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THE NATURE OF THE MORPHOLOGICAL CONTENT OF LEXICAL REPRESENTATIONS IN SECOND LANGUAGE LEARNERS

by

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ABSTRACT

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Title: The Nature of the Morphological Content of Lexical Representations in Second Language Learners

Children acquire inflectional morphology in their first language (L1), generally by the age of six and before they learn to read or write. This acquisition takes place through interaction for the purpose communication. Second language (L2) learners are often older and already literate; to learn a second language, most resort to formal language instruction. These different modes of acquisition may lead to a different outcome in the area of inflectional morphemic storage. Lexical items are ordinarily stored in the semantic memory in a person's L1. Explicit instruction of inflectional morphemes may result in their storage in the episodic memory. Retrieval from episodic memory is conscious and slower.

A timed response experiment was devised with L2 learners at both the advanced level and the beginning level of a university English as a Second Language (ESL) program. A Native-English-Speaking group of students was the control.

The experiment employed a forward mask and four categories of priming words – the same word, an unrelated word, an irregularly-inflected variant of the target word and a regularly-inflected variant. Response patterns varied by group.

Native-Speakers showed no significant difference between their responses to target words with the same word as prime and those with a regularly-inflected variant as prime. There were significant differences between both irregularly-inflected variants and unrelated words as prime when compared to the same-word-as-prime condition. Entry-Level ESL subjects showed the longest response times to target words primed by the same word; regular and, especially, irregular inflections yielded the fastest times. Frequency did not play a part in these results, but semantic inhibition may have. The Level V, advanced ESL group, failed to show a significant difference in response times to target words when preceded by any of the four types of prime. The conclusion drawn is that all lexical items of this group may be represented whole in their lexicons. This group showed a significant correlation between time spent in an English-Speaking-Culture and speed of response to words primed by inflectional variants. The significance was small, indicating that other factors also contributed.

The final question addressed the possibility that mainly classroom learning (and a relative lack of ESC experience) would show an overall slower rate of response to targets primed by inflectional variants. This did not prove to be the case. Some research has found that inflectional morphology may be a topic that lends itself to formal instruction. It seems likely that, for adults, naturalistic exposure and good classroom instruction provide the best support.

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Possibly the strongest thesis opening I've ever seen!

CHAPTER I

INTRODUCTION

Morphemes are a nice size, midway between a phoneme and (often) a lexical item. They are units that carry, not sound or structure *per se,* but meaning. But, once 'morphology' was the designation used for talking about structural elements of linguistics, e.g., grammar and syntax (Hockett, 1958; Kastorsky, 1978). The term would lose its preeminence, but re-emerge in the 1980's in its present sense. Derivational morphemes can actually change the part of speech of the word that they are attached to or, at least, seriously alter its meaning. Inflectional morphemes merely affect a lexical item in terms of its number, tense, person or degree. One of several remarkable feats accomplished by children learning English as their native language is the acquisition of inflectional morphology, generally before they start school (Brown, 1973, deVilliers & deVilliers, 1973, Derwing, 1992). Derivational morphemes are fully mastered much later.

Studies done in the 1970's looked into the order of acquisition of some inflectional morphemes for children learning their native language (Brown, 1973, deVilliers & deVilliers, 1973). Studies of this same phenomenon followed in second language acquisition (Burt & Dulay, 1974, Fathman, 1975, Larsen-Freeman, 1975). A common order had been found for native-speaking children; for children learning a second language (L2) a common order was also noted, but it

differed somewhat from that of the native-speaking subjects (Fathman, 1975, Larsen-Freeman, 1975).

For one's own native language (L1), morphemes, in general, are variously held to be stored in the mental lexicon as individual morphemes that are compiled as needed (Fromkin, 1971), as whole words (even when multimorphemic) (Bybee, 1992) or as either or both, depending on such factors as frequency of occurrence, meaning and concreteness (Hirsch-Pasek, Reeves & Golinkoff, 1993). Pinker (1994) maintains that irregular forms are listed whole, while regular forms are stored in their separate components and are combined as required.

Willem Levelt (1989) maintains that all inflections of a verb are items that "belong to the same lexical entry" (p. 183). He perceives the lexical item as having four parts – "meaning," "syntax," "morphology" and "phonology"- with communication between them. His model has been adopted for second language research (deBot, Paribakht & Wesche, 1997, Jiang, 2000). Jiang adds "orthography" to the "phonology" quadrant of Levelt's model, which is logical since most second language learners are literate when they begin study of the L2.

In many classrooms, morphology is often specifically and formally taught. When it is taken on board by a second language (L2) learner in this type of setting, it may not become an instantly accessible choice, as it is for speakers' first languages (Jiang, 2000). Given these different conditions for acquisition, it would not be surprising to find that inflectional morphemes are represented differently from those of L1 speakers. However, until very recently, no conceptual

framework existed for rational discussion of the question in L2 research (Jiang). Nan Jiang's model has a stage in which the L2 learner imports the meaning and syntax (the section called the "lemma") of their L1 into the L2 lexical representation. S/he would have learned the phonology and orthography of the L2 word, which may be automatically accessible, depending on the word. The morphologically inflected forms have each been consciously learned, individually.

When acquired "naturalistically," as by children learning their native language (L1), inflectional morphemes are widely held to be represented in the semantic memory with other language-related information (Tulving, 1972). In contrast, the episodic memory stores dated information that requires conscious effort to retrieve, which is a slower process (Tulving, 1983). It may be that L2 learners, having consciously learned morphological variants, have them represented in the episodic memory.

One contributing factor to that problem may be that, as Krashen (1976) suggests, acquisition of language only occurs with natural exposure, accompanied by interaction. Much research has been done in the area of naturalistic or contextual learning versus formal instruction (Dulay & Burt, 1974, Krashen, 1976). Advantages for naturalistic language acquisition have been variously ascribed to time spent in the country where the target language is spoken (Carroll, 1967), to receiving instruction in an academic subject through the agency of the target language (Saegert et al., 1974) and to comprehensive communication in the target language (Ellis, 1994)

This is sure a good place for a comma. You use them freely elsewhere!

A question thus arose concerning whether time spent in an English-Speaking Culture (ESC), where opportunities for natural language usage abound, could contribute to greater integration of inflectional morphemes in L2 learners.

The article by Nan Jiang (2000) contributed directly to the idea for this project. She writes:

> ...it has been found that different inflectional variants of the same word prime each other. If this is an indication of these variants being represented in the same entry, it would be interesting to see if L2 words produce similar priming effects. The presence or absence of such an effect might provide an indication of whether the morphological specifications have been integrated into the lexical entry (p. 67).

I determined to pursue the inherent suggestion in this passage. I devised an experiment that would test for priming effects for inflectional variants of an L2 word. I employed a traditional or immediate priming experiment, which is the most basic design. A mask, if used, presents first, followed by a brief display of the prime word, and, lastly, the target word appears. My study used all L2 items – for both prime and target words on participants with a range of L1's.

A frequent use of priming technique is the lexical decision task (LDT) in which subjects are presented with a string of letters and are required to decide if the string constitutes a word or not (Jiang, 2000). LDT has been used in masked cross-language priming experiments, which employ the traditional-style priming format, but are done to determine priming effects for L1 words on their L2 counterparts

Did you lose a phrase here?

and vice-versa. In each one and in every language tested, the only priming effect was found in the L1-L2 direction (as reported in Jiang).

Repetition priming, is a variant of the LDT. It follows the same prime-target pattern except for the intervening addition of from ten to fifty items between display of the prime and display of the target (Feldman & Andjelković, 1992). Repetition priming has been employed in studies to distinguish between morphological influence and that of orthographic, semantic and phonological effects in Serbo-Croatian (Feldman & Fowler, 1987), Hebrew (Bentin & Feldman, 1990), English (Fowler, Napps & Feldman, 1985) and French (Grainger, Colé & Segui, 1991). Those studies were conducted exclusively in the L1 of the participants.

As inflectional morphemes may be one of the most frequently persisting errors that occur for second language learners (Thompson, 2000), this is a question worth pursuing. The experiment created to investigate these issues includes as subjects one group of students from first year classes of the Portland (OR) State University Intensive English Language Program (IELP); another group was from the fifth year of the same program and there was a control group. This latter consisted of undergraduate students at P.S.U. between the ages of 18 and 42, who were native speakers of English. This provided an opportunity to compare students at the early stages of learning a second language with those at a more advanced stage and both of these to a group of native speakers.

The experiment was designed in two parts. L2 subjects were English as a Second Language (ESL) students, living in the U.S. Each volunteer filled out a questionnaire (Appendix A), which solicited information about the opportunities they availed themselves of to speak English outside of English class. The second part was a timed-response experiment. This was accomplished with aid of a software package from Cedrus®, which displayed a mask pattern, followed by a prime word shown briefly and a target word, which remained on display until the subjects uttered it. The SuperLabPro™ software program calculated the response time beginning with the presentation of the target word and terminating at the onset of voicing by the subject.

The results were sorted according to which type of prime preceded the target words. The randomly ordered primes were of four types: the same word as the target, a completely unrelated word, a regularly-inflected variant of the target and an irregularly-inflected variant. The speed of the response to a target word, which was primed by an inflectional variant, if significantly better than that to a target, primed by a totally unrelated word, could shed light on the question of integration of morphological variants in the lexicon of second language learners. The response times might even have been as fast as the response to a prime of the same word, which would support Levelt's (1989) position that inflections of a word are stored together with the word in the same lexical entry.

Conclusions were based on the assumption that the speed of a response to primes that are inflected variants of the target word would reflect the degree of

integration of inflectional morphemes in the lexical representations of ESL students. This proceeds from the basic paradigm, which assumes that automatic, unconscious searches are faster than conscious, intentional searches (Krashen, 1976, Tulving, 1972). Similar response times to inflected-variant-primed targets and same-word-primed targets were considered most likely to occur for the native-speaking control group and, perhaps, for some of the advanced ESL group. These latter subjects could be those with significant time spent in English-speaking cultures, as well, and possible correlation of those two strains is one issue that this study looks at.

There was an expectation that English as a Second Language (ESL) students who had spent significant time immersed in English-speaking cultures would have greater integration of inflectional morphemes within their lexicons than would classmates who had not. Would the converse prove true? If L2 students were found who eschewed opportunities to practice English outside of class and, therefore, learned most of the L2 in formal classrooms would that show up as a trend in a marked lack of integration of inflected variants? This question constituted the last of the research questions for this paper.

Chapter II

Review of the Literature

Background

Inflectional morphemes are instantly accessible to native speakers of a language, but there is ongoing debate over how these morphemes are stored. It may be that every morphological variant has its own separate entry in the lexicon (Bybee, 1992); or that they are stored as an item in the lexical entry along with the root word (Levelt, 1989), or that they are all represented as individual morphemes (Taft & Forster, 1975, 1976; Taft, 1981).

It might also be that various models apply at different times (Garman, 1990), based on various factors, e.g., frequency, meaning, concreteness and/or ambiguity (Hirsch-Pasek, Reeves & Golinkoff, 1993). Acquisition of integrated inflectional morphemes occurs in children in their first language generally before they read or write (Brown, 1973; deVilliers & deVilliers, 1973; Derwing, 1992).

Morphology, as a category worthy of independent consideration, has been in and out of favor over a period of decades. At the peak of the reign of structuralism, morphology dominated even syntax (Kastorsky, 1978) and grammar itself was considered to consist of "(1) the morphemes used in the language and (2) the arrangements in which these morphemes occur relative to each other in utterances" (Hockett, 1958, p. 129).

The preeminent position which morphology held declined as structuralism itself would, yielding to the advent of generative grammar. In "Remarks on Nominalization" Chomsky (1970) would create the first framework for the study of morphology in the new paradigm. However, studies in the generative tradition did not follow in a profuse flow. It was the late eighties before "the generative study of morphology [would] become a normal part of the field" (Aronoff, 1992, p 1.)

One area of interest that did attract a number of early studies is that of the order of acquisition of inflectional morphemes (Dickerson, 1990). Studies were published by Brown (1973) and by deVilliers and deVilliers (1973) on the order of morpheme acquisition for children in their first language. Brown's longitudinal study of three unacquainted American children and the deVilliers' cross-sectional study of twenty-one English children produced a similar order of acquisition of the fourteen morphemes tested.

