The test item noun bases are listed in table 3.3 below along with more detailed information regarding the criteria above:

Table 3.3 Summarized details of Experiment 1 test item base nouns

| | NOUN | Final cons | Origin | KF Freq | CELEX Freq | Hoosier Fam | MRC Fam | MRC Concrete | MRC Image |
|---|---|---|---|---|---|---|---|---|---|
| 1 | CHAPEL | l | Latinate | 20 | 22 | 7 | 471 | 587 | 560 |
| 2 | TONSIL | l | Latinate | 2 | 1 | 7 | | | |
| 3 | MOUNTAIN | n | Latinate | 33 | 84 | 7 | 574 | 616 | 629 |
| 4 | NAPKIN | n | Latinate | 3 | 7 | 7 | 495 | 585 | 582 |
| 5 | TIGER | r | Latinate | 7 | 12 | 7 | 513 | 611 | 606 |
| 6 | MUSTARD | rd | Latinate | 20 | 5 | 7 | 532 | 595 | 599 |
| 7 | FAUCET | t | Latinate | 1 | 2 | 7 | | | |
| 8 | HELMET | t | Latinate | 1 | 13 | 7 | 528 | 602 | 620 |
| 9 | CAMEL | l | Germanic | 1 | 25 | 7 | 421 | 597 | 561 |
| 10 | PRETZEL | l | Germanic | | 1 | 7 | | | |
| 11 | LINEN | n | Germanic | 6 | 17 | 7 | 515 | 581 | 551 |
| 12 | OVEN | n | Germanic | 7 | 20 | 7 | 577 | 593 | 599 |
| 13 | LOCKER | r | Germanic | 9 | 7 | 7 | 538 | 586 | 569 |
| 14 | SPIDER | r | Germanic | 2 | 7 | 7 | 526 | 607 | 597 |
| 15 | NUGGET | t | Germanic | 1 | 1 | 7 | | | |
| 16 | WALNUT | t | Germanic | 11 | 5 | 7 | 538 | 642 | 590 |

[blank cells indicate information not provided in the particular database]

For this study, each version of the questionnaire presented the subject with twenty-eight items, the sixteen test items described above and twelve filler items. The noun bases used for the twelve filler items were selected for their status as bases for existing and familiar denominal verbs, two bases for each of the more common verb formation processes: conversion, *-ize* affixation,*-ify* affixation,*-ate* affixation, *eN-* affixation, and *de-* affixation. The actual noun bases used are given in table 3.4 below:

Table 3.4 Noun bases and intended verbs for Experiment 1 filler items

| Denominal Verb Formation Process | Noun Base | Intended Verb |
|---|---|---|
| **conversion** | MIMIC<br>USHER | *mimic*<br>*usher* |
| ***-ize*** | VANDAL<br>SYMBOL | *vandalize*<br>*symbolize* |
| ***-ify*** | EXAMPLE<br>PERSON | *exemplify*<br>*personify* |
| ***-ate*** | ASSASSIN<br>URINE | *assassinate*<br>*urinate* |
| ***eN-*** | PRISON<br>TOMB | *imprison*<br>*entomb* |
| ***de-*** | THRONE<br>BUG | *dethrone*<br>*debug* |

The filler base nouns were not subject to the same strictness of criteria as the test base nouns. However, every attempt was made to follow their criteria wherever possible. It should also be noted that half of the filler items were set up with accomplishment verb frames and half activity verb frames.

The scenarios for both the test and the filler items were subject same types of restrictions. First, the scenarios were required to be short and of similar length; all of the scenarios were between 60 and 90 words long. Secondly, the potential base noun must be mentioned at least once, but no more than twice in the scenario. Third, the scenario must not mention any of the other test or filler item base nouns. Also, each scenario must make clear reference to the given context type (e.g. RESULTATIVE-CHANGE referenced by 'turn into' in the scenario; RESULTATIVE-NO CHANGE referenced by 'look like' etc.) and include the appropriate, respective verb frame (accomplishment or activity). Furthermore, the scenario had to include a direct object following the blank, and lastly, the scenario had to set up an uninflected form of the verb so that the novel verbs created by the subjects would not be influenced by any additional awkwardness in sound or appearance due solely to attachment of inflectional affixes.

The versions themselves also had a number of constraints to satisfy. As aforementioned, all the versions used the exact same filler items and the exact same test item noun bases, each used only once. Furthermore, the order of the items was invariant across versions so that the following constraints could be followed, mostly to avoid priming effects:

- no more than two filler items or two test items in a row
- no filler items requiring the same word formation process in succession
- no scenarios calling for the same semantic type in succession
- no more than four items of the same verb frame (i.e. accomplishment or activity) in a row[22]
- no more than two items containing base nouns with the same final consonant in a row
- no more than four Latinate items in a row[23]

[22] Four was chosen as the cut off as any fewer would require no randomness in the items whatsoever.

For the versions individually, as mentioned earlier, each version presented a given test base noun in a scenario different from the other seven. Similar scenarios were written using the different base nouns, so it was also critical that these similar scenarios not appear within the same version. Also, each version was required to present all eight individual semantic contexts (RESULTATIVE-CHANGE, RESULTATIVE-NO CHANGE, ORNATIVE-CHANGE, etc.) twice, once with a noun base of Latinate origin and once with a noun base of Germanic origin.

#### 3.3.1.3 Procedure

Once the test and filler items were properly assembled into eight versions of a paper-and-pen questionnaire, they were distributed among the subjects. Each subject completed their questionnaire while seated in a room usually with a small group of other subjects. The subjects for this task were given the following directions:

> **In English, we have a lot of ways to make nouns into verbs. Some examples are given below with the original noun and subsequent verb bolded and underlined:**
>
> a) It was so cold that a great deal of **<u>ice</u>** had formed on the wings of the plane. It took over 2 hours to **<u>de-ice</u>** the plane before they could take off.
>
> b) Several systems have been used over the centuries to group species into natural **<u>classes</u>**. Very recently, however, the use of genomic DNA analysis to **<u>classify</u>** species has led to many revisions.

---

[23] Four was chosen as the cutoff here because any fewer seemed to be impossible to attain.

c) Although whale hunting continues to be a real **danger**, it appears that industrial chemicals and pesticide run-offs serve to **endanger** the whale population even more.

d) Until a **vaccine** was developed, feline leukemia was the number one fatal disease for cats. Today, many cats have been saved because their owners chose to **vaccinate** them.

**The illustrations above represent just a few of the methods we have in English to form verbs from nouns; there are several more. What you will be doing in this study is using any method you feel is appropriate to produce what you consider to be the best-fitting verb derived from a given noun.**

**In each of the items that follow, you are presented with a scenario. The scenario contains a noun which is bolded and later on a blank where a verb should go. Your task is to read the entire scenario, then think about the context and write down a verb, derived from the given noun, that you feel would be best to fill in the blank. (You can write your response either under each item or in the blank provided. Spelling is not important, but please make it legible!)**

**For some items, a verb you know already may easily come to mind. For other items, it may feel more difficult and you may need to create a new verb on the spot; just make sure that it is based on the bolded noun and feels appropriate for the context.**

**Follow your intuitions, and if you really can't decide, just guess. Please be sure not to skip any of the items, and it is very important that you provide one (and only one) verb for each item.**

**If you have any questions now, or while you are working through the questionnaire, please raise your hand and the experimenter will assist you.**

The subjects were allowed to work at their own pace. All subjects finished in less than 20 minutes, most subjects completing their questionnaires within 10 to 15 minutes.

### 3.3.2 Results and Discussion

Before beginning the presentation of the results, it might be useful to once again review the central questions:

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Q3. What factors condition that probability?

Q4. What is the nature of the interaction between the verb formation processes?

If present-day speakers are consistent with the corpus study data discussed in chapter 2, then there is every expectation that each of the denominal verb formation processes will be used at least once for each of the four semantic categories (RESULTATIVE, ORNATIVE, LOCATIVE and INSTRUMENTAL), but they will not be used with equal frequency for each category. If the Semantic Category Distribution Hypothesis proposed here is correct, then the frequency of use for each process should be correlated with the semantic category distribution of that process among the CELEX subset forms. Moreover, in conjunction with the Semantic Category Distribution Hypothesis, the nature of the interaction between the denominal verb formation processes lead to the predictions listed above and reiterated here:

- If the new verb is to be RESULTATIVE, then -*ize* and -*ify* should be consistently preferred over the other processes, and more-*ize* should be used than -*ify*, except in those instances when the subjects choose to truncate the stem.
- If the new verb is to be ORNATIVE, there should be no clear "winner".
- If the new verb is to be LOCATIVE, then *eN*- should be the denominal verb formation process of choice; however, if a native speaker does not consider the process of *eN*-affixation to be available, then the prediction is that conversion will be chosen.
- If the new verb is to be INSTRUMENTAL, conversion should be selected more often.

This results and discussion section proceeds first with a description of the coding of the results and of the treatment of errors. Then, other independent factors (e.g., subject gender, questionnaire version, specific base noun) are examined for any potential influence upon the results before the rest of the discussion turns to the results in terms of the semantic factors of most central concern in this study.

#### 3.3.2.1 Coding of the Results

Most of the coding of the responses is very straightforward. If the subject provided a novel verb that ended in -*ize*, for example, the response was coded as IZE. This held true for the other overt affixes, including any potential allomorphic variations: -*iate* (coded as ATE); -*fy* (IFY); *im*-, *in*- (EN). If the subject provided a novel verb that was identical in form to the noun base, it was taken as an instance of CONVERSION. There were, however, a few responses that were less clear. If the subject chose to create a parasynthetic construction, i.e., a construction with a prefix and a suffix attaching to the base simultaneously, if the suffix was *-ate*, *-ify*, or *-ize*, the responses was coded as the relevant suffix. Despite the claim that such a case might be considered parasynthetic with conversion, if the novel verb involved prefixation with *eN-* and no overt suffix, the response was coded as EN. Finally, if the novel verb was preceded by some other, non-denominal verb-forming prefix, such as *de-*, *pre-*, *re-* or *un-*, and not followed by an overt suffix, the response was coded as CONVERSION. There were 24 instances of parasynthesis out of 640 total responses, or 3.8%.

Another 17 responses (3.5% of the total 640 responses) were included in an OTHER category, as they could not be coded as CONVERSION or one of the more common denominal verb-forming affixes. These responses, and the presumed word-formation process, are listed in table 3.5 below:

Table 3.5 Experiment 1 OTHER responses

| Word Formation Process | Response | Noun Base |
| --- | --- | --- |
| Compounding | spiderout | SPIDER |
| | spiderbait | SPIDER |
| | walnutbreak | WALNUT |
| | camelstore | CAMEL |
| | camelcarry | CAMEL |
| | tigerbrand | TIGER |
| Other Denominal Verb Affix | bespider | SPIDER |
| | mountaineer | MOUNTAIN |
| Clipping | nug | NUGGET |
| | mount* | MOUNTAIN |
| | lock* | LOCKER |
| Non-conventional use of existing verb | cameflouge (*camouflage* intended?) | CAMEL |
| | *or possibly mount, listed above | MOUNTAIN |
| | *or possibly lock, listed above | LOCKER |
| | immunize | TIGER |
| Questionable Process | faucetie | FAUCET |
| | spideride | SPIDER |
| | napkinite | NAPKIN |

As the instructions given to the subjects stated they could use whatever method in forming their response that they felt appropriate, it was decided that these responses should not and would not be eliminated.

#### 3.3.2.2 Treatment of Errors

Of the 49 subjects who were given the task, one subject did not complete the task as directed and their data were eliminated from the analysis of the results. The remaining 48 subjects completed the task appropriately, but varied in performance in terms of the filler items: 29 subjects made no errors in the filler items (i.e. responded correctly with the existing familiar denominal verb suggested by the scenario); 11 subjects made 1 filler item error; 8 subjects made 2 or more errors in the filler items. A decision was made to eliminate all subjects who made 2 or more filler item errors. The data from the remaining 40 subjects (31 females and 9 males; exactly 5 subjects per version) provided the results used in the analysis.

A few notes on the errors made: there was no significant difference between men and women (they made roughly same proportion of errors), and the version given to a subject did not make and should not have made a significant difference, since the 12 filler items were the same across all versions. However, there were certain filler item nouns that seemed to generate more errors than others. As table 3.6 below indicates, overall, subjects made more errors when the filler item noun was *person*, the base noun for the intended verb *personify*.

Table 3.6 Number of errors on intended verbs for Experiment 1 filler items

| **Intended Filler Item Verb (by decreasing number of errors)** | **Total Errors among Subjects with Only 1 Error** | **Total Errors among Subjects with 2 or More Errors** | **Total Errors among All Subjects** |
|---|---|---|---|
| *personify* | 2 | 6 | 8 |
| *entomb* | 3 | 2 | 5 |
| *exemplify* | 1 | 3 | 4 |
| *imprison* | 1 | 2 | 3 |
| *mimic* | 2 | 1 | 3 |
| *usher* | 1 | 1 | 2 |
| *urinate* | 0 | 1 | 1 |
| *debug* | 0 | 1 | 1 |
| *dethrone* | 1 | 0 | 1 |
| *symbolize* | 0 | 1 | 1 |
| *assassinate* | 0 | 0 | 0 |
| *vandalize* | 0 | 0 | 0 |

It is also interesting to note that, unlike all the other intended baseline verbs, the two *-ify* verbs involved phonological changes to the noun base in the formation of the verbs, and these two were found to generate the most errors among the 2+ error group and together made up over 40% of the total number of errors.

#### 3.3.2.3 Comparison of Use for All Denominal Verb Formation Processes

What follows here is a brief look at the results across all word formation processes, for subjects and items separately when necessary. As aforementioned, there were 40 subjects who completed this experimental task appropriately and each subject supplied novel verbs for 16 test items. Therefore, there were 640 opportunities in total to produce a verb by affixation, conversion, or some other method the subject felt suitable. Figure 3.3 below shows the percentages of the number of times a particular word formation process was used.

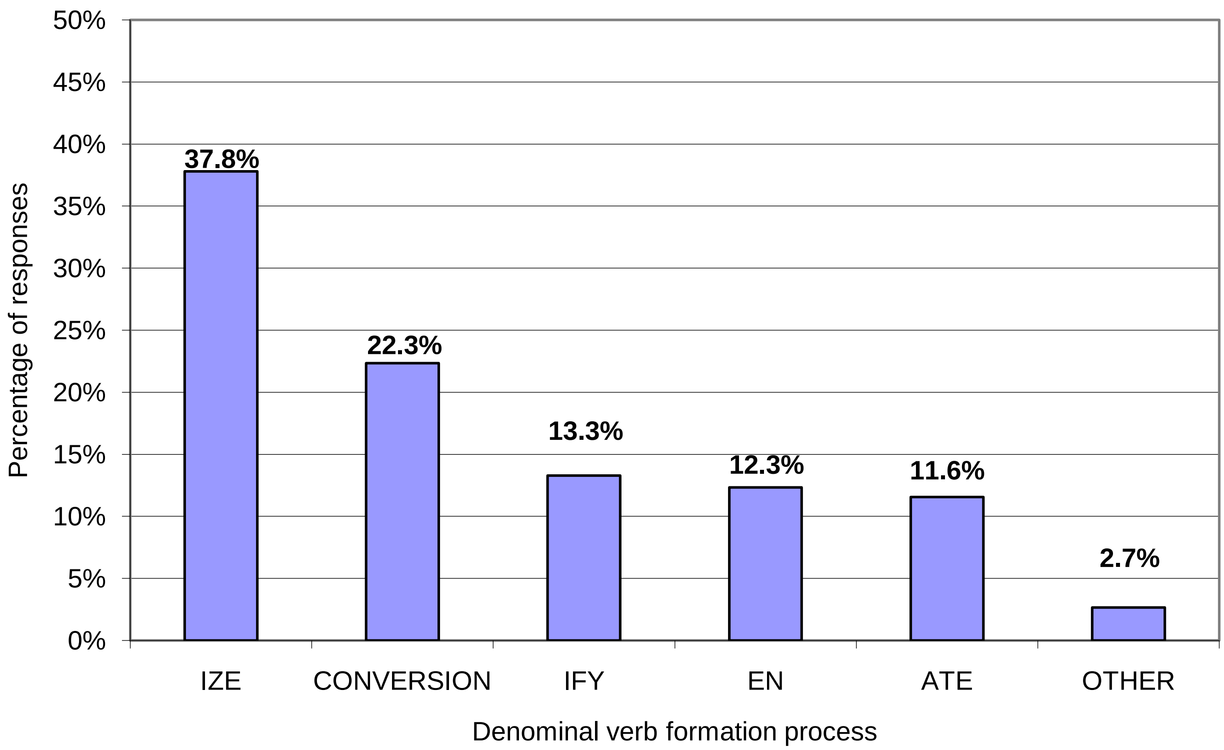


Figure 3.3 Percentage of all Experiment 1 responses by denominal verb formation process

A quick glance at the chart shows us that *-ize* affixation was used much more than any other process (37.8% of the total). The next popular method was conversion (22.3%). The other overt affixes, *-ify*, *eN-*, and *-ate* occurred in numbers very similar to each other (13.3%, 12.3%, and 11.6% respectively), and the OTHER category followed a very distant last (2.7%). These results support what has been recounted in previous literature in terms of the relative productivity of these affixes, i.e., the most productive processes synchronically are conversion and *-ize* affixation, with the other affixes no longer very productive at all. Still, caution should be used in interpreting this result, keeping in mind that each subject provided four of the counts. The chart above does not tell us whether each subject had a more or less even distribution of the affixes, or whether subjects seem to cluster into “conversioners”, “-*izer*s”, “*eN*-ers”, etc. An analysis, such as the Friedman Rank Sum test, utilizing ranking of the word formation processes for each subject, is more suitable. For each subject, the word formation process used the most number of times is ranked as 6, the second most 5, and so on until the least used affix is given the rank of 1. (The ranking of ties is determined by averaging the relevant rankings in half; for example, if the two highest-ranking affixes were used the same number of times, they would each receive the ranking of 5.5, the average of 5 and 6.) From this, it is possible to add up all the subjects’ rankings for each affix and calculate the mean rank. Figure 3.4 below shows the mean rank for each affix across subjects.

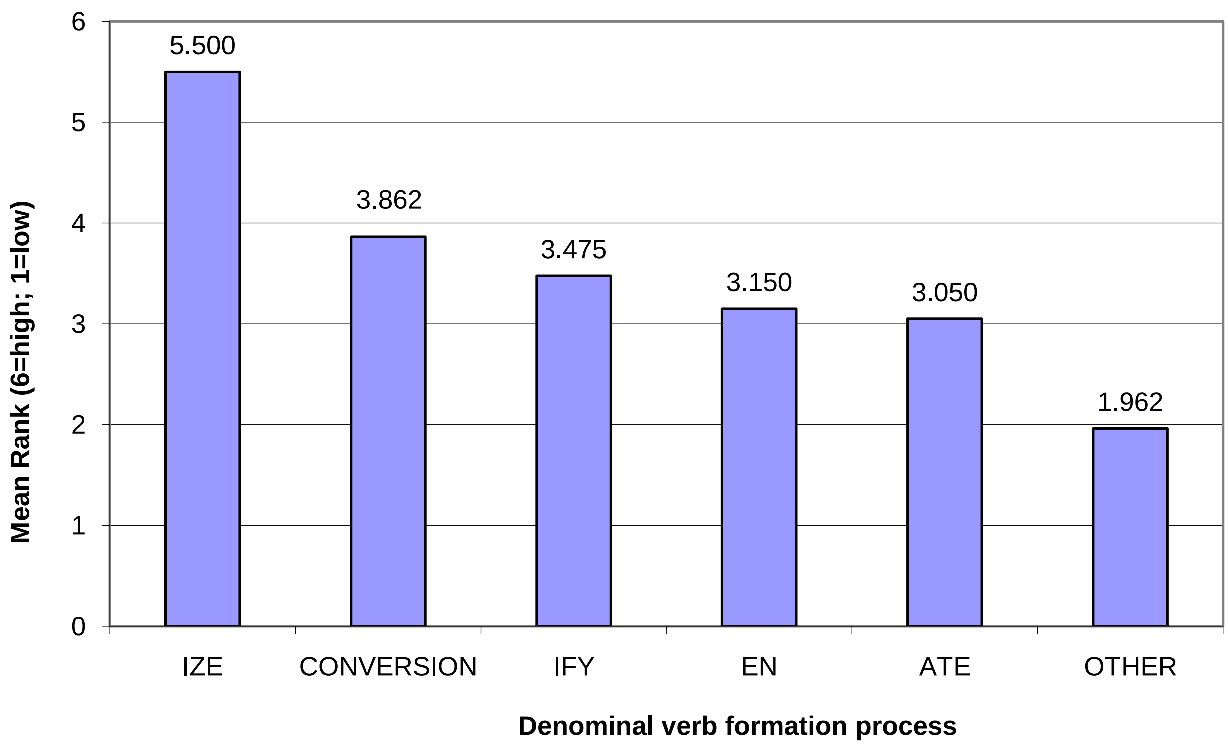


Figure 3.4 Experiment 1 subject mean rank of denominal verb formation processes

These results mirror the ones found for the raw counts above. The affix *-ize*, on average, shows up most often for each subject, followed by conversion, then *-ify*, *eN-*, and *-ate*, and the OTHER category last. Although we lose the sense of the magnitude of the difference between the affixes with this method of analysis, we gain the benefit of not skewing the results due to one subject contributing more times in one column than another. The statistic indicates that the difference in use of the word formation processes is significant at the $p < .0001$ level.

The Friedman Rank Sum Test is also applied to the analysis by items, in this case, the 16 different nouns used as bases for the novel verbs. As figure 3.5 below suggests, the results are very similar to those seen in the 'by subject' analysis above.

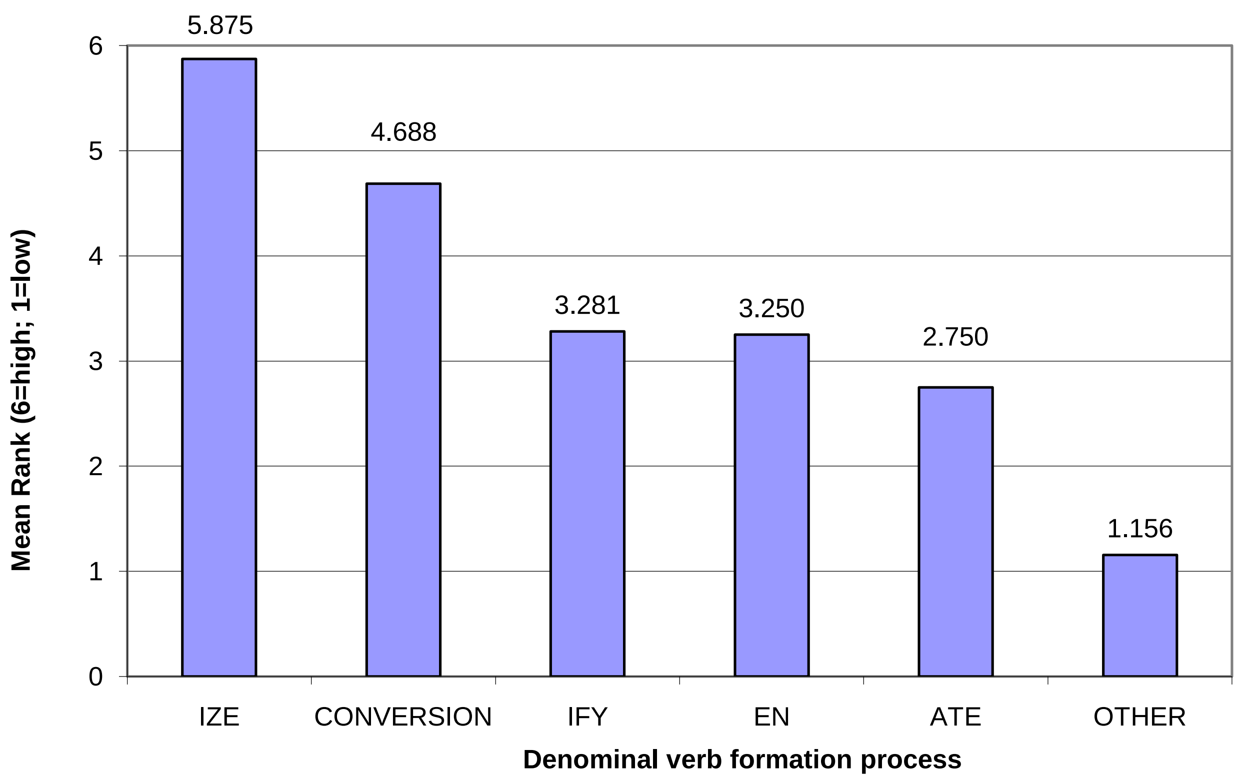


Figure 3.5 Experiment 1 item mean rank of denominal verb formation processes

Again, *-ize* is given the highest ranking on average, with conversion as the clear second. The affixes *-ify* and *eN-* are given nearly identical mean ranks, with *-ate* close behind, and the OTHER category well below these with the least ranking on average. The Friedman statistic once more yields significance at the $p < .0001$ level, suggesting that the difference in these ranks is significantly consistent across the items. Taken altogether, the above results provide support for the notion that *-ize* and conversion are much more productive than the other potential verb-forming processes. It is interesting that *-ify* is used as frequently as it is, since many consider it to be no longer productive in English. Furthermore, the test item noun bases are all trochaic; *-ify* prefers to affix to monosyllabic or iambic stems. To get around this, subjects who used *-ify* often truncated the stem to make the phonology fit.

Before continuing on to investigate whether the patterns seen above still hold under the potential influence of semantic factors, it is important to briefly discuss whether any other independent variables played a role in the results above.

#### 3.3.2.4 Other Independent Variables

A viable question is whether any of the other independent variables contributed to the pattern of results seen above. These independent variables include subject variables, such as sex of the subject and the particular questionnaire version (there were eight different versions) they completed, and base noun variables, such as etymological origin, final consonant, and the particular base noun itself.

Unpaired t-tests comparing the male and female responses to each of the word formation processes demonstrate that the differences between the two groups are not significant for any of the processes. Table 3.7 below summarizes these results.

Table 3.7 Comparison of Experiment 1 denominal verb formation process results by sex

| Denominal Verb Formation Process | % of Male Responses (n=144) | % of Female Responses (n=496) | Unpaired t-tests (38df) |
|---|---|---|---|
| IZE | 36.8% | 38.1% | t-value = -.202; p = .8412, n.s. |
| CONVERSION | 19.4% | 23.2% | t-value = -.460; p = .6483, n.s. |
| EN | 16.0% | 11.3% | t-value = 1.127; p = .2667, n.s. |
| ATE | 12.5% | 11.3% | t-value = .243; p = .8097, n.s. |
| IFY | 11.1% | 13.9% | t-value = -.628; p = .5339, n.s. |
| OTHER | 4.2% | 2.2% | t-value = 1.162; p = .2526, n.s. |

Which version a given subject completed also does not appear to be significant for any of the word formation processes, as a series of ANOVA tests indicate as shown below.

