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NON-NATIVE SPEAKERS OF ENGLISH AND  
DENOMINAL REGULARIZATION

THESIS

Presented to the Graduate Council of the  
University of North Texas in Partial  
Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

By

David S. Borden, B.A.

Denton, Texas

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The purpose of this study was to determine whether non-native speakers of English have access to specifically-linguistic constraints governing past tense morphology. Forty non-native speakers of English rated the naturalness of 29 exocentric, or headless, verbs in a partial replication of Kim, Pinker, Prince, and Prasada (1991) which looked at the same phenomenon in native speakers. Non-native speaker performance was similar to the 40 subject native speaker control group. A correlation also existed between length of residence and subject ratings. The results imply that non-native speakers have access to the rules governing past tense morphology although not as completely as native speakers.

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## CHAPTER 1

### INTRODUCTION TO THE STUDY

#### The study

This thesis addresses whether non-native speakers of English have access to specifically-linguistic constraints that govern past tense formation of exocentric verbs. As explained in Pinker and Prince (1991), exocentric verbs are those verbs deemed to be "headless" because the original grammatical category of the verb has been changed. For example, the verb fly is used as a noun in the baseball term fly (as in "fly ball"), and is then used as a verb again in the sentence, John flied out to left field. Here the irregular verb fly is regularized because it has not totally retained its verb feature. Nouns do not have any past tense mappings, and so, by default, the regular past tense morpheme -ed is used. Kim, Pinker, Prince, and Prasada (1991) showed that native speakers of English are very sensitive to this phenomenon. In the Kim et al. (1991) study, thirty-two native speakers (students at MIT) rated thirty seven verbs with irregular past tense forms using a seven point Likert Scale. The results showed that native speakers did, in fact, rate the regular past tense form of verbs (e.g., flied) better than the irregular past tense

form (e.g., flew) when judging sentences like John flied out to center field.

The intent of the present research is to perform a partial replication of the Kim et al. (1991) study with both native and non-native speakers of English in order to determine whether or not non-natives have access to the same specifically-linguistic information regarding exocentric verbs as native speakers.

#### Overview of Procedures

Forty native speakers of English were used as the control group; they served as a gauge by which the 40 subject non-native experimental group was measured. Data was gathered using a written survey instrument where subjects rated the naturalness of various past tense forms of verbs in context. The mean ratings of the two groups were compared and tested for statistical significance.

#### Overview of Chapters

The thesis is divided into five chapters with eight appendices. Chapter 2 provides the theoretical background leading up to the present study, including a brief description of the study partially replicated here. Chapter 3, Methods, is divided into four sections: subjects, materials, procedures, and hypotheses. Chapter 4 contains the results of the study organized by a protocol based on the seven hypotheses presented in Chapter 3. Chapter 5 contains a discussion of the results and offers suggestions

for further research in this area.

Eight appendices follow. Appendices A, B, and C contain the biographical questionnaire, the self-assessment questionnaire, and the instructions used in the survey device. Appendices D, E, and F contain verb by verb mean ratings for each of the major groups examined (native speakers, non-native speakers, and non-native speakers with a length of residence of four or more years). Appendix G contains the distractors used in the questionnaire, and Appendix H contains the rationale behind the design of the questionnaire instructions.

## CHAPTER 2

### BACKGROUND

This chapter presents the relevant linguistic theory concerning English past tense formation leading up to the present research. Competing models, such as the Rumelhart and McClelland Parallel Distributed Processing model, and formal rule based explanations of past tense formation are discussed. A brief summary of the debate about Universal Grammar and second language learners is presented. The chapter concludes with the rationale behind the current study.

#### The Past Tense

English past tense morphology is generally divided into two major categories, regular and irregular, with irregular verbs in the minority. Bybee and Slobin (1982) posit that irregular forms are learned by rote and stored lexically because irregularity seems to correlate with the frequency of the verb; thus, they speculate that such forms are memorized. They also found that errors produced by native speakers in forming the past tense were not novel forms, but other irregular past tense forms. As a result, Bybee and Slobin concluded that word-word associations are made between the root form and the irregular past tense. They

subcategorize the rote-learned verbs into eight phonologically different groups, some of which are defined by schemas, or shared phonological shapes, that guide the speaker to the correct association.

Bybee and Moder (1983) expand the idea of schemas by showing that speakers of English are more likely to produce a novel irregular form, the closer it resembles a prototypical form. Bybee and Moder use the analogy of a Platonic ideal for a chair. The prototypical chair is a straight-back wooden chair. A whole spectrum of chairs could be associated with this form until one reaches the most divergent from this prototypical form: the bean bag. Applying the idea of prototypicality to irregular verbs, Bybee and Moder posit, for example, that the prototypical form string / strung governs the past tense patterning of phonologically related verbs, such as wring and wrung; as these verbs diverge from the prototype, they become less likely to be inflected in the same manner. These results lead Bybee and Moder to believe that rules may not be necessary when forming the irregular past tense.

Rumelhart and McClelland (1987) developed a connectionist computer model (RM model), triggered by phonological properties (not morphological properties), that was able to learn the English past tense. Similar to the Bybee and Moder (1983) interpretation of past tense

formation, the RM model utilizes an associative network based on phonological properties. Input enters a matrix of modifiable, weighted links; nodes within the matrix turn on if an input exceeds a certain level. The signal is then routed to the most compatible output node where a phoneme association is made. Correct forms are taught to the system by a "teacher" which strengthens the connections. The model automatically generalizes new forms on the basis of sound (not meaning or category), treating irregulars in the same way as regulars. For example, /op/ becomes /opped/ in stop and /ing/ becomes /ang/ in ring. In this way, Rumelhart and McClelland assert that there is no need for children to make the distinction between regular and irregular verbs since they are processed in the same manner.

While learning the past tense, the RM model exhibited behavior resembling the so-called U-shaped learning curve. In this curve, children learning English as their native language initially produce the past tense forms of regular and irregular verbs correctly. For example, at this stage children say go - went and walk - walked. In the second stage, children overgeneralize the regular morpheme, applying the -ed rule to all verbs. At this stage they produce forms such as go and goed, as well as forms like walk - walked. Finally, they learn the distinction between regular and irregular verbs, producing the correct forms

again. These surprising results, produced by a simple model, lead Rumelhart and McClelland (1987) to conclude:

We have, we believe, provided a distinct alternative to the view that children learn the rules of English past-tense formation in any explicit sense. We have shown that a reasonable account of the acquisition of the past tense can be provided without recourse to the notion of a 'rule' as anything more than a *description* of the language. (p.246)

The simplicity of the RM model is appealing. However, its reliance on phonological properties to explain morphological alterations leads to its inability to predict all situations accurately. Pinker and Prince (1988) point out, among other things, that the model cannot handle the elementary problem of homophony. For example, using the Old English strong class of verbs, ring has the past tense form rang; however, the phonologically identical verb wring has the past tense form wrung. Homophony becomes important in relation to exocentric verbs, where verbs derived from nouns (i.e., denominal) are regularized even though they sound the same as verbs with irregular past tense forms. For example, the verb break becomes broke, but in a denominal situation it is often regularized to braked, as in I braked my car suddenly. The RM model, because it is devoid of rules, is incapable of making the distinction. The phenomenon of

denominal regularization was first mentioned in Mencken (1936), who pointed out that, "the preterate (sic) of to 'joy-ride' is not 'joy-rode,' nor 'joy-ridden,' but unless my ears fail me, 'joy-rided'" (p.439). Exocentric regularization is not confined to English alone; Kiparsky (1982) notes that it is a cross-linguistic phenomenon as well.

#### Rule Based Model

The question remains, then, why native speakers of English regularize denominal verbs. Pinker and Prince (1991) argue that irregular past tense forms are stored lexically, not learned by brute force of rote, but rather as different words associated with the present tense counterpart; by contrast, they contend that the -ed past is stored as an independent morpheme.<sup>1</sup> The RM model, on the other hand, uses a word stem to trigger the past tense phonologically. In the case of exocentric verbs, they contend that the irregular lexical association cannot be made because there is no past tense mapping in the noun framework. As a result, the regular past tense is used by default.

Prasada and Pinker (1993), replicating Bybee and Moder (1983), suggest that irregular forms occasionally generate new forms analogous to the prototype, but that regular suffixation is a more powerful mechanism. They claim that



these findings are consistent with Bybee (1985), who states that irregular verbs in English have an historical tendency to become regularized. Prasada and Pinker reason that if analogy (i.e., irregularization based on a phonological prototype) were, in fact, the more productive mechanism in producing the past tense, then verbs would remain phonologically attracted to their prototype regardless of frequency effects.

Because specifically-linguistic constraints govern past tense morphology, as stated above, the irregular past tense is not used for denominal verbs. According to Williams (1981), a verb that is derived from a noun does not carry the same features with it (in this case [irregular], or what Williams calls [+ablaut]); in essence, the verb becomes headless. In figure 1, the verb fly is shown with its feature [irregular]. When used in a past tense context, the irregular past tense form of the verb is chosen in accordance with the feature.

Figure 1.

VERB	fly	[irregular]
	flew	(past tense)

John flew out to California.

However, for the exocentric verb in figure 2, the verb loses its feature [irregular] when it becomes a noun because nouns do not inflect for past tense. When the noun is then used

as a verb, the feature [irregular] remains absent. Subsequently, the past tense form becomes regular.

Figure 2.

VERB	fly	[irregular]
NOUN	fly	[headless]
VERB	fly	(past tense)
	flied	

John flied out to left field.

(For competing viewpoints, see Spencer, 1991)

#### The Second Language Learner and Universal Grammar

There is much debate as to whether Universal Grammar (UG) is accessible to the second language learner. For the most part, the discussion has been centered around syntactic constraints (see White, 1989 and Eubank, 1991 for a more complete discussion). Bley-Vroman (1989) states in his "Fundamental Difference Hypothesis" that first and second language acquisition have little or nothing in common, and that UG is not accessible to the second language learner. Instead, Bley-Vroman contends that adults only have general problem solving capacities available for language learning. He bases this contention on the fact that second language learners have indeterminate intuitions about the L2, and rarely attain native-like mastery.