Studies of the same subject appeared shortly thereafter in second language research. Burt and Dulay (1974) created the Bilingual Syntax Measure (BSM), a test comprising eight functors, which was employed to elicit "natural L2 speech from young children" (Burt & Dulay, 1974 p. 39). A later, expanded version of the BSM contained eleven functors, eight of which were inflectional morphemes. This test was administered to Spanish- and Chinese-speaking children learning English. The order of acquisition for all the children was found to be virtually the

same, though differing somewhat from the order found in L1 studies. The Second Language Oral Production English (SLOPE) test, devised by Fathman (1975), had an even higher number of grammatical structures (20) for testing order of difficulty. More than half of these items were also inflectional morphemes. Fathman's study used one hundred forty children between six and fifteen years of age. Her results supported the earlier findings that there is a basic, consistent order of morphemic acquisition in an L2, regardless of the native languages of the subjects, for children studying ESL.

Diane Larsen-Freeman (1975) would design tasks eliciting responses from the modalities of reading, writing, listening and imitating. She also used Burt & Dulay's (1974) BSM for eliciting speaking responses and as a base of comparison. This study sought to determine whether the order of acquisition of morphemes, proposed for children in an L2, also held true for adults, beginning to study ESL, as well as whether testing different modalities would yield different results. Larsen-Freeman's conclusion was that there does seem to be a basic order of L2 morphemic acquisition within task that persists across native language backgrounds, although she found that there was variance among individuals and groups.

Contextual Learning

An anticipated possibility of the studies above was the uncovering of empirical evidence, which would support the concept of the operation of Universal

Grammar in L2 acquisition. There was also great interest in defining external factors that might be important to second language acquisition. These factors included, but were not limited to, age (Fathman, 1975), formal classroom instruction (Krashen, Seliger & Harnett, 1974) and informal, naturalistic exposure to and interaction in the target language (Carroll, 1967; Saegert, Scott, Perkins & Tucker, 1974; Pica, 1983c).

Carroll's (1967) study was one of the earliest to provide empirical data supporting the value of time spent in the country where the target language was spoken. In his study, 2784 seniors at American colleges and universities, who were foreign language majors nearing graduation, took form 'A' of the Modern Language Association Foreign Language Proficiency Test. The subjects also filled out a 4-page questionnaire, which elicited information on the extent of their foreign language study, the history of any time spent abroad (specifically in the country where their target language was spoken) and various other details of the students' attitudes and motivation for studying the foreign language. The scores, in general, were mediocre – the median was found to have scored a "2+" on the Foreign Service Institute scale where "5" was the maximum possible. This put these students at an attainment point between a "limited working proficiency" and a "minimum professional proficiency" (Carroll, 1967, p. 134). The background information elicited by the questionnaire provided data on the amount of time spent in the relevant country by each student up to a year. This time was correlated with scores on the test. The correlation was significant:

> A strong relationship was found between time spent abroad (in the country where the target language was spoken) and test performance, with those who reported a year's study abroad doing best, followed by those who reported a summer abroad or a tour. Both of these groups outperformed those who had never been in the country where the target language was spoken. (p. 159).

Another early study that provided strong empirical data in the area of indirect language acquisition was done by Saegert et al. (1974). They reported the results of their survey of 114 students at the American University in Cairo and of 71 students at the American University of Beirut. They had gathered information for each student on their total number of years of formal English instruction and whether or not they had experienced academic classes in which the medium of instruction was English. These factors were compared to the students' levels of language proficiency as measured by the Michigan Test of English Language Proficiency. This test is used for assessing the English language proficiency of University-bound students, who are not native speakers of English. The correlation between the number of years of English instruction and the proficiency scores was insignificant, while the correlation of English as a medium of instruction and proficiency scores was "highly significant" (p. 101). Consciously focusing on language as in a class seemed to have little impact on improving students' proficiency scores; however, focus on, for example, biology or history, presented through the agency of the target language, significantly improved them.

comma is outright wrong here. If makes 100% of university-bound students into non-native speakers. Read it out loud to see/hear!

Stephen Krashen (1976) directed his attention to the relative values of formal instruction versus informal interaction in a second language and would have a major impact on the developing theory of second language acquisition. He would conclude that formal language instruction and naturalistic exposure, with "intake", made "different sorts of contributions to second language competence." In fact, he came to call only the language taken on board by "intake informal environments" (p. 167) language acquisition, while the rule-laden, formal instruction of language would lead to "learning." This latter was held in a structure termed the "monitor" and its contents were available to the speaker only when there was no shortage of time, when the learner was focused on the form and if s/he knew the rule (Larsen-Freeman & Long, 1991.) For spontaneous communication, the L2 speaker would have access to and use only those items in his acquired system. This distinction was widely subscribed to and provided theoretical support to the proponents of informal, naturalistic contexts for L2 acquisition. As Ellis (1994) put it, "['Acquisition'] takes place subconsciously as a result of understanding what has been said (or written) in communication, and clearly corresponds to informal learning" (pp. 214-5).

As research continued into factors that supported second language acquisition, several issues emerged as likely, encouraging the growing realization that a multiplicity of factors must be credited. These included learner motivation and aptitude, as well as personality, e.g., degree of extroversion/introversion. The debate over formal instruction versus naturalistic interaction continued. Ellis

(1994) characterizes the affective and psychological factors as direct influences on acquisition. Other factors, such as interaction with a native speaker in a supportive environment, he classifies as social factors that merely, "determine learning opportunities" (p. 197). Addressing the 'natural' and 'educational' settings debate, he notes that the notions are hard to pin down. There will inevitably be opportunities for naturalistic interaction in modern classrooms and even specific, language-related instruction during relaxed conversation, especially between a native and a nonnative speaker. D'Anglejan (1978) has made the related point that an educational setting is only as non-interactive as the pedagogic approach in use dictates.

The value of contextual learning, however, was still being championed both by traditional supporters (Pica, 1994) and new converts (Regan, 1998). Catherine Snow (1994) characterizes the ideal conditions for acquiring a second language as the same ones that work for first language acquisition, i.e.:

> ...opportunities for conversations on topics of interest to the learner with native speakers who provide input adjusted to the learner's level, who provide conversational responses that build on learner's attempts, who are genuinely interested in communication with the learner, and who have a positive affective relationship with the learner (p. 410).

This view, held by others (Littlewood, 1984; Dulay, Burt & Krashen, 1982; Krashen, Sferlazza, Feldman & Fathman, 1976) as well, would seem to imply that

Universal Grammar and the human Language Acquisition Device, which allows first language acquisition, may continue to be available to language learners in acquiring second and additional languages. That issue is not the main thrust of this paper, however, and will not be gone into further except to acknowledge the connection.

Morphemic Representation and Storage in the L1

The dominant view of morpheme storage in the lexicon of native speakers of a language has been that *all* morphemes are stored separately, *as morphemes*. A study of speech errors by Fromkin (1971) contains the following examples of derivational and inflectional suffix exchanges and even of syllabic exchange: "bloody students → bloodent stewdies" and "a **cur**rent **ar**gument → an **ar**rent **cur**gument." (p. 41). These occurrences support the contention that all morphemes are stored separately. The segment of particular interest for this study is the inflectional plural marker. It stays put (see next paragraph), but adapts to the new phonological environment, changing from the voiceless allophone /s/, which occurs following a voiceless stop, to the voiced phone [z], as in the new environment it follows a vowel. Merrill Garrett (1982) restates Fromkin's conclusion: "the processes which give rise to these errors must precede the processes which endow such morphemes with their precise phonetic form" (p.33), i.e., the *separately–stored* morphemes switch places before they are given the correct form.

Speech production errors have provided researchers with a major source of linguistic evidence. In a study based on an error corpus of 3400 speech errors, gathered by Garrett (1975) and his colleague S.R. Shattuck at M.I.T., 143 are found to be exchange errors between words ("independent forms") and/or morphemic units ("combined forms," p. 149). Garrett dubs this latter type of error, "morpheme stranding." He claims that for the most part these "combined forms" contain free forms and bound morphemes, the latter being the elements left behind – "stranded." By way of example, he offers: "I'm not in the *read* for *mood***ing**;" and "She's already *trunk***ed** two *pack***s**" (p. 158). He maintains that the most frequently stranded type of bound morpheme is those he designates "syntactically active" (p. 158). These comprise mainly inflectional suffixes of tense, number, possession, comparison and plurality. Sandra (1994b) lists the categories that inflected word forms can belong to: "verbs, determiners, adjectives, nouns [and] pronouns" (p.231). English is not considered a richly inflected language, but we do inflect words, however minimally, in each of the above categories.

Hirsch-Pasek et al. (1993) offer two theories of word storage in the lexicon. The first is that every word has its own separate entry (Monsell, 1985; Sandra, 1990). However, this is characterized as uneconomical and a waste of space. The other theory holds that words are stored as morphemes (Taft & Forster, 1975, 1976; Taft, 1981); this is designated as a model of "cognitive economy" (p. 147). There is a caveat to the first theory that we will deal with later. Hirsch-Pasek et al. assert that, "[a]lmost no one believes that all multimorphemic words are stored as

whole words in the lexicon..." (p. 146). They note that generally the results of studies carried out on this subject support the theory that, "...people store multimorphemic words economically as morphemes..." (p. 148). They point out that there are degrees of efficiency in retrieval, though, and they list factors that are known to influence the ease of lexical access. These factors include frequency, concreteness, meaning and ambiguity. Fromkin (1993) also makes the point that "...morphologically complex items [in the lexicon] are compiled," though she does qualify that with, "even if they are stored as wholes (with morphological boundaries included)" (p.286).

Hirsch-Pasek et al. (1993) qualify their assertion (above) that some researchers maintain that every word has its own separate entry in the lexicon, stating that they may only, "...do so for either frequently occurring words, or for some compound words..." (p. 146). Other researchers acknowledge the possibility of variety in storage, vis-á-vis the question of morphemes versus whole words. Henderson (1985) queries: "Is each morphemic constituent of a word separately represented at some stage of the production system? If so, is the combined (polymorphemic) form also represented, or is it invariably assembled by rule?" (p.26)

Joan Bybee (1992) takes a definite position. She states rather categorically that full words, even multimorphemic ones, can be stored in the lexicon. She goes on to claim that the perceived problem of limited storage in the lexicon is a result

of linguists' conceptions of the lexicon as being like a dictionary. Suggesting that it is more nearly a "...part of the human memory bank" (p. 231), she states that human beings "...store tens, perhaps hundreds, of thousands of individual lexical items" with details of "their behavior and meaning" (p. 230). Furthermore, they (human beings) "have the ability to concatenate series of linguistic units to form meaningful utterances" (p. 230).

Sandra (1994a) recognizes all three models. He terms them: a Full-Listing Account like that of Butterworth (1983), in which whole words occupy the mental lexicon; the No-Listing Account, which has no whole words, but only morphemes in the lexicon; and the Horse-Race Account, e.g., the Augmented Addressed Morphology Model of Caramazza, Laudannat & Romani, (1988) or the Morphological Race Model of Frauenfelder& Schreuder, (1992) which contain both morphemes and whole words. Zhou and Marslen-Wilson (1994) combine them all and label their version a multi-level cluster model "with separate syllabic, morphemic and whole-word representation." (p. 393)

Making a distinction between "lexical items" and "lexical entries," Willem Levelt (1989) specifies that, "[t] he various inflections of a verb (e.g., *eat, eats, ate, eaten, eating*) are items belonging to the same lexical entry..." (p.183). He goes on to depict in detail the "internal structure of an item in the mental lexicon", as seen in Figure 1.

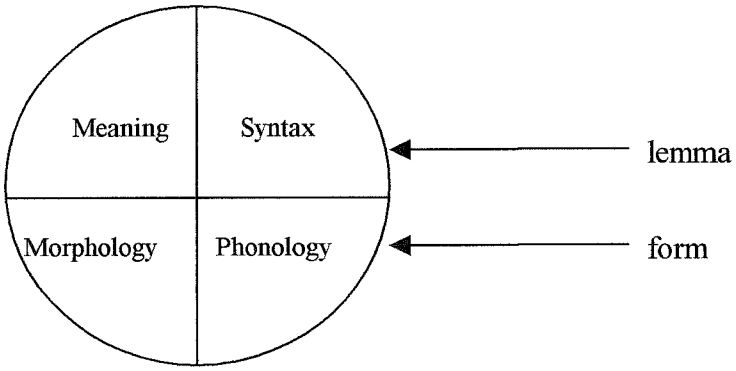

Fig. 1. Willem Levelt's concept of an item in the mental lexicon

The lexicon is considered to be the mental dictionary where human beings store words as lexical items along with several kinds of information about them in a lexical representation. Specifically, there must be syntactic, semantic, pragmatic, phonological, and, for literate persons, orthographic information represented in order for everything necessary for language processing to be available (Sandra, 1994a or b?). The lemma is the section of the lexical representation, which represents the semantic and syntactic information. It may be said to underlie the speaker's drive to construct a surface form (Levelt) and may then be considered to be the intermediate step between concept and surface structure. Levelt asserts that there is communication between the different parts of a lexical entry. For grammatical encoding, the lemma or "meaning and syntax are relevant" (p. 187), while the morphological and phonological properties are required for phonological encoding. His model has been adapted for second language lexical representation (de Bot, Paribakht & Wesche, 1997; Jiang, 2000).