Table 3.8 Comparison of Experiment 1 denominal verb formation process results by version

| **Denominal Verb Formation Process** | **ANOVA results** |
|---|---|
| IZE | F(7, 32) = 0.993; p = .4541, n.s. |
| CONVERSION | F(7, 32) = 0.515; p = .8161; n.s. |
| IFY | F(7, 32) = 1.117; p = .3769, n.s. |
| ATE | F(7, 32) = 0.782; p = .6072, n.s. |
| EN | F(7, 32) = 1.685; p = .1483, n.s. |
| OTHER | F(7, 32) = 1.223; p = .3190; n.s. |

Therefore, neither of the subject variables was shown to play a role in the nature of the results thus far.

Variables related to the test base noun must also be examined as a potential factor contributing to the results. The base noun variables include the origin of the base noun (Latinate or Germanic), the final consonant of the base noun, and the specific base noun itself. As mentioned in the methods section above, half of the 16 test base nouns were of Latinate origin and the other half were Germanic in origin. Previous literature (e.g. Fabb 1988) has claimed a Latinate Constraint that certain affixes are only found with Latinate bases. Therefore, it is necessary to examine each word formation process as to whether their results varied significantly according to the etymological origin of the base noun.

Table 3.9 Comparison of Experiment 1 denominal verb formation process results by etymological origin

| Denominal Verb Formation Process | Latinate Base Nouns (320 total) | Germanic Base Nouns (320 total) | Unpaired t-tests (14df) |
|---|---|---|---|
| IZE | 122 | 120 | t-value = .121; p = .9051, n.s. |
| CONVERSION | 69 | 74 | t-value = -.355; p = .7277, n.s. |
| EN | 38 | 41 | t-value = -.313; p = .7589, n.s. |
| ATE | 38 | 36 | t-value = .150; p = .8829, n.s. |
| IFY | 46 | 39 | t-value = .553; p = .5892, n.s. |
| OTHER | 7 | 10 | t-value = -.582; p = .5788, n.s. |

A quick glance at the raw numbers reveals that the differences between the two groups are quite small, and the unpaired t-tests performed shows that none of these differences is even close to significant. These results do not support the notion that native speakers of English rely primarily upon etymological origin in determining the appropriate word formation process when creating a novel denominal verb.

Another variable related to the test base noun is the noun's final consonant. Four of the test item nouns ended in /n/, four in /l/, four in /t/, and four in /r/[24]. The results of the ANOVAs run on each verb formation process are shown in table 3.10 below.

[24] There were actually three nouns that ended in /r/ and one that ended in /rd/; for purposes of analysis, these four are placed together in one /r/ grouping.

Table 3.10 Comparison of Experiment 1 denominal verb formation process results by final consonant

| **Denominal Verb Formation Process** | **ANOVA Results** |
|---|---|
| IZE | F(3,12) = 2.038; p = .1623, n.s. |
| CONVERSION | F(3,12) = 2.376; p = .1212, n.s. |
| IFY | F(3,12) = .811; p = .5118, n.s. |
| ATE | F(3,12) = 4.837; p = .0197 |
| EN | F(3,12) = .164; p = .9186, n.s. |
| OTHER | F(3,12) = .483; p = .7002, n.s. |

The only significant result was for -*ate* affixation. Post-hoc analysis (Fisher's PLSD) suggests the most significant differences are between the use of /n/ most often for and the use of /r/ and /t/ the least often for -*ate* affixation. For all other denominal verb formation processes, the final consonant of the base was not found to be a significant factor in determining the results.

The last base noun factor to be examined is the specific base noun itself. Are there some bases more or less likely to encourage particular denominal verb formation processes? Tables 3.11-3.16 below show the base nouns in descending order of usage by process. The Z-score is listed for any base noun that resulted in a significantly higher or lower number of responses (i.e., 1.65 standard deviations above or below the mean.)

Table 3.11 Number of Experiment 1 IZE responses by test item base noun

| **Base Noun** | **Origin** | **Number of IZE Responses (mean = 15.125; SD = 3.981)** |
|---|---|---|
| MUSTARD | LATINATE | 26 (Z = 2.73; p = .0032) |
| TIGER | LATINATE | 19 |
| CHAPEL | LATINATE | 17 |
| CAMEL | GERMANIC | 17 |
| TONSIL | LATINATE | 16 |
| OVEN | GERMANIC | 16 |
| WALNUT | GERMANIC | 16 |
| LINEN | GERMANIC | 15 |
| LOCKER | GERMANIC | 15 |
| PRETZEL | GERMANIC | 15 |
| HELMET | LATINATE | 14 |
| NUGGET | GERMANIC | 13 |
| SPIDER | GERMANIC | 13 |
| MOUNTAIN | LATINATE | 12 |
| NAPKIN | LATINATE | 9 |
| FAUCET | LATINATE | 9 |

Table 3.12 Number of Experiment 1 IFY responses by test item base noun

| **Base Noun** | **Origin** | **Number of IFY Responses (mean = 5.313; SD = 3.092)** |
|---|---|---|
| NUGGET | GERMANIC | 12 (Z = 2.16; p = .0154) |
| HELMET | LATINATE | 8 |
| TONSIL | LATINATE | 8 |
| TIGER | LATINATE | 8 |
| NAPKIN | LATINATE | 7 |
| LOCKER | GERMANIC | 7 |
| MOUNTAIN | LATINATE | 7 |
| SPIDER | GERMANIC | 6 |
| WALNUT | GERMANIC | 5 |
| FAUCET | LATINATE | 4 |
| CAMEL | GERMANIC | 4 |
| CHAPEL | LATINATE | 3 |
| PRETZEL | GERMANIC | 2 |
| LINEN | GERMANIC | 2 |
| OVEN | GERMANIC | 1 |
| MUSTARD | LATINATE | 1 |

Table 3.13 Number of Experiment 1 ATE responses by test item base noun

| **Base Noun** | **Origin** | **Number of ATE Responses (mean = 4.625; SD = 3.222)** |
|---|---|---|
| OVEN | GERMANIC | 13 (Z = 2.60; p = .0047) |
| TONSIL | LATINATE | 9 |
| NAPKIN | LATINATE | 7 |
| LINEN | GERMANIC | 7 |
| MOUNTAIN | LATINATE | 5 |
| LOCKER | GERMANIC | 5 |
| PRETZEL | GERMANIC | 5 |
| MUSTARD | LATINATE | 5 |
| CHAPEL | LATINATE | 4 |
| CAMEL | GERMANIC | 3 |
| TIGER | LATINATE | 3 |
| HELMET | LATINATE | 3 |
| FAUCET | LATINATE | 2 |
| SPIDER | GERMANIC | 1 |
| WALNUT | GERMANIC | 1 |
| NUGGET | GERMANIC | 1 |

Table 3.14 Number of Experiment 1 EN responses by test item base noun

| **Base Noun** | **Origin** | **Number of EN Responses (mean = 4.938; SD = 2.323)** |
|---|---|---|
| SPIDER | GERMANIC | 9 (Z = 1.75; p = .0401) |
| CHAPEL | LATINATE | 8 |
| LINEN | GERMANIC | 7 |
| PRETZEL | GERMANIC | 7 |
| FAUCET | LATINATE | 7 |
| NUGGET | GERMANIC | 6 |
| HELMET | LATINATE | 6 |
| MOUNTAIN | LATINATE | 5 |
| CAMEL | GERMANIC | 5 |
| TIGER | LATINATE | 4 |
| NAPKIN | LATINATE | 4 |
| LOCKER | GERMANIC | 3 |
| TONSIL | LATINATE | 2 |
| MUSTARD | LATINATE | 2 |
| OVEN | GERMANIC | 2 |
| WALNUT | GERMANIC | 2 |

Table 3.15 Number of Experiment 1 CONVERSION responses by test item base noun

| Base Noun | Origin | Number of CONVERSION Responses (mean = 8.938; SD = 3.415) |
|---|---|---|
| FAUCET | LATINATE | 17 (Z = 2.36; p = .0091) |
| WALNUT | GERMANIC | 15 (Z = 1.78; p = .0375) |
| NAPKIN | LATINATE | 12 |
| PRETZEL | GERMANIC | 11 |
| LINEN | GERMANIC | 9 |
| HELMET | LATINATE | 9 |
| LOCKER | GERMANIC | 9 |
| MOUNTAIN | LATINATE | 8 |
| OVEN | GERMANIC | 8 |
| CHAPEL | LATINATE | 8 |
| CAMEL | GERMANIC | 8 |
| SPIDER | GERMANIC | 7 |
| NUGGET | GERMANIC | 7 |
| MUSTARD | LATINATE | 6 |
| TONSIL | LATINATE | 5 |
| TIGER | LATINATE | 4 |

Table 3.16 Number of Experiment 1 OTHER responses by test item base noun

| Base Noun | Origin | Number of OTHER Responses (mean = 1.063; SD = 1.289) |
|---|---|---|
| SPIDER | GERMANIC | 4 (Z = 2.28; p = .0113) |
| MOUNTAIN | LATINATE | 3 |
| CAMEL | GERMANIC | 3 |
| TIGER | LATINATE | 2 |
| FAUCET | LATINATE | 1 |
| NAPKIN | LATINATE | 1 |
| WALNUT | GERMANIC | 1 |
| NUGGET | GERMANIC | 1 |
| LOCKER | GERMANIC | 1 |
| LINEN | GERMANIC | 0 |
| OVEN | GERMANIC | 0 |
| HELMET | LATINATE | 0 |
| TONSIL | LATINATE | 0 |
| PRETZEL | GERMANIC | 0 |
| MUSTARD | LATINATE | 0 |
| CHAPEL | LATINATE | 0 |

As the tables above indicate, each word formation process had one or two test item base nouns that seemed to promote more usage of that process: MUSTARD led to significantly more -*ize* affixed novel verbs; NUGGET significantly more -*ify* affixed novel verbs; OVEN significantly more -*ate* affixed verbs; SPIDER significantly more *eN*- verbs; FAUCET and WALNUT significantly more conversion verbs; SPIDER significantly more OTHER responses. It is uncertain why a particular base noun would result in significantly higher usage of the relevant word formation process. As already discussed, etymological origin should not make the difference, and a glance at each table shows that the other base nouns of the same etymological origin were spread out across the distribution. The same is true for the final consonant, with the exception of -*ate*, which shows all four /n/-final bases clustered near the top of the distribution. Perhaps it is simply the nature of results that there tends to be at least one outlier. It will be interesting to return to this issue for the second task. Will MUSTARD again lead to more -*ize* affixation than the other noun bases? Will FAUCET and WALNUT again lead to more conversion responses? Or will it be that the suggestion regarding the presence of outliers is correct and different noun bases will be overrepresented for each process?

In any case, it does not appear that any of the subject or base noun variables influenced the results of the task to any meaningful extent. Thus, the focus can now turn to the effect of the semantic variables.

### 3.3.2.5 Semantic Variables

Moving on now to one of the more central questions of this research: what influence does the Semantic Category Distribution Effect have upon the creation of novel denominal verbs? It should be remembered that the task was designed such that all base nouns were disyllabic trochees and all novel verbs were placed in a transitive structure. By keeping the phonology and syntax the same, it was anticipated that the semantic factors would become that much more evident. Once more, the semantic questions to be addressed are what is possible in denominal verb formation, what is probable, what affects that probability, and what the nature of the interaction between the processes is. These will be responded to below in turn.

Figure 3.6 below shows the semantic category distributions for each denominal verb formation process. It is immediately evident that each process is represented by a percentage in each of the semantic categories; thus, the experimental results are consistent with the corpus study in that each semantic category is possible for each of the denominal verb formation processes.

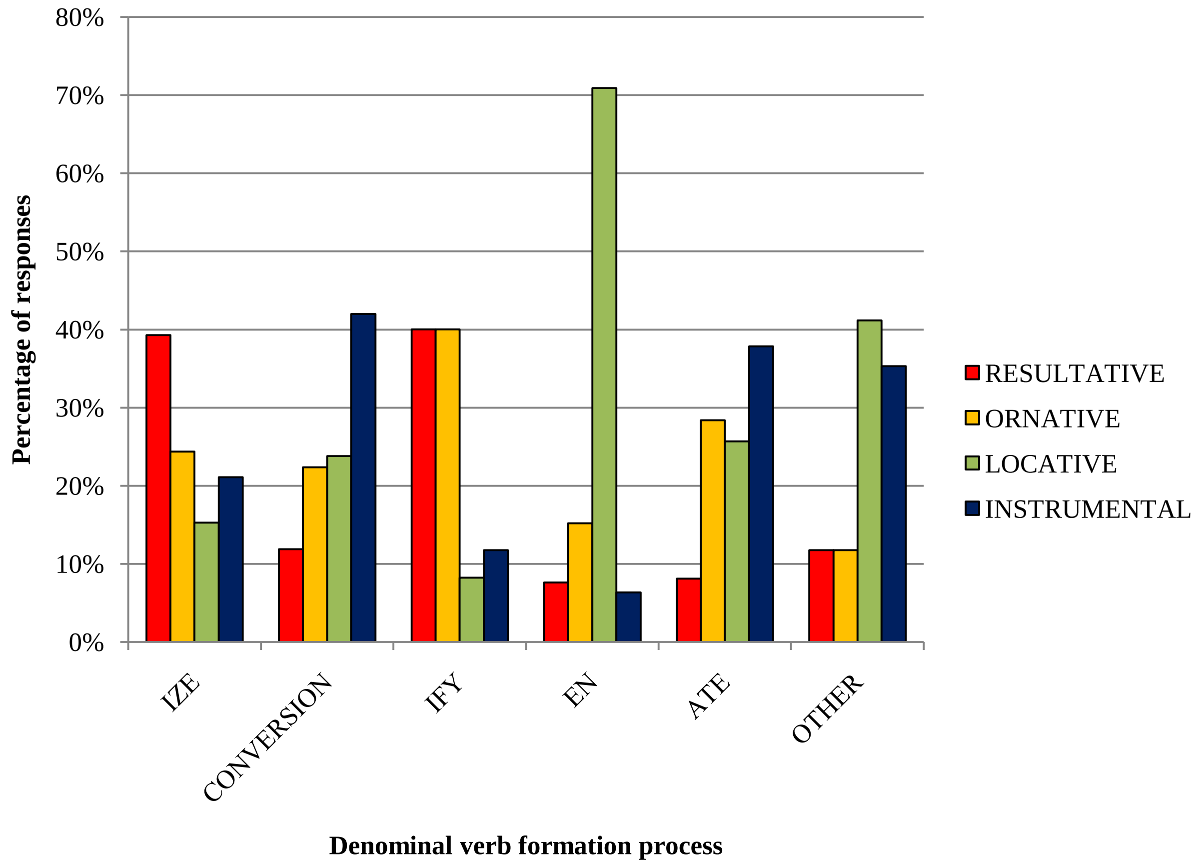


Figure 3.6 Experiment 1 semantic category distributions by denominal verb formation process

What is also immediately evident from the graph is that the percentages for each of the semantic categories vary for each of the processes. This, too, is consistent with the observations of the corpus study in chapter 2: not every semantic category is equally probable for each of the denominal verb formation processes.

Arriving quickly at the third question above: what factors affect the probability of a denominal verb formation process applying to a particular category. It is the central hypothesis of this dissertation that the semantic category distributions of the existing forms of each process is a major influence upon that probability, the Semantic Category Distribution Effect. It has been shown in the corpus study in chapter 2 that the semantic category distributions of the newly created forms of a period are significantly correlated to the existing forms. The CELEX subset provides an approximation of the existing forms for a typical native speaker of English, and following the Semantic Category Distribution Effect Hypothesis, the semantic category distributions of the novel forms created in this experiment are predicted to be significantly correlated with the CELEX distributions. Unfortunately, the results of the study fail to reach the level of significance, but the correlations often come close to significance and all in the predicted directions.

The results concerning -*ize* affixation are summarized in table 3.17 below. The second column gives the percentage of use of -*ize* in each of the four semantic categories. However, as has been aforementioned, some subjects are more likely to use -*ize* overall than others, so mean ranks for subjects and items are also provided in the third and fourth columns, along with the significant results of the Friedman statistic, which indicates that this rank (the fifth column) was consistent across subjects and across items.

Table 3.17 Comparison of Experiment 1-*ize* distribution and rank with CELEX -*ize*

| **Semantic Category** | **Exp. 1 distribution** | **Subject Mean Rank (Friedman p<.0001)** | **Item Mean Rank (Friedman p<.0001)** | **Exp. 1 rank** | **CELEX distribution** | **CELEX rank** |
|---|---|---|---|---|---|---|
| RESULTATIVE | 39.3% | 3.225 | 3.750 | 1 | 32.0% | 1 |
| ORNATIVE | 24.4% | 2.475 | 2.281 | 2 | 17.0% | 2 |
| INSTRUMENTAL | 21.1% | 2.475 | 2.219 | 3 | 15.5% | 3 |
| LOCATIVE | 15.3% | 1.875 | 1.750 | 4 | 9.7% | 4 |

The last two columns of the table show the semantic category distribution for the CELEX -*ize* denominal verbs and the ensuing rank. Comparing the Experiment 1 rank with the CELEX rank, it is clear that the two ranks are identical: RESULTATIVE, ORNATIVE, INSTRUMENTAL, and then LOCATIVE. Despite this, the Spearman Rank Correlation Coefficient performed on the two percentage distributions (r = 1.000) achieves a Z-score of only 1.732, failing to reach significance (p = 0.0833).

A similar situation is found with the experimental data on *eN*- use (table 3.18 below). The Friedman statistics are again significant, suggesting the rank is quite consistent for subjects and items, and the rank of the Experiment 1 distribution is nearly identical to the CELEX rank of existing *eN*- denominal verbs: LOCATIVE, ORNATIVE, and RESULTATIVE and INSTRUMENTAL.

Table 3.18 Comparison of Experiment 1 *eN-* distribution and rank with CELEX *eN-*

| **Semantic Category** | **Exp. 1 distribution** | **Subject Mean Rank (Friedman p<.0001)** | **Item Mean Rank (Friedman p < .0001)** | **Exp. 1 rank** | **CELEX distribution** | **CELEX rank** |
|---|---|---|---|---|---|---|
| LOCATIVE | 70.9% | 3.438 | 3.813 | 1 | 41.3% | 1 |
| ORNATIVE | 15.2% | 2.350 | 2.344 | 2 | 20.0% | 2 |
| RESULTATIVE | 7.6% | 2.125 | 1.938 | 3 | 13.8% | 3.5 |
| INSTRUMENTAL | 6.3% | 2.087 | 1.906 | 4 | 13.8% | 3.5 |

Yet, the Spearman Rank Correlation Coefficient of $r = 0.95$ is not significant at the $p < .05$ level ($Z = 1.645$, $p = 0.0999$).

This is essentially the same story for the *-ify* responses in Experiment 1 as well (table 3.19).

Table 3.19 Comparison of Experiment 1 *-ify* distribution and rank with CELEX *-ify*

| **Semantic Category** | **Exp. 1 distribution** | **Subject Mean Rank (Friedman p=.0022)** | **Item Mean Rank (Friedman p<.0001)** | **Exp. 1 rank** | **CELEX distribution** | **CELEX rank** |
|---|---|---|---|---|---|---|
| RESULTATIVE | 40.0% | 2.862 | 3.250 | 1.5 | 40.4% | 1 |
| ORNATIVE | 40.0% | 2.913 | 3.219 | 1.5 | 13.5% | 2 |
| INSTRUMENTAL | 11.8% | 2.163 | 1.906 | 3 | 5.8% | 4 |
| LOCATIVE | 8.2% | 2.063 | 1.625 | 4 | 9.6% | 3 |

Again, the rank order of the semantic categories is statistically significant across subjects and items: RESULTATIVE, ORNATIVE, INSTRUMENTAL, and LOCATIVE. Furthermore, this order is quite similar to the CELEX rank order of existing *-ify* denominal verbs. However, the statistics performed on the two distributions does not yield a significant result (Spearman r = 0.75; Z = 1.299, p = 0.1939).

Unlike the affixes -*ize*, *eN*-, and -*ify*, conversion, as shown by the CELEX distribution in table 3.20 below, is not strongly represented by any one of the four semantic categories of Experiment 1. This is reflected, as predicted by the Semantic Category Distribution Effect Hypothesis, by the Spearman Rank Correlation Coefficient of r = 0.000, which is, of course, not at all statistically significant.

Table 3.20 Comparison of Experiment 1 conversion distribution and rank with CELEX conversion

| **Semantic Category** | **Exp. 1 distribution** | **Subject Mean Rank (Friedman p=.0056)** | **Item Mean Rank (Friedman p=.0002)** | **Exp. 1 rank** | **CELEX distribution** | **CELEX rank** |
|---|---|---|---|---|---|---|
| INSTRUMENTAL | 42.0% | 3.050 | 3.531 | 1 | 18.3% | 2 |
| LOCATIVE | 23.8% | 2.413 | 2.688 | 2 | 14.8% | 4 |
| ORNATIVE | 22.4% | 2.500 | 2.250 | 3 | 22.6% | 1 |
| RESULTATIVE | 11.9% | 2.038 | 1.531 | 4 | 17.9% | 3 |

However, the rank seen with the experimental data, INSTRUMENTAL, LOCATIVE, ORNATIVE, and RESULTATIVE, is not random; it is nearly the reverse order of that seen with -*ize* above. This result further supports the notion of conversion having achieved default status in present day English.

The last denominal verb formation process to be discussed is *-ate* affixation. It will be recalled from the corpus study of chapter 2 that *-ate* has had a history in English a bit different from the other affixes borrowed from French. For one thing, the degree of borrowing of denominal *-ate* verb continued to be extensive hundreds of years longer than for the other affixes. Also, any semantic category associations began to develop much later than was the case for the other affixes. Consequently, in present-day English, *-ate* is associated with a much smaller semantic domain, with noun bases that are scientific in nature, as has been claimed in previous literature and demonstrated in the corpus study data. If native speakers are sensitive to this smaller semantic domain, *-ate* should not have been selected at all in this novel denominal verb task since none of the test item noun bases was scientific in nature. This, however, was not the case.

Table 3.21 Comparison of Experiment 1 *-ate* distribution and rank with CELEX *-ate*

| **Semantic Category** | **Exp. 1 distribution** | **Subject Mean Rank (Friedman p=.0932, n.s.)** | **Item Mean Rank (Friedman p=.0237)** | **Exp. 1 rank** | **CELEX distribution** | **CELEX rank** |
|---|---|---|---|---|---|---|
| INSTRUMENTAL | 37.8% | 2.800 | 3.094 | 1 | 7.8% | 4 |
| ORNATIVE | 28.4% | 2.575 | 2.750 | 2 | 21.4% | 2 |
| LOCATIVE | 25.7% | 2.538 | 2.406 | 3 | 10.3% | 3 |
| RESULTATIVE | 8.1% | 2.087 | 1.750 | 4 | 23.2% | 1 |

As the results summarized in table 3.21 show, although subjects were not significantly consistent in terms of their rank of use of *-ate*, the overall pattern mirrors that of the ranking by item. The nature of the *-ate* results is not predicted by its semantic structure nor by the Semantic Category Distribution Effect Hypothesis (Spearman r = -0.800, z = -1.386, p = 0.1659). So why is *-ate* more frequently used for INSTRUMENTAL, then ORNATIVE and LOCATIVE, and quite infrequently for RESULTATIVE? One way to interpret the data is that it is not so much that *-ate* is preferred as an INSTRUMENTAL verb by subjects, but that it is not as dispreferred as in INSTRUMENTAL context. That is to say, because *-ize* and *-ify* are so much more preferred in the RESULTATIVE and ORNATIVE contexts and *eN-* in the LOCATIVE context, that there is simply no room, so to speak, for *-ate*. This proposed explanation of the data leads to the last of the questions above: what is the nature of the interaction between the denominal verb formation processes?

Figure 3.7 and 3.8 below show the mean ranks for each denominal verb formation process within each semantic category, for subjects and items, respectively.