On the other hand, White (1989) makes the argument, based on underdetermination, that UG is not unaccessible to

the L2 learner. She argues that, as in the first language, second language learners acquire the language even though input is impoverished. UG may be functioning at a certain level, but non-native speakers tend to fossilize (hit a plateau where they cannot progress any further), and some never gain solid intuitions about the L2. In sum, UG is present, but "broken" in some sense. Research should then be directed toward pinpointing those parts of UG where it is functioning or not to discover why second language learners almost never reach native speaker proficiency.

Gasser (1990) examines the implications of connectionism on second language acquisition. He asserts that a parallel distributed processing model (PDP), similar to the one used by Rumelhart and McClelland, more resembles human processes than the traditional rule based model. He goes on to claim that the connectionist model learns rules inductively rather than from an innate framework, and cites the U-shaped curve that the RM model exhibits as support. Gasser performs an experiment using a PDP model where he shows how a second language is learned, in addition to one already acquired by the model, by repeating a training pattern. He explains the differences in L1 and L2 acquisition by positing the following: a) L1 patterns may transfer, b) neurophysiological changes or cognitive development may change the way the learner processes

language, and c) contextual factors (such as setting) may affect acquisition. However, these three factors are difficult to test empirically.

Gasser's model of language acquisition suffers from several shortcomings. He recognizes that the model is a gross oversimplification of the task at hand for the second language learner. He also points out that the network has no sense of time or semantics, and that his results should be viewed cautiously. In addition, the model seems to learn subject-verb word order at a faster rate than verb-subject word order. Ultimately, the model learns subject-verb word order better than verb-subject word order regardless of it being the first or second language introduced. These are odd results considering the common nature of VSO languages (Comrie, 1989).

#### The Current Study

The current study seeks to answer not how language is acquired by second language learners, but what is acquired. Do non-natives rely on phonological information when forming the past tense, or is past tense formation governed by syntactic rules (based on the syntactic category of the head)? The study will examine whether non-natives exhibit the same intuitions about denominal past tense verbs in English as native speakers. For purposes of this study, the specifically-linguistic constraints that underlie exocentric

verbs will be assumed to be part of Universal Grammar. If the non-natives are sensitive to existing and novel exocentric verbs, then one may conclude that they have access to the same specifically-linguistic information on morphological headedness as native speakers.

## CHAPTER 3

### METHOD

This chapter will discuss a) subjects, b) the materials (and rationale behind using those materials), c) the procedure by which the materials were administered to the subjects, and d) the seven hypotheses of the study.

#### Subjects

The control group was composed of 40 University of North Texas students between the ages of 17 and 38, with an average age of 23.8, and an average of 3.5 years of college experience. The subjects were all native speakers of English. Kim et al. (1991), Experiment 2, found no difference in the performance of college educated and non-college educated subjects so this study was not concerned with non-college educated speakers of English.

The experimental group was made up of 40 non-native subjects who were either students or instructors at the University of North Texas and were selected on the basis of how highly they rated their own English language ability (discussed in more detail later). These subjects did not know that they would be selected by the self-assessment procedure. Eighty-one surveys were administered to experimental subjects, but only 40 were selected. The mean

age of the non-native subjects was 25.6 with a range from 18 to 49 years. The subjects had a mean length of residence (LOR) of 6.7 years, range from 1 to 32 years, long enough to ensure quality interactions with the native-speaking population. As shown in table 1, they also had a variety of native-language backgrounds, ensuring that there was no transfer bias from a particular first language.

Table 1

Native Languages of Experimental Group

Language	<u>n</u>	Language	<u>n</u>
Arabic	5	Malay	1
Chinese <sup>a</sup>	7	Norwegian	1
Danish	4	Persian	1
French	3	Spanish	2
German	4	Russian	1
Hindi	1	Thai	2
Indonesian	2	Turkish	2
Japanese	3	Vietnamese	1
Korean	1		

Note. Bilingual and trilingual subjects are not represented in the table.

<sup>a</sup>One subject specified Cantonese and one specified Mandarin.

In addition, 1 subject was bilingual with Catalan and Spanish, and another was trilingual with Catalan, Spanish, and French. Several of the students indicated that they spoke another language in addition to English and their L1. These languages are included in table 2.

Table 2

Second Languages of Experimental Subjects

Languages	<u>n</u>
Arabic	1
Chinese <sup>a</sup>	4
French	4
German	1
Italian	1
Portuguese	1
Punjabi	1
Spanish	1
Taiwanese	1

<sup>a</sup>Two subjects specified Cantonese and one specified Mandarin.



### Materials

The survey instrument was made up of nine pages. Page one was a biographical questionnaire consisting of eight questions. Page two was a six question self-assessment questionnaire (only included in surveys administered to the non-native group). The third page was an instruction sheet. The remainder of the survey was the Naturalness Survey, sealed with tape so that subjects could not begin until they had received oral instructions.

The first page of the survey is a biographical questionnaire (see Appendix A). Questions on this part of the instrument deal with whether the subject is a native speaker, how many years of college he or she completed, if he or she can speak any other languages fluently, and what his or her age and sex are. For the non-natives, the questionnaire has additional questions about LOR and the age at which his or her English education began.

The second page is the self assessment survey. These questions were designed so that subjects that considered themselves to be strong in English could be selected (see Appendix B). In this way, only those subjects most likely to understand the vocabulary used in the questionnaire and the subtle nuances of denominals were included. Six questions appeared on the self-assessment questionnaire covering listening, reading, vocabulary, conversation, academic, and overall skill with the language. Under each

question a 6 point Likert Scale was provided. Each number was accompanied by a word that defined the number scale: 1= "poor," 2= "adequate," 3= "good," 4= "very good," 5 = "excellent," and 6= "native-like." The instructions further defined these categories, "An answer of 1 means you speak a few words of English, and 6 means could be mistaken for a native speaker of English at your college level." The subjects were instructed to circle the number that best represented their ability. They were also told to be honest, and reminded that the questionnaires were anonymous. The self-assessment questionnaire was used because research has shown that self-assessment surveys are a reliable means of rating the ability of non-native speakers (LeBlanc and Painchaud, 1985).

The Naturalness Survey questionnaire was made up of twenty-nine verbs with irregular past tense forms (see Appendix D for a listing of verbs). Each of these verbs has a homophonous noun form which is used to create denominal verbs. These homophonous forms are important with regard to the Rumelhart and McClelland model because they are semantically different, yet sound the same. The RM model would treat them equally, based on their phonological properties. If non-native speakers use phonological properties rather than specifically-linguistic constraints, then one should expect that the non-native speakers would not be sensitive to the regularization effect of exocentric

denominal verbs.

In addition, each verb was chosen because it could be extended metaphorically to form a metaphorical extension verb<sup>2</sup> (ME verb). For example, the verb break can be metaphorically extended away from its original meaning, "to make useless," to a new meaning, "to make something comfortable," as in the sentence, New shoes always hurt my feet until I break them in. ME verbs were used in the Kim et al. (1991) study to test the Semantic Centrality Principle (SCP) of Lakoff (cited in Kim et al. 1991). The SCP states that the more extended the metaphorical use of a verb, the more difficult it will be to associate it with the original irregular form. Pinker and Prince (1991) point out that irregular past tense forms of ME verbs should receive lower ratings than the irregular past tense form of non-ME verbs if the SCP is correct. For the purpose of this study, metaphorical extensions were used in keeping with the original format (and with the notion that metaphorical extensions will receive lower overall ratings when compared with verbs with central meanings). Verbs of all types were chosen on the basis of comprehensibility to the non-natives. In other words, certain cliches and idioms present in Kim et al. (1991), such as grandstanding and highsticking were omitted altogether, and other, more accessible verbs were used.

For each of the twenty-nine verbs, a denominal and ME verb sentence pair was constructed. Each pair had a context sentence to clue the subject in to the meaning of the verb. The survey was constructed such that each context sentence (a present tense form of the verb was used) was followed by a test sentence pair. The pair of test sentences was either denominal or ME verb in nature. Each verb in the test sentence was underlined, and was shown in a regular form and an irregular form.

The verbs were divided into three subcategories. In the Kim et al. (1991) study, these categories were referred to as subexperiments A, B, and C. Here they are referred to as subexperiments 1, 2, and 3. Of the twenty-nine verbs, eight had existing denominal forms as seen in (1a) with a ME verb counterpart, as in (1b). Because these denominals already exist, they serve as a baseline by which other forms can be gauged.

(1a) Mary lies about her age.

She lied to me about her age again.

She lay to me about her age again.

(1b) Mars currently lies out of reach of man.

At one time, the moon lied out of reach of man.

At one time, the moon lay out of reach of man.

These verbs served to demonstrate whether the subjects understood the distinctions with respect to phenomenon that already occur in English. Eight more of the items were

novel denominals as in (2a), with ME verb counterparts, like that shown in (2b).

(2a) The man tied the baskets together with reeds.

He reeded the baskets together.

He read the baskets together.

(2b) The meteorologist tries to read the weather.

She readed it well last week.

She read it well las week.

The remaining thirteen items were novel compound denominals as in (3a) with ME compound verbs, as in (3b).

(3a) The man repaired his bamboo hut with new bamboo shoots.

He re-shooted his hut after the storm.

He re-shot his hut after the storm.

(3b) The movie director re-shoots scenes when the actors make mistakes.

Last week the director re-shooted four scenes.

Last week the director re-shot four scenes.

Four separate versions of the questionnaire were developed. The denominal and ME verb pairs were split onto different test versions so that no subject saw both pairs and could figure out the experimental design. For example, the denominal sentence group in (1a) appeared on forms 1 and 3 while the ME sentence group in (1b) appeared on forms 2 and 4. The past tense forms of the verbs were presented in a different order according to form as well. On versions 1

and 2, test sentences with the regular form of the verb were presented first; on versions 3 and 4, test sentences with the irregular form of the verb were presented first. All four versions were then randomized in order to alleviate biases brought about by the ordering of questions. Twenty distractor items, consisting of regular verbs, were included in the random order. Some of the distractors sentences contained the regular past tense form of the verb and a novel irregular form, as in (4).

(4) Larry chews your ear off with funny stories.

Larry chewed Leslie's ear off last weekend.

Larry chow Leslie's ear off last weekend.

The other distractors used the regular past tense form and a phonologically similar past tense that would be difficult to distinguish, as in (5).

(5) My boss likes to use people for his own personal gain.