Morphological Representation and Storage in L2

The inflectional morphological storage and access theorized above would seem to be automaticized after several years of exposure and usage, e.g., from 0 to 5/6 years of age, for a person learning their first language (Brown, 1973; deVilliers & deVilliers, 1973; Derwing, 1992). This is true whether inflectional morphemes are stored separate from the roots or if inflectional variants of a verb are stored whole at the same address in the mental lexicon. The issue for *second* language acquisition is whether and when inflectional morphemes become as automatically accessible as they are for an L1 speaker. The 1970's studies on the order of morpheme acquisition for second language learners were followed in the 1980's by serious interest in L2 vocabulary acquisition. Jiang (2000) asserts that this interest led to psycholinguistic research into L2 acquisition in general. She posits three interrelated aspects of the psycholinguistic study of second language acquisition – that of representation, that of acquisition and that of processing. She further asserts that, while processing and acquisition have been well researched, representation has not (Jiang).

In adapting Levelt's (1989) model for L2 lexical representation, Jiang (2000) adds "orthography" to the "phonology" quadrant of the "formal" half of the lexical representation model. This half is also designated the "lexeme" (Fig. 2), which is that part of the lexical item that is the uninflected, "decontextualized vocabulary

word" (Aronoff, 1992, p.13): it is the surface form – its sound and spelling. As pointed out earlier, students learning a second language are often already literate. Early in second language learning, those very elements, the sounds (phonology) and spellings (orthography) of lexical items are presented to students. However,

> [c]lassroom L2 learners often lack sufficient, highly contextualized input in the target language,... [which] often makes it extremely difficult, if not impossible, for an L2 learner to extract and create semantic, syntactic, and morphological specifications about a word and integrate such information into the lexical entry of that word (Jiang, 2000,p. 49).

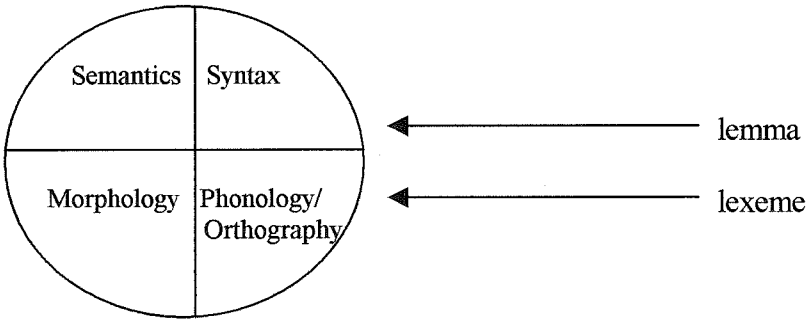

Fig. 2. Nan Jiang's adaptation of Levelt's lexical representation

Jiang maintains that at an early stage L2 learners, having learned the spelling and sound of an L2 word, often shift the entire lemma (semantics and syntax) from their L1 into the lexical representation of similar L2 words. For example, for a student from a police state, the appropriate response to the word "police" may be fear. Most Americans consider the police, by-and-large, protectors of property and persons. That student may learn the English orthography and

phonology for "police", but hold an erroneous semantic notion of that official body and its place in American life. Syntactically, "police" is a plural count noun, which is used with the plural forms of a verb. In speaking of a single member of that group, in English we append "-man" or "officer." Consequently, the semantics and the syntax of the "imported" lemma may not conform to the corresponding English usage. The pronunciation and spelling are the focus of the word and morphology is often taught separately and later. In the instance described above, the usual plural suffix does not apply. A student might end up in a position of needing to unlearn an assumed or newly acquired pattern, which has been misapplied.

Consequently, for L2 learners in traditional classrooms, inflections may be explicitly learned knowledge, which is therefore stored in the episodic memory system, rather than in the semantic memory with the lexicon and associated processes. Endel Tulving (1972) is credited with first proposing episodic memory as the opposing system to semantic memory. The semantic system had been so-named (Quillian, 1968) and variously described as a system that could memorize facts, solve problems, make logical deductions, understand ideas (Rumelhart, Lindsay & Norman, 1972) or simply serve as an organized internal lexicon (Kintsch, 1972). Tulving had noted that, in the description of memory systems, "[m]ost appellations are divisions of larger concepts: two complementary categories exhaust a superordinate category" (p. 382). Short-term memory opposes long-term; implicit memory opposes explicit. He asked the logical

question, 'What does semantic memory contrast with?' and posits "episodic" memory (p. 384). Tulving maintained that both systems could receive information from perceptual or other cognitive systems, retain features of that information and apply it to other systems, including "those responsible for translating it into behavior and conscious awareness" (p. 385). His conception of the semantic memory system is that it is:

> the memory necessary for the use of language. It is a mental thesaurus, organized knowledge a person possesses about words and other verbal symbols, their meaning and referents, about relations among them, and about rules, formulas, and algorithms for the manipulation of these symbols, concepts and relations (p. 386).

The episodic memory, on the other hand, stores events with an autobiographical reference. New events are taken in, dated and fixed in space with reference to existing events. As a result, access to information in this memory system "...tends to be deliberate and usually requires conscious effort (Tulving, 1983, p. 46)."

In a repetition priming study, Feldman and Andjelković (1992) found that morphologically related words primed target words to the same degree that the self-same word did. If Levelt's (1989, p.183) contention that "[t]he various inflections of a verb..." belong "to the same lexical entry" is accepted, then there is no reason to be surprised at those results. However, inflectional morphemic

processing may not be acquirable in the same way, given the normally different circumstances of acquisition, for L2 learners. This look at students at different levels in the process of acquiring morphemic integration in conjunction with data on how they use English in their daily lives may go some small way toward illuminating that process.

Chapter III

Methods

Introduction and Research Questions

Linguists have pursued answers to questions concerning the factors, internal and external that support second language acquisition. Psycholinguistic research has focused more toward internal processing of lexical items and issues of access, storage and retrieval. The two strands above are not necessarily, or even ideally, only studied individually. Much research has been done in an effort to link external factors to internal results, particularly in second language acquisition. This focus on L2 studies may be, in part, because children acquire their native languages "[g]iven a minimal set of necessary and sufficient conditions" generally before they even start school (d'Anglejan, 1978, p.221). Second language learners may be of virtually any age, in any locale, receiving language input through a wide variety of sources. There have been second language studies addressing the effects of the L2 as the medium of instruction on "proficiency," (Saegert et al. 1974); the effects of 20 various factors, including several regarding experience with English in English-speaking cultures, on pronunciation (Suter, 1976); and the effects of both classroom settings and "naturalistic" settings on language acquisition (Pica, 1983c). Little has been done to discover possible connections between informal exposure and specifically inflectional morphemic automaticization. I propose to investigate the effects of 10 factors related to experience in English-speaking

milieus (see Appendix A) on the perceived integration of inflectional morphemes in the lexical representations of second language learners.

The present research compares a native-English speaking control group with low- and high-level ESL learners and addresses the following questions:

I). For second language learners, are inflected variants of a word automatically available upon access to a morphologically related prime?

II). Does time spent in an English-speaking culture correlate with a measurable level of automaticization of inflected variants of words in the lexicons of second language learners?

A). For beginning level students?

B). For advanced students?

III). Does mainly classroom learning lead to storage of inflectional morphemes in the episodic memory, requiring a two-step retrieval process for inflected words?

Pilot and De-Bugging

A pilot test was run in November of 2002. It was well-subscribed with10 volunteers for each of the three categories of subject – Level E, Level V and Native speaker. The testing revealed several major problems. The biggest problem uncovered was that of the supplementary computer monitor. A Sylvania 15" SF150 Flat Panel Monitor had been purchased to use in conjunction with the MacIntosh laptop, which ran the software program. A bigger screen was needed for the best possible visual display. Both the laptop, running the software, and the monitor, displaying it, utilized liquid crystal display technology in their screens. A

fact discovered toward the end of the pilot period was that that type of display has a persistence factor of approximately 225 ms. The design of my experiment required a display of the prime word for only 50 ms.

The sensitivity of the microphone seemed to present a problem. It may be that what was uncovered as a problem with the software program was the cause of the volume difficulties attributed to the microphone. In any case, the microphone was traded for a MacIntosh microphone, an Apple 590-0670. The software problem was with the "uptake bar" on the "Sound Panel" page. It reverted to zero each time the laptop was turned off. This bar had to be moved up at the beginning of each session for most sounds to register.

A design issue surfaced during the pilot: several control group subjects read *either* the prime or the target or, in one case, *both* the prime and the target. Many of this Native-English-Speaking group expressed some confusion at seeing two words instead of the single one they expected. My subsequent research into reading speed standards confirmed that words *can* be read at 50msecs of exposure, i.e., even with a new word presented every 50 msec. (Forster, 1970). This is notable in light of the fact that this "should not occur, given that the minimal oculomotor reaction time of the eyes is around 150-175 msec" (Rayner & Balota, 1989, p. 281). There is also an ongoing debate on the "formidable" issue of at what point the intake is unconscious (Carr & Dagenbach, 1990, p. 341).

Subjects

The population of this study consisted of foreign students of English who are registered in the Intensive English Language Program at Portland State University. Upon entering the Program, students undergo placement examinations. They are then placed in one of five levels for study. The curriculum is comprehensive with core classes in Grammar, Reading, Writing and Speaking/Listening, augmented by elective offerings in such categories as Pronunciation, TOEFL prep and Vocabulary Building. Completion of Level V prepares students to pass the TOEFL and go on to regular American University classes. Random sampling was not a realistic possibility for this project. One of the anticipated results was a direct product of students at two distinct levels of fluency. I implemented a systematic stratified approach by dictating that only subjects from the already established levels E and V of classes at P.S.U. participate.

In this study half the subjects were students from first year classes of the IELP (Level E); the other half were from fifth year (Level V). There was also a native English speaking control group, which consisted of undergraduates at P.S.U. between the ages of eighteen and forty-two. The majority of the IELP students in recent years have been Asian, though any other nationality is possible. This fact of itself is not relevant to this study, though the type of learning they have experienced is. Specifically, any students who have lived in an English-speaking culture were asked to describe that on the nonnative questionnaire (Appendix A). Such experience may constitute an advantage in factors which are known to

facilitate automaticity in morpheme selection, e.g., extended exposure to contextual usage (Pica, 1983a; Sternberg, 1987). The control group consists of native speakers of English.

Recruitment was done by means of posters and by announcements in the relevant classes, where permitted. Bulletins were posted in East Hall, where the IELP office is located, for IELP students and on bulletin boards at other locations around campus, designated by the P.S.U. Office of Student Development, for the undergraduate control-group subjects. The study was announced in IELP classes and in a very large statistics class on the main University schedule. I had students schedule an appointment and handed out questionnaires and consent forms ahead of time. A few were emailed and others were directly handed out to interested persons. Appointments were set up in person, by phone or by email. Contact information for me, as well as for the Office for Human Subject Research was located on the consent forms (Appendices C & D).

Problems of recruitment did not surface until the second period for the actual experiment. The pilot test was well-subscribed, but when the subsequent test was run, it conflicted with final exams at the University. No-shows were a big problem, particularly for the native-English speaking subjects. This necessitated extending the recruitment period into the following term. I continued to test until I had a minimally acceptable number of participants- the smaller the group the slighter the possibility of any generalizability, which should be avoided if possible.

I also offered incentives. I generally provided homemade cookies and paid $10.00 per subject.

Materials and Equipment

Two questionnaires (Appendices A & B) were filled out by the students. The one for the control group (Appendix B) merely seeks to establish English as the native language for these students. The other is much more complex: it is designed to elicit rather detailed histories of the subjects' experience with English as a foreign and/or second language. As quality time spent in English-speaking cultures by ESL students constitutes the independent variable in this experiment, this information is critical. Various factors thought to effect second language acquisition will be noted. This data will be analyzed for purposes of comparison/correlation.