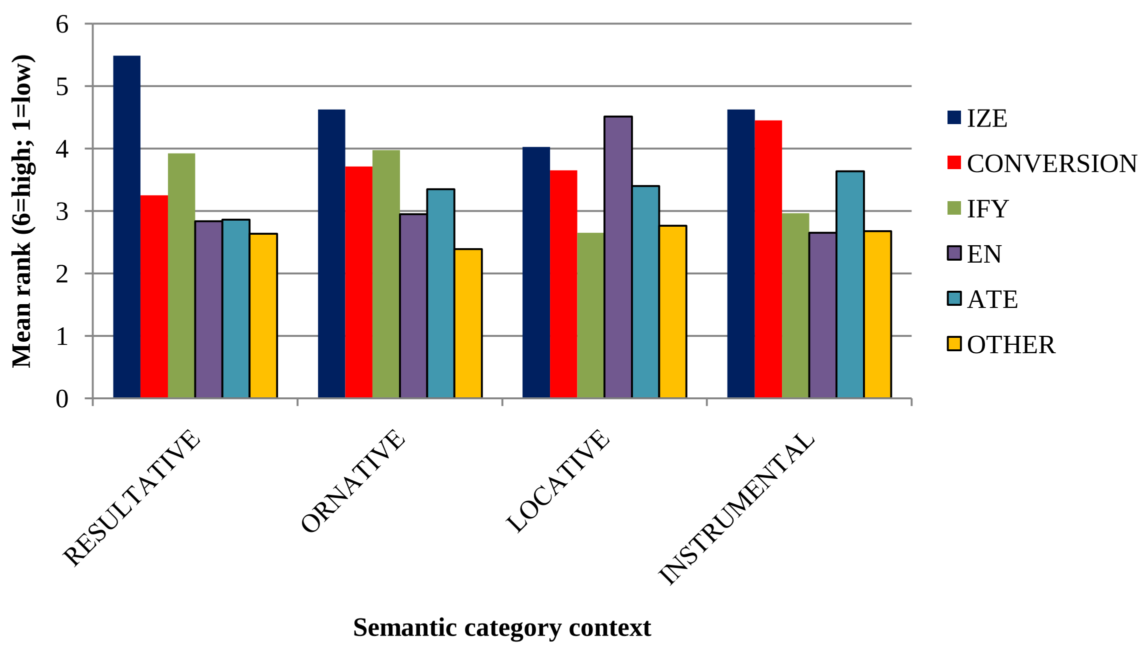


Figure 3.7 Experiment 1 subject mean ranks of denominal verb formation processes by semantic category context

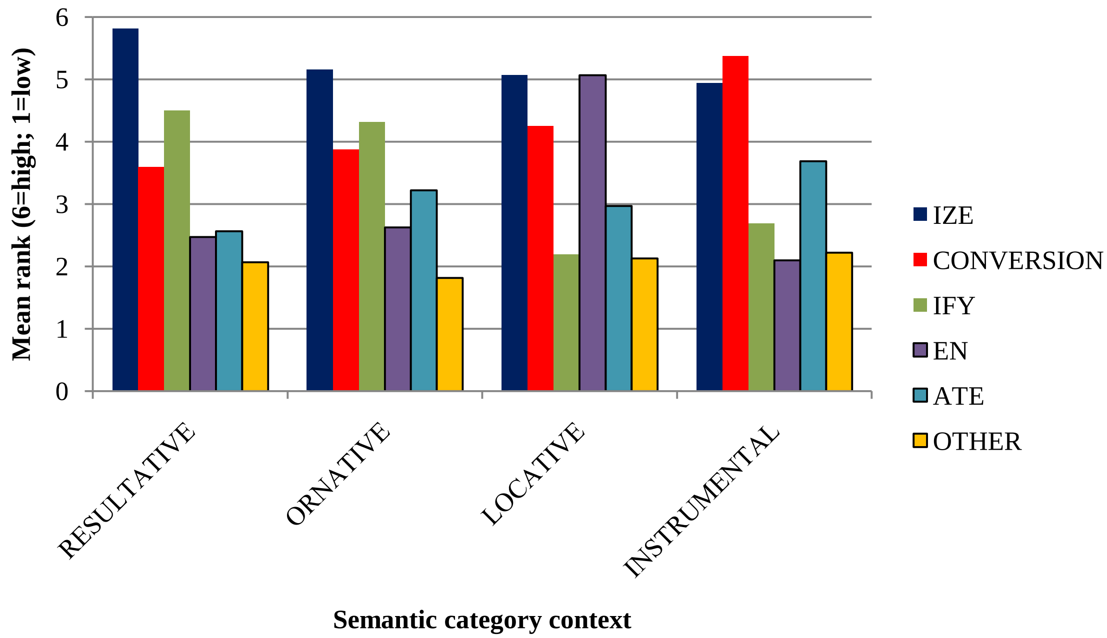


Figure 3.8 Experiment 1 item mean ranks of denominal verb formation processes by semantic category

Based upon the Semantic Category Distribution Effect Hypothesis, aforementioned predictions were made regarding how the denominal verb formation processes would interact such that particular processes should be selected more often than the others. For the semantic contexts that set up a RESULTATIVE interpretation of the novel verb, the prediction is that subjects in this task would select -*ize* and -*ify* more often than the other verb formation processes, as they are both highly represented by RESULTATIVE interpretations in their existing forms. Moreover, it is predicted that -*ize* would be selected more often than -*ify*, since the trochaic noun bases were more consistent with the phonological constraints of -*ize* affixation than -*ify* affixation. A quick glance at the two figures above show that these predictions are borne out: -*ize* and -*ify* were used for the RESULTATIVE novel verbs more than the other processes, and -*ize* more often than -*ify*. Friedman statistics run on both the subjects and items analyses were highly significant (p <

0.0001), indicating the rankings were consistent for each subject and each item overall. The figures above mask the magnitude of the difference between -*ize* and -*ify* and the other processes; in fact, -*ize* and -*ify* are used over 80% of the time when taken together. Thus, as mentioned in relation to -*ate* above, there is very little room left for any other process to compete.

There was no prediction made regarding denominal verbs created out of the ORNATIVE contexts other than that there should be real competition among the processes, as all processes ranked ORNATIVE as either their first or second highest represented category among the existing verbs. However, the results show that there is, in fact, a clear preference among the subjects for -*ize* affixation in this context. The rankings for both subjects and items (again quite significant according to the Friedman statistic with $p < 0.0001$) show that the order of preference is -*ize*, -*ify*, conversion, -*ate*, *eN*-, and finally OTHER. This result suggests that some other factor or factors are encouraging a consistent preference for -*ize* in this task. One such potential factor is proposed to be what is termed here as the Overt Affixation Preference. This is a concept mentioned in Plag (1999, 231): he proposes that when both overt affixation and conversion are possible, overt affixation is often preferred as its semantics are generally more specific than any associated with conversion, and thus provide a clearer signal to the listener of the speaker's intended meaning. If this Overt Affixation Preference is correct, then the results above can be partially accounted for. However, it is not every overt affix that is preferred over conversion for novel ORNATIVE verbs in this task; it is precisely the overt affix that is also the most productive in terms of type frequency. Thus, it appears that another concept crucially interacts with the Overt Affixation Preference, what is referred to here as the Type Frequency Productivity Preference.

These two proposed Preferences also account for the nature of the data relating to the novel LOCATIVE denominal verbs. It will be remembered from above that based upon the CELEX subset data, the prediction that follows is that if the new verb is to be LOCATIVE, then *eN*- should be the process of choice, but since *eN*- is no longer considered very productive in present day English, it may be that conversion will be chosen because its LOCATIVE percentage is the next highest compared to the other three processes in figure 3.1 and also its status as a default process (see chapter 2).

Referring once again to figures 3.7 and 3.8, it can be observed that *eN*- is the overwhelming favorite. The willingness of subjects to use *eN*- in this or any context may be somewhat surprising as most previous literature (e.g. Marchand 1969, Plag 1999) would consider *eN*- as no longer productive in today's English. Still, as proposed by the Semantic Category Distribution Effect, native speakers may have a very clear association of this affix with LOCATIVE meanings due to the higher frequency of its use with this interpretation. The result seen here suggests that the subjects in this study opted for more transparent semantics over *eN*-'s lack of type frequency productivity.

Contrary to the prediction above, for subjects that did not choose *eN*-, it is, in fact, -*ize* that comes in second, with conversion as third most frequently used. This result is consistent across subjects and items (Friedman $p < 0.0001$ for both), and is reminiscent of the discussion of ORNATIVE above. When overt affixation competes with conversion, the Overt Affixation Preference is operative in this task. In this case, two affixes are preferred: the more semantically associated affix *eN*-, as determined by the Semantic Category Distribution Effect, and the most productive of the overt affixes -*ize*, consistent with the Type Frequency Productivity Preference.

The last prediction based upon the CELEX subset distributions is that for novel INSTRUMENTAL verbs, conversion should be selected more often as conversion maintains a greater percentage for INSTRUMENTAL than do the other processes. And, conversion does come out the winner in the item mean ranks in INSTRUMENTAL category (figure 3.8), but for subjects, it is -*ize* affixation that is consistently ranked the highest (figure 3.7), both mean ranks significant at the $p < 0.0001$ level according to the Friedman statistic. Once again, it may be that subjects in this task preferred overt affixation to conversion in order to signal a novel verb more obviously, and chose the most type frequency productive overt affix, -*ize*, to do so.

Taking a look at all of the data together this way demonstrates that the different word formation processes operate as a dynamic system in the formation of denominal verbs, where besides phonology and syntax, the pragmatic factor of overtness, the extralinguistic factor of productivity and the Semantic Category Distribution Effect constantly interact.

There are two other semantic factors to be addressed in this section: affectedness or the degree of change upon the internal argument of the novel verb, and the verb frame which set up a novel accomplishment or novel activity verb. As described above, half of each of the semantic contexts presented scenarios in which there was a permanent or significant change to the direct object following the novel verb blank, and the other half presented scenarios with a temporary change to the direct object or left the direct object completely unaffected. It was anticipated that the use of particular word formation processes might be influenced by this semantic factor. The results are shown in table 3.22 below.

Table 3.22 Difference in Experiment 1 change vs. no-change responses by verb formation process

| **Denominal verb formation process** | **Change (320 total)** | **No-Change (320 total)** | **Subjects (paired t-test; 39 df)** | **Items (paired t-test; 15 df)** |
|---|---|---|---|---|
| IZE | 135 | 107 | t-value=2.732; p[25]=.0094 | t-value=1.951; p[26]=.0699, n.s. |
| CONVERSION | 64 | 79 | t-value=-1.955; p = .0577, n.s. | t-value = -1.523; p = .1486, n.s. |
| IFY | 41 | 44 | t-value =-.368; p = .7148, n.s. | t-value = -.356; p = .7265, n.s. |
| ATE | 41 | 33 | t-value=1.091; p = .2819, n.s. | t-value = .953; p = .3555, n.s. |
| EN | 32 | 47 | t-value=-2.490; p = .0171 | t-value = -2.167; p = .0468 |
| OTHER | 7 | 10 | t-value = -.621; p = .5384, n.s. | t-value = -.899; p = .3828, n.s. |

[25] The Bonferroni Correction is often applied when there are many t-test comparisons performed. The Bonferroni Correction is either the alpha level/N or p-value*number of outcomes. In this case if .05 is divided by 40, the significant p would need to be less than .00125. With the correction, none of the word formation processes displayed a significant difference in responses in terms of affectedness in the ‘by subjects’ analysis.

[26] In this case if .05 is divided by 16, the significant p would need to be less than .003. With the Bonferroni Correction, the results, as with the subjects’ t-tests, none of the word formation processes differed significantly in terms of affectedness.

Although it looks as if -*ize*, conversion, and *eN*- might differ significantly in number of responses along this dimension, the paired t-tests show that this is questionable, particularly when the Bonferroni correction is applied (please refer to footnotes 8 and 9).

The last potential semantic factor to be discussed here is whether the context promoted an accomplishment verb or an activity verb. It may be remembered from the methods section above that half of the test items were placed within an accomplishment verb frame (signaled by the phrases *it took X time* or *in X time*) and the other half were placed within an activity verb frame (signaled by *for X time*). The results are provided in table 3.23 below.

Table 3.23 Difference in Experiment 1 accomplishment vs. activity responses by verb formation process

| **Denominal verb formation process** | **Accomplish-ment (320 total)** | **Activity (320 total)** | **Subjects (paired t-test; 39 df)** | **ITEMS (paired t-test; 15 df)** |
|---|---|---|---|---|
| IZE | 154 | 88 | t-value=4.344; p[27]<.0001 | t-value=4.689; p[28]=.0003 |
| IFY | 68 | 17 | t-value=4.846; p< .0001 | t-value=5.648; p< .0001 |
| CONVERSION | 49 | 94 | t-value=-3.805; p=.0005 | t-value=-4.920; p=.0002 |
| ATE | 27 | 47 | t-value=-3.491; p=.0012 | t-value=-1.890; p=.0783, n.s. |
| EN | 18 | 61 | t-value=-5.538; p<.0001 | t-value=-5.805; p<.0001 |
| OTHER | 4 | 13 | t-value=-1.940; p=.0596, n.s. | t-value=-2.334; p=.0339 |

[27] As aforementioned, the Bonferroni Correction is often applied when there are many t-test comparisons performed. The Bonferroni Correction is either the alpha level/N or p-value*number of outcomes. In this case if .05 is divided by 40, the significant p would need to be less than .00125. Even with the correction, the results are the same: all but OTHER resulting in significance.

[28] In this case if .05 is divided by 16, the significant p would need to be less than .003. With the Bonferroni Correction, the results are the same except the difference between OTHER accomplishments and OTHER activities is no longer significant, in line with the ‘by subject’ results.

According to these results, verb frame does appear to be a significant factor in determining the use of each verb formation process, with the exception of *-ate* affixation in the 'by item' analysis and the OTHER category in both analyses. In fact, it has been proposed that the determining factor between *-ize*/*-ify* affixation and conversion is the type of verb created: *-ize*/*-ify* verbs are accomplishments; conversion verbs are activities (Rosenberg 1995). This notion is termed here the Verb Aspect Constraint. The results are consistent with this hypothesized constraint: *-ify* and *-ize* are significantly more likely to be selected in ACCOMPLISHMENT contexts and conversion significantly more likely to be selected in ACTIVITY contexts. However, a closer look at the mean ranks within each type of verb frame context reveals that the Verb Aspect Constraint cannot be considered validated here. Looking at all the ACCOMPLISHMENT responses (table 3.24 below), we can see that while *-ize* and *-ify* do achieve the two highest mean ranks, conversion is number three, far from being the lowest rank as a claim that conversion verbs are always activities might predict.

Table 3.24 Experiment 1 subject and item mean ranks of accomplishment responses

| **Denominal verb formation process** | **Subject mean rank (Friedman $p < .0001$)** | **Item mean rank (Friedman $p < .0001$)** |
|---|---|---|
| IZE | 5.425 | 5.781 |
| IFY | 4.063 | 4.469 |
| CONVERSION | 3.538 | 3.813 |
| ATE | 3.087 | 2.844 |
| EN | 2.763 | 2.594 |
| OTHER | 2.125 | 1.500 |

Furthermore, when looking at the ACTIVITY responses in a similar fashion (table 3.25), we see conversion is indeed the highest ranked process in the 'by item' analysis and -*ify* affixation one of the lowest, but -*ize* affixation is the second highest ranked process. Moreover, while -*ify* remains one of the lowest ranked in the 'by subject' analysis, conversion actually falls behind the number one ranked -*ize* affixation.

Table 3.25 Experiment 1 subject and item mean ranks of activity responses

| **Denominal verb formation process** | **Subject mean rank (Friedman p < .0001)** | **Denominal verb formation process** | **Item mean rank (Friedman p < .0001)** |
|---|---|---|---|
| IZE | 4.463 | CONVERSION | 5.094 |
| CONVERSION | 4.225 | IZE | 4.719 |
| EN | 3.862 | EN | 4.219 |
| ATE | 3.475 | ATE | 3.125 |
| IFY | 2.538 | IFY | 2.063 |
| OTHER | 2.438 | OTHER | 1.781 |

This is certainly not a predicted result of the claim that -*ize* verbs are only found as accomplishments. This leads one to conjecture that perhaps the Verb Aspect Constraint is much more of a tendency than an absolute, or perhaps even more likely, the significant results here are a reflex of the greater use of -*ize* and -*ify* in the RESULTATIVE and ORNATIVE semantic contexts (the contexts assigned ACCOMPLISHMENT verb frames) and lesser use in the LOCATIVE and INSTRUMENTAL contexts (the contexts assigned ACTIVITY verb frames).

### 3.3.3 Experiment 1 Summary

The results of this first, open-ended novel denominal verb formation task reinforce the findings related to chapter 2 on the corpus study: all denominal verb formation processes were considered possible realizations for all four semantic categories, but their probability of use was not equivalent across these categories. The Semantic Category Distribution Effect, the central hypothesis of this work, proposes that native speakers are sensitive to the distribution of existing forms among the semantic categories and make use of this information when forming novel denominal verbs. Although the statistics performed on these experimental results do not lend strong support to the Semantic Category Distribution Effect Hypothesis, most of the results are qualitatively consistent with the predictions of the hypothesis. The distribution ranks of the novel items for the three denominal verb formation processes of -*ize*, *eN*-, and -*ify* are indeed quite similar to the distribution ranks of the existing items approximated to be in the typical native speaker's mental lexicon. Moreover, the more flatly distributed conversion process behaved much more like a default, consistent with the results seen in the corpus study discussed in chapter 2. The unexpected distribution witnessed with -*ate* in the experimental task has been proposed to be due to the interaction of the other processes. Whereas -*ate* was predicted to have made a better showing among the RESULTATIVE and ORNATIVE categories, it was not the only option; -*ify* and -*ize* were so dominant in these categories (and *eN*- in LOCATIVE) that INSTRUMENTAL was the only category left in the task, and even then, -*ate* ranks only third.

In terms of the interaction among the denominal verb formation processes, it was seen that the Semantic Category Distribution Effect is not the only factor in play. It should be recalled that according to the data of the CELEX subset (section 3.2.2), conversion overwhelms all the other denominal verb formation processes in terms of type frequency regardless of semantic category. However, in the experimental results, subjects selected *-ize* affixation more frequently than any other process (section 3.3.2.3). Why should this be the case? Two other factors, what have been referred to here as the Overt Affixation Preference and the Type Frequency Productivity Preference, have been proposed to account for these results. The Overt Affixation Preference, the pragmatic preference for a clear signal of noun-to-verb formation, is responsible for the preference of the overt affixes to conversion for nearly all of the categories, despite the overwhelming type frequency productivity of conversion in English denominal verb formation overall. However, the Type Frequency Productivity Preference also interacts with the Overt Affixation Preference in that it was not the case that every overt affix was preferred to conversion; rather it was the overt affix with the highest overall type frequency, i.e. *-ize*.

It is possible that the task of Experiment 1 might have been too unnatural, in a sense, and that subjects might have neglected to consider conversion as frequently as they might have in other circumstances. Thus, a second experimental task was designed, extremely similar to the first, except that only two choices are available for selection for the denominal verb blank, a novel conversion verb and a novel *-ize* verb. This experiment is discussed immediately below.

### 3.4 Experiment 2: Novel Denominal Verb Task - Forced Choice Response

This task, like the previous one, provided subjects with a scenario containing a salient noun and a blank where a novel verb based on that noun should be placed. In this task, however, the subjects were provided with two novel verbs from which to choose, a novel -*ize* form and a novel conversion form. As aforementioned, the nature of the first experimental task may have led subjects to be less aware of the possibility of conversion use; by the forced-choice design of this experimental task, it is anticipated that subjects will be forced to consider conversion for every test item, thus eliminating this potential problem. In addition, several of the same questions addressed in Experiment 1 are addressed in Experiment 2, except targeting -*ize* affixation and conversion in particular:

Q1. What semantic categories are possible for -*ize* affixation and conversion?

Q2. What semantic categories are probable for -*ize* affixation and conversion?

Q3. What factor or factors influence that probability?

As before, Q3 deals specifically with the influence of the hypothesized Semantic Category Distribution Effect, as well as the Overt Affixation Preference.

#### 3.4.1 Method

The method employed in Experiment 2 was very similar to that employed in Experiment 1. However, the aspects of the methodology that are specific to this task are noted below.

#### 3.4.1.1 Subjects

Eighty subjects participated in this study, 51 females and 29 males, all undergraduate students enrolled in introductory level linguistics courses at Northwestern University, participating in the study in order to fulfill experimental requirements for their particular course. As with the first experiment, subjects were not paid for their participation and all subjects are monolingual speakers of American English.

#### 3.4.1.2 Materials

For this study, each one of eight questionnaires presented the subject with 32 items, consisting of a brief scenario containing a blank space where a verb (derived from a salient noun) is required and two choices from which to choose. For example:

> Belinda has been an environmental activist all her life. When she was only 10 years old, while other girls were using electricity for their easy-bake ovens, she took a few household items and turned them into a solar-powered oven. With a roll of aluminum foil, some black spray paint, a plastic bag and some glue, she was able to ____________ two cardboard boxes in only one afternoon. The little chocolate cake she made with it was pretty good, too!
>
> a. oven b. ovenize

Of the 32 items, sixteen were the same test items used in Experiment 1 with the addition of the two explicit choices as shown above, and the remaining sixteen were filler items, which again presented the subject with a previously existing, familiar denominal verb as one of their two choices. Since this study deals with only the two verb formation processes of *-ize* affixation and conversion, it was possible to increase the number of filler items and hold them to stricter criteria than those of Experiment 1. The noun bases for these filler items were selected such that half of the nouns (8 of 16) are bases for existing *-ize* verbs and half are bases for existing conversion verb forms, and none are bases for both[29]. The filler base nouns were also subject to the same or similar criteria as the test base nouns, where appropriate. For example, all the filler item nouns are two syllables with a trochaic stress pattern and are of low to mid frequency (<85/million) according to both the Kucera-Francis and CELEX databases (or according to either if only one lists the given noun). As with the test item nouns, the filler nouns end in /l/, /n/, /r/, /rd/ or /t/; however, they also may end in /m/ and /k/ as well. The criterion for familiarity is also slightly less restricted in that nouns with a Hoosier Mental Lexicon familiarity rating of at least 6.25/7.00 are considered acceptable (the test item nouns have to be 6.5/7.0 or higher.) The concreteness and imageability criteria had to be disregarded entirely for the filler item noun bases as very few of these were listed in the MRC database. Also, it was not possible to find eight existing *-ize* verbs with Germanic noun bases that also met the other criteria; therefore, all of the filler noun bases, *-ize* and conversion forms alike, are Latinate in origin. The filler item base nouns and their details are listed in the tables below, one for the *-ize* filler items and the other for the conversion filler items:

[29] Again, there appears to be one base that the American Heritage Dictionary-Fourth Edition (2001) does list as having both an *-ize* and conversion verb form, SYMBOL. Also, the OED lists several corresponding, but obsolete *-ize* and conversion forms. Some other denominal verbs without special marking, *to modellize, to item, to symbol,* and *to burglar,* do not appear to be part of the general American lexicon.

Table 3.26 Details of Experiment 2 *-ize* filler item base nouns

| | Base Noun | Final cons | Origin | KF freq | CELEX freq | CELEX *-ize* freq | Hoosier Familiarity noun/*-ize* |
|---|---|---|---|---|---|---|---|
| 1 | CRITIC | K | Latin | 25 | 35 | 28 | 7 |
| 2 | SCANDAL | L | Latin | 8 | 14 | 2 | 7 |
| 3 | SYMBOL | L | Latin | 54 | 36 | 8 | /7 |
| 4 | VANDAL | L | Latin | | 1 | 1 | 7 |
| 5 | ITEM | M | Latin | 54 | 46 | 1 | 7/6.9167 |
| 6 | SERMON | N | Latin | 12 | 8 | 1 | 7 |
| 7 | PATRON | N | Latin | 4 | 9 | 5 | 6.5833/6.25 |
| 8 | BURGLAR | R | Latin | 1 | 4 | 0 | /6.8333 |

[blank cells indicate information not provided in the particular database]

Table 3.27 Details of Experiment 2 conversion filler item base nouns

| | Base Noun | Final cons | Origin | KF Freq | CELEX Freq | CELEX conversion Freq | Hoosier Familiarity |
|---|---|---|---|---|---|---|---|
| 1 | MIMIC | K | Latin | | 1 | 5 | 6.8333 |
| 2 | MODEL | L | Latin | 77 | 81 | 5 | 6.9167 |
| 3 | CUSHION | N | Latin | 8 | 14 | 2 | 7 |
| 4 | TORTURE | R | Latin | 3 | 12 | 11 | 7 |
| 5 | LITTER | R | Latin | 3 | 9 | 7 | 7 |
| 6 | USHER | R | Latin | 2 | 5 | 7 | 7 |
| 7 | BUTCHER | R | Latin | 8 | 6 | 3 | 7 |
| 8 | PROFIT | T | Latin | 28 | 69 | 5 | 7 |

[blank cells indicate information not provided in the particular database]

The semantic contexts set up by the filler scenarios were different than those used for the test items, mainly because it was near to impossible to create equal numbers of *-ize* and conversion verb forms with the RESULTATIVE, ORNATIVE, LOCATIVE, and INSTRUMENTAL meanings that also had disyllabic, trochaic nouns as their bases. Therefore, a decision was made to use existing -*ize* and conversion denominal verbs whose meanings indicate contexts other than the four used for the test items, namely SIMILATIVE (ACT AS/LIKE N), PERFORMATIVE (DO/PERFORM N), and EFFECTIVE (CREATE N). With these contexts, it was possible to distribute the filler noun bases for the existing -*ize* and conversion forms evenly, as shown in table 3.28 below:

Table 3.28 Semantic category contexts of Experiment 2 filler items

| **Semantic category context** | **Verb frame** | ***-ize*** | **conversion** |
|---|---|---|---|
| SIMILATIVE-CHANGE | accomplishment | BURGLAR | BUTCHER |
| SIMILATIVE-CHANGE | accomplishment | VANDAL | MODEL |
| SIMILATIVE-NO CHANGE | accomplishment | SYMBOL | USHER |
| SIMILATIVE-CHANGE | activity | CRITIC | TORTURE |
| SIMILATIVE-NO CHANGE | activity | PATRON | CUSHION |
| PERFORMATIVE-NO CHANGE | activity | SERMON | MIMIC |
| EFFECTIVE-NO CHANGE | accomplishment | ITEM | LITTER |
| EFFECTIVE-CHANGE | activity | SCANDAL | PROFIT |

It should be noted that half of the filler items are set up with accomplishment verb frames and half activity verb frames, and every effort was also made to establish equal numbers of contexts which described events in which the direct objects were significantly affected and half not.

The versions themselves also had to satisfy constraints similar to Experiment 1 with the additional constraints that for the response choices, no more than 2 verb forms (-*ize* or conversion) in a row as the A response and that of all 32 items, 16 must present the -*ize* verb form as the A response choice and 16 present it as the B response; these must be further distributed with 8 filler items and 8 test items presenting the -*ize* form as the A response, and then these must be counterbalanced again so that 4 filler conversion, 4 filler -*ize*, 4 test Latinate and 4 Germanic present the -*ize* form as the A response. Lastly, each version must have an alternative version with the response choice order reversed.

**3.4.1.3 Procedure**

Once the test and filler items were properly assembled into eight versions of a paper-and-pen questionnaire, they were distributed among the 80 subjects, 10 subjects per version. Also, half of the subjects for each version received a questionnaire with the A and B response choices reversed. The subjects were given the following directions:

> *In each of the items below, you are presented with a scenario. The final sentence of the scenario contains a blank where a verb should go. Below each scenario you are given two verbs to choose from to fill in that blank.*
>
> *Your task is to consider the two choices and circle the letter of the verb you feel would be best to fill in the blank.*
>
> *It will probably feel easier to decide for some of the items and harder for others. Just follow your intuitions, and if you really can't decide, just guess. Please be*

*sure not to skip any of the items, as it is very important that you make one (and only one) selection for each item.*

*If you have any questions now, or while you are working through the questionnaire, please raise your hand and the experimenter will assist you***.**

### 3.4.2 Results and Discussion

As aforementioned, there were 80 subjects (29 or 36.3% males; 51 or 63.8% females), 10 subjects per version. Of this group, 38 made no filler item errors and 42 made 1 filler item error. Clearly, this is a much larger percentage of filler item errors than with the first experiment, due mainly, as will be discussed momentarily, to three particular filler items. Of the 42 subjects that made 1 filler item error, 14 or 33.3% were males and 28 or 66.7% were females. As the proportion is very similar to the total number, no sex difference in error-making is suggested. Again, since the filler items were the same across all the versions, it is not expected that the error results should be significantly affected by which version the subject completed, and a chi-square analysis shows that they were not ($\chi^2(7, n = 42) = 3.332$, $p = .8527$, n.s.). All 42 errors were produced on 9 filler items (see also figure 3.9 below): 15 for SERMON (intended verb *sermonize*); 10 for PATRON (*patronize*); 10 for PROFIT (*profit*); 2 for LITTER (*litter*); and 1 each for CRITIC (*criticize*), BURGLAR (*burglarize*), ITEM (*itemize*), MODEL (*model*), and TORTURE (*torture*). This made for 28 total errors on intended -*ize* verbs, exactly twice as many as the 14 errors on intended conversion verbs.