My boss used Mr. Jones and then fired him.

My boss uset Mr. Jones and then fired him.

The distractors as a whole were designed to provide the subjects with verbs that clearly did not sound natural, as in the novel irregular in (4), and verbs that sound very similar, as in (5). As a result, when questioned afterward, no subject knew what was being tested. In fact, one non-native subject, pointing to sentence group (5), thought the experiment was examining the perceived differences between

American and British English. (For a complete list of distractors, see Appendix F.)

### Procedure

60 questionnaires were administered to students enrolled in introductory linguistics courses, 40 were selected randomly out of this pool to make up the control group (a multiple of four was necessary due to the experimental design). 81 questionnaires were administered to students enrolled in sophomore level Technical Writing courses for non-native speakers. 40 subjects were selected out of the 81 in accordance with the selection procedure outlined above.

Subjects were instructed to complete the biographical questionnaire (and the self-assessment questionnaire for non-natives) and wait for further instructions. Then, the instructions were given orally. The subjects were asked to rate the naturalness of each past tense regular and irregular verb form "1" to "7" using a Likert Scale. "1" means "very natural sounding" and "7" means "very unnatural sounding." The subjects were told to follow along with the written instructions as the instructions were presented orally (also see Appendix C). Several examples were used to illustrate how the scale works, using non-denominal verbs so that the experimental design was not revealed (see Appendix H for rationale behind specific examples). Example ratings were given on the instruction sheet, but subjects were told

that these were not necessarily "correct." Subjects were told that their opinions might differ, and that there were no wrong answers. Subjects were informed to disregard the spelling of various verbs and to think about how they would sound if pronounced<sup>3</sup>. Also, subjects were reminded to rely on their intuitions or feelings about the sound of the verbs in context when rating them, not on what they considered "proper English."

The subjects were told that their participation in the study was completely voluntary and would not affect their standing in the course in accordance with the University of North Texas research policy. The subjects were then asked to break the seal binding the remainder of the questionnaire, and begin.

#### Hypotheses

Seven hypotheses are tested in this study; all assume a null hypothesis in which there is no difference between native speakers and non-native speakers. The first two are concerned with whether subjects rate regular forms of denominal verbs higher than irregular forms.

Hypothesis 1: Native speakers of English will rate the regular past tense form of denominal verbs higher than the irregular form.



Hypothesis 2: Non-Native speakers will rate the regular past tense form of denominal verbs higher than the irregular past tense form similar to the native speakers.

The next two hypotheses pertain to the SCP and whether the three subexperiments have a significant effect on subject ratings.

Hypothesis 3: No main or interactive effects will be found between native speakers ratings and subexperiment 1, 2, or 3.

Hypothesis 4: No main or interactive effects will be found between non-native speaker ratings and subexperiment 1, 2, or 3.

The next three hypotheses pertain to the phonological subclasses presented in Kim et al (1991) and Bybee and Slobin (1982). If the subjects rate irregular past tense forms of denominal verbs higher within a particular subclass, it may be a result of phonological schemata. In other words, the prototypical form from that particular phonological class is governing the past tense morphology, rather than specifically-linguistic rules. However, Hypothesis 5 and Hypothesis 6 will not be tested statistically, so any results must be regarded with caution.

Hypothesis 5: When native speakers rate irregular past tense forms of denominal verbs higher than the regular form, these errors will not be predictable by phonological subclasses.

Hypothesis 6: When non-native speakers rate irregular past tense forms of denominal verbs higher than the regular form, these errors will not be predictable by phonological subclasses.

Within the non-native group, subjects with a LOR of four years or more (top 16 non-native subjects) are expected to rate the verbs more like native speakers. This assumption is expressed in hypothesis 7. The results from this group will be tested for statistical significance.

Hypothesis 7: Non-native speakers with a LOR of four or more years will rate regular past tense forms of denominal verbs higher than non-native speakers with a LOR of four years or less.

## CHAPTER 4

### RESULTS

This chapter presents the results by examining a) subject ratings of denominal regularization, b) the distribution of these results into the three subexperiments (as outlined in Chapter 3), and c) subclassifying them by phonological properties. Results in each section will be presented in terms of the seven hypotheses with the control group's (native speakers) results given first, and then the experimental group's (non-native speakers) results.

#### Denominal Regularization and Subexperiments

The control group (native speakers) rated the regular past tense form higher than the irregular past tense form for denominal verbs, and rated the irregular past tense form higher than the regular past tense form for ME verbs as predicted by Hypothesis 1. The mean ratings organized by subexperiment for the control group are given in Table 3. A three-way ANOVA was performed on subject ratings, with mean past tense ratings as the dependent variable; and nature of the verb (denominal or ME verb), subexperiment (1, 2, 3), and past tense form (regular or irregular) as independent variables. The two-way interaction between the nature of the verb and past tense form was significant ( $F = 268.554$ ,

$p < .000$ ). The three-way interaction between subexperiment, nature of the verb, and past tense form was not significant ( $F = 0.587$ ,  $p = .558$ ); therefore, subjects were not influenced by whether denominal verbs were pre-existing, novel, or novel compounds. This finding confirms Hypothesis 3.

Table 3

Mean Ratings for Control Group

Nature of the verb	Subexperiment		
	1	2	3
<b>Denominal</b>			
regular	4.42	4.26	4.65
irregular	2.84	2.36	2.33
<b>ME Verb</b>			
regular	2.55	2.27	1.88
irregular	6.56	6.23	6.10

The non-native speakers also rated the regular past tense form of denominal verbs higher than the irregular past tense form, and rated the irregular past tense form higher than the regular past tense form for ME verbs, thus confirming Hypothesis 2. The mean ratings, organized by subexperiment for the experimental group (non-natives) are

given in Table 4.

Table 4

Mean Ratings for Experimental Group

Nature of the verb	Subexperiment		
	1	2	3
<u>Denominal</u>			
regular	5.22	4.38	4.33
irregular	3.49	3.59	3.73
<u>ME Verb</u>			
regular	3.78	3.40	2.97
irregular	5.56	5.88	5.78

A three-way ANOVA was also performed on subject ratings, with past tense ratings as the dependent variable; and nature of the verb (denominal or ME verb), subexperiment (1, 2, 3), and past tense form (regular or irregular) as independent variables. The two-way interaction between the nature of the verb and past tense form was significant ( $F = 252.031$ ,  $p < .000$ ). The three-way interaction between subexperiment, past tense form and nature of the verb was not significant ( $F = 0.587$ ,  $p = .558$ ), showing that non-natives were not sensitive to the subexperiments, confirming Hypothesis 4.

When compared to each other, the control group and the experimental group perform at a similar level. Both the natives and non-natives rated regular past tense forms of denominal verbs higher than the irregular forms. These results are in keeping with the findings in Kim et al. (1991) and are shown in Table 5.

Table 5

Comparison of Overall Results.

Nature of the Verb	Study		
	Non-natives	Natives	Kim et al.
Denominal			
regular	4.59	4.48	4.32
irregular	3.62	2.48	2.37
ME Verb			
regular	3.31	2.17	2.03
irregular	5.74	6.26	5.23

Note. Kim et al. (1991) cannot be directly compared to the current study because of differences outlined in Chapter 3.

Phonological Subclassifications

The results were analyzed in phonological terms as well. Table 6 illustrates the verbs and what groups they belong to according to the subclasses posited by Kim et al.

(1991). These groupings were developed in response to the RM model which, as discussed in Chapter 2, uses phonological properties to determine past tense forms.

Table 6

Phonological Subclass of verbs

Based on Kim et al. (1991)

- 
1. ablaut /e/ --> /o/  
(steal, break, bear, sell, write)
  2. T/D no change  
(cast, spit, shed, beat, split)
  - 3.<sup>a</sup> [ay --> I]  
(hide, slide)
  4. T/D with tense / lax  
(read, flee, meet)
  5. I - ae / \_\_ group  
(stick, strike, drink, sink, ring)
  6. overt "t" ending  
(buy, mean, deal)
- 

<sup>a</sup> The subclass does not appear in Kim et al. (1991).

Table 7 illustrates the verbs and how they fit into the phonological classification system used in Bybee and Slobin (1982). Bybee and Slobin (1982) posited a mechanism by

which irregular past tense formation is governed by a schema, or a phonological relationship between members of the same phonological class.

Table 7

Phonological Subclass of Verbs

Based on Bybee and Slobin (1982)

- 
1. no change  
(cast, spit, shed, beat, split)
  2. /d/ --> /t/
  3. vowel change add t/d  
(sell, flee)
  4. vowel change add t  
(buy, mean, deal)
  5. internal vowel change + dental  
(write, stand, shoot, meet, read, hide, slide)
  6. /I/ --> /ae/ or /U/<sup>4</sup>  
(drink, sink, ring, stick, strike)
  7. all other vowel changes  
(break, bear, steal, lie, see)
  8. all verbs with vowel change ending in a diphthong  
(fly)
- 

Of the 29 verbs used in the study, only three denominal verbs (deal, spit, and banana-split) were rated by native



speaker as more natural sounding in an irregular past tense form (see Appendix D for mean ratings). Each of these three verbs belongs to different phonological subclasses as presented in Kim et al. (1991), shown in Table 8. These verbs are also members of different phonological subclasses according to the Bybee and Slobin (1982) system, as seen in Table 9. These results imply that there is not a strong relationship between subject ratings of the verb forms and phonological cues. In addition, for each phonological subclass, denominal verbs were rated higher in the regular past tense form than in the irregular past tense form. Ratings for the regular past tense form of denominal verbs (3.24) were similar to ratings for irregular forms of denominal verbs (3.08) for the ablaut class /I/ --> /ae/ or /U/<sup>4</sup> (based on Bybee and Slobin, 1982) containing (stick, strike, drink, sink, and ring). Notice that this correlates exactly to subclasses 5 from Kim et al. (1991).