The tool for presenting the masked vocabulary and measuring the reaction time of subjects is a software program from Cedrus®, called SuperLabPro™. The model used in this experiment is the one for Macintosh as it alone at this time had a dependable voice-key feature. It is capable of displaying the mask pattern, followed by the prime and target words for the specified times, then measuring response time from the presentation of the target word on the screen to the utterance by the subject. The software program was run on a portable computer, which could be removed at the end of each session, as there was not a dedicated space for the experiment. This laptop was a Macintosh Powerbook G3 series, running OS 9.1. It has a 4 Gb drive with 64-bit memory. It runs on a Power PC

G3 333MHz processor. The screen has a resolution of 1024 x 768 pixels. As is frequently the case in laptops, it uses a liquid crystal display (LCD). This medium allows images to persist for up to 225 msec. As the requirements for this experiment included the presentation of a prime word, to persist for ±45msec., an additional monitor was called for. This was a ViewSonic® UltraBrite™ A70f+-1 CRT monitor with a 17" screen (16.0" diagonal viewable). The microphone was an Apple 590-0670.

Research design

This study looks at the question of inflectional morpheme storage and retrieval in second language learners, comparing students who have learned English mainly through classroom instruction and those who have also had a reasonable amount of exposure to, or immersion in, English-speaking cultures. This study is a causal-comparative design. A project of this type, "allows researchers to investigate the possibility of a causal relationship among variables that cannot be manipulated" (Fraenkel & Wallen, 2000, p.396). It is consequently ideal for, and is generally used for, investigating events that have already taken place. Fraenkel and Wallen (2000) further classify this study as a Type III, which category explores the consequence of an intervention. The "intervention" in this case comprises the experience in English-speaking cultures that the students in the IELP at Portland State University have experienced outside of a classroom.

A causal-comparative study resembles a correlational study in that both are associational. The primary question of this study is whether the amount of time

spent in an English-speaking culture has any relation to the measurable level of automaticization of morphemic access and retrieval. This differs from a correlational model in that different tools are used in analyzing the data: averages and crossbreak tables rather than scatterplots, although there will actually also be a correlational analysis applied to several strains of the data.

The independent variable of this study, which is a random variable, is not subject to control or manipulation. This is the quality time spent immersed in an English-speaking culture by individual ESL students. They self-reported the duration and, to some degree, the intensity of such experience by means of a questionnaire (Appendix A). In it the students answered questions regarding their inclination to initiate English conversation, whether or not they had ever lived with English-speakers, etc. This information was quantified and codified to produce representative numbers for analysis. The questions regarding the amount of time spent were entered as monthly totals; the proportional questions were entered as percentages. The validity of the results depends, to some extent, on the authenticity of the students' responses to the questionnaire and on the accurate assignment of numerical values to their English language experiences. Fixed variables are the four categories of priming words – same as the target, completely unrelated, regularly-inflected variant of the target and irregularly-inflected variant of the target word – and the group or predetermined academic level of the student participants – beginning or "entry" level (E), advanced or year 5 (V) or Native-Speaking control group (N).

The dependent variable is the degree of automaticity of inflectional morphemic access. This will be inferred by the speed of response to a display of lexical items shown briefly. Priming on inflected-variant trials will be identified if the response time on those trials matches that on identical trials, and is quicker than the response time on unrelated trials.

Possible intervening variables included the variation in language aptitude, not to mention general intelligence, among the students. As this study relied on already assigned classes, we had to assume that the testing done when students were admitted to the Program had gone some way toward minimizing this question. The relative degrees of extroversion/introversion present in any given population would contribute to a student's willingness to initiate conversation with English-speakers for practice. A question regarding the frequency of soliciting English conversation is included in the questionnaire. Performance anxiety can adversely affect students' concentration. The test site was quiet and comfortable. One aspect of instrument decay that could have appeared in this study was interviewer fatigue. Sessions were scheduled with an eye to duration and to the time of day to minimize that possibility.

When the target word appeared, timing began. Each subject had been instructed to respond as quickly as possible. The clock stopped at the onset of the utterance when the subject read aloud the target word. The assumption was that the response time would vary, depending on the nature of the prime preceding it. To establish a base level, some primes were the same word as the target, which

were expected to yield the shortest reaction times of all. At the other extreme, some prime words are totally unrelated to the target; these times were expected to be longer. The results of greatest interest for this study are the reaction times recorded for words primed by inflected variants of the target word itself. Within this category there was a further sub-division - that of regularly inflected words and of irregular ones. The type of primes preceding target words were displayed in a random order for all participants.

Stimuli

The target words were common ones (Word List, Appendix E), selected on the basis of the students' presumed familiarity with them. The unrelated primes were chosen avoiding semantic, as well as orthographic or etymological, similarity, as Dagenbach, Carr and Barnhardt (1990) have shown that semantically related primes can facilitate word production, while "orthographic primes may inhibit" (Feldman & Andjelković, 1992, p. 347). Some researchers (Taft, 1979a; Niemi, Laine & Tuominen, 1994) have found that high-frequency forms elicit faster response times or, in the case of aphasics, the ability to successfully decipher words at all. Prime and target words in this experiment are controlled for the frequency effect only in the sense that they are all in the same approximate range of frequency, based on the order provided by Carroll, Davies and Richmond (1971) in The American Heritage Word Frequency Book. Vocabulary used in this experiment is virtually all from the 1000 most frequently used words in Carroll et

al.'s list. This was necessary to insure recognition by the lower level, non-native students.

Procedure

The testing took place on campus at P.S.U. Conference rooms 109 and 326 in East hall were available to me for data collection. I was able to sign up for 2 to 5 hours on each day of my targeted period.

For all groups, the collection procedure was accomplished in the same way. The questionnaires (Appendices A & B) were distributed to the students ahead of time. Entry-level students had been offered questionnaires in their native languages. I had had questionnaires translated into Japanese, Korean, Mandarin and Thai (see Appendices F, G, H & I). The IELP office felt that that would cover the languages of ninety percent of the Level E student body. I then had these questionnaires back-translated to English by different translators to insure equivalence, so that the answers could be compared across languages with confidence.

The questionnaires elicited information from the subjects on their experience with English. The period of time "immersed" in an English-speaking culture constitutes the independent variable. Insofar as they were living in the U.S. at the time, all have some time spent in an English-speaking country. The questionnaire attempts to qualify their experience, past and present, as much as possible, as well as quantify it. It includes questions regarding their willingness to elicit

conversation with English-speakers and their estimate of the percentage of time they spend outside of class speaking English in a typical day.

As collection of the questionnaire data was of major importance, I reviewed every subject's form with them, before they took the word-reading test. Once confident that the subject had understood the forms and answered as accurately as possible, I seated subjects in front of a computer monitor. They were instructed to look at the screen at all times and to read the English words as soon as they appeared, as quickly as they could. The first few words were for practice only and no prime preceded them, although a mask did. Once the actual experiment began, a series of alternating prime and target words were presented to the subjects, one at a time. The first screen presented a "mask." This could have been a "...string of hash marks (######)" (Jiang, 2000, p. 60) or a page of "...alternating rows of X's and O's..." (Carr & Dagenbach, 1990, p. 344). The mask displayed for this experiment was composed of rows of capital "X's".

Priming is a technique that is used to delve into the subconscious reaches of the human mind. In psycholinguistic research, several different types of priming are used to focus on various aspects of representation and process in the mental lexicon. Traditional priming presents a target item immediately following the presentation of a prime item. There may or may not be a forward mask. Masked priming is theorized (Marcel, 1980) to separate automatic encoding from consciously controlled processing. Pattern-masked priming effects are, consequently, thought to remain below the conscious awareness of the subject

(Jiang, 2000). Masked, traditional priming has been used in lexical decision tasks (LDT) in which the subject must decide if a presented string of letters is a word or not. The same technique has been used in semantic tasks in which a subject must decide which semantic category a word belonged to (reported in Jiang). Feldman & Andjelković, 1992) investigated morphological versus orthographic facilitation, employing immediate priming techniques. They found morphological priming, but possible orthographic inhibition.

The masked, traditionally primed LDT's mentioned above were cross-language studies. DeGroot & Nas (1991) tested priming effects on Dutch-English bilinguals from the subjects' L1 to their L2. The cross-language testing done on Spanish-English bilinguals (Sanchez-Casas, et al., 1992) looked only at L2 to L1 priming effects. Hebrew-English and English-Hebrew bilinguals were tested in both directions, L1 to L2 and L2 to L1 by Gollan et al. (1997). Nan Jiang (1999) tested Chinese-English bilinguals also in both directions. In each of the tests described above, only the L1-L2 direction showed priming effects.

A variant of the LDT is repetition priming. In this technique, ten to fifty items are inserted between the prime word and the target word. Extensive L1 testing, using repetition priming, has investigated morphological processing as reported in Feldman & Andjelković (1992). Fowler, Napps & Feldman, (1985) discovered that morphological relatedness manifests between even pairs of irregular inflections and the base forms. A study by Feldman & Moskovljević (1987) used

the duality of Serbo-Croatian spelling systems (Roman and Cyrillic) to separate orthographic effects from the morphologic ones. In that same year, Feldman & Fowler found that in Serbo-Croatian, morphological facilitation occurs even when the morphologically related prime undergoes spelling or pronunciation alteration. A study done using masked priming in French with French speakers confirmed the facilitation by morphological variants. In that study, priming by unrelated words had a neutral effect; priming by orthographic variants had an inhibitory effect (Grainger, Colé & Segui, 1991). Bentin & Feldman (1990) compared semantic and morphological relatedness in an experiment that employed immediate *and* repetition priming. Differences in the results led them to conclude that different search faculties underlie semantic and morphological facilitation.

In this experiment, the forward mask presented for 2 sec. In the pilot I had found that a period shorter than that caused mild panic among some of the subjects. Lengthening the mask period to 2 seconds prevented the subjects from being rushed. The mask was immediately followed by the prime word, displayed for ± 45msec; this time period had been reduced as a result of a discovery made during the pilot. The prime had been displayed for 50msecs originally, but some native-English-speaking subjects were reading the primes some of the time. Shortening the presentation of the prime word reduced the incidence of prime-reading somewhat. The prime word, even though shown for such a short period however, may or may not have remained below the conscious level of the subject (Carr & Dagenbach, 1990), particularly among the Native-Speaking subjects.

Following presentation of the prime, the target word appeared and persisted until the word was uttered by the subject. The timing mechanism within SUPERLABPRO™ registered the lapse between the presentation and the onset of the response.

Table 1
The Procedure

STUDENTS	SUPERLABPRO™ PROGRAM
1) FILL OUT QUESTIONNAIRES	1) DISPLAYS MASK PATTERN FOR ± 2 sec.
**********	2) PRESENTS PRIME WORD FOR ± 45ms.
**********	3) PRESENTS TARGET WORD UNTIL RESPONSE.
2) VIEW VOCABULARY	**********
3) READ WORDS ALOUD	4) TIMES VOCAL RESPONSES

There were nine subjects from each level – control, Entry level and Advanced - who each viewed forty words (see word list in Appendix C). This number of words was chosen in an effort to maximize validity without exceeding the students' attention span or the total amount of time available. These forty words were immediately preceded by four types of primes: the self-same word, a completely unrelated word, a regular, inflectional variant of the target word and an irregular, inflectional variant of the same. Each type appeared ten times in a random order for each subject throughout the experiment. There were twenty-seven subjects in the experiment. Each subject viewed forty words; 1080 data points were generated. Averaging response times (RT's) within the four categories, determined by the type of prime that precedes it, yielded 120 data

points or four average RT's for each subject. The subjects' average RT's per prime category from Levels E and V were compared to each other and both were compared to the RT's of the control group of native speakers.

As the result of problems discovered during the pilot test, this experiment began with a new monitor with CRT technology and a microphone specifically built for use with MacIntosh products. An issue that remained, which was overcome with improved mnemonics of the researcher was that of the volume bar on the Sound Panel page of the software program. During the experiment, if an utterance by the subject did not register, the Sound Panels page was the first thing I checked.

Chapter IV

Results

Introduction

The data consists of the response times to four types of primes for each of the two IELP groups of students participating and for the native-English-speaking control group. Mean response times (and standard deviations) can be seen in Table 2. For all statistical analyses, the alpha level was set at .05, as is standard in the social sciences. This means that there is a 5% probability of finding that there is a statistically significant result when none is actually present.

Table 2

Mean Reaction Times per Group by Prime with (Standard Deviations)

Type of Prime / Name of Group	II	RI	S	U
E	901 (265)	960 (264)	1167 (712)	1125 (789)
N	614 (232)	575 (101)	534 (80)	617 (111)
V	761 (152)	808 (203)	812 (277)	817 (161)

Note. II=Irregularly inflected, RI=regularly inflected, S=Same, U=Unrelated

Errors were difficult to pin down. These are, after all, ESL learners, some from the Entry level of the IELP. Pronunciation is somewhat erratic and articulation is not always clear. Also, a word like "flower," pronounced as /floʊ/, like a stream, /ɚ/ isn't necessarily an error. Mightn't a great river be characterized as "a powerful flow-er"? What generally happened, when an unknown word was

encountered, is that the subject would pause and would sometimes go on to sound the word out. This response time would have been longer than average. Occasionally I would eventually make a sound to move the program along. However, these longer response times were included for two reasons. First, longer response times may have been genuine attempts to sound the word out. Second, there were only ten cases out of the total one thousand eighty where the response time was over three seconds. The response times that registered as 1 ms. were cases of random ambient sounds or a movement of the microphone and were deleted on that basis.