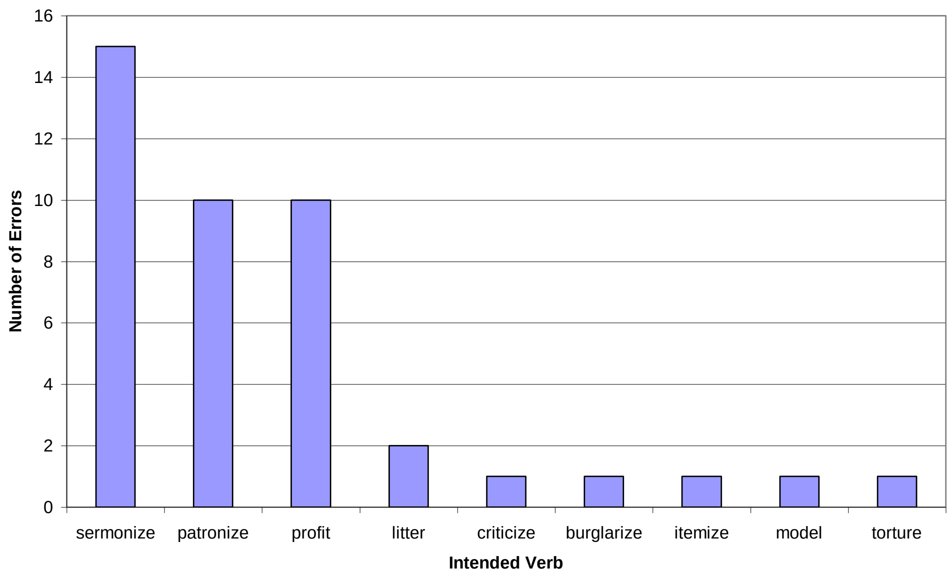


Figure 3.9 Number of Experiment 2 filler item errors by intended verb

None of these intended verbs was set up in a scenario that would have struck a native speaker as particularly odd. For example, *sermonize* is usually a PERFORMATIVE verb, and an activity verb, with generally no great effect or change upon its internal argument, and the scenario (provided below) set up the verb in a way consistent with those interpretations.

> Keith was a wonderful minister overall, but people generally did not enjoy his sermons. They seemed very deep and meaningful, but the way he delivered them, no one could really tell what point he was actually trying to make. In fact, he would often ____________ the congregation for a full hour and most people would not even bother to listen anymore.

Therefore, the large number of errors associated with *sermonize* is not that it would have been used here in an unusual way. However, what this intended verb shares with the other error-causing verbs is that the semantic category is not one of the more central ones associated with the process: PERFORMATIVE (*sermonize*) and SIMILATIVE (*patronize*, *burglarize*, *criticize*) are not considered to be core meanings of -*ize* as the affix is currently used. Furthermore, three of the four verbs set in the EFFECTIVE context caused the most errors after *sermonize* and *patronize*: *profit*, *litter*, and *itemize*. Again, it was not that the intended verb would have been oddly placed in the scenario (please see scenario for *profit* below), but rather that the EFFECTIVE semantic category is not a core one associated with either -*ize* affixation or conversion.

> Edward found the corporate world of movie making to be like a roller coaster ride. And it seemed all his studio cared about were box office numbers and profit. As long as he was able to ____________ the company for a sustained amount of time, they thought he was the greatest, perks, corner office, private jet and everything. But the moment he began to slide, he was fired. Edward thought he might like to try a career in gardening for a while.

The results regarding the errors in this task are further consistent with the notion that while all semantic category interpretations are possible for a given word formation process and are represented within the lexicon, to the native speaker subject, they are not all equally probable.

#### 3.4.2.1 Selection Results Regardless of Semantic Context

As the format of this task was a forced choice, obviously if a subject responded with the -*ize* novel verb, they did not respond with the conversion novel verb, and vice versa. Thus, it is possible to report the results in terms of one denominal verb formation process, as the other can be assumed as the converse. For this study, the results will be reported in terms of -*ize* affixation.

Of the 1280 (16 test items x 80 subjects) possible responses, 831 in raw numbers or 64.9% of the responses was the *-ize* novel verb option (and therefore 449 responses or 35.1% conversion novel verb.) This result is significantly higher than chance, both across subjects (one-sample t-test, $t(79) = 5.934$, $p < .0001$, two-tailed) and test items (one sample t-test, $t(15) = 5.409$, $p < .0001$, two-tailed). Furthermore, both the median and the mode were 10 out of 16 *-ize* responses (62.5%). However the same caveat encountered with Experiment 1 holds true here: because each subject contributed 16 counts, this raw count, or percentage based on raw count, may have been affected by "izers" and/or "conversioners", that is, subjects that responded with all *-ize* novel verbs or all conversion novel verbs, regardless of the scenario. Figure 3.10 below displays the number of subjects with a given number of *-ize* responses out of the possible sixteen.

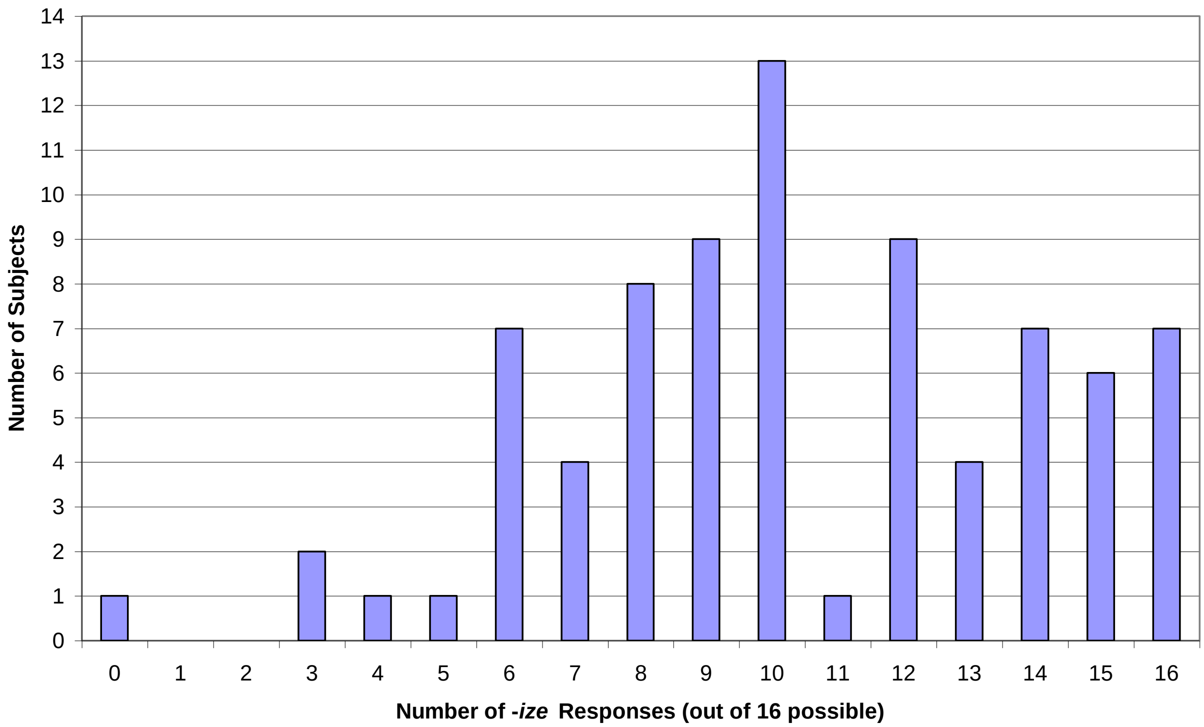


Figure 3.10 Number of Experiment 2 subjects providing X-number of -*ize* responses

As we can see there was 1 “conversioner”, one subject who responded with 0 -*ize* verbs and therefore all conversion verbs, and 7 “izers”, subjects who responded with -*ize* all 16 times.

What is interesting about this is that it suggests that native speakers may opt for different strategies: perhaps the “conversioner” consistently chose to go with most productive process, i.e. conversion (Type Frequency Productivity Preference), whereas the “izers” consistently went with the overt verb formation process, -*ize* affixation (Overt Affixation Preference).

Disregarding the "izer" and "conversioner" responses, out of a possible 1152 responses (16 test items x 72 subjects), 719 responses or 62.4% were *-ize* verbs. It still appears that here, as with the first experiment, the overt verb formation process is selected more often than conversion. This is again consistent with Plag's (1999) notion of what has been termed here the Overt Affixation Preference that pragmatic factors result in a general preference to utilize overt affixation as a more transparent signal of change of meaning, and potentially change of syntactic category, than the non-overt method of conversion.

It may be considered prudent to eliminate the data from the "izer" and "conversioner" subjects; however, further analysis showed that the removal of their data made no difference in terms of any of the statistical results, and the decision was made to keep the results from the "izers" and "conversioner" in.

**3.4.2.2 Other Independent Variables**

Before continuing on to the more central questions involving the semantic factors, the potential influence of the subject and base noun variables will be discussed first. The 29 males in this study responded with 274 *-ize* responses out of a total possible 464 responses, or 59.1%; the 51 females responded with 557 *-ize* responses out of 816, or 68.3%. An independent samples t-test shows that this difference is not significant (t (78) = 0.499; p = 0.6190, n.s., two-tailed). Nor did the results differ according to the particular version the subjects completed (ANOVA (7, 72) F-value = 1.130; p = 0.3540, n.s). Also, the order of presentation of the novel verb choices (e.g., whether the *-ize* verb was presented as the A response on the questionnaire or the B response) was not a significant factor upon the results, whether across all versions (independent samples t-test, t (78) = .031, p = .9755, n.s., two tailed) or for each version (independent samples t-tests, t (78), lowest p-value = 0.2976, n.s.) Thus, none of the subject variables was a significant influence on the responses.

The variables related to the test item base noun are base noun origin (Latinate or Germanic), final consonant of the base noun, and the specific base noun itself. Of the 831 -*ize* responses, 419 were for Latinate base nouns and 412 were for Germanic base nouns. The paired t-test for subjects (t (79) = 0.521, p = 0.6040, n.s.) and the independent samples t-test for items (t (14) = 0.192; p = 0.8507, n.s., two-tailed) both demonstrate that the etymological origin of the test item noun (whether Latinate or Germanic) is not a significant factor on the choice of -*ize* affixation for the subjects in this task. Consistent with the results of the first task, the etymological origin of the base was not found to be the main factor of whether -*ize* is available for affixation or not.

All of the test item noun bases ended in either /l/, /n/, /r/, or /t/ in order to be consistent with existing -*ize* verbs[30]. Figure 3.11 below shows the number of -*ize* responses by the final consonant of the noun base.

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[30] As with Experiment 1, MUSTARD will be considered with the /r/-final group for the purposes of analysis.

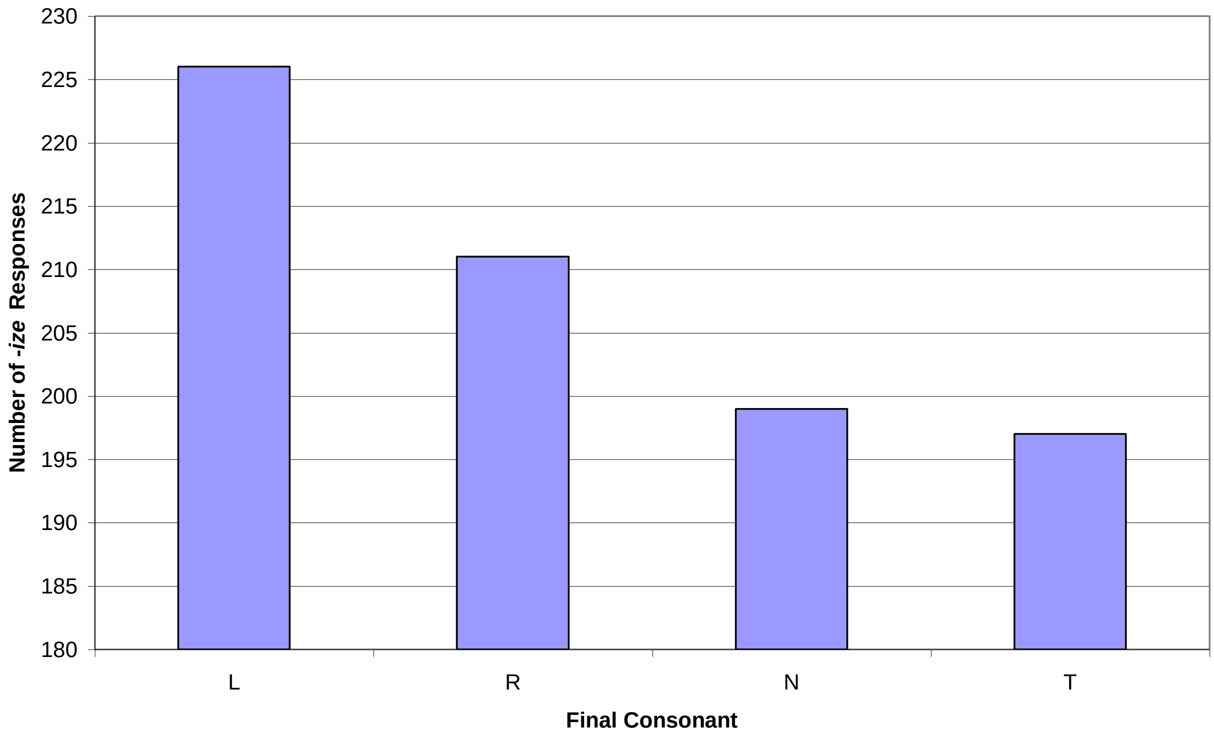


Figure 3.11 Number of Experiment 2 -*ize* responses by final consonant

The difference in final consonant was found to be approaching a trend in the ‘by subject’ analysis, as can be seen in table 3.29, but was not at all significant by items (ANOVA (3,12) F-value = 0.503; p = 0.6870, n.s.)

Table 3.29 Number of Experiment 2 -*ize* responses and subject mean rank by final consonant

| **Final Consonant** | **Number of -*IZE* Responses** | **Subject Mean Rank (Friedman[31] p = .1440, n.s.)** |
|---|---|---|
| L | 226 | 2.750 |
| R | 211 | 2.556 |
| N | 199 | 2.337 |
| T | 197 | 2.356 |

The last test item base noun factor under consideration is the specific base noun itself. Were there any base nouns that seemed to generate significantly more -*ize* responses or significantly more conversion responses? And if so, were these the same test item base nouns that generated significantly more -*ize* or conversion responses in Experiment 1? Table 3.30 below indicates the order of base nouns, from highest number of -*ize* responses to lowest (significant ones provided with Z-scores), and their rank from Experiment 1.

[31] As described in relation to Experiment 1, the Friedman Mean Rank Sum test utilizes ranking of the word formation processes in testing for significance. In this analysis, for each subject, the final consonant with the highest number of -*ize* responses is ranked as 4, the second highest 3, and so on. (The ranking of ties is determined by averaging the relevant rankings in half; for example, if two final consonants both had the same highest number of -*ize* responses, they would each receive the ranking of 3.5, the average of 3 and 4.) From this, it is possible to add up all the subjects' rankings and calculate the mean rank.

Table 3.30 Number of Experiment 2 -*ize* responses by specific base noun

| **Base Noun** | **Origin** | **Number of -*ize* Responses (mean = 51.938; SD = 8.828)** | **Order from Exp. 1 (1=Highest # of -*ize*; 16= Lowest)** | **Order from Exp. 1 (1=Highest # of Conversion; 16= Lowest)** |
|---|---|---|---|---|
| MOUNTAIN | LAT | 68 (Z = 1.82; p = .0344) | 14 | 8-11 |
| TIGER | LAT | 63 | 2 | 16 |
| TONSIL | LAT | 63 | 5-7 | 15 |
| NUGGET | GER | 59 | 12-13 | 12-13 |
| CAMEL | GER | 56 | 3-4 | 8-11 |
| CHAPEL | LAT | 55 | 3-4 | 8-11 |
| WALNUT | GER | 52 | 5-7 | 2 |
| SPIDER | GER | 52 | 12-13 | 12-13 |
| OVEN | GER | 51 | 5-7 | 8-11 |
| PRETZEL | GER | 51 | 8-10 | 4 |
| MUSTARD | LAT | 49 | 1 | 14 |
| FAUCET | LAT | 48 | 15-16 | 1 |
| LOCKER | GER | 47 | 8-10 | 5-7 |
| LINEN | GER | 44 | 8-10 | 5-7 |
| HELMET | LAT | 37 | 11 | 5-7 |
| NAPKIN | LAT | 36 (Z = 1.81; p = .0351) | 15-16 | 3 |

Once again, there is one base noun (MOUNTAIN) that encouraged a significantly high number of -*ize* responses and one base noun (NAPKIN) with a significantly high number of conversion responses (assumed from the significantly low number of -*ize* responses). We can not appeal to final consonant as the explanation as both end in /n/, and it is not due to etymological origin as Latinate nouns are both the highest and lowest in the order. Moreover, these are not the same base nouns that were significant in Experiment 1: in Experiment 1, MUSTARD generated significantly high numbers of -*ize* responses and MOUNTAIN was the fourteenth highest out of

16, but in Experiment 2, MOUNTAIN is first and MUSTARD is the eleventh; in Experiment 1, FAUCET was significantly the highest in conversion responses and NAPKIN was the third highest, but in Experiment 2, NAPKIN is first and FAUCET fifth. As mentioned in the first experiment discussion, it may be simply that it is just the nature of results that there is usually at least one outlier.

**3.4.2.3 Semantic Variables**

The semantic variables of Experiment 2 are the same discussed in Experiment 1: semantic category context; affectedness/degree of change; verb frame. They are discussed below in turn.

To explore the effect of semantic category distribution (RESULTATIVE, ORNATIVE, LOCATIVE, or INSTRUMENTAL) of the novel denominal verb on the choice of an -*ize* or conversion form for that verb, we begin by looking at the raw numbers of -*ize* responses for each of the semantic categories (figure 3.12).

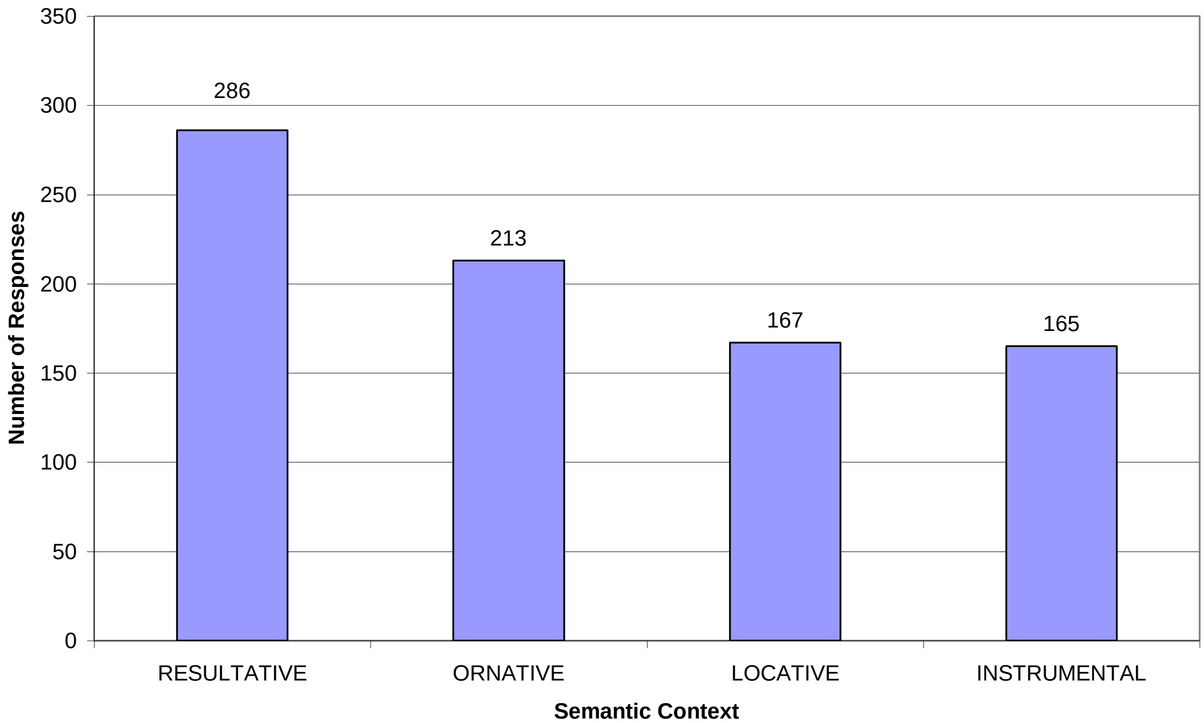


Figure 3.12 Number of Experiment 2 -*ize* responses by semantic context

We see here nearly an identical pattern to that seen for -*ize* responses in Experiment 1: RESULTATIVE contexts promote the greatest number of -*ize* responses, less for ORNATIVE, and even less for LOCATIVE. Where the two patterns differ is that in this study the choice of -*ize* in the INSTRUMENTAL context is slightly less than LOCATIVE; in Experiment 1, INSTRUMENTAL was slightly higher in -*ize* affixation than LOCATIVE. Individually, the semantic categories also differed in the extent of -*ize* selection as compared to chance. The results of both ‘by subject’ and ‘by item’ analyses are given in the table below.

Table 3.31 One-sample t-test results of Experiment 2 -*ize* responses for each semantic category

| **Semantic Category** | **Subject One-Sample t-test (df=79)** | **Item One-Sample t-test (df=15)** |
|---|---|---|
| RESULTATIVE | t = 17.110; p < .0001 | t = 18.445; p < .0001 |
| ORNATIVE | t = 4.935; p < .0001 | t = 4.090; p = .0010 |
| LOCATIVE | t = 0.596; p = .5531, n.s. | t = 0.492; p = .6300, n.s. |
| INSTRUMENTAL | t = 0.407; p = .6848, n.s. | t = 0.429; p = 6741, n.s. |

The RESULTATIVE and ORNATIVE categories promote -*ize* selection in a significant manner, but LOCATIVE and INSTRUMENTAL do not. Another way to interpret these results is that the choice of the -*ize* novel verb over the conversion novel verb was significant when set in a RESULTATIVE and ORNATIVE semantic context, but the two choices are not significantly different when the novel verb is set up to be a LOCATIVE or INSTRUMENTAL verb. As with Experiment 1, because each subject contributed 16 times to the raw counts, the Friedman Mean Rank Sum test is more appropriate when comparing across semantic categories. The mean ranks for subjects and items are shown in figures 3.13 and 3.14 below.

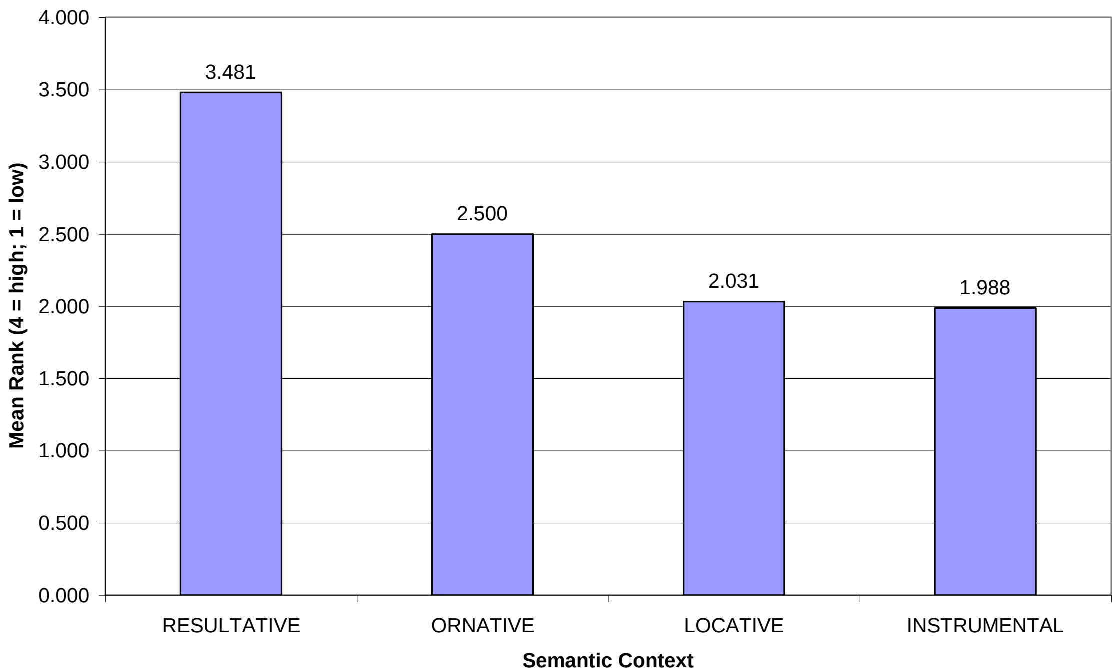


Figure 3.13 Experiment 2 subject mean rank of *-ize* responses by semantic context

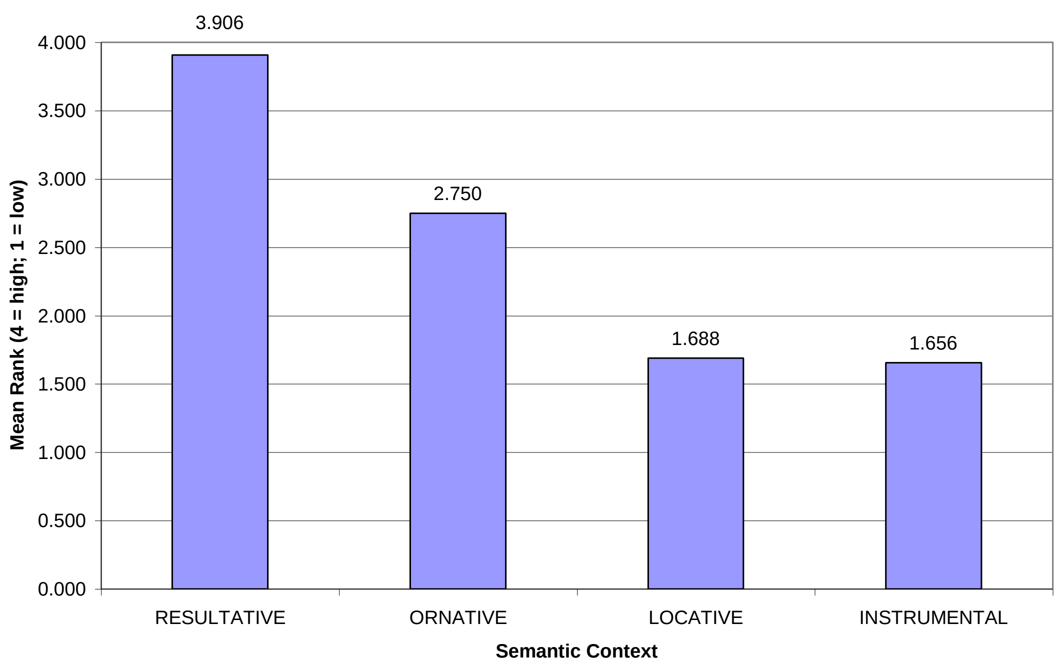


Figure 3.14 Experiment 2 item mean rank of *-ize* responses by semantic context

We see that the pattern for the raw numbers shown in figure 3.12 above is repeated in the mean ranks, and as table 3.32 shows, the results are significant, suggesting that for each subject and each item overall this same order of preferential context for *-ize* verbs was encountered (results for conversion are, of course, the inverse).