Henceforth, the two synonymous groups (I - ae / \_\_ group and /I/ --> /ae/ or /U/) will be referred to in terms of the Bybee and Slobin (1982) subclass. The regular past tense form of denominal verbs (3.24) was rated similarly to the irregular form (3.08); however, the difference in ratings is in the direction predicted by the formal grammatical theory as presented by Kim et al. (1991). In contrast, the regular form of ME verbs (1.67) was rated much

Table 8

Phonological Subclasses for Native SpeakersBased on Kim et al. (1991)

Phonological Subclass		Past tense form	
		Regular	Irregular
1. ablaut /e/ --> /o/			
(e.g., steal)	Denominal	4.95	2.04
	ME verb	2.09	6.48
2. T/D no-change			
(e.g., cast)	Denominal	4.50	3.25
	ME verb	3.23	6.04
3. [ay -> I]			
(e.g., hide)	Denominal	4.13	2.38
	ME verb	1.88	6.63
4. T/D with tense / lax			
(e.g., read)	Denominal	5.75	1.48
	ME verb	1.58	5.83
5. ablaut /I/ --> /ae/ or /U/			
(e.g., stick)	Denominal	3.24	3.08
	ME verb	1.67	6.62
6. overt "t" ending			
(e.g., buy)	Denominal	4.05	3.02
	ME verb	2.67	5.50

Table 9

Phonological classes of NativesBased on Bybee and Slobin (1982)

Phonological Subclass	Past Tense Form	
	Regular	Irregular
1. no change		
(e.g., cast) Denominal	4.50	3.25
Me verb	3.23	6.04
3. vowel change + t/d		
(e.g., sell ) Denominal	5.95	1.58
Me verb	1.98	5.88
4. vowel change add t		
(e.g., buy ) Denominal	4.05	3.02
Me verb	2.67	5.50
5. internal vowel change + dental		
(e.g., write) Denominal	4.66	2.20
Me verb	1.64	6.62
6. /I/ --> /ae/ or /U/		
(e.g., drink) Denominal	3.24	3.08
Me verb	1.67	6.62
7. all other vowel changes		
(e.g., break) Denominal	4.91	1.78
Me verb	2.35	6.27

lower than the regular form (6.62). In sum, native subjects rated irregular forms of ME verbs as sounding very natural (6.62 out of a possible 7), and rated irregular past tense forms of verbs derived from nouns below the mid point (3.08). These results strongly imply that in a denominal context, phonological properties are not a reliable predictor for past tense formation, thus, confirming Hypothesis 5.

For the non-natives, 10 of the 29 denominal verbs (deal, drink, shed, air-strike, shoot, mean, undersea, taco-stand, banana-split, and water-slide) were rated higher in the irregular past tense form (see Appendix E for mean ratings). The only denominal verb that both the native and non-native speakers consistently rated higher in an irregular past tense form was deal (see Chapter 5 for possible explanations). The verbs listed above fall into several categories; however, the ablaut class /I/ --> /ae/ or /U/ (in which native speakers rated regular and irregular forms of denominal verbs similarly) the non-natives rated the irregular past tense form of the denominals (4.02) higher than the regular form (4.18), as seen in Table 10. The same ratings appear on Table 11 because that particular phonological subclassification is identical to Table 10. On the other hand, within the same phonological subclass the ME verb counterpart is rated lower for regular (3.41) and higher for irregular (5.78), which implies that

Table 10

Phonological Subclasses for Non-Native SpeakersBased on Kim et al. (1991)

Phonological Subclass	Past tense form	
	Regular	Irregular
1. ablaut /e/ --> /o/		
denominal	5.29	2.42
Me verb	2.79	6.34
2. T/D no-change		
Denominal	4.53	4.07
ME verb	4.32	5.05
3. [ay -> I]		
Denominal	4.47	4.43
Me verb	3.30	5.68
4. T/D with tense / lax		
Denominal	4.58	3.23
Me verb	2.22	5.82
5. I - ae / __ group		
Denominal	4.02	4.18
Me verb	3.41	5.78
6. overt "t" ending		
Denominal	4.78	3.92
Me verb	3.35	5.40

Table 11

Phonological Subclasses of Non-NativesBased on Bybee and Slobin (1982)

Phonological Subclass	Past Tense Form	
	Regular	Irregular
1. no change		
Denominal	4.53	4.07
Me verb	4.32	5.05
3. vowel change + t/d		
Denominal	4.80	2.95
Me verb	2.35	6.15
4. vowel change add t		
Denominal	4.78	3.92
Me verb	3.35	5.40
5. internal vowel change + dental		
Denominal	4.65	3.81
Me verb	2.59	6.19
6. /I/ --> /ae/ or /U/		
Denominal	4.02	4.18
Me verb	3.41	5.78
7. all other vowel changes		
Denominal	5.00	2.50
Me verb	3.56	5.77

there is something besides phonological processes affecting the ratings of denominal verbs. Hypothesis 6 seems to be disproved by these results because the phonological subclass appears to govern the past tense formation (see Chapter 5 for possible explanations).

#### Very Advanced Non-Natives

In order to see if there is a relationship between the LOR of a subject and verb ratings, the non-native group was subdivided into those with a LOR of four or more years (LOR 4+) and those with a LOR of four or fewer years. Sixteen subjects fell into the category of LOR plus 4 years. Out of the 29 denominal verbs presented, only 7 verbs (deal, spit, drink, strike, mean, split, and slide) were rated higher in their irregular past tense form by the LOR 4+ group (see Appendix E for individual verb means). Within the phonological subclasses, the LOR 4+ group performed more like the native speakers, rating regular past tense forms of denominals higher than irregular forms, as seen in Table 12 and Table 13.

A three-way ANOVA was performed with mean ratings as the dependent variable, and nature of the verb, past tense form, and subexperiments as the independent variables. The two-way interaction between nature of the verb and past tense form was significant ( $F = 126.262$ ,  $p < .000$ ). The three-way interaction between subexperiments, nature of the

Table 12

Phonological classes for Non-Natives (LOR 4+)Based on Kim et al (1991)

Phonological Subclass	Past tense form	
	Regular	Irregular
1. ablaut /e/ --> /o/		
denominal	5.44	2.40
Me verb	2.30	6.55
2. T/D no-change		
Denominal	4.73	4.08
ME verb	4.40	5.68
3. [ay -> I]		
Denominal	4.81	3.57
Me verb	4.44	5.62
4. T/D with tense / lax		
Denominal	5.00	1.92
Me verb	2.67	6.13
5. I - ae / __ group		
Denominal	4.00	3.03
Me verb	3.78	6.13
6. overt "t" ending		
Denominal	5.21	3.84
Me verb	3.71	5.33



Table 13

Phonological Classes of Non-Natives (LOR 4+ years)Based on Bybee and Slobin (1982)

Phonological Subclass	Past Tense Form	
	Regular	Irregular
1. no change		
Denominal	4.73	4.08
Me verb	4.40	5.68
3. vowel change + t/d		
Denominal	5.26	2.19
Me verb	2.14	6.19
4. vowel change add t		
Denominal	5.21	3.84
Me verb	3.71	5.33
5. internal vowel change + dental		
Denominal	4.77	2.32
Me verb	3.54	6.36
6. /I/ --> /ae/ or /U/		
Denominal	4.00	3.03
Me verb	3.78	6.13
7. all other vowel changes		
Denominal	5.56	3.23
Me verb	1.98	5.90

verb, and past tense form was not significant ( $F = 0.546$ ,  $p = .581$ ). When compared to the other 24 non-native speakers and native speakers, the group, as a whole, performed somewhere in the middle. In other words, the LOR 4+ group rated regular denominals higher than the other non-natives, but not as high as native speakers (see table 14). No statistical analyses were performed on the LOR 1-4 group.

Table 14

LOR Effects on Overall Ratings

Nature of the Verb	Non-Natives		Natives
	LOR 4+yrs	LOR 1-4 yrs	
Denominal			
Regular	4.79	4.45	4.48
Irregular	3.32	3.82	2.48
ME Verb			
Regular	3.11	3.44	2.17
Irregular	5.98	5.61	6.26

## CHAPTER 5

### DISCUSSION

This chapter explores the implications of the results as they relate to the hypotheses presented in Chapter 3. Denominal regularization will be discussed, in terms of first native speakers and then non-native speakers, and how the two differ. The second section addresses the question of phonological influences on the results. The third section discusses the possible relationship between subject LOR and subject performance. The fourth section discusses a semantic argument for the results. The last section contains suggestions for future research.

#### Denominal Regularization

The control group (native speakers) rated regular past tense forms of denominal verbs higher than irregular forms. This result is in keeping with the results of Kim et al. (1991). Native speakers of English favor the use of the regular past tense (i.e., -ed) for denominal verbs; thus, a rule based model of past tense formation accounts for the data better than a phonological model. Although a phonological model can account for non-denominal verbs (Bybee and Moder, 1983), the rule based model is able to account for denominal and non-denominal past tense formation

of irregular verbs. It appears that the root of this problem is that a phonological model does not take grammatical categories into account when implementing morphological changes. Clearly, morphological transformation is not devoid of specifically-linguistic rules that govern alternations.

The experimental group (non-natives) also rated, overall, regular forms of denominal verbs higher than irregular forms. These results imply that non-native speakers of English also have access to the same specifically-linguistic information as native speakers. However, the non-natives did not make as sharp a contrast between regular and irregular forms of denominals as did the natives. Upon closer examination one finds that the non-natives rated irregular ME verbs (5.74) much higher than the regular form (3.31) overall. When these numbers are then compared to the denominal ratings, one discovers that the regulars (4.59) and irregulars (3.62), although rated closer together than the natives, show that irregular forms of denominal verbs are rated more than two points lower than the irregular form of the ME verbs (see Table 5, Chapter 4). One could conclude that rule governed behavior better explains the data. Phonological triggering of the past tense would not result in such a difference between whether the head of the verb was a noun or not.

The subexperiments did not significantly affect either

the natives or the non-natives. For the non-natives, subexperiment 3 showed only a slight difference between the ratings of regular and irregular denominals (0.60); however, the difference between irregular forms of ME verbs and irregular forms of denominal verbs was more than two (2.05). Again, the relative closeness of mean ratings for denominal verbs in subexperiment 3 are not related to the subexperiment itself.

#### Phonological Subclasses

The control group rated regular forms of denominal verbs higher than irregular forms without regard to phonological subclass. However, for the ablaut class /I/ --> /ae/ or /U/, native speakers rated regular and irregular forms of denominal verbs very closely. One could argue that the strength of the phonological prototype governing this class influenced subject ratings. However, if the prototype argument is true, then why are irregular forms of ME verbs overwhelmingly rated higher (3.54 points higher) than irregular forms of denominal verbs in this class? Again, the inherent nature on the verb (whether denominal or not) is stronger than any phonological cues (see Prasada and Pinker, 1993 for a more indepth discussion on the question of relative strengths of rules versus phonological prototypes).