Research Question I

Research Question I. asks, "For each group of language learners, are inflected variants of a word automatically available upon access to a morphologically related prime?" An affirmative answer to this question would require that response times to target words with inflected variants as prime remain essentially the same as when the prime is the exact same word as the target. A negative response would be inferred if the response time to a target word with an inflected word as prime is significantly slower than that to a target with the self-same word as prime.

The expectation was that the control group's times would be fastest, followed by Level V, with Level E averaging the slowest times. To investigate this question, a one-way ANOVA was run for each group (Native Speakers, E and V)

with the type of prime as a with-in subjects independent variable and reaction time the dependent variable. The ANOVA for group E subjects showed a statistically significant effect of prime type on reaction times, $F(3,351) = 4.573$, $p = .004$. In other words, they responded faster to some types of primes than they did to others. Planned comparisons followed, as the statistics for this group warranted further analysis (see Table 3). The planned, pairwise comparisons (Bonferroni) revealed statistically significant differences in response times between target words, primed by irregularly inflected variants and those primed by the same words. As seen in Figure 3 and Table 2, the responses to words primed by irregularly inflected variants were actually significantly faster than responses to words primed by the exact same word itself. Thus, the self-same word did not appear to facilitate lexical retrieval of the forms more than the other types of primes.

Table 3
Planned, Pairwise Comparisons (Bonferonni)

(I) Prime Code	(J) Prime Code	Mean Difference (I-J)	Standard Error	Significance
Same	Irregular Inflected	265.4451	84.565	.011
	Regular Inflected	206.9537	84.091	.086
	Unrelated	41.4110	84.565	1.000
Irregular Inflected	Same	-265.4451	84.565	.011
	Regular Inflected	-58.4914	84.331	1.000
	Unrelated	-224.0341	84.804	.052
Regular Inflected	Same	-206.9537	84.091	.086
	Irregular Inflected	58.4914	84.331	1.000
	Unrelated	-165.5427	84.331	.303
Unrelated	Same	-41.4110	84.565	1.000
	Irregular	224.0341	84.804	.52
	Regular Inflected	165.5427	84.331	.303

Note. Level E Subjects

Of particular interest was how far Level V lags behind the control, in the inflected variant prime condition. However, the ANOVA for the advanced Level V group showed no statistically significant differences in response times to type of prime, $F(3,355) = 1.416$, $p = .238$. This suggests that the different types of primes are not any different at facilitating lexical access for this group, i.e., no priming was found. Figure 3 shows the almost straight line with minimal variation in response times for all four categories of prime. Planned, pairwise comparisons of the differences in reaction time between the primes were only conducted when a significant effect for prime type on reaction times was found. No planned comparisons were called for with the Level V statistics as there was no significant effect of prime-type on reaction time to follow up.

The native-English-speaking control group did show a significant effect of prime type on reaction time. The oneway ANOVA done for their data revealed: $F(3,355) = 6.584$, $p = .000$. Planned, pairwise comparisons (Table 4) further examined those results. These analyses showed that there was a significant difference between responses to the target when primed by the same word when compared to both those responses to targets primed by irregularly inflected variants and to those primed by unrelated words. Priming by the same word yielded faster response times in both cases. There was no significant difference in response times between targets primed by the same word and those primed by

regularly inflected variants of the target word. Figure 3 shows the relation between all three groups' responses.

Table 4

Planned Pairwise comparisons (Bonferonni)

(I) Prime Code Code	(J) Prime	Mean Difference (I-J)	Standard Error	Significance
Same	Irregular Inflected	-79.333	21.417	.001
	Regular Inflected	-40.878	21.417	.343
	Unrelated	-83.182	21.478	.001
Irregular Inflected	Same	79.333	21.417	.001
	Regular Inflected	38.456	21.417	.441
	Unrelated	-3.849	21.478	1.000
Regular Inflected	Same	40.878	21.417	.343
	Irregular	-38.456	21.417	.441
	Unrelated	-42.304	21.478	.298
Unrelated	Same	83.182	21.487	.001
	Irregular Inflected	3.839	21.478	1.000
	Regular	42.304	21.478	.298

Note. Native-English-Speaking Subjects

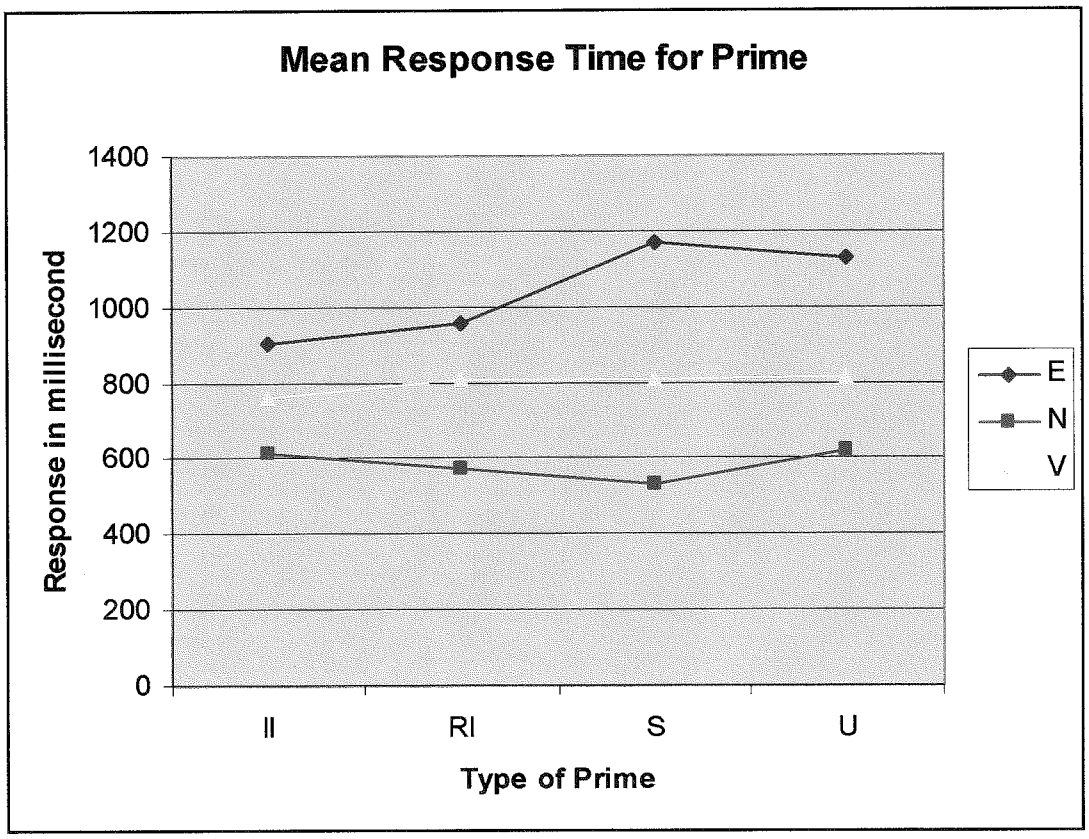

Figure 3 II=Irregularly Inflected, RI= Regularly Inflected, S=Same, U=Unrelated

Research Question II

Research question II is: "Does time spent in an English-speaking culture correlate with a measurable level of automaticization of inflected variants of words in the lexicons of second language learners? For beginning level students? For advanced level students?" Answers to these questions will be found in looking for a statistically significant correlation between response times to targets with morphological variant primes and a composite score derived from the

Questionnaire questions about contact a subject has had with an English-speaking Culture (ESC). The general statistics for questionnaire responses can be seen in Table 5.

Table 5
Statistics for Questionnaire, Q1-Q8

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Mean	8.83	2.90	47.92	65.28	6.94	44.89	15.28	47.22
Median	9.50	1.13	37.50	75.00	0.00	50.00	0.00	50.00
Standard Deviation	5.09	4.50	37.19	22.91	20.66	24.79	35.50	18.96
Range	16.50	18.00	100.0	75.00	75.00	100.0	100.0	50.00

Individual, representative numbers were arrived at by calculating Z-scores for each subject based on their answers to questions 1-8 of the Questionnaire (Appendix A). As seen in Appendix J, Z-scores for each question and each subject were first calculated. To arrive at a single number, which could be considered representative of the cultural exposure for each subject, the mean score for each question of questions 1-8 was determined (Table 5). This mean was subtracted from the individual's score for that question. This result was divided by the standard deviation calculated for that question. The quotient is the composite Z-score for that individual, which can be seen in Table 6.

Table 6

Composite Z-scores for Each Subject

Subject	Z-Score	Subject	Z-Score
E1	0.28	V1	-0.05
E2	0.41	V2	-0.56
E3	-0.31	V3	0.16
E4	0.18	V4	-0.74
E5	0.27	V5	-0.18
E6	-0.16	V6	-0.33
E7	-0.13	V7	-0.06
E8	0.27	V8	-0.20
E9	1.58	V9	-0.46

Statistics for mean times and composite Z-scores by prime and for both groups, E and V, can be seen in table 7.

Table 7
Descriptive Statistics for Levels E and V

Group	**Prime**	**Mean Times**	**Z-Composites**
Level E	I	901.39	-.87
	R	959.88	-.86
Level V	I	761.39	.84
	R	807.93	.86

Note. II=irregularly inflected, RI=regularly inflected

For correlation, Pearson's *r* was calculated for the composite score and the reaction times for each of the prime types (*same, irregularly inflected, regularly inflected and unrelated*). Results of irregularly inflected primes for Level E revealed $r88 = -.127$, $p=0.238$, e.g., no significant correlations were found between the score for contact with the ESC and reaction times on the irregularly inflected primes. Pearson's *r* calculations for regularly inflected primes and Level E response times also showed a lack of correlation; $r90 = -.06$, $p = .58$.

For Level V, however, there was a statistically significant correlation found between time spent in an ESC (as reflected by their Z-scores) and response times to inflected variants of the target words. Pearson's *r* was calculated for Level V and yielded $r89 = -.297$, $p=.005$ for irregularly inflected primes and $r90 = -.240$, $p = .023$ for regularly inflected primes. These results suggest that there is a small, but definite relationship between reaction time on these two types of primes and the amount of contact with an English-speaking culture. Those individuals who had more contact with an ESC responded faster than individuals who had less contact.

Research Question III

Research question III is: Does mainly classroom learning lead to storage of inflectional morphemes in the episodic memory, requiring a two-step retrieval process for inflected words? To answer this question, the subjects were divided into two groups, based on the Z-scores calculated for them (Appendix J). Subjects with minus Z-scores were assigned to the "low" group, i.e., for time spent in an ESC. They were, therefore, assumed to be students who had received most of their English exposure from formal instruction in a classroom. Positive Z-scores constituted the "high" group for cultural exposure, which should indicate a lower percentage of learning from formal instruction.

ANOVA's were run with primes as within subjects variable and groups as between subjects variable to determine whether there was an overall effect for group and, within group, an overall effect for prime. Oneway ANOVA's run for

Level E, Level V and for both together revealed no statistical significance between those with low ESC exposure (relatively high classroom experience) and response times to morphologically inflected primes or between those with high ESC exposure and their response times. (Appendix K)

Univariate analyses of variance yielded the following data (Tables 8, 9, 10 and 11).

Table 8
Descriptive Statistics for Level E

Prime Code	Outside English Contact	Mean	Standard Deviation	N
Irregular Inflected	low	899.2245	232.8403	49
	high	904.1026	304.4739	39
	total	901.3864	265.3469	88
Regular Inflected	low	970.9000	316.7520	50
	high	946.1000	179.6662	40
	total	959.8778	263.6998	90
Total	low	935.4242	279.3158	99
	high	925.3671	248.4958	79
	total	930.9607	265.3923	178

Note. Dependent Variable=TIME

Table 9
Tests of Between-Subjects Effects: Level E

Source	df	Mean Square	F	Sig.
Corrected Model	3	55470.168	.785	.504
Intercept	1	152014900	2150.412	.000
PRIMCODE	1	141918.218	2.008	.158
CONTACT	1	4358.997	.062	.804
PRIMCODE*CONTACT	1	9673.761	.137	.712
Error	174	70691.047		
Total	178			
Corrected Total	177			

Note. R Squared=.013: Adjusted R Squared=.004. Dependent Variable=TIME

Subjects with low cultural composites did not show a significant difference in response times to inflected variant primes in the Level E group, when compare to those with high-cultural composites. Actually the low group was a little faster in the irregularly inflected form, but somewhat slower in the regularly inflected prime condition, but neither difference was big enough to be significant.