Table 3.32 Number and mean ranks of Experiment 2 *-ize* responses by semantic context

| **Semantic Context** | **Number of *-ize* Responses** | **Subject Mean Rank (Friedman p < .0001)** | **Item Mean Rank (Friedman p < .0001)** |
|---|---|---|---|
| RESULTATIVE | 286 | 3.481 | 3.906 |
| ORNATIVE | 213 | 2.500 | 2.750 |
| LOCATIVE | 167 | 2.031 | 1.688 |
| INSTRUMENTAL | 165 | 1.988 | 1.656 |

These results mirror those of Experiment 1: all semantic categories were possible for both *-ize* affixation and conversion, but not all equally probable. What factor or factors influence that probability? The nature of the results for *-ize* selection cannot be accounted for by phonological information, as all noun bases were consistent with phonological restrictions placed upon *-ize* affixation. Also, syntax cannot be appealed to as the syntactic structure for all semantic category contexts was transitive, which is consistent with all the semantic categories chosen as contexts for this task. The very fact that the results vary significantly by semantic category context in the 'by subjects' analysis shows that choices made purely on the Type Frequency Productivity Preference or the Overt Affixation Preference were not the case for most of the subjects; otherwise most of them would have chosen conversion for all sixteen responses or *-ize* for all of their responses. Semantics of the input, i.e., the base noun itself, are of no help as the base noun was held constant across its semantic category contexts. Semantics of the output, i.e., the novel verb to be interpreted, is the next logical place to look for an explanation for the nature of the data. The distribution of the experimental results closely matches the distribution of the CELEX subset of the English denominal verb corpus study, although again, the match fails to achieve statistical significance (Spearman $r = 0.800$; $Z = 1.386$, $p = 0.1659$). Still, this result is consistent with the hypothesis that the distribution of semantic categories for a denominal verb formation process is information native speakers are sensitive to and use when forming novel denominal verbs. Moreover, whether conversion is following its own semantic category distribution or is behaving as a default, conversion is predicted to have been preferred in the LOCATIVE and INSTRUMENTAL contexts, but in fact, *-ize* was still selected just over 50% of the time for both categories. This result points once more to the influence of the Overt Affixation Preference upon the greater probability of application of an overt affix, *-ize*, as compared to conversion, regardless of semantic category.

Turning once again to the semantic factor of affectedness/degree of change, it will be remembered that each of the semantic categories was represented by two different types: one that described an event in which the direct object was greatly affected or changed and another that described an event in which the direct object was not at all or only very slightly affected or changed. It may be recalled from the discussion of the first experiment that there did not seem to be any sort of significant influence of this factor on the pattern of results. However, with the forced-choice nature of this task, the potential influence of affectedness/degree of change might become more evident, and the results below suggest that it has.

In CHANGE contexts, the number of -*ize* verbs selected was 432; in NO CHANGE, the number of -*ize* responses was 399. This difference is significant for subjects (paired t-test; t (79) = 2.383, p = 0.0196) and nearing a trend for items (paired t-test; t (15) = 1.550, p = .1420). These results may be further teased apart by looking at each context individually, as shown in table 3.33.

Table 3.33 Experiment 2 results of change/no change contexts by semantic context

| **Semantic Context** | **Number of -*ize* Responses in Change Context** | **Number of -*ize* Responses in No Change Context** | **Subjects Paired t-test (79 df)** | **Items Paired t-test (15df)** |
|---|---|---|---|---|
| RESULTATIVE | 144 | 142 | t-value = .445; p = .6576, n.s. | t-value = .307; p = .7630, n.s. |
| ORNATIVE | 118 | 95 | t-value = 3.356; p = .0012 | t-value - 2.144; p = .0489 |
| LOCATIVE | 88 | 79 | t-value = 1.155; p = .2517, n.s. | t-value - 1.027; p = .3205, n.s. |
| INSTRUMENTAL | 82 | 83 | t-value = -.132; p = .8956, n.s. | t-value = -.068; p = .9464, n.s. |

Although the pattern of preferred -*ize* use in CHANGE contexts is minimally displayed in terms of raw numbers for RESULTATIVE and LOCATIVE, it is really the ORNATIVE semantic context that is driving the significant results. Why this should be so is not exactly clear; however, it does suggest that the factor of affectedness needs further exploration in terms of an influence upon the probability of application of particular denominal verb formation processes.

Lastly, as to the semantic factor of ACCOMPLISHMENT vs. ACTIVITY verb frame, in this task, half of the scenarios included phrases that would indicate the novel verb is an ACCOMPLISHMENT verb and the other half included phrases that would indicate the novel verb is an ACTIVITY. All RESULTATIVE and ORNATIVE contexts were set in ACCOMPLISHMENT verb frames and all LOCATIVE and INSTRUMENTAL contexts were set in ACTIVITY verb frames. The number of *-ize* responses according to verb frame and the relevant paired t-tests are shown in table 3.34.

Table 3.34 Number of Experiment 2 *-ize* responses by verb frame

| **Number of *-ize* Responses in Accomplishment frame** | **Number of *-ize* Responses in Activity frame** | **Subjects paired t-test (79df)** | **Items paired t-test (15df)** |
|---|---|---|---|
| 449 | 332 | t-value = 8.531; $p < .0001$ | t-value = 7.727; $p < .0001$ |

It should be remembered that Rosenberg (1995) has suggested that all *-ize* verbs are accomplishments and all conversion verbs are activities, what has been called here the Verb Aspect Constraint. If the Verb Aspect Constraint is in operation here, it follows that subjects would prefer to choose novel *-ize* verbs set in an accomplishment verb frame and novel conversion verbs set in an activity frame. The results of the t-tests above show that the differences according to verb frame are indeed highly significant, and at the outset, this appears to be evidence for the Verb Aspect Constraint. However, closer analysis reveals that this result is an artifact of other factors, namely semantic category and affectedness/degree of change. Although the contexts placed in an accomplishment verb frame (i.e., the RESULTATIVE and ORNATIVE contexts) yield an *-ize* percentage significantly greater than chance while the contexts placed in an activity verb frame (i.e., the LOCATIVE and INSTRUMENTAL contexts) do not, the RESULTATIVE and ORNATIVE contexts differed significantly from each other (RESULTATIVE contexts much more likely to evoke *-ize* selection than the ORNATIVE contexts). Furthermore, as we ended with in the previous section, one of the accomplishment contexts, ORNATIVE-NO CHANGE, is significantly different from its sister context ORNATIVE-CHANGE. If the Verb Aspect Constraint is correct, then we would not expect such non-uniform behavior in this group since they are all accomplishments.

Examining all of the contexts together tells us even more of the story. Figure 3.15 shows the raw numbers for each of the semantic contexts' subdivisions side by side.

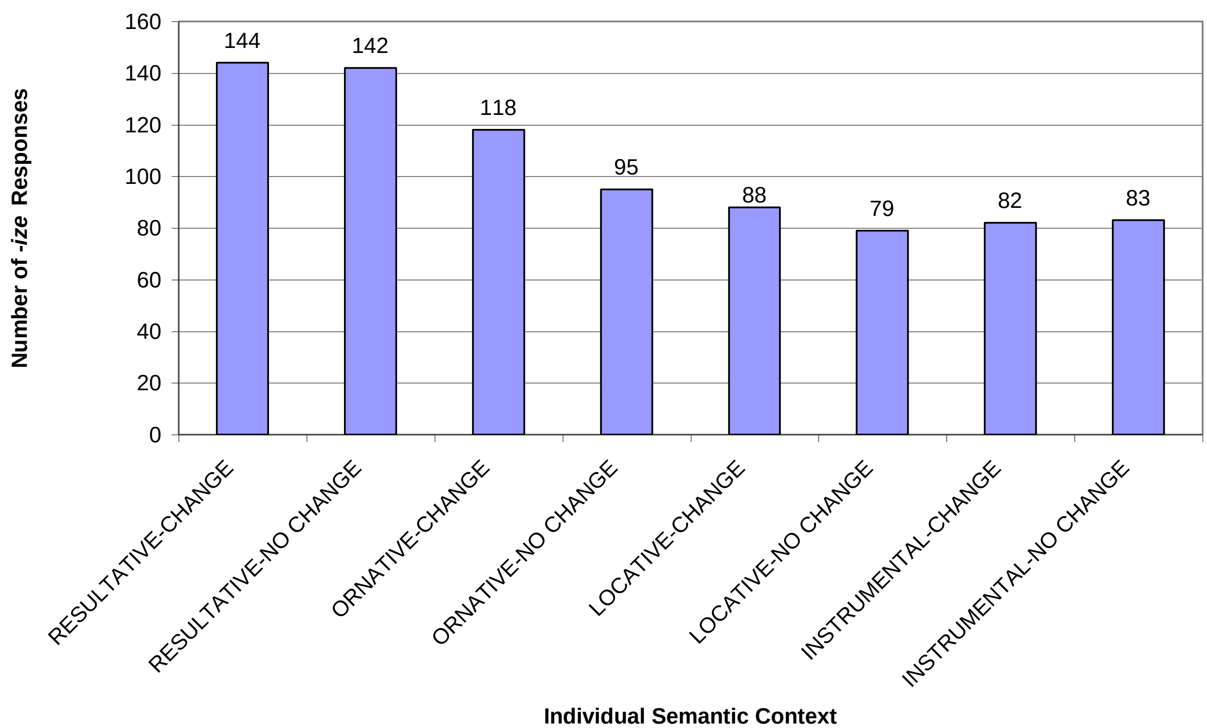


Figure 3.15 Number of Experiment 2 *-ize* responses by individual semantic context

A series of paired t-test (please see table 3.35) shows that, not surprisingly, the RESULTATIVE contexts are not significantly different from each other, but both of them are significantly different from ORNATIVE-CHANGE (and therefore the other contexts as well).

Table 3.35 Experiment 2 paired t-test results comparing individual semantic contexts

| **Semantic Contexts Under Comparison** | **Subjects paired t-tests (79df)** | **Items paired t-tests (15df)** |
|---|---|---|
| RESULTATIVE-CHANGE vs. RESULTATIVE-NO CHANGE | t-value = .445; p = .6576, n.s. | t-value = .307; p = .7630, n.s. |
| RESULTATIVE-CHANGE vs. ORNATIVE-CHANGE | t-value = 4.753; p < .0001 | t-value = 3.372; p = .0042 |
| RESULTATIVE-NO CHANGE vs. ORNATIVE-CHANGE | t-value = 4.043; p = .0001 | t-value = 3.162; p = .0064 |
| ORNATIVE-CHANGE vs. ORNATIVE-NO CHANGE | t-value = 3.356; p = .0012 | t-value = 2.144; p = .0489 |
| ORNATIVE-NO CHANGE vs. LOCATIVE- CHANGE | t-value = .841; p = .4028, n.s. | t-value = .740; p = .4709, n.s. |
| ORNATIVE-NO CHANGE vs. LOCATIVE-NO CHANGE | t-value = 1.975; p = .0517, n.s. | t-value = 1.380; p = .1878, n.s. |
| ORNATIVE-NO CHANGE vs. INSTRUMENTAL- CHANGE | t-value = 1.580; p = .1182, n.s. | t-value = 1.593; p = .1320, n.s. |
| ORNATIVE-NO CHANGE vs. INSTRUMENTAL-NO CHANGE | t-value = 1.444; p = .1527, n.s. | t-value = .978; p = .3433, n.s. |

ORNATIVE-CHANGE, as we have already seen, is significantly higher in number of -*ize* responses than ORNATIVE-NO CHANGE (and therefore the rest of the contexts). What is key here is that the number of -*ize* responses in the ORNATIVE-NO CHANGE context is not significantly different from the rest of the contexts: LOCATIVE-CHANGE, LOCATIVE-NO CHANGE, INSTRUMENTAL-CHANGE, and INSTRUMENTAL-NO CHANGE (none of which, as suspected from the raw number count, is significantly different from each other.) In other words, ORNATIVE-NO CHANGE patterned like the activity contexts, and not like the other accomplishment contexts. This is, in fact, contrary to the Verb Aspect Constraint.

Thus, of the semantic factors, the results of Experiment 2 suggest that the Semantic Category Distribution Effect and the Overt Affixation Preference, and at least for the ORNATIVE contexts, affectedness/degree of change all influence the probability of -*ize* application when forming novel denominal verbs in English.

### 3.4.3 Experiment 2 Summary

The results of the forced-choice design of Experiment 2, as with those of the open-ended response design of Experiment 1, demonstrate that novel -*ize* and conversion denominal verbs may be realized with all four semantic category interpretations. However, the application of these two processes is not equivalent across all semantic categories. When the novel verb is to be RESULTATIVE or ORNATIVE, -*ize* affixation is significantly more likely to be used. However, when the novel verb is set up within a LOCATIVE or ORNATIVE context, the two denominal verb processes are true competitors, each being selected around half of the time. The greater preference of -*ize* use in the RESULTATIVE and ORNATIVE contexts as compared to the LOCATIVE and INSTRUMENTAL contexts is entirely consistent with the semantic category distribution of its existing forms as identified by the CELEX subset. And the higher than expected use of -*ize* with the LOCATIVE and INSTRUMENTAL categories as compared to conversion suggests the influence of the Overt Affixation Preference, the pragmatically-driven preference to provide a clearer signal of use as a denominal verb. Lastly, one other semantic factor is suggested in the results, that of affectedness or degree of change upon the novel denominal verb’s internal argument, at least for novel verbs set within an ORNATIVE context.

Further, more focused study of the potential effect of this factor will elucidate whether this is an influence solely upon ORNATIVE verbs, solely upon *-ize* verbs, or both.

## 3.5 General Discussion

Extending Clark and Clark (1979) to processes other than conversion, it is claimed here that native speakers will choose the word formation process that they feel is most likely to lead to successful interpretation by the interlocutor of the speaker's intended meaning. Already identified as crucial elements in morphological competence are phonological information and syntactic information. In order to further identify certain semantic, pragmatic, and extralinguistic factors, these factors must be isolated from the known factors. Therefore, all noun bases used in the experiments displayed similar phonological characteristics, so the phonological factor could be neutralized. Also, transitive sentence structure and the limitation of the test items to promoting RESULATIVE, ORNATIVE, LOCATIVE, and INSTRUMENTAL semantics eliminated the potential for syntactic preference information to interfere with the results. Also, using the same noun base across all semantic category contexts defuses the potential contribution of the semantics of the base noun itself. Greatly reducing the potential effects of these factors allows for more acute perception of the influence of other factors and allow the four questions which began this chapter, repeated below, to be addressed.

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Q3. What factors condition that probability?

Q4. What is the nature of the interaction between the verb formation processes?

The experiments described here have addressed all four of these questions by asking subjects to produce novel denominal verbs of different semantic categories: RESULTATIVE, ORNATIVE, LOCATIVE and INSTRUMENTAL. Experiment 1 was designed to elicit any response the subjects felt most appropriate for the scenario given, while Experiment 2 was a forced-choice design, which offered the subjects two options, a novel *-ize* verb or a novel conversion verb. The results have shown that when forming novel denominal verbs in English, all denominal verb formation processes are possible for all four of the semantic categories, RESULTATIVE, ORNATIVE, LOCATIVE, and INSTRUMENTAL. However, their application within these semantic categories has not been found to be equally likely. The experimental results demonstrate that native speaker subjects much preferred *-ize* and *-ify* affixation when forming novel verbs that were to be interpreted as RESULTATIVE or ORNATIVE. Affixation with *eN-* was much more likely when the context set up a LOCATIVE verb. As for novel verbs with an INSTRUMENTAL interpretation, both *-ize* and conversion were strong competitors. What factor or factors are found to influence the likelihood of a particular process applying when the verb is of a particular semantic category? Four different factors have been indentified which affect the probability of a denominal verb formation process applying to a particular semantic category: the Semantic Category Distribution Effect; the interaction between processes; the Overt Affixation Preference; and the Type Frequency Productivity Preference.

Evidence for the Semantic Category Distribution Effect was found in the results that showed that subjects' preferences differed according to semantic category context in a manner analogous to the distribution of these same semantic categories among existing denominal verbs derived by the respective word formation processes. Most of the existing denominal -*ify* and -*ize* verbs in English are found with RESULTATIVE and ORNATIVE interpretations, and likewise, subjects used -*ify* and -*ize* significantly more often when the novel verb called for RESULTATIVE and ORNATIVE semantics. Most of the existing *eN*- denominal verbs have LOCATIVE meanings, and subjects in Experiment 1 chose *eN*- affixation for LOCATIVE contexts significantly more than any other.

Evidence of the interaction among the processes is exhibited by the experimental results related to conversion and -*ate* affixation. In both Experiment 1 and Experiment 2, conversion displayed a pattern that was the converse of -*ize*, leading to the notion that the use of conversion depends not upon its own distribution, but upon that of the other word formation processes; in other words, conversion currently maintains the status of default in English denominal verb formation. Also, -*ate* affixation, despite the greatest number distribution of RESULTATIVE meanings among its existing verb distribution, was used least of all in the RESULTATIVE context, and it has been proposed here that -*ize* and -*ify* were so preferred for this context that -*ate* did not stand a chance. Taken altogether, these results suggest that calculations regarding semantic category distributions are performed across all of the word formation processes before a final decision is made when creating a new verb from a noun.

As to the Overt Affixation Preference, the results demonstrated that in these tasks -*ize* appears to be much more productive than conversion. In general, conversion is a much more productive process in English than *-ize* affixation; however, it is important to keep in mind that three-fourths of the test items are of a semantic type consistent with *-ize*. Still, this result is consistent with ideas of Clark and Clark (1979) and Plag (1999). In Clark and Clark (1979), conversion is possible with any meaning whenever the circumstances are such that the speaker has good reason to believe the listener will be able to correctly interpret his or her use of the verb. This idea may be extended to be consistent with Plag (1999) in terms of overt affixation: if the speaker believes the interlocutor will better grasp his or her meaning with an overt affix than with conversion, the speaker will use the overt affix. Thus, when it comes to verb formation process competition, conversion may lose out to overt affixation, precisely because it is overt and therefore a more obvious signal of the speaker's intention.

The Type Frequency Productivity Preference was also found to influence the results. In Experiment 1, the two processes with the highest type frequency in English overall, conversion and *-ize* affixation, were used more than all the other verb formation processes combined. This Preference also interacts with the Overt Affixation Preference in that not all overt affixes are preferred; it is the overt affix with the highest type frequency, *-ize*, that is particularly preferred.

The results of the experiments described in this chapter also speak to a number of other potential factors or hypotheses discussed in previous literature. One such factor that has been claimed to affect denominal verb formation is the Latinate Constraint, i.e. certain affixes select for Latinate bases only. Fabb (1988) claims that *-ize*, *-ify*, and *-ate* attach only to Latinate bases, and indeed most (but not all) of the verbs with these affixes are Latinate in origin. If this information is part of native speaker competence in verb formation, the expectation would be that in the experimental tasks, if a subject chooses one of these affixes to form the novel verb, s/he would only do so if the test item base noun is Latinate. However, the results from both studies clearly show that, contradictory to the Latinate Constraint, native speakers are not making use of etymological information to any significant extent when forming or interpreting novel denominal verbs in English. The subjects in both studies seemed to disregard this information, or be entirely unaware of it, when creating denominal verbs or when choosing between a novel *-ize* verb form and a novel conversion verb form.

Another constraint that has been proposed as important to verbal derivation is what has been referred to here as the Verb Aspect Constraint, essentially that *-ize* and *-ify* form accomplishment verbs and conversion forms activity verbs (Rosenberg 1995). Although the results above on this dimension were significant, looking at the data carefully, it became clear that the determining factor is not so much ACCOMPLISHMENT vs. ACTIVITY as it is RESULTATIVE vs. INSTRUMENTAL; the ORNATIVE items were set in an ACCOMPLISHMENT frame and the LOCATIVE items were set in an ACTIVITY frame, and they are nearly indistinguishable in terms of preference for both raw numbers and mean ranks. Also, that conversion was ranked third in the RESULTATIVE context is contradictory to the notion that conversion does not form accomplishment verbs. Conversely, inconsistent with the claims that *-ize* verbs are dispreferred in an activity setting, in fact, subjects were just as willing to use *-ize* affixation for ACTIVITY verbs as they were to use conversion and *-ize* affixation was ranked even higher than conversion in the LOCATIVE context. Also, the results show that subjects did not find all of the individual

ACCOMPLISHMENT contexts to be uniformly appealing for affixation with -*ize*; RESULTATIVE was a much more preferred context than ORNATIVE, and within the ORNATIVE contexts, ORNATIVE-CHANGE was much more preferred than ORNATIVE-NO CHANGE. In fact, in terms of -*ize* responses, ORNATIVE-NO CHANGE, despite its being set in ACCOMPLISHMENT verb frames, patterned like the ACTIVITY contexts of LOCATIVE and INSTRUMENTAL, and significantly unlike the other three ACCOMPLISHMENT contexts. This suggests that although verb frame may play some role in denominal verb formation decisions, it does not appear to be a central factor for -*ize* and conversion, the two most productive denominal verb processes.

One hypothesis these results address relates specifically to -*ize* and -*ify*. Both Plag (1999) and Lieber (2004) have claimed that -*ize* and -*ify* have an identical lexical conceptual structure. The results relating to -*ize* and -*ify* varied enough in terms of semantic variables to call into question this hypothesis. Nor was it the case that the -*ify* results were analogous to the pattern of -*ize* responses only to a smaller degree, which would be consistent with -*ify*'s lower productivity. Moreover, -*ize* and -*ify* were selected significantly less often in LOCATIVE contexts than in RESULTATIVE and ORNATIVE contexts, which suggests that the LOCATIVE interpretation does not share equal status with the other two, again not a prediction that follows from the hypothesis following from Plag and Lieber. Also, the lexical conceptual structure proposed for -*ify* and -*ize* does not include the possibility of an INSTRUMENTAL interpretation (Plag 1999, Lieber 2004). Although -*ify* was not at all preferred for INSTRUMENTAL contexts, -*ize* was used even more often than conversion and with enough subjects to cause *-ize* to have a higher subject mean rank than conversion in this context. These results suggest that the conception of *-ize* in the mental lexicon needs to be modified to include INSTRUMENTAL as a potential reading of *-ize* verbs. Thus, the notion that *-ify* and *-ize* alone share the identical lexical conceptual structure is not supported by the data here. However, the fact that all four processes were available for all four semantic category interpretations in the experimental tasks does support the proposal made in chapter 2 that all the denominal verb formation processes share a common semantic skeleton, repeated as (4) below:

(4) CAUSE [x BE y LOC z]

To reiterate what was described in chapter 2, in this structure, the verb has three arguments x, y, and z and makes use of the semantic primitives CAUSE, BE, and LOC. CAUSE is a primitive that represents the causative, creative, or performative relationship; BE indicates the state of being or becoming; LOC indicates a location relation between two arguments. How different denominal verbs receive their particular semantic interpretations depends upon which argument, x, y or z, is filled by the noun base, which instantiation of LOC (LOC-TO or LOC-FROM) is utilized, and the extent to which the LCS is fully expressed. If this proposed structure is correct, what then makes them intuitively feel as if they had different underlying semantics? Returning to the central hypothesis of this dissertation, this "feeling" has to do with the variable associations developed from the Semantic Category Distribution Effect.

The results of the experimental tasks speak to one more hypothesis brought out by Lieber (2004), namely that *-ify* and *-ize* verbs set in an ORNATIVE context should be less preferred than those set in the core, 'goal-oriented' contexts of RESULTATIVE and LOCATIVE. The results of the experiments did not support this claim. Although ORNATIVE contexts were indeed less preferred for *-ize* verb selection than for RESULTATIVE contexts, RESULTATIVE and ORNATIVE contexts were equally preferred for *-ify* verb selection. Also, not only were LOCATIVE contexts less likely to promote *-ize* use and selection than RESULTATIVE contexts, but they were also less likely to promote *-ize* use and selection than ORNATIVE contexts as well, a prediction not at all consistent with Lieber's (2004) claim. However, it is possible to appeal to an explanation based upon the semantic structure to account for the less frequent appearance of LOCATIVE meanings across most of the denominal verb formation processes. According to the semantic skeleton proposed in (4) above, a LOCATIVE interpretation is achieved when the noun base is the z argument, as in (5):

(5) CAUSE [$x_i$ BE $y_i$ LOC-TO [noun base]]

Realizations with the base noun as the topmost argument is more preferred for denominal verbs overall, and LOCATIVES do not result in the noun base as the topmost (x) argument or even the second topmost (y) argument, thus there are fewer of them overall to become semantically associated with in general.

Just as with the results of the corpus analysis, the experimental results can be placed within the larger scope of the nature of denominal verb formation processes. Certainly, the Semantic Category Distribution Effect as it relates to the experiments suggests that subjects are indeed sensitive to the distribution of existing forms among the semantic categories and use this information when creating novel denominal verbs. Also, the role of pragmatics is also highlighted in the experiments; by use of overt affixes, it may be assumed that the native speaker believes that s/he will be more successful with a more obvious signal of semantic/syntactic category change when using a novel verb. And, the type of interaction as evidenced by the results suggests that the denominal verb formation processes are always in competition, and so once again, the experimental results point to a mental lexicon that monitors, among others, type frequency information as it relates to semantic category distribution of not just each individual process but of all denominal verb processes and how they interrelate. The data here are, therefore, most consistent with a very dynamic and interactive mental lexicon.