The experimental group rated the regular form of denominal verbs higher than the irregular form in all of the

phonological subclasses except in the ablaut class /I/ --> /ae/ or /U/. For this subclass, the non-natives rated the irregular form slightly higher (0.16 points higher) than the regular form. This result has several possible explanations. First, the experimental group consistently rated regular past tense forms closer to irregular past tense forms on the scale than the control group. The marginal ratings of the control group in this class coupled with the smaller distance between experimental group ratings of denominal regulars and irregulars caused the overlap. However, this explanation is impossible to prove. The second explanation is that non-native speakers are more sensitive to phonological cues for this subclass (/I/ --> /ae/ or /U/) than native speakers. However, when one examines the individual mean ratings of the verbs in this subclass, one finds that three (drink, strike, sink) of the five verbs are rated higher in the irregular denominal form. These are also verbs that are very difficult to denominalize.

An alternative explanation emerges: the non-native speakers, when confronted with a strange construction (see Appendix E for exact sentences used) default to prescriptive phonological cues. The non-natives do not feel comfortable with applying rules to the construction because of the sometimes phonologically bizarre output; thus, they opt for the comfort of simply applying the irregular past tense

form. The above scenario is not provable with the data given, but this hypothesis finds some support when the non-native group is divided into two smaller groups based on LOR.

#### Subject LOR in Relation an Subject Ratings

The experimental group was subdivided into two groups. The first group had a LOR of four or more years (LOR 4+) and contained 16 subjects. The second group had a LOR of one to four years (LOR 1-4) and contained the remaining 24 subjects. The LOR 4+ group rated verbs more like the control group than did the remaining 24 non-natives or the non-native group as a whole. One could hypothesize that LOR has an effect on subject ratings. Then the question arises, have these subjects (LOR 4+) acquired more intuitions about English than their LOR 1-4 counterparts? The empirical evidence seems to support this position.

When the LOR 4+ group results are organized into phonological subclasses, an interesting fact arises. The LOR 4+ group rates the regular form of denominal verbs higher than the irregular form in every class, including the /I/ --> /ae/ or /U/ subclass. It appears that these subjects are more comfortable with regularizing awkward forms, unlike the rest of the non-native group which still is more comfortable relying on prescriptive rules of irregular past tense formation.

### The Semantic Explanation

Harris (1992) takes the Pinker and Prince (1991) account of past tense formation to task. She posits the notion that verbs have a central meaning (similar to the SCP of Lakoff) and that as the meaning of the verb becomes divergent from the original meaning, the less likely it will be inflected in the same way. Using a 6 point Likert Scale, she had native speaker subjects rate the semantic distance of the verbs used in the Kim et al (1991) study to see if a correlation existed between semantic distance and regularization. A rating of 1 = central meaning (e.g., fly, meaning to move through the air) and 6 = most divergent, or denominal (e.g., fly, meaning hit a baseball high in the air). Using this system, she was able to explain some of the behavior of the Kim et al (1991) subject ratings (mainly those cases where subject ratings were counter to the hypotheses set out by Kim et al., 1991).

A connectionist model, incorporating this semantic rating system, was able to form the past tense with a 90% acquisition rate. These results lead the researchers to conclude, "The theory here is that people are able to judge semantic distances and that this information enters into the computation of the past tense" (Daugherty, MacDonald, Peterson, and Seidenberg, 1993).

Although this approach carries some merit, it also has some inherent problems. First, it is assumed that each verb



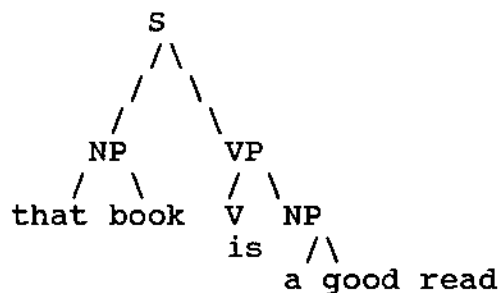
has a particular central meaning and that all verbs related to it are divergent along a scale of descending centrality. The model also assumes (on top of the first assumption) that native speakers can detect, and metalinguistically rate the level of divergence from the original form. Furthermore, the model assumes that past tense morphology is heavily influenced by semantic relationships.

#### Suggestions for Further Research

This section proposes three major points where further research should be directed: a) the phenomenon of denominal regularization, b) studies looking specifically at non-natives and whether they default to prescriptive rules when confronted with odd constructions, c) studies of non-natives with various lengths of residence, and d) studies with more naturalistic data.

Little is really known about denominal verbs. Some verbs readily can be nominalized and denominalized, such as fly. But, all verbs do not have this ability. For example, the verb read can be nominalized in the sentence That book is a good read. Figure 3 illustrates its structure.

Figure 3.



However, it is impossible to then transform read back into a denominal verb. As a result, the sentence, The book readed well sounds very strange. Other verbs seem to fall into a category somewhere in between. As shown in the present study, strike is sometimes accepted and other times rejected in a regularized denominal verb form, as in the sentence, The airforce launched an airstrike; they airstriking the enemy position with much force. A study focusing on denominals alone should be carried out in order to determine the rules that govern this alternation. Thus, shedding light on possible explanations for results in the present study.

Non-native speakers appeared to rate some verbs based on prescriptive rules. Perhaps a study comparing non-natives who are literate in the L2 and acquired it naturalistically to the current subjects would shed some light on if an influence from education is an issue. Of course, finding such a subject pool would be extremely difficult. It would be valuable to carry out a study specifically looking at whether certain denominal verbs are in fact understood correctly in context. Many non-native subjects rated irregular forms of denominal verbs higher, but was this simply a result of the non-natives not fully understanding the context?

More research should be directed toward length of residence and its effect on subject performance. A similar

study needs to focus on low, intermediate, and advanced non-native speakers of English to determine whether the specifically-linguistic constraints posited in this study are acquired as a result of extended exposure, and if non-natives who have lived in an English speaking environment over an extended period of time ever perform in the same way as native speakers.

Lastly, studies should be conducted using more naturalistic data. Conversations or fill-in-the-blank verb tests might render slightly different results. Do non-natives, at different levels, understand and accept regularized denominal verbs in conversation, and do they produce them? It would be interesting to learn the level at which non-natives feel comfortable enough with English to produce odd sounding constructions like regularized denominals.

## NOTES

<sup>1</sup> A hybrid system exists where regular and irregular inflection is governed by rules. Regulars are computed on-line via a traditional rule based model. Irregulars are stored in an associative, connectionist-like system where analogy (prototypical forms) is partially productive in mapping the correct past tense form.

<sup>2</sup> Kim, Pinker, Prince, and Prasada (1991) use the term deverbals.

<sup>3</sup> In Kim et al. (1991) no significant difference was found between ratings for novel spellings and actual spellings.

<sup>4</sup> Because of the lack of appropriate IPA fonts, /U/ has been substituted for the mid, unrounded back vowel, normally denoted by an upside-down "v" in IPA.

APPENDIX A  
BIOGRAPHICAL QUESTIONNAIRE

## [BIOGRAPHICAL QUESTIONNAIRE]

## NATURALNESS SURVEY

1. Is your native language English? \_\_\_\_\_ (Yes/No)  
(If you answer yes, skip questions 2 - 4.)
2. What is your native language? \_\_\_\_\_
3. At what age did you begin learning English? \_\_\_\_\_ years
4. How long have you lived in an English speaking country? \_\_\_\_\_
5. Age \_\_\_\_\_
6. Sex \_\_\_\_\_
7. Years of college? \_\_\_\_\_
8. What other languages do you speak? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

APPENDIX B  
INSTRUCTIONS TO THE SURVEY

## INSTRUCTIONS

In this questionnaire you will be asked to rate the naturalness of various past tense verbs. You are to rate them on a scale from 1-7 where 1 means *very unnatural sounding* and 7 means *very natural sounding*. For example:

My sister comes home to Boston on weekends.

1. She came home to Boston.  
 2. She comed home to Boston.

Some sentence pairs may both sound natural, although each verb sounds a little different:

Maria dreams about winning a lot of money.

3. She dreamed that she won the lottery.  
 4. She dreamt that she won the lottery.

Rate the verb in the context of the sentence. Some verbs may sound awkward standing alone, but may sound very natural in the context of the sentence. For example:

In some states they still hang criminals.

5. They hanged the criminal.  
 6. They hung the criminal.

In this case, 'hanged' sounds strange by itself, but in the context of sentence (5) it sounds very natural. Do not judge verbs without carefully considering the context.

My parents hang paintings in their house.

7. They hanged the painting over the fireplace.  
 8. They hung the painting over the fireplace.

Remember to read the sentences carefully so that you are sure you understand them completely. Also carefully read the first sentence (present tense) in the three sentence group to get a feeling for the meaning of the verb. Most importantly, use your **intuitions** or **feelings** about the verbs when rating them as natural or unnatural. For example:

The man slays large animals for the meat. ('slay' meaning to kill)

9. The man slayed a bear yesterday.  
 10. The man slew a bear yesterday.

In this example you might want to rate 'slew' higher because you think it sounds more formal, but you really think 'slew' sounds weird, and that 'slayed' sounds more natural. Follow your instincts and rate them according to what you feel-- not according to what you think is "proper English."

Disregard spelling and concentrate on how the word would sound if pronounced in the context of the sentence. Remember there are no wrong answers and you may take your time, but try to go with your first instinct.



**APPENDIX C**  
**SELF-ASSESSMENT QUESTIONNAIRE**

## [ SELF-ASSESSMENT QUESTIONNAIRE ]

Please rate your English ability in the following questions. Circle the number that most resembles your English ability in that category. An answer of 1 means you speak a few words of English, and 6 means that you could be mistaken for a native speaker of English at your college level.