Table 10
Descriptive Statistics for Level V

Prime Code	Outside English Contact	Mean	Standard Deviation	N
Irregularly Inflected	low	747.3750	126.9378	40
	high	772.8367	169.5902	49
	total	761.3933	151.6280	89
Regularly Inflected	low	778.3750	110.8577	40
	high	831.5800	252.1101	50
	total	807.9333	202.6956	90
Total	low	762.8750	119.4355	80
	high	802.5051	216.1900	99
	total	784.7933	180.1489	179

Note. Dependent variable=TIME

Table 11
Tests of Between-Subjects Effects – Level V

Source	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	3	174107.728	1.813	.147
Intercept	1	108374548	3385.109	.000
PRIMCODE	1	89083.257	2.783	.097
CONTACT	1	68450.181	2.138	.145
PRIMCODE * CONTACT	1	8513.488	.266	.607
Error	175	32015		
Total	179			
Corrected Total	178			

Note. R Squared=.030: Adjusted R Squared=.014. Dependent Variable=TIME

For the Level V subjects, the low composite Z-score group did score faster times on both regularly and irregularly inflected primes than the high composite Z-

score group, though not fast enough to be significant. If anything, that would seem to imply a benefit to classroom instruction.

Chapter 5

Discussion

Entry Level Subjects

The Entry-Level group had the greatest variations of response times. Their results showed the fastest RT's, in ascending order, to: irregularly-inflected forms, regularly-inflected forms, unrelated words and, the slowest response time of all – the self-same word. This is not explained as a frequency effect, since the stimulus words in the same-word-as-prime were also the most frequent of all the stimulus groups (average ranking – 475, Carroll et al., 1971). The Level E group's fastest responses were to the irregularly-inflected words, which have an average frequency ranking of 750 (Carroll et al.). Frequency of appearance does not seem to have been a very influential factor in these results.

Favoring irregular variant primes over regular ones could be explained by the mechanics of storage. Helmut Zobl (1998) has found that during the early stages of learning a language, whether first or subsequent, "a preference for listing-type retrieval would not be surprising" (p 340). This includes irregular forms, which are widely held to have their own listing in the lexicon (Pinker, 1994). Zobl credits this possible preference to the fact that a certain sophistication of linguistic structure must be operative in order for the frequent concatenation of affixes to variable stems to be smoothly accomplished. That is, a certain level of proficiency

is necessary in a language to be able to seamlessly affix, for instance, inflectional morphemes.

One possible explanation for the finding that the self-same word did not prime response to the target word for this group may be semantic inhibition. Research into the effects of inadequately learned prime vocabulary on the retrieval of semantically related target words illuminates the difficulty posed for low-level learners, in particular (Dagenbach et al., 1990). In the study by Dagenbach et al. (1990), subjects were given a sizable number of obscure vocabulary words to learn along with their definitions and they were intentionally limited in the amount of time they had to study. These words were then used as the primes in a lexical decision task in which the target words were semantically related to the hastily learned primes. The result was that when the meaning of the prime could not be recalled, it had an inhibitory effect on naming the target word, even though the target was a better-known word.

Obvious differences exist between that experiment and mine: my participants were not *intentionally* subjected to vocabulary that would be challenging, and this experiment was an immediate masked priming experiment, rather than a lexical decision task. But there may have been an inhibitory effect operating, nevertheless. The most unexpected finding was that for the Entry-level group the longest average response time was to the same-word-as-prime category, e.g., the trials in which the prime word was semantically, as well as orthographically,

phonologically, morphologically and syntactically identical to the prime. Dagenbach et al. suggest, "that the range of conditions under which this retrieval-failure-induced inhibition can be found may be fairly wide" (p. 336). It may be that the vocabulary was difficult for this group and seeing it twice made things worse, not better.

This group showed no correlation between time spent in an ESC and integration of inflectional morphemes, nor was there a significant difference between those with low Z-scores, or cultural composites, and speed of response. The results for Level E may be indicative of the difficulty that group is experiencing with acquiring English, generally. Some knowledge of English is required for entry into the IELP. The members of this group were able, for the most part, to read the vocabulary presented to them during the experiment, but their responses were naturally slower than those of the advanced group. The Entry Level subjects indicated on their Questionnaires that they had had both less time in Intensive English classes, e.g., the PSU IELP, and less time spent in an ESC than the Level V respondents. It is difficult with this information to tease apart the individual contributions of formal instruction and contextual learning.

Level Five (V) Subjects

The IELP advanced, V-Level group showed the smallest variation in RT's across the four prime types. Their average RT's for each of the four different

types of prime showed no significant effect between them at all. One possible explanation that presents itself is that ESL learners at this advanced level might have most words listed whole in their lexicons. Retrieval would be a one-step process for all lexical items. That could explain the phenomenon of all prime types producing essentially the same response times in this group.

A significant difference between the RT's of native-speakers and Level V subjects here could have lent credence to the possibility of two-step access to inflections by second language learners at what Jiang, (2000, p. 52) characterizes as the "second stage" of second language lexical integration. The responses for

Level V lagged behind Native-Speaker responses by the percentages, seen in table 12. As the responses for Level V were essentially the same and it is

Table 12

Percentage of difference in response times for N & V

Primes	II	RI	S	U
Native-Speakers RT's	614	575	534	617
Level V RT's	761	808	812	817
Percentage Difference	21%	29%	34%	24%

extremely unlikely that, at this stage of their studies, they would be consciously searching for all words, it seems possible that all of their vocabulary could be represented whole in their lexicons. Responses to irregular forms were the fastest; this category is generally held to be individually listed in the lexicons of speakers in their L1's (Pinker, 1994). For L2 advanced students, this may be the case, as

well. The fact that the same word as prime and the regularly inflected prime took the longest might be an indication of some effort to combine base forms and their rule-generated inflections. Statistically speaking, however, any differences that existed were so small as to be insignificant.

The Level V group, however, did show a significant correlation between time spent in an ESC and speed of response to inflected variant primes. This significance was small, which means that other factors must also be considered as relevant in the acquisition effort for this group. Nevertheless, the clear relevance of this result implies that naturalistic exposure continues to be important to language acquisition.

Native Speakers

The native-speaker data showed no significant difference between priming by a regularly-inflected variant of the word and priming by the same word. They did show a significant difference between priming by an irregularly inflected variant and priming by a totally unrelated word when compared to the same-word-as prime condition.

The mechanisms for production of regular versus irregular inflectional morphology in one's native language may be different (Pinker & Prince, 1988). It may be that irregular forms are stored whole in the lexicon or "listed", while regular forms are compiled according to set rules (Pinker, 1994). Dominiek Sandra (1994a or b) offers that some regularly inflected word forms may have their

own listings as a result of the frequency with which they appear in normal speech. But, if a lexical search is something of a "Horse Race" with a full listing and means of compilation both available, either one could be accessed.

Levelt's (1989) model contains all inflections of a word in its lexical entry, e.g., all forms would be available once the entry is opened. The fact that Native-Speakers accessed same words and regularly inflected words with equal speed could be explained by this model. Pinker's (1994) suggestion that irregular forms tend to have their own listing could also be at work here. Native Speakers' responses to the category of unrelated words as prime were the slowest of all. They were significantly slower than the responses to the same-word-as-prime and to regularly-inflected forms as prime. This would seem to indicate that these were separate searches.

Implications for ESL Pedagogy

Level E volunteers had anomalous results. Compared to Level V participants, they had less time living in an ESC *and* less time in an intensive English course. It may be that both continued, intensive study and additional naturalistic interaction are needed to assist the Level E learners toward their goals.

There was a correlation found for the Level V group between time spent in an ESC and response times on inflectional variants as primes. That finding, along with the myriad studies done that support naturalistic learning suggest that educators would do well to continue to give their students opportunities to practice

the language in an interactive way. The fact that there was not a strong correlation for Level V on research question 2, however, implies that there are many other factors that contributed to the speed of their responses.

Pica (1983) has suggested that inflectional morphology may be an area that is actually amenable to formal instruction, at least for adults. Inflections may not be salient when they occur in normal, sometimes rapid speech. Explicit highlighting by a teacher may allow adults, with their higher cognitive function, to grasp the concept of inflectional variants and from there, use and acquire them (Pica). Other researchers (Bialystock, 1978a, Stevick, 1980) suggest that, Krashen's theories notwithstanding, information that is formally acquired may come to be available for use just as that which is informally acquired. ESL educators should not forego specific instruction in morphological inflections.

Limitations of the study

A causal-comparative study allows a format of using past experience to explain present ability. In this case, that prior experience comprised the self-reported experience of the participants in an ESC. That earlier experience was in no way under the control or oversight of the researcher. Consequently, one cannot say conclusively that the experience was the cause of the knowledge being investigated. The value of causal-comparative research is its use in identifying possible causes of present abilities (Fraenkel & Wallen, 2000).

Priming techniques have been used in a variety of experiments designed to test lexical decisions, semantic connectedness and morphological relatedness. Primes may be consciously accessed with subjects instructed to take them into account when judging subsequent presentations. At other times, primes are intended to remain below the conscious level of the subject. This technique is intriguing as the unconscious mind is the target of much fascination and speculation. Some of the Native-Speaking participants in my experiment registered the primes; one read *both* the prime and target words aloud. Clearly, for this subject, the prime words were not perceived unconsciously. This fact calls into question the premise of addressing the unconscious representation of morphological variants through the masked priming procedure I employed. None of the L2 subjects exhibited the same behavior. Perhaps, for them, the prime presentation was below the conscious level. Carr & Dagenbach (1990) concede that the issue is a thorny one. In their words, "it remains a complex and formidable task to conclusively demonstrate that the pattern-masked words producing the priming effect are indeed "unconscious" (p.341).

paragraph kinda lonely

The sample size was quite small: it was not possible to draw any generalizations from it. A larger study would have greater weight. Bigger numbers would be more easily come by if volunteer recruitment were not done near significant periods in a student's life such as holidays or finals week.

Implications for further research

One issue that emerged concerned the categories of "job" and that of "other" on the nonnative Questionnaire (Appendix A). Question 4B asked the volunteers what proportion of their time at work they spent speaking English. As it turned out, only a small subset of the IELP students had jobs. This category should be analyzed with "job-holders" and "non-job-holders" compared with each other. Similarly, question 4D again asks for the percentage of time that they typically spent speaking English, but in the category of "other", with instructions to "specify" the activity. Again only a small group filled in activities here. They included: "with my boyfriend" or "shopping" or "at drinks party". If it was important enough to specifically write it in, I felt it was a significant occurrence in their English-speaking experience. A future study with a larger sample might utilize these areas as have/have not queries, comparing those with entries to those without.

This study was done to shed light on the question of how students manage inflectional morphemes while learning a second language. Results could be used by teachers of English to speakers of other languages to help place their lessons along the implicit acquisition-explicit instruction continuum. Alternatively, equal measures of formal instruction and opportunities for naturalistic interaction in the target language could be offered. A variety of teaching styles benefits learners in any case, as learners come with a wide range of learning styles. Acquisition of

inflectional morphemes may best be acquired naturally, as we do in our L1's, but adults in particular may also be helped along with explicit instruction.

References

Aronoff, M. (1992). Introduction. In M. Aronoff (Ed.), Morphology Now (pp. 1-3). Albany, NY: State University of New York Press.

programs, practices. Washington, D.C.: TESOL.

Bentin, S. & Feldman, L. (1990). The contribution of morphological and semantic relatedness to repetition priming at short and long lags: Evidence from Hebrew. Quarterly Journal of Experimental Psychology, 42A, 693-711.

Bialystok, E. (1978). Language skills and the learner: The classroom perspective. In C. Blatchford and J Schachter (Eds.), On TESOL '78: EFL policies programs, practices. Washington, D.C.: TESOL.

Bock, K. & Levelt, W. (1994). Language production: Grammatical encoding. In M. A. Gernsbacher (Ed.), Handbook of Psycholinguistics (pp. 945-84). San Diego, CA: Academic Press, Inc.

Brown, R. (1973). A first language: The early stages. Cambridge, MA: Harvard University Press.

Butterworth, B. (1983). Lexical representation for derived words in the mental lexicon. In B. Butterworth (Ed.), Language production, Vol. 2: Development, writing, and other language processes (pp. 257-294). London: Academic Press.

Bybee, J. (1992). Diachronic and typological properties of morphology and their implications for representations. In L. B. Feldman (Ed.), Morphological aspects of language processing (pp. 225-46). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Caramazza, A., Laudanna, A. & Romanii, C. (1988). Lexical access and inflectional morphology. Cognition, 28, 297-332.