# 4. Conclusion

The more general concern of this dissertation has been what kinds of information native speakers make use of when successfully creating and interpreting denominal verbs in English. To that end, chapter 1 began with a review of the literature that addresses this question from several perspectives: morphophonological; syntactic; lexical-semantic; and pragmatic. The specific contribution this dissertation seeks to make is mainly from the lexical-semantic perspective. Through analyses of a corpus study and experimental data, the following hypotheses have been proposed:

1. All denominal verb processes in English share the same underlying semantic structure and this structure partially dictates the general pattern of type frequency distribution of the semantic categories;
2. The Semantic Category Distribution Effect, native speaker sensitivity to the semantic category type frequency distribution of existing lexical items influences the probability of application of a given denominal verb process when creating a novel denominal verb from a particular semantic category, and thus this Effect is responsible for the exact shape of the semantic category distributions; and,
3. When native speakers create a novel denominal verb, all processes are in competition, and this type of interaction can override the Semantic Category Distribution Effect and change the distributions over time.

What follows is a review of the evidence presented in the previous chapters in support of these hypotheses. Also, the implications of the research here upon the nature of the competition between word formation processes, the nature of word formation processes in general, and the nature of the mental lexicon are explored. Finally, several directions for further study are suggested.

### 4.1 Shared Underlying Semantic Structure

The hypothesis that all denominal verb formation processes share the same underlying semantic structure follows from the response to two of the questions posed of the data:

Q1. What is possible when forming denominal verbs in English?

Q2. What is probable when forming denominal verbs in English?

Analysis of the data from the corpus study described in chapter 2 reveal that all of the major semantic categories (i.e., RESULTATIVE, ORNATIVE, LOCATIVE, INSTRUMENTAL, SIMILATIVE, PERFORMATIVE, and PRIVATIVE) have been represented over time by each overt affix and conversion (please refer to table 2.12 in chapter 2). Consistent with these corpus study results, Experiment 1 on the production of novel denominal verbs discussed in chapter 3 also shows native speakers' willingness to use each process[32] in each semantic category context given (table 4.1).

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[32] *be-* is considered to be no longer productive in today's English, so the process of *be-* affixation was not expected to be used at all; however, in fact, one subject did supply *bespider* in an ORNATIVE context.

Table 4.1 Examples of Experiment 1 subject responses for each denominal verb formation process in each semantic category context

| **Denominal verb formation process** | **Resultative** | **Ornative** | **Locative** | **Instrumental** |
|---|---|---|---|---|
| *en-* | *enspider* | *enpretzel* | *enmustard* | *enmountain* |
| *-ate* | *ovenate* | *linenate* | *napkinate* | *lockerate* |
| *-ify* | *napkinify* | *nuggify* | *mountainify* | *faucify* |
| *-ize* | *walnutize* | *chapelize* | *faucetize* | *helmetize* |
| conversion | *nugget* | *spider* | *linen* | *walnut* |

Thus, following the intuition of Plag (1999) and Lieber (2004) regarding -*ify* and -*ize* affixation, if these processes cover exactly the same semantic domains, it is feasible that they share the same underlying semantic structure. It is proposed here that the shared semantic structure can be represented by the following lexical conceptual structure (LCS):

(1) CAUSE [x BE y LOC z]

The interpretation as any one of the different semantic categories is due to the surface manifestation of this structure, coupled with real world knowledge. In general, the semantic categories are realized with the structures as shown in table 2.21 in chapter 2, repeated here as table 4.2.

Table 4.2 Proposed lexical conceptual structures of semantic categories

| **Semantic Category** | **Lexical Conceptual Structure** |
|---|---|
| RESULTATIVE | CAUSE [x BE [noun base] LOC-TO z] |
| SIMILATIVE | BE [noun base] LOC-TO z |
| PERFORMATIVE | CAUSE [[noun base]] |
| ORNATIVE | CAUSE [[noun base]$_i$ BE $y_i$ LOC-TO z] |
| LOCATIVE | CAUSE [$x_i$ BE $y_i$ LOC-TO [noun base]] |
| PRIVATIVE | CAUSE [[noun base]$_i$ BE $y_i$ LOC-FROM z] |
| ABLATIVE | CAUSE [$x_i$ BE $y_i$ LOC-FROM [noun base]] |

However, the analysis of the corpus study data have shown that not all semantic categories are equally probable for all denominal verb formation processes. The corpus study data shows that general pattern in terms of type frequency is ORNATIVE and RESULTATIVE usually first, followed by PERFORMATIVE, SIMILATIVE, and LOCATIVE, with PRIVATIVE and ABLATIVE the least represented overall. Following the rationale used by Lieber (2004) in her analysis of the semantic structure of *-ize* and *-ify* to account for the relative productivity of the semantic categories, the underlying semantic structure of denominal verb formation has been examined as a potential source of the pattern. It has been hypothesized in this dissertation that there is a set of properties that leads to a prototype, in a sense, of what a “good” denominal verb in English is. These three properties are the use of an LOC-TO instantiation of the location relation, the noun base as the topmost (x) argument, and full expression of the structure. The extent to which the interpretation of the denominal verb encompasses these three properties predicts the observed general order of preference for the different surface structures: ORNATIVE and RESULTATIVE most preferred for denominal verb interpretations, PRIVATIVE and ABLATIVE least preferred, and LOCATIVE, PERFORMATIVE, and SIMILATIVE in between.

However, there is enough variation in the semantic category distributions of each denominal verb formation process such that one must conclude that the semantic structure is only partially responsible for the exact shape of the distributions. This observation, then, leads to the next question: what factor or factors condition the probability of a denominal verb formation process being used for a particular semantic category? And the response to this question leads to the second hypothesis listed above, the Semantic Category Distribution Effect Hypothesis, discussed immediately below.

## 4.2 Semantic Category Distribution Effect

The previous section reviews the results that suggest that the denominal verb formation processes of English are not as distinct in their <u>possible</u> semantic domains as has been previously thought, and thus an underlying semantic structure is hypothesized to be shared by all denominal verb formation processes. However, in both the corpus study and the experiments, the distributions among the semantic categories were not equal, leading to the conclusion that the denominal verb formation processes may instead be distinct in terms of their <u>probable</u> semantic domains. The proposed shared semantic structure is able to account for a general pattern of semantic category distribution; however, the data show that this structure alone cannot account for the specific shape of the distributions of the individual processes. Therefore, the question that must be posed is:

Q3. What, in addition to the semantic structure, determines which verb formation processes are more probable for which semantic categories?

The response to this question has been proposed to be the Semantic Category Distribution Effect. This hypothesis claims that native speakers of English are sensitive to information regarding the current type frequency distribution of semantic categories within particular denominal verb formation processes, and they make use of this information when making decisions about which process to apply in creating and interpreting a novel denominal verb. As a consequence, it is this Effect that makes a substantial contribution in determining which denominal verb formation processes are more probable for which semantic categories.

Evidence for the Semantic Category Distribution Effect has been found with both the corpus study data discussed in chapter 2 and the experimental data discussed in chapter 3.

The corpus study data provide indirect evidence for this sensitivity to and use of type frequency distributional information in the formation of denominal verbs. The results of the corpus study demonstrate that for each of the denominal verb formation processes the correlation between the existing forms and the newly created forms of each time period is significant or close to significant (table 4.3 below).

Table 4.3 Significance levels of Spearman Rank Correlation statistic comparing semantic distributions of existing and newly created forms for each process by time period

| **Time Period** | ***eN-*** | ***-ify*** | ***-ate*** | ***-ize*** | **conversion** |
|---|---|---|---|---|---|
| Early Borrowing (1250-1529) | $p = 0.052$ | $p = 0.077$ | $p = 0.044$ | *$p = 0.213$* | $p = 0.054$ |
| First Peak (1530-1679) | $p = 0.049$ | $p = 0.047$ | $p = 0.032$ | *$p = 0.137$* | $p = 0.044$ |
| Lull (1680-1789) | $p = 0.032$ | $p = 0.030$ | $p = 0.060$ | $p = 0.019$ | $p = 0.054$ |
| Second Peak (1790-1899) | $p = 0.026$ | $p = 0.030$ | $p = 0.042$ | $p = 0.038$ | *$p = 0.131$* |
| 20th Century (1900-1999) | $p = 0.049$ | $p < 0.001$ | $p = 0.057$ | $p = 0.097$ | *$p = 0.726$* |

[significance levels above $p < 0.100$ are italicized]

The significant correlations between the semantic category distribution of the existing forms and the semantic category distribution of the newly created forms across time suggest that the distributions of existing forms influence the distributions of newly created forms, with the further implication that native English speakers have been sensitive to this Semantic Category Distribution Effect and have made use of this information when making decisions regarding which verb formation process to use for which semantic category.

More direct evidence for the Semantic Category Distribution Effect is provided by the experiments on novel denominal verb formation. It will be remembered from chapter 3 that in Experiment 1, subjects were asked to supply a novel denominal verb appropriate for a scenario promoting a particular semantic category interpretation. Subjects' responses for a given denominal verb formation process (e.g. *-ize*) consistently and significantly differed according to the semantics the novel verb was intended to convey (i.e., RESULTATIVE, ORNATIVE, LOCATIVE, or INSTRUMENTAL). Moreover, the choice of denominal verb formation process

(-*ize*, conversion, -*ify*, etc.) differed significantly according to the semantics of the novel verb (e.g. RESULTATIVE). Most noteworthy is the similarity between the order of the semantic categories in terms of frequency of selection of a given denominal verb formation process in the experimental task and the order of the respective semantic categories in terms of type frequency for the same denominal verb formation process as identified by the CELEX subset of the corpus study, particularly for the cases of -*ize*, -*ify*, and *eN*- affixation, where the CELEX subset distribution shows definite peaks in the type frequencies of certain semantic categories. What these results indicate is that native speaker subjects use denominal verb formation processes differentially according to the intended semantic category interpretation, and that their selections are not random. They are, in fact, quite consistent with the semantic category distributions of the existing denominal verbs formed by the respective processes. This outcome, then, is seen as more direct support for native speaker sensitivity to and use of the Semantic Category Distribution Effect when creating novel denominal verbs.

The results of Experiment 2 also provide evidence in support of the Semantic Category Distribution Effect Hypothesis. As described in chapter 3, and similar to Experiment 1, subjects who participated in Experiment 2 were asked to select between two novel denominal verb choices, one a result of -*ize* affixation and the other the result of conversion, to fill in the blank of given scenarios. The scenarios differed in terms of the semantic category of the novel verb to be created, whether RESULTATIVE, ORNATIVE, LOCATIVE, or INSTRUMENTAL. The focus upon -*ize* and conversion was intended to clarify the factors involved in the interpretation of these two denominal verb formation processes without the potential interference of other, less productive forms, e.g. those formed with -*ify*, -*ate*, or *eN*-. Once again, the results showed that novel -*ize* forms are selected significantly more often than conversion for the semantic categories where existing -*ize* forms display the greatest type frequency, RESULTATIVE and ORNATIVE, and for RESULTATIVE interpretations significantly more often than ORNATIVE interpretations. For LOCATIVE and INSTRUMENTAL, where attested -*ize* forms exist but are not nearly as numerous, the choice between the novel -*ize* and conversion forms is not significantly different than chance. And, as with Experiment 1, the semantic category distribution of the -*ize* results in Experiment 2 is also quite similar to the semantic category distribution of existing -*ize* forms in the CELEX subset, providing further support for the Semantic Category Distribution Effect Hypothesis.

What both the corpus study and experiments demonstrate is that while all of the denominal verb formation processes in English are possible for all semantic category interpretations, they are not all equally probable, and the results suggest that a significant factor in dictating the probability of use of a particular denominal verb formation process is the Semantic Category Distribution Effect, the influence of the type frequency of existing forms within each semantic category in relation to each other and to other potential verb formation process competitors.

However, the sensitivity to and use of semantic category distribution information alone cannot account for all of the data. For one thing, if the semantic structure and Semantic Category Distribution Effect were the entire story, then there would be no expectation of change in the distributions over time. However, as the corpus study data has shown, distributions, and consequently associations, have indeed changed over time. What accounts for this phenomenon? Also, the experimental data discussed in chapter 2 found that the results did not reach levels of significance for all of the comparisons, despite the consistency among subjects and items. What additional factor is dictating these sorts of results? It has been hypothesized here that the answer to both questions lies in the nature of the competition among the denominal verb formation processes, to which the discussion now turns.

### 4.3 Competition among Denominal Verb Formation Processes

The last question posed of both the corpus study data and the experimental data is (Q4) below:

Q4. What is the nature of the interaction between the verb formation processes?

The response to this question is third hypothesis listed at the beginning of this chapter: constant competition between the denominal verb formation processes. This factor, in addition to the nature of the semantic structure and the Semantic Category Distribution Effect, contributes to the probability of a given verb formation process being used in the successful creation and/or interpretation of denominal verbs of a given semantic category.

The corpus study data discussed in chapter 2 has shown that the semantic category distribution of one denominal verb formation process simply cannot be divorced from the distributions of the other processes. From the entry of the French affixed forms into English, the denominal verb formation processes have displayed competition. The entry of *-ify* into English, for example, was very heavily skewed in terms of RESULTATIVE interpretations for the denominal verbs, and consistent with the Semantic Category Distribution Effect, the newly created *-ify* forms were also strongly represented by RESULTATIVE denominal verbs. However, the phonological constraints upon *-ify* limited the noun bases to monosyllables, iambs, and truncated stems. Conversion and *eN-* were used to form RESULTATIVE denominal verbs from the noun bases inappropriate for *-ify*, but these two processes were also heavily competing with each other for the ORNATIVE denominal verbs. On the other hand, *-ize* was most associated through its borrowings with the less used PERFORMATIVE semantic category and the Semantic Category Distribution Effect Hypothesis predicts that the newly created *-ize* forms would consist mostly of PERFORMATIVE verbs. However, since the phonological constraints upon *-ify* do not apply to *-ize*, it became the best candidate to use for the other noun bases used for RESULTATIVE denominal verbs. Hence, the interaction between the processes dictated the "trumping" of the Semantic Category Distribution Effect, as evidenced by the lack of significance in the correlation between the borrowed and existing *-ize* forms and the newly created *-ize* forms in the early periods in its history.

Another example of the competition among the processes leading to distribution change relates ultimately to conversion achieving default status in English. The competition between conversion and *eN-* for ORNATIVE denominal verbs resulted in *eN-* more often as the "loser". Thus, *eN-* became more associated with its second largest semantic category, LOCATIVE. However, LOCATIVE is not one of the preferred semantic categories for denominal verbs, and so the overall type frequency of *eN-* begins to drop, eventually causing *eN-* to lose its status as a productive denominal verb formation process. In the meantime, conversion continues to dominate the ORNATIVE category, as well as taking over much of the PERFORMATIVE and SIMILATIVE denominal verbs since -*ize* had become less associated with these categories and more associated with RESULTATIVE. With the decline of *eN*-, conversion also becomes the preferred choice for LOCATIVE denominal verbs. The end result is that the semantic category distribution for conversion begins to flatten out, conversion becomes less associated with any one particular semantic category, and instead it is used more as the default when the other competitors are less likely to be chosen.

Experiment 1 reveals even more evidence of interaction between the denominal verb formation processes. For one thing, RESULTATIVE scenarios were not at all well-represented by conversion, *eN*- and -*ate*, a result which is inconsistent with the CELEX distributions of their existing forms and contra the Semantic Category Distribution Effect Hypothesis. However, it must be remembered that subjects' responses were not independent: if subjects created an -*ize* or -*ify* form for a RESULTATIVE scenario, they could not also use *eN*-, -*ate*, or conversion for the same item. It may be that there is no room in this category for anybody else, so to speak, when -*ize* and -*ify* are around. Furthermore, the correlations between the CELEX distributions and the distributions of the subjects' responses for both -*ate* and conversion are not even close to significant, a result which is again inconsistent with the Semantic Category Distribution Effect Hypothesis. Instead, what appears to be of more relevance are preferences, or perhaps more appropriately dispreferences, related to -*ize* affixation; it seems that -*ate* and conversion are behaving more like defaults in Experiment 1, -*ate* as the overt affix default and conversion as productive default when -*ize* is not preferred, i.e. as an INSTRUMENTAL. Thus, the competitive nature of the interaction between the denominal verb formation processes serves to highlight two other factors previously proposed in the literature (Plag 1999) and discussed in chapter 3: the Overt Affixation Preference and the Type Frequency Productivity Preference.

### 4.4 Implications

Having summarized the evidence for the three hypotheses presented above it is necessary to explore some of the implications of these hypotheses and the data used as evidence in support of them. Starting with a continuation of the previous discussion on the nature of denominal verb formation process competition, Plag (1999) concludes there really is very little competition: the decision of which verb formation process to use is determined mostly by phonological constraints and semantic domain restrictions. There is the expectation that when the domains by chance do overlap that multiples should be found, and indeed multiples are attested (Plag 1999: 230, 233; section 2.3.5 of chapter 2 above). However, the suggestion based upon the results of the corpus study and of the two experiments described in the previous chapters is that the denominal verb formation processes are <u>always</u> in competition, unless of course the process is all but dead and gone for English (e.g. *be*- affixation).

Moreover, the hypotheses presented here have implications on the nature of the denominal verb formation processes themselves. The dissertation began with the very broad question of what a denominal verb formation process is comprised of. In other words, what information is relevant to the successful application and interpretation of a denominal verb formation process? As already discussed, there has already been much in the way of proposals of what native speaker competence in word formation consists of. Plag (1999) and Hay (2000) both point out the crucial role of phonological information in the creation of novel words. Hale and Keyser (1993) discuss the need for syntactic information in order to ensure accurate interpretation. Clearly, the semantics of the process is important-- what contribution does the addition of the affix, for example, make to the meaning of the derived form? We need to know the semantics of the affix to understand its contribution. Plag (1999) and Lieber (2004) both make attempts at defining the semantics of verb-forming processes, and an underlying semantic structure has also been hypothesized here (Hypothesis 1). Hay (2000) addresses semantics as well in terms of the relevance of semantic transparency. Clark and Clark (1979) also demonstrate the role pragmatics plays in word formation; by adherence to certain principles of conversation, a speaker is more likely to be successful when using a novel word.

The advantage of the experiments described in chapter 3 is that every attempt was made to hold the above factors steady so that other factors could be more clearly identified. In terms of pragmatics, the instructions indicated to the subjects that the speaker's (writer's) intent was sincere and the individual scenarios provided the specific context of the speech situation. Furthermore, all test items were placed within a transitive construction, so that syntactic factors would not interfere. All test item noun bases were also similar to each other in terms of phonological shape and token frequency. Also, half of the noun bases were Latinate in origin and half Germanic in order to balance out for such potential lexical factors. As for semantics, any contribution of the base noun was held constant as the same base noun was presented in each of four different semantic contexts (RESULTATIVE, ORNATIVE, LOCATIVE, and INSTRUMENTAL). The factors that are left are the semantics of the denominal verb formation process itself, the pragmatic factor of whether the process is overtly indicated by an affix or not, and the extragrammatical factor of whether the process is more or less productive in relation to the others.

The experimental results cannot be accounted for by any one of these factors alone, and each of the factors is subject to the Semantic Category Distribution Effect. To begin with, the subjects' use of each of the denominal verb formation processes for each of the contexts suggest that the semantic structure the native English speaker subjects have for each of the processes allows for all of the semantic category interpretations, even those not previously claimed to be part of the structure (e.g. INSTRUMENTAL for -*ize* and -*ify*).

However, the results also indicate that the use of a given denominal verb formation process is not equally probable for all semantic contexts. What this suggests is the development of a semantic category prototype for each process. But where does this prototype come from? It has been proposed here (Hypothesis 2) that prototypes regarding the denominal verb formation processes have developed in a manner similar to the development of prototypes of other lexical items, and it is here that the influence of the Semantic Category Distribution Effect upon the semantic structure is most strongly felt. By maintaining a sensitivity to the type frequency of semantic categories for -*ize*, for example, the native speaker begins to associate -*ize* more and more with its most frequent interpretations, i.e. RESULTATIVE and ORNATIVE, and less so with its less frequent interpretations, i.e. LOCATIVE and SIMILATIVE. Prior to the 20th century, it is hypothesized based upon the corpus study results that native speakers would have prototypically associated conversion denominal verbs with an ORNATIVE interpretation and less so with PERFORMATIVE. However, as the history for this denominal verb formation process demonstrates, the prototypical associations may change as the type frequency counts of semantic categories change. As the distribution among the semantic categories flattened out for this process, no particular prototype has been discernable for the current generation of native speakers, and the process is used much more like a default.

In addition to the semantics involved in the denominal verb formation processes, the influence of the Semantic Category Distribution Effect is also felt upon the pragmatics. Although the experimental results do support the notion of a preference for overtness, the Semantic Category Distribution Effect constrains this preference such that overtness is not preferred in contexts where the overt affix is possible but not very probable. And, again, what determines the probability of use of an affix is the degree to which that affix has become associated with a particular semantic interpretation based upon the distribution of forms among the semantic categories.

Productivity of the processes, too, was found to be affected by the Semantic Category Distribution Effect. The experimental results indicate that even the most productive processes (conversion and *-ize* affixation) are not the most frequently used in every context. They are less likely to be chosen when the semantic association created by the Semantic Category Distribution

Effect is stronger for another denominal verb formation process. This suggests the importance not just of token frequency and relative frequency, and not just of type frequency, but of type frequency within semantic categories as well.

Assuming the validity of the Semantic Category Distribution Effect, it becomes part of a larger model of the production and interpretation of denominal verbs in English. It is proposed here that this factor fits into the production model thus:

- initially and throughout, pragmatic factors are central-- as the speaker, what is my purpose? Am I intending to be taken seriously or do I intend to be deceptive or facetious?
- what meaning do I intend to convey? which participant in the event do I intend to use as the base of my novel verb?
- of all my choices in denominal verb formation, which do I believe will most likely allow my listener to arrive at my intended meaning? How do the phonological factors, **Semantic Category Distribution Effect**, and productivity factors interact? If I have to, which do I want to give precedence to based on my beliefs about what the listener implicitly knows?
- what syntactic form do I believe will be the most compatible with my new verb and still allow my listener to assign all of the other participant roles?
- utterance

Similarly, the Semantic Category Distribution Effect plays a significant role in the model of interpretation of a denominal verb in English. Again, the Semantic Category Distribution Effect enters into the computation related to competition in the interpretation process:

- As the listener, what do I believe the speaker's intention to be? Do I think s/he is sincere or deceptive? Or maybe s/he is attempting to be humorous.
- assuming I think the speaker is serious, what semantic interpretations are most compatible with the syntactic form of the speaker's utterance?
- thinking about the possible semantic interpretations, which is most likely given the speaker's selection of denominal verb formation process? In other words, which interpretation does s/he probably believe I will most likely associate with this verb formation process, given its **Semantic Category Distribution**?
- based on these calculations, the listener arrives at what s/he believes is the intended meaning.

As for the nature of morphology and the lexicon, sensitivity to type frequency according to semantic category suggests that continual observation and likewise adjustments are part of the morphological system, and through persistent analogies, lead to a psychologically apparent rule. Are morphological processes really rules? The account presented here is not consistent with the concept of a rule as there would be too many exceptions to make the rule of much value. The discussion of the processes thus far is more consistent with the notion that the processes are more a result of constraints, or perhaps even something else like a probability function. The notion that morphology is another area susceptible to frequency effects of many different types, including the Semantic Category Distribution Effect, is most consistent with a mental lexicon that contains lexical entries, both derived and underived, and a conception of the related word formation processes. As such, the evidence presented here provides support for the ideas that the mental lexicon is extremely dynamic, and rules, whether real or apparent, cannot be divorced from the relevant entries. Furthermore, the interplay between phonological, syntactic, semantic, and pragmatic factors and the morphological processes discussed in this dissertation also promotes a morphology that closely interacts with all other aspects of language.

### 4.5 Further Study

Now that another factor influencing denominal verb formation in English has been identified, a next logical step is to examine its importance relative to other phonological, syntactic, semantic, pragmatic, and extragrammatical factors. Plag has made the suggestion that morphological considerations may override phonological constraints (1999: 175) and that semantics may override morphological constraints (1999: 79). And, it has already been alluded to several times thus far that the Semantic Category Distribution Effect may override both phonological and semantic constraints. So, beyond identifying the factors, a worthy goal is to uncover exactly what the contribution of each of these factors is. In other words:

- to what extent is English denominal verb formation a phonological phenomenon?
- to what extent is English denominal verb formation a syntactic phenomenon?
- to what extent is it a semantic phenomenon?
- to what extent is it a pragmatic phenomenon?

- to what extent is it an extragrammatical phenomenon?

Moreover, is there one factor that always takes precedence over the others? If not, under what circumstances can one override another? Although obviously not an easy task to undertake, the attempt in Experiments 1 and 2 to hold constant or to balance out as many factors as possible has shown that the relative influence of a particular factor can be elucidated. Furthermore, experiments similar to the ones carried out here can certainly be designed such that certain factors are pitted directly against each other. For example, one could design a study that forces the choice between a novel denominal *-ize* verb and a novel denominal *-ify* verb, but with all noun bases being monosyllabic or iambic, thus favoring *-ify*, and with all INSTRUMENTAL test contexts, which are not at all preferred by *-ify*. An experiment such as this should reveal whether phonological constraints can override productivity and the Semantic Category Distribution Effect (with subject responding with significantly more novel *-ify* responses than *-ize*) or can productivity override phonology (with more *-ize* responses than *-ify*).

Another direction that might be taken has to do with whether syntactic category of the base is a relevant factor. Most of the denominal verb formation processes also take adjective bases, less frequently verb bases, and even adverbial bases in a few cases. The results of the corpus study suggested no difference between denominal and deadjectival forms of a process in terms of development and semantic category distribution; however, the question of the importance of base syntactic category was not examined thoroughly here. Again, novel verb experiments could be designed that could provide answers to this type of question.

At the other end, the results of the experiments suggested that an additional semantic factor may play an important role in deciding between denominal verb formation processes: the affectedness/degree of change upon the verb's internal argument. At this point, the data of the corpus study have not been analyzed according to this dimension, but considering the experimental results, it would be quite advantageous to follow up on this question as well. This also reinforces the notion that both corpus and experimental data may be used in tandem to identify other factors, perhaps those related to sociolinguistics or language acquisition, which was not attempted in this dissertation.

Beyond denominal verb formation, similar methods can also be used to examine notions of semantic prototypicality in terms of the other word formation processes in English. Moreover, it is not expected that the Semantic Category Distribution Effect should be an idiosyncratic feature of English; therefore, assuming its effects are real, they should be evidenced in the nature of word formation processes in other languages as well.

With both types of data, it is possible to see from both directions the importance of prototypical semantic information upon native speaker competence. This is seen in the development over time of certain semantic categories over others and in the willingness or reluctance of subjects to use particular processes based upon the similarity of the semantics of the derived form to the prototypical semantics of other forms derived by the same process.