1. My English listening skills are:

poor	adequate	good	very good	excellent	native-like
1	2	3	4	5	6

2. My English reading skills are:

poor	adequate	good	very good	excellent	native-like
1	2	3	4	5	6

3. My skills in understanding new vocabulary are:

poor	adequate	good	very good	excellent	native-like
1	2	3	4	5	6

4. My English conversation skills are:

poor	adequate	good	very good	excellent	native-like
1	2	3	4	5	6

5. My academic English skills are:

poor	adequate	good	very good	excellent	native-like
1	2	3	4	5	6

6. Overall, I consider my English to be:

poor	adequate	good	very good	excellent	native-like
1	2	3	4	5	6

**APPENDIX D**  
**NATIVE SPEAKER MEAN RATINGS**

## NATIVE SPEAKER MEAN RATINGS

## Existing Denominal vs. Metaphorical Extension Verb

1. **steel / steal**

A. Frank needs muscles of steel to lift heavy things at work.

3.35 Frank steeled his muscles at the gym by lifting weights.

1.55 Frank stole his muscles at the gym by lifting weights.

B. Hank is good at stealing girl's hearts.

1.80 Yesterday Hank stealed Mary's heart.

6.85 Yesterday Hank stole Mary's heart.

2. **broadcast / cast**

A. Bill watches the sports broadcasts on NBC.

6.30 Last week NBC broadcasted a basketball game.

3.50 Last week NBC broadcast a basketball game.

B. The fisherman casts his nets into the ocean to catch fish.

4.70 Last week the fisherman casted his nets into the ocean.

6.25 Last week the fisherman cast his nets into the ocean.

3. **lie / lie**

A. Mary tells lies about her age.

6.65 She lied to me about her age again.

1.35 She lay to me about her age again.

B. Mars currently lies out of reach of man.

3.15 At one time, the moon lied out of reach of man.

1.35 At one time, the moon lay out of reach of man.

## 4. ring / ring

A. The children formed a ring around the school by holding hands in a big circle.

4.05 The children ringed the school.

2.25 The children rang the school.

B. The telephone was ringing off the wall at work today.

1.60 The telephone ringed off the wall.

6.90 The telephone rang off the wall.

## 5. brake / break

A. I put my foot on the brake to stop my car.

4.30 I braked my car quickly.

2.20 I broke my car quickly.

B. New shoes always hurt my feet when I first put them on, and I always hate breaking them in to make them comfortable.

1.70 I braked in my shoes last week.

6.50 I broke in my shoes last week.

## 6. deal / deal

A. The car salesman finally made me a great deal on my new car.

3.50 He dealed with me about the price all afternoon.

6.05 He dealt with me about the price all afternoon.

B. Life deals a lot of sadness to some people.

4.10 Life dealed Frank a lot of sadness.

6.55 Life dealt Frank a lot of sadness.

## 7. lead / lead

A. Some mechanical pencils use a lot of lead.

4.45 Last week I leaded my pencil everyday.

1.65 Last week I led my pencil everyday.

B. Critics say that Dr. Jones is leading students astray.

1.75 Critics say that he leaded some students astray.

6.95 Critics say that he led some students astray.

### 8. stick / stick

A. I tied sticks to the trees in front of my house to make them stand up straight.

2.75 I sticked all of the trees in front of my house.

4.15 I stuck all of the trees in front of my house.

B. Sometimes Harry does not stick to the facts when he tells a story; instead, he states a lot of his own opinions.

1.60 He sticked to the facts in his last story.

6.90 He stuck to the facts in his last story.

### Novel Denominal vs. Metaphorical Extension Verb

### 9. spit / spit

A. At the Bar-B-Q Mr. Jones slowly cooked the beef on a spit using a steel rod over a large fire.

2.90 Yesterday he spitted some beef.

3.95 Yesterday he spit some beef.

B. Sometimes my computer spits out the wrong data.

1.85 Yesterday it spitted out the wrong data again.

6.90 Yesterday it spit out the wrong data again.

### 10. sink / sink

A. After dinner I put all the dishes in the sink and turn on the water.

3.35 After dinner last night, I sinked the dishes then turned on the water.

3.20 After dinner last night, I sank the dishes then turned on the water.

B. My hopes of getting all "A's" sink when I don't do well in a class.

1.65 After I got a "C" on my first algebra test, my hopes sinked.

6.40 After I got a "C" on my first algebra test, my hopes sank.

## 11. Bear / bear

A. The Forest Service wants to put bears back in Yosemite National Park.

5.80 Last year the Forest Service re-beared Yellowstone National Park.

1.35 Last year the Forest Service re-bore Yellowstone National Park.

B. Shelly does not bear bad news very well.

3.60 She beared the news of the accident poorly.

5.55 She bore the news of the accident poorly.

## 12. reed / read

A. The man tied the baskets together with reeds.

5.60 He reeded the baskets together.

1.55 He read the baskets together. (pronounced 'red')

B. The meteorologist tries to read the weather.

1.10 She readed it well last week.

6.80 She read it well last week. (pronounced 'red')

## 13. drink / drink

A. The bartender served Frank mixed drinks for several hours.

2.10 The bartender drinked Frank for hours.

2.05 The bartender drank Frank for hours.

B. When I go to the art museum, I drink up the paintings with my eyes.

1.60 Yesterday, at the art museum, I drinked up the paintings.

6.00 Yesterday, at the art museum, I drank up the paintings.

14. **shed / shed**

A. After the harvest, the farmer puts his tractor in the old wooden shed behind his house.

3.80 After this year's harvest the farmer shedded his tractor.

3.50 After this year's harvest the farmer shed his tractor.

B. Bob is shedding himself of all of his old possessions by giving them to charity.

2.90 Bob shedded his old television last week.

5.70 Bob shed his old television last week.

15. **beet / beat**

A. The farmer plants sweet beets in his garden every year.

4.95 This year he beeted his garden early.

1.90 This year he beet his garden early.

B. Susan's heart beats faster when she is happy.

3.75 Susan's heart beated with joy at the party.

5.60 Susan's heart beat with joy at the party.

16. **cell / sell**

A. The guards put the prisoners back into their prison cells.

5.55 The guards celled the prisoners after lunch.

1.40 The guards coled the prisoners after lunch.  
(pronounced 'sold')

B. We tried to sell our father on the idea of going home early.

1.70 Last week we selled him on the idea of going home early.

6.85 Last week we sold him on the idea of going home early.



Novel Denominal Compound vs. Novel ME Verb Compound

17. **copyright / write off**

A. Dr. Smith owns the copyright on her book.

5.75 The publisher copyrighted the book for her.

3.70 The publisher copyrote the book for her.

B. Betty writes off all of her charity donations on her taxes.

1.65 Betty writed off her donation of \$100 last month.

6.65 Betty wrote off her donation of \$100 last month.

18. **goodbye / buy**

A. We said goodbye to the hosts of the party for an hour.

4.45 We goodbyed the hosts for an hour after the party.

1.10 We goodbought the hosts for an hour after the party.

B. Melissa buys more than anybody I know.

1.40 Tuesday she out-buyed everyone in the store.

6.60 Tuesday she out-bought everyone in the store.

19. **de-flea / re-flee**

A. When I leave my dog outside too long I have to de-flea him with a bath.

6.35 I left him outside too long yesterday so I de-flea'd him this morning.

1.75 I left him outside too long yesterday so I de-fled him this morning.

B. The rebels had to flee into the hills after the battle.

2.25 The next day they re-fleed again to the hills after another battle.

4.90 The next day they refled again to the hills after another battle.

## 20. airstrike / strike

A. The air-strike against the enemy was successful.

3.95 The air force air-striking the enemy again today.

3.75 The air force air-struck the enemy again today.

B. Sometimes an idea just suddenly strikes people.

1.90 The scientist was suddenly stricken with a new idea.

6.90 The scientist was suddenly struck with a new idea.

## 21. de-fly / re-fly

A. My grandmother's house is full of flies.

5.45 She de-flies her house yesterday with poison.

2.10 She de-flew her house yesterday with poison.

B. My brother flies to Houston often.

1.55 He re-flies to Houston on business last week.

5.35 He re-flew to Houston on business last week.

## 22. meat / meet

A. Sally does not like meat so she always takes it off of her pizza.

5.30 Sally de-meats the pizza we shared yesterday.

1.15 Sally de-met the pizza we shared yesterday.

B. Sometimes I forget the names of people, and I must meet them again.

1.40 Yesterday I re-meeted a man at work.

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## 23. shoot / shoot

A. The man repaired his bamboo hut with new bamboo shoots.

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2.05 The man re-shot his hut after the storm.

B. The movie director re-shoots scenes when the actors make mistakes.

2.00 Last week the director re-shooted four scenes.

6.90 Last week the director re-shot four scenes.

25. **hide / hide**

A. Billy has some old chairs with cowhide seats.

4.85 When the seats fell apart, Billy re-hidden them.

1.85 When the seats fell apart, Billy re-hid them.

B. After looking at his buried treasure, the pirate hides it again.

1.70 The pirate re-hidden his treasure twice last year.

6.60 The pirate re-hid his treasure twice last year.

26. **mean / mean**

A. The math teacher told us that the class mean was 62%.

4.20 He thought that was too low so he re-meanned it.

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B. Roger has to choose between two sports that mean a lot to him.

2.50 He chose basketball because it out-meanned football to him.

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27. **undersea / oversee**

A. The navy wants to expand undersea exploration.

4.45 The navy undersea'd 12 more boats.

2.45 The navy undersaw 12 more boats.

B. The manager oversees 25 employees.

1.50 At one time the manager overseed 10 employees.

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A. Paco's goal as a businessman is to put one of his taco stands on each street corner.