Carr, T. & Dagenbach, D. (1990). Semantic priming and repetition priming from masked words: Evidence for a center-surround attentional mechanism in perceptual recognition. Journal of Experimental Psychology: Learning, memory and cognition, 16, 2, 341-350.

Carroll, J. B. (1967). Foreign language proficiency levels attained by language majors near graduation from colleges. Foreign Language Annals, 1, 131-151.

Carroll, J. B., Davies, P. & Richman, B. (1971). The American heritage word frequency book. Boston: Houghton Mifflin.

Chomsky, N. A. (1970). Remarks on nominalization. In R. A. Jacobs & P. S. Rosenbaum (Eds.), Readings in English transformational grammar (pp. 184-221). Waltham, MA: Ginn.

Dagenbach, D., Carr, T. & Barnhardt, M. (1990). Inhibitory semantic priming of lexical decisions due to failure to retrieve weakly activated codes. Journal of Experimental Psychology: Learning, Memory, and Cognition, 16, 328-340.

D'Anglejan, A. (1978). Language learning in and out of classrooms. In J. Richards (Ed.), Understanding Second and Foreign Language Learning (pp. 218-237). Rowley, MA: Newbury House.

De Bot, K., Paribakht, T. & Wesche, M. (1997). Toward a lexical processing model for the study of second language vocabulary acquisition. Studies in Second Language Acquisition, 19, 309-329.

De Groot, A. M. B. & Nas, G.L.J. (1991). Lexical representation of cognates and noncognates in compound bilinguals. Journal of Memory and Language, 30, 90-123.

Derwing, B. L. (1992). Orthographic aspects of linguistic competence. In P. Downing, S. D. Lima & M. Noonan (Eds.), The linguistics of literacy (pp. 193-210). Amsterdam/Philadelphia: John Benjamins Publishing Company.

DeVilliers, J. & deVilliers, P. (1973). A cross-sectional study of the acquisition of grammatical morphemes in child speech. Journal of Psycholinguistic Research, 2, 267-278.

Dickerson, W. (1990). Morphology via orthography: A visual approach to oral decisions. Applied Linguistics, 11, 238-52.

Dulay, H. C. & Burt, M. K. (1974). Natural sequences in child second language acquisition. Language Learning, 24, 37-53.

Dulay, H. C., Burt, M. K. & Krashen, S. (1982). Language Two. New York: Oxford University Press.

Ellis, R. (1994). The study of second language acquisition. Oxford: Oxford University Press.

Fathman, A. K. (1975a). The relationship between age and second language productive ability. Language Learning, 25, 2:245-253.

Feldman, L. B. & Andjelković, D. (1992). Morphological analysis in word recognition. In R. Frost & L Katz (Eds.), Orthography, phonology, morphology and meaning (pp. 343-60). Amsterdam: Elsevier Science Publishers B.V.

Feldman, L. B. & Fowler, C. (1987). The inflected noun system in Serbo-Croatian: Lexical representation of morphological structure. Memory & Cognition, 15, 1-12.

Feldman, L. B. & Moskovljević, J. (1987). Repetition priming is not purely episodic in origin. Journal of Experimental Psychology: Learning, Memory & Cognition, 13, 573-581.

Forster, K. (1970). Visual perception of rapidly presented word sequences of varying complexity. Perception and Psychophysics, 8, 215-221.

Fowler, C., Napps, S. & Feldman, L. (1985). Relations among regular and irregular morphologically related words in the lexicon as revealed by repetition priming. Memory & Cognition, 13, 241-255.

Fraenkel, J. & Wallen, N. (2000). How to design and evaluate research in education (4th ed.). Boston: McGraw-Hill Companies, Inc.

Frauenfelder, U. & Schreuder, R. (1992). Constraining psycholinguistic models of morphological processing and representation: The role of productivity.

In G. Booij & J. van Marle (Eds.), Yearbook of morphology 1991. Dordrecht: Fortis.

Fromkin, V. (1971). The non-anomalous nature of anomalous utterances. Language, 47, 27-52.

Fromkin, V. (1993). Speech production. In J. B. Gleason and N. B. Ratner (Eds.), Psycholinguistics (pp. 272-300). Orlando, Florida: Harcourt Brace College Publishers.

Garman, M. (1990). Psycholinguistics. Cambridge: Cambridge University Press.

Garrett, M. (1975). The analysis of sentence production. In G. Bower (Ed.), The Psychology of Learning and Motivation (pp.133-78). New York: Academic Press.

Garrett, M. (1982). Production of speech: Observations from normal and pathological language use. In A. Ellis (Ed.), Normality and pathology in cognitive functions. (pp. 19-76) London: Academic Press.

Gollan, T., Forster, K. & Frost, R. (1997). Translation Priming with different scripts: Masked priming with cognates and noncognates in Hebrew-English bilinguals. Journal of Experimental Psychology: Learning, Memory and Cognition,23,1122-1139.

Grainger, J., Colé, P. & Segui, J. (1991). Masked morphological priming in visual word recognition. Memory & Language, 30, 370-384.

Hanson, V. & Feldman, L. (1989). Language specificity in lexical organization: Evidence from deaf signers' lexical organization of ASL and English. Memory & Cognition, 17, 292-301.

Henderson, L. (1985). Toward a psychology of morphemes. In A. Ellis (Ed.), Progress in the psychology of language, 1, (pp. 15-72). London: Lawrence Erlbaum Associates, Ltd.

Hirsch-Pasek, K., Reeves, L. & Golinkoff, R. (1993). Words and meaning: From primitives to complex organization. In J. B. Gleason & N. B. Ratner (Eds.), Psycholinguistics (2nd ed.) (pp. 134-97). Orlando, Florida: Harcourt Brace College Publishers.

Hockett, C. F. (1958). A course in modern linguistics. New York: Harcourt & Brace.

Jiang, N. (1999). Testing processing explanations for the asymmetry in masked cross-language priming. Bilingualism: Language and Cognition, 2, 59-75.

Jiang, N. (2000). Lexical representation and development in a second language. Applied Linguistics, 21, 47-77.

Kastorsky, D. (1978). Zero in morphology: a means of making up for phonological losses? In W. Winter (Series Ed.) & J. Fisiak (Vol. Ed.), Trends in linguistics. Studies and monographs: Historical morphology. (pp. 213-250). The Hague, New York: Mouton.

Kintsch, W. (1972). Notes on the structure of semantic memory. In E. Tulving and W. Donaldson (Eds.), Organization of memory (pp. 247-308). New York: Academic Press, Inc.

Krashen, S. (1976). Formal and informal linguistic environments in language acquisition and language learning. TESOL Quarterly, 10, 157-168.

Krashen, S., Seliger, H. & Harnett, D. (1974). Two studies in adult second language learning. Kritikon Litterarum, 2/3, 220-228.

Krashen, S., Sferlazza, V., Feldman, L. & Fathman, A. (1976). Adult performance on the SLOPE test: More evidence for a natural sequence in adult second language acquisition. Language Learning, 26, 1, 145-151.

Larsen-Freeman, D. (1975). The acquisition of grammatical morphemes by adult ESL students. TESOL Quarterly, 9, 409-19.

Larsen-Freeman, D. & Long, M. (1991). An Introduction to Second Language Acquisition Research. London: Longman Group UK, Ltd.

Levelt, W. (1989). Speaking: From intention to articulation. Cambridge, MA: MIT Press.

Littlewood, W. (1984). Foreign and Second Language Learning. Cambridge: Cambridge University Press.

Marcel, A. J. (1980). Conscious and preconscious recognition of polysemous words: Locating the selective effects of prior verbal context. In R. S. Nickerson (Ed.), Attention and performance VIII (pp.435-458). Hillsdale, NJ: Erlbaum.

Monsell, S. (1985). Repetition and the lexicon. In A. W. Ellis (Ed.), Progress in the psychology of language (Vol. 2) (pp. 147-195). London: Lawrence Erlbaum Associates, Publishers.

Niemi, J., Laine, M. & Tuominen, J. (1994). Cognitive morphology in Finnish: Foundations of a new model. In D. Sandra & M. Taft (Eds.), Morphological structure, lexical representation and lexical access (pp. 423-446). Hove, U.K.: Lawrence Erlbaum Associates, Ltd.

Pica, T. (1983a). Adult acquisition of a second language under different conditions of exposure. Language Learning, 33, 465-497.

Pica, T. (1983c). The role of language context in second language acquisition. Interlanguage Student Bulletin, 7,101-23.

Pica, T., Young, R. & Doughty, C. (1994). The impact of interaction on comprehension. In R.M. Barasch & C.V. James (Eds.), Beyond the monitor model: Comments on current theory and practice in second language acquisition (pp. 97-119). Boston: Heinle & Heinle Publishers.

Pinker, (1994). Rules of language. In P. Bloom (Ed.), Language Acquisition (pp. 472-484). Cambridge, MA: MIT Press.

Pinker & Prince, (1988). On language and connectionism: Analysis of a parallel distributed processing model of language acquisition. Cognition, 28, 73-193.

Quillian, M. (1968). Semantic memory. In M. Minsky (Ed.), Semantic information processing. Cambridge, MA: Massachusetts Institute of Technology Press.

Rayner, K. & Balota, D. (1989). Parafoveal preview effects and lexical access during eye fixations in reading. In W. Marslen-Wilson (Ed.), Lexical Representation and Process (pp. 261-290). Cambridge, MA: M.I.T. Press.

Regan, V. (1998). Introduction. In V. Regan (Ed.), Contemporary approaches to second language acquisition in social context: Crosslinguistic perspectives (pp. 1-8). Dublin: University College Dublin Press.

Rumelhart, D., Lindsay, P. & Norman, D. A process model for long-term memory. In E. Tulving and W. Donaldson (Eds.), Organization of memory (pp. 197-246). New York: Academic Press, Inc.

Saegert, J., Scott, S., Perkins, J. & Tucker, G.R. (1974). A note on the relationship between English proficiency, years of language study and medium of instruction. Language Learning, 24, 99-104.

Sandra, D. (1990). On the representation and processing of compound words: Automatic access to constituent morphemes does not occur. Quarterly Journal of Experimental Psychology, 42A, 529-567.

Sandra, D. (1994a). The morphology of the mental lexicon: Internal structure viewed from a psycholinguistic perspective. In D. Sandra & M. Taft (Eds.), Morphological structure, lexical representation and lexical access (pp. 227-269). Hove, U.K.: Lawrence Erlbaum Associates, Ltd.

Sandra, D. (1994b). Morphology in the reader's mental lexicon. Frankfurt am Main: Peter Lang GmbH.

Snow, C.E. (1994). Bilingual and second language acquisition. In J.B. Gleason & N. B. Ratner (Eds.), Psycholinguistics (pp. 392-416). Orlando, Florida: Harcourt Brace College Publishers.

Sternberg, R.J. (1987). Most vocabulary is learned from context. In M. McKeown & M. Curtis (Eds.), The nature of vocabulary acquisition (pp.89-106). Hillsdale, NJ: Lawrence Erlbaum Associates.

Stevick, E. ((1980). The Levertov machine. In S. Krashen & R. Scarcella (Eds), Research in second language acquisition: Selected papers of the Los Angeles second language acquisition research forum. Rowley, MA: Newbury House.

Stillings, N., Weisler, S., Chase, C., Feinstein, M., Garfield, J. & Rissland, E. (1995). Cognitive science: An introduction (2nd ed.). Cambridge MA: The MIT Press.

Suter, R. (1976). Predictions of pronunciation accuracy in second language learning. Language Learning, 26, 2, 233-253.

Taft, M. & Forster, K. (1975). Lexical storage and retrieval of prefixed words. Journal of Verbal Learning and Verbal Behavior, 14, 638-647.

Taft, M. & Forster, K. (1976). Lexical storage and retrieval of polymorphemic and polysyllabic words. Journal of Verbal Learning and Verbal Behavior, 15, 607-620

Thompson, G. E. (2000). Second language acquisition and comprehension mechanisms: The problem of Russian inflectional morphology (Doctoral dissertation, University of Alberta [Canada], 2000). UMI ProQuest Digital Dissertations.

Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), Organization of memory (pp. 381-403). New York: Academic Press, Inc.

Tulving, E. (1983). Elements of episodic memory. Thetford, Norfolk UK: The Thetford Press, Ltd.

Zhou, X. & Marslen-Wilson, W. (1994). Words, morphemes and syllables in the Chinese mental lexicon. Language and Cognitive Processes, 9, 393-422.