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## Appendix -Test Item Base Noun Scenarios

TEST ITEM BASE NOUN - CAMEL

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Wally was really enjoying his time at sorcery camp, but he was having such a hard time with his magic spells. The sorcerers-in-training were supposed to turn a mouse into a camel using a spell of their own creation. Everyone else seemed to get it right away, but it took nearly an hour for Wally to ___________ his mouse. It was just too embarrassing. (65) |
| RES-NO CHANGE | Every year, Wally would get into Halloween in a very big way. Not only would he dress up for the annual party, but he would dress up his dog, too. This year, he decided they would go as Princess Jasmine and her grumpy camel. As you can imagine, the grumpy part was a given, but it took all day and a whole lot of struggling before Wally was finally able to ___________ his dog. Still, they were a huge hit at the Halloween party. (84) |
| ORN-CHANGE | Wally just loved camels. Every since he was a little boy, he had been collecting figurines of the two-humped variety, and now that he was an adult, he displayed them all over the house. He couldn't believe it when found wallpaper simply covered with them, and he was absolutely thrilled when he was able to _______ the entire bathroom in less than an hour. (64) |
| ORN-NO CHANGE | Wally was fascinated to learn about the US Camel Corps. Apparently, in the 1800's, the United States Army experimented with adding the famed "ships of the desert" to their units in Texas. Evidently, as pack animals, they consistently outperformed mules and horses. However, due to politics, the army's attempt to ___________ their Southwest divisions in five years was put to an end almost before it began. (66) |
| LOC-CHANGE | Wally was a professional photographer and happy to be taking pictures of the Sahara, but he was also physically exhausted. Although his camel was very useful for storing a lot of his things, Wally just wouldn't ___________ his delicate photographic equipment for any length of time. Therefore, he ended up walking a lot, keeping his heavy equipment in the bags he himself carried. (63) |
| LOC-NO CHANGE | Wally shut the door behind him. He needed to think fast. He had successfully stolen the microchip, but he could hear them running up the stairs, only seconds away. He had to hide it. But where? Suddenly he noticed the Maltese Cobra and Tunisian Camel figurines in the corner. As soon as he picked one up, he decided-- he would ___________ the microchip for a while until he could figure out how to get it out of the country. (79) |
| INS-CHANGE | Wally really loved new adventures, so he was enthusiastic about the idea of going to North Africa. He really learned a lot, but there was one time he really felt ignorance would have been bliss. He absolutely loved this one local apricot nectar and asked how it came to acquire such a unique flavor. They were most pleased to tell him that they used specially-trained camels to stomp on the fresh apricots. Apparently, they usually ___________ the apricots for about 3 hours to get that, um, distinctive taste. (88) |
| INS-NO CHANGE | Wally really loved new adventures, so he was enthusiastic about the idea of going to North Africa and traveling across part of the Sahara. They used jeeps most of the time, but there was one path where they needed to use a camel as transportation. His was so grumpy and would not move if it didn't feel like it. In fact, Wally could only ___________ the path for 5 minutes at a time without stopping. Still, he felt it was all worth it. (83) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - CHAPEL

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | The college wanted to have a non-denominational place of worship for their students, and Penny was put in charge of the project. Land was at such a premium in the area that they couldn't afford to buy new property, so Penny suggested that they take one of the rarely used buildings and turn it into a chapel. The college approved her idea and she was able to ___________ the greenhouse in ten months. All the stained-glass windows really made it something to behold. (83) |
| RES-NO CHANGE | For its bicentennial celebration, the college wanted to temporarily re-create how it appeared in the early 1800's, and Penny was put in charge of the project. The only building she had difficulty with recreating was the old chapel. Finally, she thought of the new greenhouse. The college approved her idea and she was able to ___________ the greenhouse in two weeks. All the glass windows really made it something to behold. (71) |
| ORN-CHANGE | The college wanted to have a non-denominational place of worship for their students, and Penny was put in charge of the project. Land was at such a premium in the area that they couldn't afford to buy new property, so Penny suggested that they attach a small chapel to the largest church. The college approved her idea and she was able to ___________ the church in ten months. All the stained-glass windows really made it something to behold. (78) |
| ORN-NO CHANGE | The college wanted to have a non-denominational place of worship for their students, and Penny was put in charge of the project. Land was at such a premium in the area that they couldn't afford to buy new property, so Penny suggested that they take one of the rarely used parking lots and build the chapel on part of it. The college approved her idea and she was able to ___________ the parking lot in ten months. All the stained-glass windows really made it something to behold. (87) |
| LOC-CHANGE | The nuns were trying to find the best location to dry their rolls of handmade paper when it was raining outside. Sister Penny thought the chapel would be the perfect place. It was always so warm in there because of all the stained-glass windows. She presented the idea to the other sisters and they decided to ___________the paper for however long it took for the rain to stop. (68) |
| LOC-NO CHANGE | The nuns were trying to find the best location to temporarily store the cases of wine they recently acquired. Sister Penny thought the chapel would be the perfect place. It was always so cool and dark there. She presented the idea to the other sisters and they decided to ___________the wine for the next few weeks until their new wine cellar was completed. (63) |
| INS-CHANGE | Penny loved her toy village with all the scale models. Unfortunately, the only place to keep it was in the basement, which was full of centipedes, her most feared insect. One time, she caught sight of one right next to her and before she could think, she grabbed the model chapel and used it to kill the hated insect. Thereafter, whenever she spotted a centipede, she would ___________ it for a few seconds until she was sure it was dead. (80) |
| INS-NO CHANGE | Penny loved her toy village with all the scale models. Unfortunately, the only place to keep it was in the basement, a scary place for Penny. She was okay as long as the door was open. But one time, the doorstop suddenly broke off and the door was about to swing shut. Without even thinking, she grabbed the heavy model chapel and used it to prop the door open again. Thereafter, she would always ___________ the door for however long she was down there. (84) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - FAUCET

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Theme restaurants are a booming business these days. In fact, Harley-Davidson is opening one downtown in the very near future. Cecelia has been hired to create the fixtures in the bathroom, which of course, will maintain the motorcycle theme. She came up with the great idea of using authentic motorcycle parts in the sink designs. The most difficult task has been to turn exhaust pipes into the faucets. It actually takes several hours just to ___________ one pipe. But really it will be worth it—they look fantastic! (88) |
| RES-NO CHANGE | Cecelia was more than just a movie make-up artist; she was a magician! Disney was doing a live action version of Beauty and the Beast, and Cecelia had been given the task of making the live actors look as much as possible like housewares. By far, the most difficult one was the Kitchen Sink, where she had to make the actor's nose look like a faucet. It took over two hours everyday to ___________ the actor's nose, but the end result was truly remarkable. (84) |
| ORN-CHANGE | Cecelia was very excited about opening her first restaurant. They had already finished construction of most of the space, but the kitchen still needed a lot of work. The contractor said it would take at least a week to finish installing the sinks and other plumbing. The faucets would be added last, but he said that was the easiest part. Apparently, it only takes 15 minutes to ___________ a single sink. Cecelia really didn't care about the details—she just wanted it done already. (84) |
| ORN-NO CHANGE | Cecelia generally liked her job at the home improvement store, but she really didn't like it when she had to do stocking. At the moment, she had to add a whole bunch of boxes of heavy faucets to the shelves. Doing the ones on the bottom shelves was fine, but it took forever to ___________ the upper shelves and it was a total killer on her back. (67) |
| LOC-CHANGE | Cecelia has become quite resourceful while working at the junkyard. One day, she bought insulin at the pharmacy before coming to work. Since she's been a diabetic forever, it should have occurred to her that she would need to store the small vial someplace cool. Unfortunately, she didn't think of it and there was no fridge at work. So she looked around and found this big metal faucet. She decided to ___________ the vial all day and hoped the insulin would stay cool enough until she could go home. (89) |
| LOC-NO CHANGE | Cecelia shut the door behind her. She needed to think fast. She had successfully stolen the microchip, but she could hear them running up the stairs, only seconds away. She had to hide it. But where? The building was abandoned, so she knew the water supply had probably been long turned off. What about the toilet? Too obvious. The faucet! She decided-- she would ___________ the microchip for a while until she could figure out how to get it out of the country. (83) |
| INS-CHANGE | Cecelia found that when you work in a junkyard like she does, you learn to be quite resourceful. For example, someone left a locked trunk there and no one had any idea what was in it. They wanted to open it but couldn't find the usual tools one would use to smash the lock open. So, Cecelia grabbed an old metal faucet; it was easy to grip and certainly felt heavy enough. She began to ___________ the lock and after a few seconds, it just broke open. (87) |
| INS-NO CHANGE | Cecelia found that when you work in a junkyard like she does, you learn to be quite resourceful. For example, there was this old refrigerator with a heavy door that would just swing shut on its own. Many small animals had gotten trapped in there and suffocated. So, Cecelia grabbed a heavy metal faucet that was lying around and used it to prop the refrigerator door open. And ever since she had thought to ___________ the door at all times, not one animal has died. (85) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - HELMET

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Trent's favorite fairytale was a male version of Cinderella. Instead of going to a ball, the boy in the story wanted to join a jousting tournament as a knight. His fairy godmother turned a mouse into a steed, his broom into a joust, and his clothes into beautiful armor. The last thing to do was turn something into a brilliant helmet. She grabbed a wooden bucket, put it over his head and in a flash, was able to ___________ it. And of course, the story ended happily ever after. (89) |
| RES-NO CHANGE | Trent was playing upstairs when he discovered his daddy's old football uniform. He was so excited to put it on and pretend he was making the winning touchdown. When he couldn't find the helmet, he looked around for something he could make look like one. Trent spied a crystal bowl in the downstairs china cabinet that would be perfect. It only took him a few minutes to ___________ it with NFL stickers. He couldn't understand what his mommy was so upset about—he thought it looked great! (87) |
| ORN-CHANGE | Trent just loved football. He had been collecting all things NFL since he was a little boy, and now that he was an adult he displayed them all over the house. He couldn't believe it when he found wallpaper of all the helmets from the NFL teams, past and present, and he was absolutely thrilled when he was able to ___________ the entire bathroom in less than an hour. (69) |
| ORN-NO CHANGE | Every year, not only would Trent dress himself up for Halloween, but he would dress up his dog, too. This year, he decided they would go as a Dallas Cowboy football player and cheerleader, with Trent as the cheerleader of course. As far as his dog was concerned, the uniform was fine, but he was not about to let anyone put a helmet on top of his head. It took nearly three hours and a whole lot of Snausages before Trent was finally able to ___________ his dog. (88) |
| LOC-CHANGE | Trent was very suggestible. He was watching a war movie before he fell asleep and, consequently, dreamt he was a soldier in the jungle who had become separated from the other men. He found a little waterfall, but had lost his canteen and all he had for a storage container was his helmet. So he decided to ___________ the water for the rest of the day, even though it would acquire the taste of his old sweat inside. Luckily, he woke up before he had "tasted" the unpleasant water. (89) |
| LOC-NO CHANGE | Trent was very suggestible in what he dreamt about. He was watching a war movie before he fell asleep and dreamt he was a soldier in the jungle who had become separated from the rest of the men. He had found a little waterfall, but had lost his canteen and all he had for a storage container was his helmet. So he decided to ___________ the water for the rest of the day. He was okay until he heard gunfire; then, he woke up. (84) |
| INS-CHANGE | Trent was surprised to learn that not every state requires the use of helmets while riding a motorcycle. He knows it can get suffocatingly hot with it on, but it just seems so obvious to him that you should always ___________ yourself for the entire time you are on a bike, whether as the "driver" or the "passenger". It's such an easy thing to do and the potential benefits are overwhelming. (71) |
| INS-NO CHANGE | Trent is a tour guide who knows all the tricks. When going through the Louvre, there are always many tours going on simultaneously and tourists often have problems keeping track of their particular guide. Novice guides raise their hand in the air for their group to locate them—not very effective. More experienced guides will raise an umbrella, but still a lot of guides do that. Only Trent uses a helmet. All he has to do is ___________ his group for a minute and they all find him easily. (89) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - LINEN

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Hannah was not only a brilliant sorceress, but also a very practical one. Lots of other sorceresses turned straw into golden silk material for their clothes. But Felicia felt that linen was a much more suitable material for the climate, and furthermore, she could ___________ just as much straw in half as much the time as the other sorceresses took for silk. (62) |
| RES-NO CHANGE | Hannah absolutely hated having to iron her clothes. She was thrilled when she heard that a new technology had been developed that could weave synthetic fibers in such a way that the fabric would look just like linen (which seemed to wrinkle more easily than anything else) but would never need ironing. In fact, the company would be able to ___________ the fibers in less time than it took to weave the real thing, so the fabric would be even cheaper! (81) |
| ORN-CHANGE | Everyone said that Hannah's employer was the most gifted designer working in fashion today, but she thought he was an idiot. His latest stroke of brilliance was to attach a hem of linen to the entire collection of silk skirts. She thought it looked awful, but she kept her mouth shut and did the job she was assigned—to ___________ every single skirt in one week, all the time that was left before the runway show. (76) |
| ORN-NO CHANGE | Hannah worked as the catering manager at the largest hotel in the city and she prided herself on her efficiency. She had developed a system that would allow her staff to set up the banquet tables in the ballroom, add the tablecloths and napkins, and perfectly place the china, silverware and stemware in less than half an hour. She was most proud of the method she created for folding the linens such that her people could ___________ every table in less than 4 minutes. (84) |
| LOC-CHANGE | Hannah loved making her own blue cheese. It took her a while to perfect her recipe and she experimented quite a bit with various methods of aging. At last, she felt she had it—the right recipe and, most importantly, storing the cheese in linen while it aged. Apparently, by doing so, enough air could penetrate the cheese and grow just the right amount of mold. She also figured out that she had to ___________ the cheese for at least 67 days to get the very best flavor. (88) |
| LOC-NO CHANGE | Hannah loved making her own blue cheese. It took her a while to perfect her recipe and she experimented a lot with various methods of aging. At last, she felt she had it—the right recipe and, most importantly, first storing the cheese in linen while it aged. By doing so, the cheese would age normally, without the molding. Hannah figured out that she should ___________ the cheese for 30 days before transferring it to regular cheesecloth. At that point, the characteristic blue marbling would begin to develop. (88) |
| INS-CHANGE | Hannah wasn't much for following directions. She had been told at the optical center that since she didn't buy scratch-resistant lenses, she shouldn't use abrasive fabric like linen to clean her eyeglasses. Of course, she ignored the advice and as soon as her glasses were a little smudged, she took the edge of her skirt and proceeded to ___________ her glasses for several minutes. By the time she was done, the lenses were ruined. (74) |
| INS-NO CHANGE | Hannah always wanted her windows to be nice and clean, but she really hated the work involved. It seemed that no matter what cleaner she used, there would always be streaks and the longer she wiped, the more lint would be left behind. Finally, she thought of using a linen cloth instead of a paper towel. She was ecstatic with the results. She found that she could ___________ a window for any amount of time and with any cleaner and never see a single streak or piece of lint. (89) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - LOCKER

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Sylvia's junior high school experience was not off to a good start. First of all, they didn't have her name on their registered student list. Then, it turns out that they didn't have any lockers left to assign to her and were going to try to turn something else into one. It took them nearly 4 periods to ___________ the only thing they could—an unused broom closet! Meanwhile, Sylvia had to lug all of her books with her to every class. (82) |
| RES-NO CHANGE | Sylvia's junior high school experience was not off to a good start. First of all, they didn't have her name on their registered student list. Then, it turns out that they didn't have any lockers left to assign to her and tried to make a rarely used broom closet look like one instead. It took them nearly 4 periods to ___________ the broom closet. Meanwhile, Sylvia had to lug all of her books with her to every class. (78) |
| ORN-CHANGE | Sylvia's junior high school experience was not off to a good start. First of all, they didn't have her name on their registered student list. Then, it turns out that she wouldn't have any place to put her things. It seems that over the summer, they had added a new wing to the school but they hadn't added the lockers yet. It took them nearly three weeks to ___________ the new wing. Meanwhile, Sylvia had to lug all of her books with her to every class. (86) |
| ORN-NO CHANGE | Sylvia's junior high school experience was not off to a good start. First of all, they didn't have her name on their registered student list. Then, it turns out that over the summer, they had added a new wing to the school but they hadn't added the lockers yet. They decided to improvise by putting a few in the gymnasium temporarily. But still, it took them nearly four periods to ___________ the gym and meanwhile, Sylvia had to lug all of her books with her to every class. (88) |
| LOC-CHANGE | Sylvia was really fed up with the girls she coached on the swim team. They kept storing their wet swimsuits in their lockers over the weekend, and by Monday the entire area would smell very moldy. She decided to make the announcement that in the future, they will have to swim twenty extra laps if they ___________ their swimsuits for any longer than one day. (65) |
| LOC-NO CHANGE | Sylvia was really fed up with the girls she coached on the swim team. Instead of storing their swimsuits in their assigned lockers, they kept leaving them on the benches over the weekend. She decided to make the announcement that in the future, they will have to swim twenty extra laps if they don't ___________ their swimsuits for any longer than one day. (63) |
| INS-CHANGE | Sylvia had a great imagination. She wrote a short story about a Godzilla-like monster invading her junior high school. It seemed hell-bent on destroying all the teachers. Its favorite weapon of choice was one of the lockers it had tipped over. It tried to ___________ every teacher it saw until the three o'clock bell rang. Then, it simply left to go home. (62) |
| INS-NO CHANGE | Sylvia had a weird dream about a Godzilla-like monster invading her junior high school. It seemed determined to disrupt the school by waving around a locker it had picked up and making a lot of noise. It kept roaring down the hallway, trying to ___________ everyone the whole day, but no one seemed the least bit affected. Finally, he gave up and went back to where it came from. (69) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - MOUNTAIN

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Abel's writing class was a lot of fun. The assignment this week was to write their own Greek myth. Abel named his protagonist Ebileus, a Titan who suffered the consequences of unrequited love. Abel hadn't quite figured out what he wanted to happen to Ebileus, but he had narrowed it down to him pining away and turning into a mountain or drowning himself in the sea. In the end, Abel decided it would be more heart-wrenching if it took 100 years to ___________ Ebileus. (84) |
| RES-NO CHANGE | Abel had learned to be extremely practical in his many years as a set designer. The current production of Sound of Music needed a mountain that the von Trapp family could walk upon. He decided that it would be easy to make the volcano they had made for the production of last year look like an Austrian Alp. And as a bonus, it took him hardly any time at all to ___________ it. (73) |
| ORN-CHANGE | Abel liked painting in his very limited spare time. He took a step back and looked at his current work, a landscape. He felt something wasn't quite right—too much empty space at the top. He thought, "What I need is to add some mountains!" Whenever he could find the time, he would ___________ a little bit more of his painting. Although it took a total of five weeks, he was very happy with the finished product. (77) |
| ORN-NO CHANGE | It was up to Abel to decorate his baby's nursery in his very limited spare time. He thought the "great outdoors" theme was looking really good, but there was too much empty space on the north wall. He thought, "What I need is to hang up some pictures of mountains!" Whenever he could find the time, he would ___________ a little bit more of the wall. Although it took a total of five weeks, he was very happy with the finished product. (82) |
| LOC-CHANGE | Abel learned quite a lot from his trip to the winery. He found out that his favorite wine comes from grapes grown late in the season and must be matured in casks stored high in the mountains. It seems that the winery has to ___________ the wine for at least five months in order to achieve its distinctive flavor. (59) |
| LOC-NO CHANGE | Abel's writing class was a lot of fun. The assignment this week was to write their own Greek myth. Abel named his human protagonist Ebileus and focused on Zeus as the angry god who punishes him. Abel hadn't quite figured out what he wanted to do for Ebileus' punishment, but he had narrowed it down to keeping him prisoner on the highest mortal mountain or making him work as one of Neptune's servants under the sea. In the end, he decided to have Zeus ___________ Ebileus for 100 years. (89) |
| INS-CHANGE | Abel loved his toy Alpine village with all the scale models. Unfortunately, the only place to keep it was in the basement, which was full of centipedes, his most feared insect. One time, he caught sight of one right next to him and before he could think, he grabbed a model mountain and used it to kill the hated insect. Thereafter, whenever he spotted a centipede, he would ___________ it for a few seconds until he was sure it was dead. (81) |
| INS-NO CHANGE | Abel's writing class was a lot of fun. This week's assignment was to write their own Greek myth. Abel named his human protagonist Ebileus and focused on Zeus as the jealous god who keeps Ebileus from his beloved. Abel hadn't quite figured out how Zeus would keep the lovers apart, but he had narrowed it down to using a mountain to separate them or have Ebileus get eaten by a sea monster. Finally, Abel decided it would be more heart-wrenching to ___________ them for the rest of their lives. (89) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - MUSTARD

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | The newest fad among the upwardly mobile set was taking a few basic ingredients and some fancy spices and turning them into their own homemade gourmet mustard. Ivan, being the shrewd businessman that he was, knew they would soon be looking for a way to reduce the time and effort involved in the process, so he invented a machine that could ___________ the ingredients in less than 30 minutes. (69) |
| RES-NO CHANGE | Ivan was the prop master for the newest Grey Poupon commercial. As it turns out, the main actress, the one doing all the tasting and reacting with rapture, was actually allergic to mustard and she didn't bother to tell anyone until they were about to shoot. So Ivan had to take some mayonnaise and ___________ it in just a few seconds with some yellow food coloring. (66) |
| ORN-CHANGE | Ivan knew a lot of people put a lot of different things into their martinis nowadays—fruit juices, mint, whipped cream, coffee, chocolate, bananas—all good. But he was puzzled when he saw his sister-in-law grab the mustard, and he was downright shocked to see her ___________ a martini in less than five seconds, like she'd been doing it all her life. And when she took a massive drink from it, he felt positively sick. (75) |
| ORN-NO CHANGE | Ivan knew a lot of people put a lot of different things on top of their bagels—cream cheese, margarine, jam, peanut butter, cheese, lox—all good. He was puzzled when he saw his sister-in-law grab the mustard, but he was downright shocked to see her ___________ a bagel in less than five seconds, like she'd been doing it all her life. And when she took a massive bite out of it, he felt positively sick. (76) |
| LOC-CHANGE | Ivan knew a lot of people stored their jewelry in a lot of different places. But he was shocked to see his sister-in-law take off her diamond earrings and put them in a jar of mustard. When he asked her why, she said that when you ___________ your jewelry overnight, the ingredients act as a natural cleanser for both the diamonds and the gold setting. You just have to brush them gently with a soft toothbrush in the morning and you're good to go! (84) |
| LOC-NO CHANGE | Ivan knew a lot of people stored their jewelry in a lot of different places. But he was shocked to see his sister-in-law take off her diamond earrings and put them in a jar of mustard. When he asked her why, she said that when you ___________ your jewelry overnight, if anyone were to rob you, they'd never in a million years think to look there. You just have to brush them gently with a soft toothbrush in the morning and you're good to go! (85) |
| INS-CHANGE | Ivan knew a lot of people used a lot of different things to clean their jewelry. But he was shocked to see his sister-in-law take off her diamond earrings, grab a jar of Grey Poupon and dab some mustard on them. When he asked her what she was doing, she said that when you ___________ your jewelry for a few seconds, it acts as a natural cleanser for the diamonds. You just have to brush them gently with a soft toothbrush, and then rinse them off. (86) |
| INS-NO CHANGE | Ivan was concentrating very hard on preparing a very complicated gourmet meal, when his neighbor, yet again started blaring his music. Ivan just couldn't think! He used his fist to pound on the wall, but it just didn't seem loud enough. So he grabbed the full jar of mustard next to him. It felt pretty heavy—why not? So he began to ___________ the wall for a few minutes, and it did the trick. There was quiet once again. (79) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - NAPKIN

| **Context** | **Scenario (with word count)** |
|---|---|
| RES-CHANGE | During the last-minute preparations for her cocktail party, Janie checked her list yet again, but she just couldn't shake the feeling that she was forgetting something. Suddenly, she remembered—the guests would have nothing to put their drinks on, no coasters or anything. There wasn't enough time to go to the store, but Janie was very resourceful. She looked around for something she could potentially turn into cocktail napkins. She grabbed the paper towels and was able to ___________ the whole roll in less than fifteen minutes. (87) |
| RES-NO CHANGE | During the last-minute preparations for her cocktail party, Janie checked her list yet again, but she just couldn't shake the feeling that she was forgetting something. Suddenly, she remembered—the guests would have nothing to put their drinks on, no coasters or anything. There wasn't enough time to go to the store, but Janie was very resourceful. She looked around for something that could potentially look like cocktail napkins. She grabbed the paper towels and was able to ___________ the whole roll in less than fifteen minutes. (87) |
| ORN-CHANGE | Janie loved spending time at her aunt's; she always had so many ideas for fun craft projects. Janie's favorite one so far was taking plain Christmas ornaments and making them something really unique. Her aunt showed Janie how to carefully glue a pretty cocktail napkin over the ornament so it wouldn't rip in the process. Janie wasn't very dexterous yet and it took her quite a while before she was able to ___________ an ornament successfully. It was worth the effort, though, because the final product was really special. (89) |
| ORN-NO CHANGE | During the last-minute preparations for her cocktail party, Janie checked her list yet again, but she just couldn't shake the feeling that she was forgetting something. Suddenly, she remembered—the guests would have nothing to put their drinks on, no coasters or anything. Quickly, she grabbed the cocktail napkins and performed a quick count. She definitely had enough to add a pile to all the tables. She worked quickly and in fact was able to ___________ every flat surface she saw in less than ten minutes. (86) |
| LOC-CHANGE | Little Janie loved spending time at her aunt's; she was such a good cook! Janie always wanted to save some of her aunt's food for when she returned home, but inexplicably, she felt she had to sneak it. Usually, she would store it in a cloth napkin and put it under the bed. Last time, she wanted to sneak some homemade bread, but when she attempted to ___________ it until she got home, the bread was all moldy because it couldn't "breathe". Janie didn't sneak food after that. (88) |
| LOC-NO CHANGE | Janie liked spending time with her elderly aunt. She was such a character and a great storyteller. The only problem was that her aunt <u>really</u> loved to cook, but she was <u>really</u> bad at it. Every visit, Janie would have to find someplace, her purse or her napkin, to discreetly store her "mouthfuls", all the while pretending to chew and swallow. Last Sunday, she had to ___________ what amounted to two large pork chops for an hour until she could get rid of them. (84) |
| INS-CHANGE | Janie really wasn't much for remembering and following directions. She had been told at the optical center that since she didn't buy scratch-resistant lenses, she shouldn't use anything abrasive to clean her eyeglasses. Of course, as soon as her glasses were a little smudged, she grabbed a paper napkin and, completely ignoring the advice, proceeded to ___________ her glasses for several minutes. By the time she was done, the lenses were ruined. (72) |
| INS-NO CHANGE | Janie loved playing with her twin girls. Because it was raining yesterday, they decided to build "forts" inside. The twins waged a serious battle against their mom and it was clear they were winning. When all hope was lost, Janie looked around and a white napkin was all she could find to use to signal her surrender. But the twins were so absorbed in planning their next attack that Janie had to ___________ them for 5 minutes before they noticed they had already won. (84) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - NUGGET