3.00 Paco taco standed all of downtown last year.

2.20 Paco taco stood all of downtown last year.

B. My brother understands calculus.

1.55 He understanded Algebra at an early age.

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**29. banana split / split**

A. Sharon serves me a banana split every time I go to her house.

4.55 I cannot eat another banana split; I'm splitted-out.

3.40 I cannot eat another banana split; I'm split-out.

B. My brother and I compete to see who can split logs faster with an axe.

2.95 Last week I out-splitted my brother.

5.75 Last week I out-split my brother.

**30. water slide / slide**

A. The Funslide Company built a water-slide on the hill outside of town.

3.40 The company water-slided the side of the hill.

2.90 The company water-slid the side of the hill.

B. My little brother likes to run and slide on icy sidewalks; he can slide further than any of his friends.

2.05 He out-slided all of his friends yesterday.

6.65 He out-slid all of his friends yesterday.

APPENDIX E  
NON-NATIVE SPEAKER MEAN RATINGS

## NON-NATIVE SPEAKER MEAN RATINGS

## Existing Denominal vs. Metaphorical Extension Verb

## 1. steel / steal

A. Frank needs muscles of steel to lift heavy things at work.

4.90 Frank steeled his muscles at the gym by lifting weights.

1.80 Frank stole his muscles at the gym by lifting weights.

B. Hank is good at stealing girl's hearts.

3.20 Yesterday Hank stealed Mary's heart.

6.80 Yesterday Hank stole Mary's heart.

## 2. broadcast / cast

A. Bill watches the sports broadcasts on NBC.

5.65 Last week NBC broadcasted a basketball game.

4.40 Last week NBC broadcast a basketball game.

B. The fisherman casts his nets into the ocean to catch fish.

4.65 Last week the fisherman casted his nets into the ocean.

4.35 Last week the fisherman cast his nets into the ocean.

## 3. lie / lie

A. Mary tells lies about her age.

6.95 She lied to me about her age again.

1.75 She lay to me about her age again.

B. Mars currently lies out of reach of man.

4.90 At one time, the moon lied out of reach of man.

5.05 At one time, the moon lay out of reach of man.

#### 4. ring / ring

A. The children formed a ring around the school by holding hands in a big circle.

5.05 The children ringed the school.

3.65 The children rang the school.

B. The telephone was ringing off the wall at work today.

3.00 The telephone ringed off the wall.

5.95 The telephone rang off the wall.

#### 5. brake / break

A. I put my foot on the brake to stop my car.

5.40 I braked my car quickly.

2.40 I broke my car quickly.

B. New shoes always hurt my feet when I first put them on, and I always hate breaking them in to make them comfortable.

2.75 I braked in my shoes last week.

6.60 I broke in my shoes last week.

#### 6. deal / deal

A. The car salesman finally made me a great deal on my new car.

4.80 He dealed with me about the price all afternoon.

5.50 He dealt with me about the price all afternoon.

B. Life deals a lot of sadness to some people.

4.60 Life dealed Frank a lot of sadness.

5.05 Life dealt Frank a lot of sadness.

#### 7. lead / lead

A. Some mechanical pencils use a lot of lead.

4.05 Last week I lead my pencil everyday.

3.80 Last week I led my pencil everyday.

B. Critics say that Dr. Jones is leading students astray.

2.95 Critics say that he lead some students astray.

6.70 Critics say that he led some students astray.

### 8. stick / stick

A. I tied sticks to the trees in front of my house to make them stand up straight.

5.00 I sticked all of the trees in front of my house.

4.66 I stuck all of the trees in front of my house.

B. Sometimes Harry does not stick to the facts when he tells a story; instead, he states a lot of his own opinions.

4.15 He sticked to the facts in his last story.

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### Novel Denominal vs. Metaphorical Extension Verb

### 9. spit / spit

A. At the Bar-B-Q Mr. Jones slowly cooked the beef on a spit using a steel rod over a large fire.

4.60 Yesterday he spitted some beef.

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B. Sometimes my computer spits out the wrong data.

4.50 Yesterday it spitted out the wrong data again.

5.15 Yesterday it spit out the wrong data again.

### 10. sink / sink

A. After dinner I put all the dishes in the sink and turn on the water.

4.40 After dinner last night, I sinked the dishes then turned on the water.

4.55 After dinner last night, I sank the dishes then turned on the water.

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## 11. Bear / bear

A. The Forest Service wants to put bears back in Yosemite National Park.

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B. Shelly does not bear bad news very well.

4.20 She bearred the news of the accident poorly.

5.30 She bore the news of the accident poorly.

## 12. reed / read

A. The man tied the baskets together with reeds.

4.50 He reeded the baskets together.

3.75 He read the baskets together. (pronounced 'red')

B. The meteorologist tries to read the weather.

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## 13. drink / drank

A. The bartender served Frank mixed drinks for several hours.

2.00 The bartender drinked Frank for hours.

3.50 The bartender drank Frank for hours.

B. When I go to the art museum, I drink up the paintings with my eyes.

3.15 Yesterday, at the art museum, I drinked up the paintings.

6.80 Yesterday. at the art museum, I drank up the paintings.

14. **shed / shed**

A. After the harvest, the farmer puts his tractor in the old wooden shed behind his house.

4.80 After this year's harvest the farmer shedded his tractor.

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B. Bob is shedding himself of all of his old possessions by giving them to charity.

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5.30 Bob shed his old television last week.

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A. The farmer plants sweet beets in his garden every year.

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16. **cell / sell**

A. The guards put the prisoners back into their prison cells.

5.80 The guards celled the prisoners after lunch.

2.40 The guards coled the prisoners after lunch.  
(pronounced 'sold')

B. We tried to sell our father on the idea of going home early.

1.55 Last week we selled him on the idea of going home early.

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Novel Denominal Compound vs. Novel ME Verb Compound

17. **copyright / write off**

A. Dr. Smith owns the copyright on her book.

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B. Betty writes off all of her charity donations on her taxes.

2.25 Betty writed off her donation of \$100 last month.

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18. **goodbye / buy**

A. We said goodbye to the hosts of the party for an hour.

5.50 We goodbyed the hosts for an hour after the party.

1.45 We goodbought the hosts for an hour after the party.

B. Melissa buys more than anybody I know.

2.30 Tuesday she out-buyed everyone in the store.

6.00 Tuesday she out-bought everyone in the store.

19. **de-flea / re-flee**

A. When I leave my dog outside too long I have to de-flea him with a bath.

3.80 I left him outside too long yesterday so I de-flea'd him this morning.

3.50 I left him outside too long yesterday so I de-fled him this morning.

B. The rebels had to flee into the hills after the battle.

3.15 The next day they re-fleed again to the hills after another battle.

5.40 The next day they refled again to the hills after another battle.

## 20. airstrike / strike

A. The air-strike against the enemy was successful.

3.65 The air force air-striking the enemy again today.

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B. Sometimes an idea just suddenly strikes people.

3.25 The scientist was suddenly stricken with a new idea.

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## 21. de-fly / re-fly

A. My grandmother's house is full of flies.

4.75 She de-flies her house yesterday with poison.

3.20 She de-flew her house yesterday with poison.

B. My brother flies to Houston often.

3.70 He re-flies to Houston on business last week.

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## 22. meat / meet

A. Sally does not like meat so she always takes it off of her pizza.

5.45 Sally de-meated the pizza we shared yesterday.

2.45 Sally de-met the pizza we shared yesterday.

B. Sometimes I forget the names of people, and I must meet them again.

1.70 Yesterday I re-meeted a man at work.

5.65 Yesterday I re-met a man at work.

## 23. shoot / shoot

A. The man repaired his bamboo hut with new bamboo shoots.

3.90 The man re-shooted his hut after the storm.

4.60 The man re-shot his hut after the storm.

B. The movie director re-shoots scenes when the actors make mistakes.

2.85 Last week the director re-shooted four scenes.

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25. **hide / hide**

A. Billy has some old chairs with cowhide seats.

4.95 When the seats fell apart, Billy re-hidden them.

3.65 When the seats fell apart, Billy re-hid them.

B. After looking at his buried treasure, the pirate hides it again.

3.15 The pirate re-hidden his treasure twice last year.

5.80 The pirate re-hid his treasure twice last year.

26. **mean / mean**

A. The math teacher told us that the class mean was 62%.

4.05 He thought that was too low so he re-meanned it.

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B. Roger has to choose between two sports that mean a lot to him.

3.15 He chose basketball because it out-meanned football to him.

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27. **undersea / oversee**

A. The navy wants to expand undersea exploration.

3.40 The navy undersea'd 12 more boats.

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B. The manager oversees 25 employees.

2.75 At one time the manager overseed 10 employees.

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A. Paco's goal as a businessman is to put one of his taco stands on each street corner.

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**29. banana split / split**

A. Sharon serves me a banana split every time I go to her house.

3.10 I cannot eat another banana split; I'm splitted-out.

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B. My brother and I compete to see who can split logs faster with an axe.

3.95 Last week I out-splitted my brother.

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**30. water slide / slide**

A. The Funslide Company built a water-slide on the hill outside of town.

4.00 The company water-slided the side of the hill.

5.20 The company water-slid the side of the hill.

B. My little brother likes to run and slide on icy sidewalks; he can slide further than any of his friends.

3.45 He out-slided all of his friends yesterday.

5.55 He out-slid all of his friends yesterday.

APPENDIX F

NON-NATIVE SPEAKER MEAN RATINGS:

SUBJECTS WITH A LOR OF 4+ YEARS

## NON-NATIVE SPEAKER RATINGS:

## SUBJECTS WITH A LOR OF 4+ YEARS

## Existing Denominal vs. Metaphorical Extension Verb

1. **steel / steal**

A. Frank needs muscles of steel to lift heavy things at work.

4.88 Frank steeled his muscles at the gym by lifting weights.

1.87 Frank stole his muscles at the gym by lifting weights.

B. Hank is good at stealing girl's hearts.

2.75 Yesterday Hank stealed Mary's heart.

7.00 Yesterday Hank stole Mary's heart.

2. **broadcast / cast**

A. Bill watches the sports broadcasts on NBC.

5.75 Last week NBC broadcasted a basketball game.

5.25 Last week NBC broadcast a basketball game.

B. The fisherman casts his nets into the ocean to catch fish.

4.00 Last week the fisherman casted his nets into the ocean.

5.75 Last week the fisherman cast his nets into the ocean.

3. **lie / lie**

A. Mary tells lies about her age.

7.00 She lied to me about her age again.

1.63 She lay to me about her age again.

B. Mars currently lies out of reach of man.

4.38 At one time, the moon lied out of reach of man.

5.25 At one time, the moon lay out of reach of man.



## 4. ring / ring

A. The children formed a ring around the school by holding hands in a big circle.

5.50 The children ringed the school.

2.88 The children rang the school.

B. The telephone was ringing off the wall at work today.

2.13 The telephone ringed off the wall.

6.88 The telephone rang off the wall.

## 5. brake / break

A. I put my foot on the brake to stop my car.

6.88 I braked my car quickly.

1.38 I broke my car quickly.

B. New shoes always hurt my feet when I first put them on, and I always hate breaking them in to make them comfortable.

2.50 I braked in my shoes last week.

6.13 I broke in my shoes last week.

## 6. deal / deal

A. The car salesman finally made me a great deal on my new car.

5.13 He dealed with me about the price all afternoon.

5.25 He dealt with me about the price all afternoon.

B. Life deals a lot of sadness to some people.

4.88 Life dealed Frank a lot of sadness.

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## 7. lead / lead

A. Some mechanical pencils use a lot of lead.

3.13 Last week I leaded my pencil everyday.

2.50 Last week I led my pencil everyday.

B. Critics say that Dr. Jones is leading students astray.

3.13 Critics say that he leaded some students astray.

6.75 Critics say that he led some students astray.

### 8. stick / stick

A. I tied sticks to the trees in front of my house to make them stand up straight.

5.63 I sticked all of the trees in front of my house.

3.50 I stuck all of the trees in front of my house.

B. Sometimes Harry does not stick to the facts when he tells a story; instead, he states a lot of his own opinions.

4.00 He sticked to the facts in his last story.

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### Novel Denominal vs. Metaphorical Extension Verbs

### 9. spit / spit

A. At the Bar-B-Q Mr. Jones slowly cooked the beef on a spit using a steel rod over a large fire.

4.38 Yesterday he spitted some beef.

4.88 Yesterday he spit some beef.

B. Sometimes my computer spits out the wrong data.

4.50 Yesterday it spitted out the wrong data again.

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A. After dinner I put all the dishes in the sink and turn on the water.

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A. The Forest Service wants to put bears back in Yosemite National Park.

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B. Shelly does not bear bad news very well.

3.13 She beared the news of the accident poorly.

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## 12. reed / read

A. The man tied the baskets together with reeds.

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3.50 He read the baskets together. (pronounced 'red')

B. The meteorologist tries to read the weather.

1.13 She readed it well last week.

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A. The bartender served Frank mixed drinks for several hours.

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2.63 The guards coled the prisoners after lunch.  
(pronounced 'sold')

B. We tried to sell our father on the idea of going home early.

1.38 Last week we selled him on the idea of going home early.

7.00 Last week we sold him on the idea of going home early.

Novel Denominal Compound vs. Novel ME Verb Compound

17. **copyright / write off**

A. Dr. Smith owns the copyright on her book.

6.00 The publisher copyrighted the book for her.

2.75 The publisher copyrote the book for her.

B. Betty writes off all of her charity donations on her taxes.

2.25 Betty wrote off her donation of \$100 last month.

6.75 Betty wrote off her donation of \$100 last month.

18. **goodbye / buy**

A. We said goodbye to the hosts of the party for an hour.

6.38 We goodbyed the hosts for an hour after the party.

1.13 We goodbought the hosts for an hour after the party.

B. Melissa buys more than anybody I know.

2.88 Tuesday she out-buys everyone in the store.

5.50 Tuesday she out-bought everyone in the store.

19. **de-flea / re-flee**

A. When I leave my dog outside too long I have to de-flea him with a bath.

5.38 I left him outside too long yesterday so I de-flea'd him this morning.

2.25 I left him outside too long yesterday so I de-fled him this morning.

B. The rebels had to flee into the hills after the battle.

3.00 The next day they re-fleed again to the hills after another battle.

5.38 The next day they refled again to the hills after another battle.

## 20. airstrike / strike

A. The air-strike against the enemy was successful.

2.50 The air force air-striked the enemy again today.

5.13 The air force air-struck the enemy again today.

B. Sometimes an idea just suddenly strikes people.

3.13 The scientist was suddenly striked with a new idea.

6.25 The scientist was suddenly struck with a new idea.

## 21. de-fly / re-fly

A. My grandmother's house is full of flies.

5.13 She de-flied her house yesterday with poison.

2.38 She de-flew her house yesterday with poison.

B. My brother flies to Houston often.

3.25 He re-flied to Houston on business last week.

4.88 He re-flew to Houston on business last week.

## 22. meat / meet

A. Sally does not like meat so she always takes it off of her pizza.

5.38 Sally de-meated the pizza we shared yesterday.

2.25 Sally de-met the pizza we shared yesterday.

B. Sometimes I forget the names of people, and I must meet them again.

1.63 Yesterday I re-meeted a man at work.

6.00 Yesterday I re-met a man at work.

## 23. shoot / shoot

A. The man repaired his bamboo hut with new bamboo shoots.

3.88 The man re-shooted his hut after the storm.

4.00 The man re-shot his hut after the storm.

B. The movie director re-shoots scenes when the actors make mistakes.

2.63 Last week the director re-shooted four scenes.

6.50 Last week the director re-shot four scenes.

25. **hide / hide**

A. Billy has some old chairs with cowhide seats.

5.25 When the seats fell apart, Billy re-hidden them.

3.88 When the seats fell apart, Billy re-hid them.

B. After looking at his buried treasure, the pirate hides it again.

3.13 The pirate re-hidden his treasure twice last year.

5.67 The pirate re-hid his treasure twice last year.

26. **mean / mean**

A. The math teacher told us that the class mean was 62%.

4.13 He thought that was too low so he re-meanned it.

4.75 He thought that was too low so he re-meant it.

B. Roger has to choose between two sports that mean a lot to him.

3.75 He chose basketball because it out-meanned football to him.

5.00 He chose basketball because it out-meant football to him.

27. **undersea / oversee**

A. The navy wants to expand undersea exploration.

4.75 The navy undersea'd 12 more boats.

2.13 The navy undersaw 12 more boats.

B. The manager oversees 25 employees.

3.37 At one time the manager overseed 10 employees.

5.75 At one time the manager oversaw 10 employees.

28. **taco stand / understand**

A. Paco's goal as a businessman is to put one of his taco stands on each street corner.

4.25 Paco taco standed all of downtown last year.

3.38 Paco taco stood all of downtown last year.

B. My brother understands calculus.

1.50 He understanded Algebra at an early age.

7.00 He understood Algebra at an early age.

**29. banana split / split**

A. Sharon serves me a banana split every time I go to her house.

3.75 I cannot eat another banana split; I'm splitted-out.

4.75 I cannot eat another banana split; I'm split-out.

B. My brother and I compete to see who can split logs faster with an axe.

3.38 Last week I out-splitted my brother.

5.88 Last week I out-split my brother.

**30. water slide / slide**

A. The Funslide Company built a water-slide on the hill outside of town.

4.38 The company water-slided the side of the hill.

5.00 The company water-slid the side of the hill.

B. My little brother likes to run and slide on icy sidewalks; he can slide further than any of his friends.

4.00 He out-slided all of his friends yesterday.

5.62 He out-slid all of his friends yesterday.



APPENDIX G  
DISTRACTORS USED IN THE NATURALNESS SURVEY

## DISTRACTORS USED IN THE NATURALNESS SURVEY

31. When the leaves on the trees turn colors I know it is Fall.  
The leaves turn colors early this year.  
The leaves turned colors early this year.
32. My boss likes to use people for his own personal gain.  
My boss uset Mr. Jones and then fired him.  
My boss used Mr. Jones and then fired him.
33. Jimmy Connors really serves the tennis ball hard.  
Jimmy serve the ball hard in the last game.  
Jimmy served the ball hard in the last game.
34. The runner jumped the gun at the start of the race and was disqualified.  
The runner jumpt the gun twice that morning.  
The runner jumped the gun twice that morning.
35. Mrs. Brown no longer believes in magic.  
She beleft in magic when she was a little girl.  
She believed in magic when she was a little girl.
36. My little sister is asking for it when she sings annoying songs all day long.  
My little sister ask for it yesterday.  
My little sister asked for it yesterday.
37. Henry wraps himself up in his work so much that he has very little free time.  
Henry is so wrapt up in his work that he neglects his children.  
Henry is so wrapped up in his work that he neglects his children.
38. Larry chews your ear off with funny stories.  
Larry chow Leslie's ear off last weekend.  
Larry chewed Leslie's ear off last weekend.
39. Doctor Marshall usually delivers one hundred babies each year.  
Last year he only deleft ninety.  
Last year he only delivered ninety.
40. I sometimes get speeding tickets when I drive to Dallas.  
I sped through Lewisville and got a ticket.  
I speeded through Lewisville and got a ticket.

41. The spelling bee lasted a long time and I am very tired.  
I cannot spell another word; I am spelling was-out.  
I cannot spell another word; I am spelling bee'd-out.
42. I fell trees with my axe so that I can make furniture.  
I fell twenty trees last month.  
I felled twenty trees last month.
43. Mary works for the telephone company looking up names  
and numbers in the directory.  
She look up a phone number for me yesterday.  
She looked up a phone number for me yesterday.
44. My mother tricks my little brother into eating his  
vegetables.  
My mother truck him into eating his vegetables at  
dinner.  
My mother tricked him into eating his vegetables at  
dinner.
45. Marcy tries to kick her smoking habit every year.  
Last year she almost kuck the habit.  
Last year she almost kicked the habit.

APPENDIX H

RATIONALE BEHIND THE INSTRUCTIONS TO THE NATURALNESS SURVEY

RATIONALE BEHIND THE INSTRUCTIONS  
TO THE NATURALNESS SURVEY

Several examples were used to illustrate how the Likert Scale works, using non-denominal verbs so that the experimental design was not revealed. The first group of sentences focused on illustrating past tense forms that were at either end of the scale. In this example, the irregular form clearly sounded natural and the regular form sounded unnatural: She came / \*comed home to Boston. The next example showed how the verbs could both sound similar by using the equally acceptable past tense forms of dream: She dreamed / dreamt that she won the lottery. Subjects were then shown that the context of the verb was extremely important when making their decisions. They were told that the verb hanged may sound unnatural by itself, but in the context of hanging a criminal, it sounds natural. The example was given, They hanged / ?hung the criminal. The next example sentences illustrated how hanged sounds unnatural in a different context: They \*hanged / hung the painting over the fireplace. The subjects were then instructed to rate verbs according to their intuitions or feelings, and not according to prescriptive rules. The last example, The man \*slayed / slew the bear yesterday was used to illustrate this point. Subjects were told that if they thought slew, the prescriptively correct form, sounded old

fashioned or awkward, and that slayed sounded natural to them, they should rate the verbs accordingly.

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