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Frank was really enjoying his time at sorcery camp, but he was having such a hard time with his magic spells.  The sorcerers-in-training were supposed to turn a rock into a nugget of gold using a spell of their own creation.  Everyone else seemed to get it right away, but it took nearly an hour for Frank to ___________ his rock.  It was just too embarrassing. (66) |
| RES-NO CHANGE | Frank very much enjoyed Bugs Bunny cartoons, especially those with Bugs and Yosemite Sam.  One of his favorites was the one set during the Gold Rush.  Bugs gets back at Yosemite Sam by taking a big rock and making it look like a nugget of gold.  It only takes him a couple of minutes to ___________ the rock with a little bit of paint, and the revenge is sweet. (69) |
| ORN-CHANGE | Frank really loved a good burger, especially one with absolutely everything on it.  When he was out with a friend, he saw them adding potato chips right onto their burger.  He really didn't care for potato chips, but he spied the chicken nuggets he also ordered and thought, why not?  So he grabbed some and in a couple of minutes he was able to ___________ his burger to his satisfaction.  He liked it so much, he never ate a burger any other way again. (84) |
| ORN-NO CHANGE | Frank generally liked his job as a waiter for the largest catering company in the city.  He only wished they wouldn't do children's parties.  The combined smell of the pigs-in-a-blanket, pizza and chicken nuggets always made him nauseous.  Plus, the kids were so grabby—they wouldn't even wait for him to finish adding more food to a tray before they started attacking it.  Last time, it took him 10 minutes to ___________ a tray because their hands were everywhere.  He couldn't wait for the day to be over. (88) |
| LOC-CHANGE | Frank had a cat named Woozy.  Woozy was generally a good cat, except when it came time to take his medicine.  Frank would actually have to put the pill inside Woozy's favorite food, a chicken nugget, so that it would take on that flavor and then Woozy would eat it.  Of course, Frank would have to ___________ the pill for quite some time before it would smell like chicken, but it sure was easier than trying to force it down Woozy's throat! (82) |
| LOC-NO CHANGE | Frank had a cat named Woozy.  Woozy was generally good, except when he had to take his medicine.  Frank tried everything, including putting the pill inside Woozy's favorite food, a chicken nugget, so that it would take on that flavor and then hopefully Woozy would eat it.  However, no matter how long Frank tried to ___________ the pill, it just wouldn't absorb the smell.  Frank finally gave up all attempts and just had to force the pill down Woozy's throat, which was very traumatic for them both. (87) |
| INS-CHANGE | Frank was a miner in the old West.  After years of digging, he finally found a huge chunk of gold.  He whooped and hollered at the top of his lungs, which, unfortunately, caused the mine to cave in and the only thing that he could use to dig with was the large gold nugget.  He was forced to ___________ the rocks in front of him for hours, and each time, more of the gold would flake off.  By the time he made it out, he had nothing left. (88) |
| INS-NO CHANGE | Frank had a cat named Woozy.  Woozy was generally a good cat, except when it came time to go to the vet.  He would hide in these tight, hard-to-reach spaces.  The only way Frank could get him out was to use his favorite food, chicken nuggets, to tempt him out, and even then it was difficult.  Last time, he had to ___________ Woozy for 15 minutes before he finally came out. (71) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - OVEN

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Belinda has been an environmental activist all her life. When she was only 10 years old, while other girls were using electricity for their easy-bake ovens, she took a few household items and turned them into a solar-powered oven. With a roll of aluminum foil, some black spray paint, a plastic bag and some glue, she was able to ___________ two cardboard boxes in only one afternoon. The little chocolate cake she made with it was pretty good, too! (79) |
| RES-NO CHANGE | When Belinda was little, her family didn't have a lot of money, but it didn't matter to her because she had a great imagination. For example, she took a cardboard box and some crayons and made it look like the easy-bake ovens some of the other kids had. It only took a few minutes to ___________ the box, and she spent hours pretending she was making little cakes, with the bonus that she didn't get sick eating what she baked! (80) |
| ORN-CHANGE | Belinda was very excited about opening her first restaurant, an upscale pizzeria. They had already finished construction of the space and had nearly finished decorating the dining room. The kitchen still needed a lot of work, with most of the pizza ovens and other appliances still needing to be installed. The contractor said it would take at least two days to ___________ the kitchen, but as soon as they did, she could begin training her staff on them. She could hardly wait to begin. (84) |
| ORN-NO CHANGE | Belinda was delighted with being given the opportunity of teaching a course in "cowboy cooking", cooking over a campfire. Her students had all assembled outside, each with their own fire started and their first recipe "buttermilk cornbread" prepared. They were just waiting for the Dutch ovens to be placed over their coals. It only took Belinda's staff a few minutes to ___________ everyone's fires. Most people's cornbread turned out really well, and everybody said they learned a lot and had a great time. (83) |
| LOC-CHANGE | Belinda was baking bread for the first time. The recipe said that she should let the dough rise in a warm place, suggesting keeping it in an oven that had been turned on and then off. So, she decided to ___________ the dough as recommended. Unfortunately, the recipe didn't say what temperature to warm it up to before turning it off and Belinda had turned it way up. After an hour, the dough had risen too much, completely overflowing its container and making a huge mess. (86) |
| LOC-NO CHANGE | Belinda loved buying birthday gifts for her twins, but they always seemed to find her hiding places and spoil the surprise. Belinda wanted this year to be different, but she just couldn't think of a good spot. Suddenly, she remembered the old oven up in the attic. It was the perfect size and the twins never went up there because of all the cobwebs. She made the decision right then and there to ___________ the presents for the two and a half weeks until their birthday. (86) |
| INS-CHANGE | Belinda just loved her super large dollhouse. Unfortunately, the only place to keep it was in the basement, which was full of centipedes, her most feared insect. One time, she caught sight of one right next to her and before she could think, she grabbed the dollhouse oven and used it to kill the hated insect. Thereafter, whenever she spotted a centipede, she would ___________ it for a few seconds until she was sure it was dead. (77) |
| INS-NO CHANGE | Belinda just loved playing with her large dollhouse. The only problem was that her big brother would turn up his music so loud that she just couldn't concentrate properly on the scene she was imagining. She used her fist to pound on the wall, but it just didn't seem loud enough. So she grabbed the heavy metal oven from the dollhouse kitchen and began to ___________ the wall for a few minutes. It did the trick; he turned down his music and she could focus once again. (87) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - PRETZEL

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Whenever Charlie had a party to go to, he always brought his delicious, homemade breadsticks. Everyone loved them, but he was getting a bit bored with them. One day, he decided to turn them into pretzels. It was a little hard to do at first, but after some practice, he was able to ___________ a breadstick in less than 10 seconds. They tasted great and Charlie couldn't wait for his friends to try them. (74) |
| RES-NO CHANGE | Charlie adored his job in food research and development at the snack food company. On Thursday, he would be presenting to the board of directors his idea of forming their cheese puffs into the shape of a pretzel. In fact, this new process would allow them to ___________ each cheese puff in just under one second, barely increasing their production costs overall. (62) |
| ORN-CHANGE | Whenever Charlie had a party to go to, he always brought his delicious carrot cake. Everyone loved it, but he was getting a bit bored with it. One day, he got the crazy idea to add pretzels to the batter. It took quite a long time at first, but after some practice, he was able to ___________ the batter easily. Amazingly, the cake tasted even better than before and Charlie couldn't wait for his friends to try it. (78) |
| ORN-NO CHANGE | By all accounts, Charlie was a great waiter at the hotel bar. He had a great memory for drinks and faces, and all the customers liked him. Furthermore, he was always early and had everything set (putting the tables and chairs in order and adding pretzels to every table) well before they opened. One day, however, he was very distracted. He arrived later than usual and barely had enough time to ___________ the tables. The night went downhill from there and he got the worst tips of his career. (89) |
| LOC-CHANGE | Charlie knew a lot of people stored their jewelry in a lot of different places. But he was shocked to see his sister-in-law take off her pearl necklace and put them in a bag of pretzels. When he asked her why, she said that when you ___________ your pearls overnight, the salt acts as a natural cleanser. You just have to brush them gently with a soft toothbrush in the morning and you're good to go! (76) |
| LOC-NO CHANGE | Charlie shut the door behind him. He needed to think fast. He had successfully stolen the microchip, but he could hear them running up the stairs, only seconds away. He had to hide it. But where? Suddenly he noticed the box of pretzels on the kitchen counter. He decided instantly— he would ___________ the microchip for a while until he could figure out how to get it out of the country. After all, who would ever think to look there? (80) |
| INS-CHANGE | Charlie loved to play those scratch-off lottery games. One day, he bought his game card and walked across the street to the park. But when he reached into his pocket for a coin, he couldn't find one. He searched the ground for a penny or something, but all he found was a half-eaten bag of pretzels. He thought for half a second, then grabbed one and started to ___________ the card. After a few seconds, he saw that he was a big winner! He never used anything else again! (89) |
| INS-NO CHANGE | Charlie enjoyed feeding the squirrels in the park. Most of them were very friendly and Charlie could use just about any food to tempt them to come near him. However, there was one squirrel who seemed to be quite picky—having a definite thing for pretzels—and even then he could be standoff-ish. One day, Charlie had to ___________ the squirrel for ten minutes before he would approach him. (69) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - SPIDER

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Oliver was really enjoying his time at sorcery camp, but he was having such a hard time with his magic spells. The sorcerers-in-training were supposed to turn a rock into a spider using a spell of their own creation. Everyone else seemed to get it right away, but it took nearly an hour for Oliver to ___________ his rock. It was just too embarrassing. (64) |
| RES-NO CHANGE | Every year, Oliver would get into Halloween in a very big way. Not only would he dress up for the annual party, but he would dress up his dog, too. This year, he decided they would go as Little Miss Muffet and the Spider. As you can imagine, it took all day and a whole lot of struggling, but Oliver was finally able to ___________ his dog, and they were a huge hit at the party. (76) |
| ORN-CHANGE | Ever since Oliver was a small child, he had been really into anything related to spiders. Everything he owned was covered with pictures of them, and he had tons of little spider figurines placed all over the house. But when he decided to take an afternoon to completely ___________ his new car, his friends were so creeped out that they refused to ride with him. (65) |
| ORN-NO CHANGE | Oliver and his dad decided to go fishing. They weren't having much luck with the bait they were using. Oliver's dad suggested something a bit unusual—spiders. Oliver didn't mind finding them and carrying them back to his dad, but he really didn't want to put them on the hook. Oliver's dad showed him how and encouraged him, and before too long, Oliver was able to ___________ his hook in just a few seconds. By the end of the day, they had caught 16 fish! (85) |
| LOC-CHANGE | Oliver was a very talented entomologist. He had discovered a method of increasing the population of the endangered sun scorpion. The scorpion's eggs would be carried by a surrogate, a spider, in fact. What Oliver does is harvest the eggs from the scorpion and then ___________ them for a few weeks until they are past the critical stage of their development. Then the eggs are put back into the scorpion. The numbers have been very promising in the sample population thus far. (82) |
| LOC-NO CHANGE | Oliver shut the door behind him. He needed to think fast. He had successfully stolen the microchip, but he could hear them running up the stairs, only seconds away. He had to hide it. But where? Suddenly he noticed the Mongolian Monkey and Siamese Spider figurines in the corner. As soon as he picked one up, he decided-- he would ___________ the microchip for a while until he could figure out how to get it out of the country. (79) |
| INS-CHANGE | Oliver lived to torment his little sister. He knew she was deathly afraid of anything creepy crawly, so he would go out into the garden and pick up the biggest, scariest spider he could find and dangle it in front of her until she screamed. One day, his sister decided that she had had enough. She told him that the next time he tried to ___________ her for any length of time, she would bury his favorite videogame in the trash. The threat worked—he never tried it again. (89) |
| INS-NO CHANGE | Oliver and his dad decided to go fishing. They weren't having much luck with the bait they were using. Oliver's dad suggested something a bit unusual—that they use spiders as bait. Oliver didn't mind finding them and carrying them back to his dad, but he really didn't want to put them on the hook, so his dad did that job. They tried to ___________ the fish for the next few hours, but in the end, they still came home empty-handed. (81) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - TIGER

| Context | **Scenario (with word count)** |
|---|---|
| RES-CHANGE | Valerie was really enjoying her time at sorcery camp, but she was having such a hard time with her magic spells. The sorcerers-in-training were supposed to turn a regular cat into a tiger using a spell of their own creation. Everyone else seemed to get it right away, but it took nearly an hour for Valerie to ___________ her cat. It was just too embarrassing. (65) |
| RES-NO CHANGE | Valerie was more than just a movie make-up artist; she was a magician! Disney was doing a live action version of The Jungle Book, and Valerie had been given the task of making a live actor look as much as possible like the tiger, Shere Khan. It took several hours everyday to ___________ the actor, but the end result was truly remarkable. (62) |
| ORN-CHANGE | Valerie just loved tigers. Ever since she was a little girl, she had been collecting figurines of them, which, now that she was an adult, she put all over her house. She couldn't believe it when she found wallpaper simply covered with the striped felines, and she was absolutely thrilled when she was able to ___________ the entire bathroom in less than an hour. (64) |
| ORN-NO CHANGE | Valerie worked in the children's section of the library and she just loved decorating the area to match whatever theme they had going. This month's theme was the jungle. She had already finished the walls, and she had hung a lot of elephants, monkey, and zebras from the ceiling. Now, it was time to add the tigers. She made quick work of it and it only took her 15 minutes to ___________ the rest of the ceiling. She couldn't wait for the kids to see the end result. (88) |
| LOC-CHANGE | When Valerie, a zoologist, heard that a kangaroo rat species was endangered because of disease-carrying fleas, she had an inspiration. She knew Tasmanian tigers were immune to that particular disease, and these fleas would certainly be attracted to the larger animal. Her idea was to introduce the fleas to the new host while they immunized the kangaroo rats. Her suggestion was accepted, and they were able to ___________ the fleas for several months until they were ready to re-introduce them to the kangaroo rats and restore the natural equilibrium. (89) |
| LOC-NO CHANGE | Valerie shut the door behind her. She needed to think fast. She had successfully stolen the microchip, but she could hear them running up the stairs, only seconds away. She had to hide it. But where? Suddenly she noticed the Maltese Monkey and Thai Tiger figurines in the corner. As soon as she picked one up, she decided-- she would ________ the microchip for a while until she could figure out how to get it out of the country. (79) |
| INS-CHANGE | Valerie learned about something very interesting the other day. It seems the Chinese government was experiencing a problem with their wild deer population, which was increasing at an alarming rate. They decided to do something a bit unusual—they decided to use Siberian tigers, which prey on the wild deer naturally, as a method of reducing the population. Preliminary studies showed that if they were able to ___________ the population for even just a couple of years, the number of deer would be much more manageable. (86) |
| INS-NO CHANGE | Valerie learned about something very interesting the other day. It appears that Kellogg's has sued Exxon because they both use similar-looking cartoon tigers to promote their products, Kellogg's since 1952 and Exxon since 1964. For 30 years, the situation was not a problem because the two companies were not in competition, but now the Exxon Mobil Corporation sells food and beverages. Kellogg's does not want them to ___________ their products any longer because, they claim, it is creating consumer confusion. (80) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - TONSIL

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Diana is a very talented medical scientist, specializing in the ear, nose, and throat area. Very recently, she discovered a method of turning stem cells into specific glands, such as tonsils. On her first attempt, it took her over two weeks to ___________ the cells, but over time, her method grew more efficient. She is now also able to create thyroid and salivary glands, and very quickly at that. (69) |
| RES-NO CHANGE | Diana loved to throw Halloween parties for her kids and their friends. She always made foods look like really weird things. For example, last year, she served them "gory gorilla tonsils". They were actually Brussel sprouts covered with melted white cheese (pus) and paprika (blood specks). It hardly took any time at all to ___________ the sprouts, and the kids had the best time being disgusted. (66) |
| ORN-CHANGE | Diana is a very talented medical scientist, specializing in the ear, nose, and throat. Very recently, she discovered a method of turning stem cells into specific glands, such as healthy tonsils, which fight off infection. This has turned out to be very important work, as it appears that many people had theirs removed unnecessarily and it would serve them well to have new ones put back in. And in fact, it would take a surgeon less time to ___________ a patient than the original surgery took to remove them. (89) |
| ORN-NO CHANGE | Diana had seen some rather unusual food choices in her travels, but what she was looking at now was really something. The chief of the tribe had asked for his favorite dish of salad topped with fried chicken tonsils. Diana watched as the chief dropped some on top of his salad, then it was clear that he wanted Diana to ___________ her salad as well. So, Diana took a minute to do that, then she took a deep breath and tried it. It was actually pretty good! (87) |
| LOC-CHANGE | Diana is a very talented medical scientist, specializing in the ear, nose, and throat area. Very recently, she discovered that by extracting some viral cells and inserting them directly into cow tonsils (which fight off infections) and storing them there for a certain amount of time, the cells mutate. They can then be removed and when reinjected into their original host, they negate the effects of the other cells. Diana further found that she could ___________ other viruses for similar amounts of time and with similar success rates. (88) |
| LOC-NO CHANGE | The espionage business was really becoming extreme. Diana worked in the anti-espionage department and she was amazed to discover the lengths some would go to in smuggling technological information. She heard of one case where a microchip was surgically installed in the smuggler's tonsil and stored there until he could successfully leave the country. In fact, the smuggler had to ___________ the microchip for over a week before he found a doctor to remove it. (75) |
| INS-CHANGE | When we speak, we utilize many different places in our mouths to make different speech sounds, e.g. our teeth, our hard palate, our soft palate, even our uvula—that little thing that hangs down in the back of our mouth. Linguists have recently discovered a tribe in the Amazon whose members actually use their tonsils to make certain language sounds. In fact, the speakers of this language are able to ___________ the sounds for a whole minute straight. (78) |
| INS-NO CHANGE | Diana had a weird sense of humor. When, as an adult, she had to have her tonsils removed, she asked if she could have them. Diana kept them in a jar and used them as a paperweight. This would have been fine at home, but she brought it to the office and would ___________ her papers on her desk there all day long. Her employees were certainly not as amused as Diana was. (73) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

TEST ITEM BASE NOUN - WALNUT

| Context | Scenario (with word count) |
|---|---|
| RES-CHANGE | Rufus was a very talented botanist. His primary research focus was the King Billy Pine, an endangered tree of Australia. He discovered that by splicing King Billy Pine genes with Virginia Black Walnut genes, the pine would be able to thrive in its current environment. However, the spliced-in genes would dominate and consequently ___________ the King Billy into a new subspecies of its own in a little over 100 years. (70) |
| RES-NO CHANGE | Rufus took great pride in most of the dishes he cooked, but he just couldn't figure out why his dim sum tasted funny. Looking at the way the restaurants in Chinatown made them, he noticed that they were shaped to look more like walnuts than perfect little balls. So, the very next time, Rufus tried to ___________ them, and although it took twice as long, it made all the difference; every dumpling was perfectly cooked. (75) |
| ORN-CHANGE | Rufus took great pride in the fact that most of his dishes incorporated unique flavors. But, to him, his macaroons were too ordinary. He looked at his recipe, trying to think of what he could add that would give them uniqueness. Suddenly, his eyes focused on the almond extract, and he thought—what about finely-ground walnuts instead? The very next day, he made the macaroons and decided to ___________ them, and although it took twice as long, it made all the difference in the world; everyone raved about them! (89) |
| ORN-NO CHANGE | It's a good thing Rufus was not allergic to nuts because he was simply crazy about them, walnuts in particular. Not only would he add huge amounts to the food he made at home, but he would also bring a whole bag of them to a restaurant. One time, it took him over five minutes to ___________ a fruit plate to his satisfaction. (63) |
| LOC-CHANGE | Rufus learned quite a lot from his trip to the winery. He found out that his favorite wine comes from grapes grown late in the season and is matured in wooden casks made from walnut trees. It seems that the winery has to ___________ the wine for at least five months in order to achieve its distinctive flavor. (58) |
| LOC-NO CHANGE | Rufus just loved the story of Thumbelina, especially the part of her sleeping in half a walnut shell as her bed. When he found a caterpillar outside, he decided that it would become his very own Thumbelina. He brought it inside and before too long it was time for bed. Just like Thumbelina, he thought that he could ___________ the caterpillar overnight. He was quite upset to find it missing in the morning, but not as upset as his mom was to find it in <u>her</u> bed! (87) |
| INS-CHANGE | It's a good thing Rufus was not allergic to nuts because he was simply crazy about them, walnuts in particular. Everywhere he went he took his nutcracker with him so he could eat them whenever he felt like it. One day, though, the nutcracker broke, from overuse probably. Anyway, that left him with nothing to use to crack open his favorite snack. He was so desperate that he even tried to ___________ another walnut for several minutes before he finally had to give up and go without. (87) |
| INS-NO CHANGE | Rufus enjoyed feeding the squirrels in the park. Most of them were very friendly and Rufus could use just about any food to tempt them to come near him. However, there was one squirrel who seemed to be quite picky—having a definite thing for walnuts—and even then he could be standoff-ish. One day, Rufus had to ___________ the squirrel for ten minutes before he would approach him. (69) |

RES = RESULATIVE; ORN = ORNATIVE; LOC = LOCATIVE; INS = INSTRUMENTAL

# Curriculum Vitae

## Carolyn A. Gottfurcht

**Born:**

Detroit, Michigan, May 21, 1968

**Education:**

Ph.D. in Linguistics, Northwestern University, 2008
M.A. in English-Specialization in Applied English Linguistics, University of Wisconsin-Madison, 1994
B.A. with distinction in Psychology and Film/Video Studies, University of Michigan-Ann Arbor, 1990

**Certification:**

Certificate-Teaching English as a Second Language, University of Wisconsin-Madison, 1993

**Fellowships and Awards:**

| | |
|---|---|
| 1997-1998 | Northwestern University Graduate Fellowship (Linguistics) |

**Professional Experience:**

| | |
|---|---|
| Fall 2005 | Adjunct Lecturer<br>School of Continuing Studies, Northwestern University<br>Linguistics 220: Language and Society |
| Spring 2005,<br>Summer 2000,<br>Fall 1999,<br>Summer 1999 | Adjunct Lecturer<br>School of Continuing Studies, Northwestern University<br>Linguistics 204/221: Language and Prejudice |
| Spring 2004;<br>Fall 2004 | Teaching Assistant<br>Department of Linguistics, Northwestern University<br>Linguistics 221: Language and Prejudice |
| Winter 2003;<br>Winter 1999 | Tutor to International Graduate Students<br>ESL Program, Department of Linguistics, Northwestern University |

| | |
|---|---|
| Fall 2003;<br>Fall 2002;<br>Spring 2002;<br>Spring 2000 | Adjunct Lecturer<br>School of Continuing Studies, Northwestern University<br>Linguistics 202:  Introduction to the Study of Words |
| Spring 2003;<br>Spring 2001 | Adjunct Lecturer<br>School of Continuing Studies, Northwestern University<br>Linguistics 330:  Child Language |
| 2001-2002 | Graduate Assistant<br>Office of Fellowships, Northwestern University |
| Spring 2001 | Instructor (Teaching Assistant with Sole Teaching Responsibility),<br>Department of Linguistics, Northwestern University<br>Linguistics 204:  Language and Prejudice |
| Winter 2001 | Instructor (Teaching Assistant with Sole Teaching Responsibility),<br>Department of Linguistics, Northwestern University<br>Linguistics 209:  Language and Society |
| Fall 2000 | Adjunct Lecturer<br>School of Continuing Studies, Northwestern University<br>Linguistics 330:  Language of Prejudice |
| Summer 2000 | Instructor<br>International Summer Institute, Northwestern University<br>English as a Second Language (ESL) and Test of Spoken English<br>(TSE) Preparation for International Graduate Students |
| Fall 1999 | Instructor (Teaching Assistant with Sole Teaching Responsibility),<br>Department of Linguistics, Northwestern University<br>Linguistics 380:  Spoken English for Non-Native Speakers of English:<br>Focus on Intonation and Pronunciation |
| Spring 1999 | Instructor (Teaching Assistant with Sole Teaching Responsibility),<br>Department of Linguistics, Northwestern University<br>Linguistics C81:  Written English for Non-Native Speakers of English |
| Fall 1998 | Teaching Assistant<br>Department of Linguistics, Northwestern University<br>Linguistics B09:  Language and Society |

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| 1995-1997 | Instructor<br>Robert Morris College, Chicago, IL<br>Communications 101: Introduction to Communication<br>Communications 310: Business Communication<br>English 104: English Composition I<br>English 105: English Composition II<br>English 210: Argument, Analysis and Research<br>English 310: Writing for the Professions |
| 1994 | Senior Instructor<br>Department of Literature, University of Asia and the Pacific, Manila, Philippines<br>First Year Literature: Homer<br>Second Year Literature: Virgil<br>Third Year Literature: Shakespeare |
| Spring 1994 | Substitute Instructor<br>ESL Department, International School of Manila, Manila, Philippines<br>High School Social Studies<br>High School English as a Second Language |
| Fall 1993 | Research Assistant for Professor Jane Zuengler<br>Department of English, University of Wisconsin-Madison<br>Cooperative Language Learning |
| Fall 1993 | Tutor of Test of English as a Foreign Language (TOEFL) test-taking for Bolivian International Students<br>Department of Agriculture, University of Wisconsin-Madison |
| Summer 1993 | Instructor<br>English Language Institute, University of Wisconsin-Madison<br>English 110: Reading for Academic Purposes |

**Service:**

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| 2004-2007 | Linguistics Department Librarian<br>Northwestern University |
| 2001 | Rhodes, Marshall, and Mitchell Scholarships Committee<br>Northwestern University |
| 2000 | Guest Speaker: “Language is the Last Acceptable Prejudice”<br>Diversity Conference, Northwestern University |

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| 2000 | Assistant Director<br>ESL Program, Northwestern University |
| 2000 | SPEAK Test Administrator<br>ESL Program, Northwestern University |
| 1999-2000 | Academic Year Program Coordinator<br>ESL Program, Northwestern University |
| | Curriculum Development<br>ESL Program, Northwestern University |
| | SPEAK Test Administrator<br>ESL Program, Northwestern University |
| 1998-1999 | SPEAK Test Rater<br>ESL Program, Northwestern University |
| 1995-1997 | English and Communications Curriculum Committee<br>Robert Morris College, Chicago, IL |
| | Communications Assessment Committee<br>Robert Morris College, Chicago, IL |
| 1994 | Curriculum Planning Committee<br>Department of Literature, College of Arts and Sciences<br>University of Asia and the Pacific, Manila, Philippines |