Zobl, H. (1998). Representational changes: From listed representations to independent representations of verbal affixes. In M.-L. Beck (Ed.), Morphology and its interface in second language knowledge (pp. 339-371).In the series Language and Language Disorders, Vol.19. Philadelphia, PA: John Benjamins Publishing Company.

Appendix A

Questionnaire: IELP students

BIOGRAPHICAL INFORMATION

NAME_____

_____

LEVEL IN P.S.U. IELP (E - V)_____

COUNTRY & DATE OF BIRTH_____

NATIVE LANGUAGE(S)_____

OTHER LANGUAGES SPOKEN_____

ENGLISH-SPEAKING EXPERIENCE-Some questions are taken from Suter (1976)

1A) List the English-speaking countries that you have lived in: (For example: Australia, Canada, England, U.S.A.)

1B) How long did you live in each one?

WHICH COUNTRY	HOW LONG

2A) Have you ever lived with a person or people who were native speakers of English?

_____

2B) If your answer is 'yes', for how long?

_____

3A) What age were you when you first learned to speak English?

_____

3B) Do you speak English at home?

_____

3C) What proportion of all the time you spend speaking at home is spent speaking English – 0, ¼, ½, ¾, all?

_____

4) What proportion of the time you spend speaking outside of home do you estimate you spend speaking English? 0, ¼, ½, ¾, all?

A. At school_____

B. At work

_____

C. Hanging out with friends

_____

D. Other (specify)

_____

5) Do you initiate conversation with English-speakers?

Almost never_____Seldom_____Sometimes_____Often_____All the time_____

(0) (1/4) (1/2) (3/4) (1.00)

6) How many years of formal (classroom) instruction in English have you had, including in your own country?

_____

7) How many total years of intensive English training (2 ½ hours or more per day), including your time so far at the P.S.U. IELP, have you had?

At P.S.U._____Elsewhere_____

Appendix B

QUESTIONNAIRE

NAME_____

_____

AGE_____

_____

ARE YOU AN UNDERGRADUATE STUDENT HERE AT P.S.U.?

_____

NATIVE

LANGUAGE_____

ARE YOU

BILINGUAL?_____

COUNTRIES YOU HAVE LIVED IN OTHER THAN THE U.S.A.

_____

_____

_____

Comments:

Appendix C

Consent Form

Be part of an important project
The Nature of the Morphological Content in Lexical Representations for Second Language Learners

Judith Newman from Portland State University's Teaching English to Speakers of Other Languages Program is doing a research study about the best way to acquire inflectional morphemes in English for nonnative speakers. This can help with designing better ways to present/foster this important aspect of language learning.

What will I have to do?

If you decide to take part in this study, I will:

► Ask you to fill out a questionnaire with questions about your formal and informal experience with English. You may have a questionnaire in your native language, if you wish.

► Ask you to sit in front of a computer screen and read the words that appear as quickly as you can. There will be forty words so this should take about 10 minutes.

Why have I been asked to take part in this study?

You have been asked to take part in this study because you are a second language learner. You do not have to take part in this study if you do not want to.

Are there any risks?

If you take part in this study:

► There is a small risk that someone will find your name and find out what your response times are. We make sure we do everything possible to protect your identity.

► There is a small risk that you will become frustrated in filling out the questionnaire and/or reading the words on the computer screen. If this is the case, you may stop at any time.

What are you doing to protect me?

It is very important to protect your privacy.

► We will not tell anyone if you take part in this study or not.

► Your answers on the questionnaire and your response times when reading the words will be kept confidential to the extent allowed by law. This means that the names of the people who take part in this study will not be given to anyone else. We will only reveal information obtained from you in a way that no one could ever guess or know that it was you that it came from.
► Your name and other personal information will be kept secure so that no one other than the researcher will be able to see it. I need this information to keep track of who participated. For example, *this* form will be kept secure because it has your name on it.
►When I write or talk about what I learned in this study, I will use code names and leave some things out so that no one will ever know to whom I am referring.

What will I gain by taking part in this study?

►Each participant who completes the project will be paid $10.00.
►You will provide us with valuable information about the best way to teach plurals, superlatives and tense markers to second language learners.

What happens if I decide not to take part in this study?

► You do not have to take part in this study. Your participation is voluntary.
► You can change your mind and stop at any time, even if you first said yes.
► It will not affect any course grades if you say no.
► It will not affect your relationship with your teachers or Portland State University if you say no.
►Your relationship with the researcher, Judith Newman, will not be affected either if you say no.

Any questions?

If you have any questions about this study, this form or the project, you can:
► Talk to the researcher: Judith Newman: telephone: (503) 699-9552
email: jaenewman@msn.com
►Contact the Chair of the Human Subjects Committee of Portland State University about your rights as a research participant. They can be contacted at:
Portland State University
Cramer Hall, Room 111
1721 Broadway Ave.
Portland, OR 97201
Telephone: (503) 725-8182; email: hsrrc@lists.pdx.edu
Hours: 9:00a.m. to 5:00p.m., Monday through Friday

If I sign, what does it mean?

This is a consent form. Your signature below means that:

- You have read and understood what this form says.
- You are willing to take part in this study by filling out a questionnaire and reading English words from a computer screen.
- You know that you do not have to take part in this study. Even if you agree, you can change your mind and stop at any time. No problem.
- If you take part in this study it has nothing to do with your classes at PSU. If you agree to take part, or if you say no, no one will know and it doesn't matter.
- You will get a copy of this form to keep for yourself.

_____ _____

Participant signature Date Participant name, printed

Appendix D

Native Speakers Consent Form

Be part of an important project
The Nature of the Morphological Content in Lexical Representations for Second Language Learners

Judith Newman from Portland State University's Teaching English to Speakers of Other Languages Program is doing a research study about the best way to acquire inflectional morphemes in English for nonnative speakers. This can help with designing better ways to present/foster this important aspect of language learning.

What will I have to do?

If you decide to take part in this study, I will:

► Ask you to fill out a **brief** questionnaire, **confirming English as your native language**.

► Ask you to sit in front of a computer screen and read the words that appear as quickly as you can. There will be forty words so this should take about 10 minutes.

Why have I been asked to take part in this study?

You have been asked to take part in this study because you are **a native speaker of English**. You do not have to take part in this study if you do not want to.

Are there any risks?

If you take part in this study:

► There is a small risk that someone will find your name and find out what your response times are. We make sure we do everything possible to protect your identity.

► There is a small risk that you will become frustrated in filling out the questionnaire and/or reading the words on the computer screen. If this is the case, you may stop at any time.

What are you doing to protect me?

It is very important to protect your privacy.

► We will not tell anyone if you take part in this study or not.

► Your answers on the questionnaire and your response times when reading the words will be kept confidential to the extent allowed by law. This means that the names of the people who take part in this study will not be given to anyone else. We will only reveal information obtained from you in a way that no one could ever guess or know that it was you that it came from.
► Your name and other personal information will be kept secure so that no one other than the researcher will be able to see it. I need this information to keep track of who participated. For example, *this* form will be kept secure because it has your name on it.
►When I write or talk about what I learned in this study, I will use code names and leave some things out so that no one will ever know to whom I am referring.

What will I gain by taking part in this study?

►Each participant who completes the project will be paid $10.00.
►You will provide us with valuable information about the best way to teach plurals, superlatives and tense markers to second language learners.

What happens if I decide not to take part in this study?

► You do not have to take part in this study. Your participation is voluntary.
► You can change your mind and stop at any time, even if you first said yes.
► It will not affect any course grades if you say no.
► It will not affect your relationship with your teachers or Portland State University if you say no.
►Your relationship with the researcher, Judith Newman, will not be affected either if you say no.

Any questions?

If you have any questions about this study, this form or the project, you can:
► Talk to the researcher: Judith Newman: telephone: (503) 699-9552
email: jaenewman@msn.com
►Contact the Chair of the Human Subjects Committee of Portland State University about your rights as a research participant. They can be contacted at:
Portland State University
Cramer Hall, Room 111
1721 Broadway Ave.
Portland, OR 97201
Telephone: (503) 725-8182; email: hsrrc@lists.pdx.edu
Hours: 9:00a.m. to 5:00p.m., Monday through Friday

If I sign, what does it mean?

This is a consent form. Your signature below means that:

- You have read and understood what this form says.
- You are willing to take part in this study by filling out a questionnaire and reading English words from a computer screen.
- You know that you do not have to take part in this study. Even if you agree, you can change your mind and stop at any time. No problem.
- If you take part in this study it has nothing to do with your classes at PSU. If you agree to take part, or if you say no, no one will know and it doesn't matter.
- You will get a copy of this form to keep for yourself.

_____ _____ _____

Participant signature Date Participant name, printed

Appendix E

TEST WORDS

Same Word as Prime

Prime	Target
seems	seems
pretty	pretty
perhaps	perhaps
young	young
those	those
summer	summer
matter	matter
probably	probably
between	between
filled	filled

Irregularly Inflected Word as Prime

Prime	Target
teeth	tooth
did	do
left	leave
found	find
stood	stand
thought	think
kept	keep
rang	ring
caught	catch
broken	break

Regularly Inflected Word as Prime

covers	cover
explained	explain
fresher	fresh
filling	fill
placing	place
flowers	flower
reached	reach
talking	talk
latest	late
waiting	wait

Unrelated Word as Prime

mother	sentence
sleep	force
story	never
usual	himself
remember	answer
green	looked
change	need
boys	road
space	morning
body	time

Appendix F

Japanese Language Questionnaire

IELP 在籍生徒へのアンケート（記述の回答は必ず英語 (in English)でお願いいたします。）

（回答者について）

名前 (In English)

IELP でのレベル（Entry, V II III IV V）※あてはまるものを○で囲む。

国籍 及び 生年月日 (In English) /19 年 月 日

母国語（第一言語） (In English)

母国語以外に会話のできる言語 (In English)

※会話というのは 旅行などで日常会話に困らない程度のものを意味しています。

（英会話の経験について）（一部 Suter(1976)の研究にある質問事項を使用しています。）

1A) 住んだことのある国の名前を書いてください。

(In English)_____ 〈例：Australia, Canada, England など〉

1B) 滞在期間はどのくらいでしたか？

国 名 (In English)	滞在期間 (In English)

2A) 英語を母国語とするネイテイブスピーカーと生活したことがありますか、また現在そういう経験をしていますか？（はい/Yes）（いいえ/No） ※どちらかに○をつける。

2B) 2A) （はい/Yes）での場合には、その期間を具体的に書いてください。

（現在そういう経験をしている場合には,現時点までの期間）

_____(In English)

3A) はじめて英語を話せるようになったのは何歳くらいのときですか？_____くらい

(In English)

3B) 現在の生活で、自宅〈自室〉にもどってから英語を話しますか？

（はい/Yes）（いいえ/No） ※どちらかに○をつける。

※（はい/Yes）の場合には、以下の３C)から４）A,B,C,D の質問に答えてください。

（いいえ/No）の場合には、５）に進んでください。

3C) その英語を話している時間は、あなたが家で話しをしている時間のどのくらいの割合をしめると思いますか？　※いずれかに○をつける。〈大体の目安で結構です〉

0（ほとんど）ない　1/4 少ないほう　1/2 大体半分くらい　3/4 多いほう　1 ほとんど全部

4）上記と同様に、自宅以外のところで、英語を話している時間は　あなたが話しをしている時間のどのくらいの割合を占めていると思いますか？

A. 学校にいるとき　※いずれかに○をつける。〈大体の目安で結構です〉

0（ほとんど）ない　1/4 少ないほう　1/2 大体半分くらい　3/4 多いほう　1 ほとんど全部

B. 職場にいるとき　※いずれかに○をつける。〈大体の目安で結構です〉

0（ほとんど）ない　1/4 少ないほう　1/2 大体半分くらい　3/4 多いほう　1 ほとんど全部

C. 友人といるとき　※いずれかに○をつける。〈大体の目安で結構です〉

0（ほとんど）ない　1/4 少ないほう　1/2 大体半分くらい　3/4 多いほう　1 ほとんど全部

D. 他の場合

※ 具体的にどういうときかを書いてください。(In English)_____

※ また、同様にいずれかに○をつけてください。

0（ほとんど）ない　1/4 少ないほう　1/2 大体半分くらい　3/4 多いほう　1 ほとんど全部

5）他の人と英語を話しているときに　会話を積極的にリードしますか？

0（ほとんど）ない　1/4 少ないほう　1/2 大体半分くらい　3/4 多いほう　1 ほとんど全部

6）日本での教育も含めて、これまでに学校でどのくらいの期間　英語を学習してきましたか？ _____くらい(In English)

7） PSU の IELP プログラムを含めて、英語集中プログラムでの英語の勉強は、通算するとどのくらいになりますか？

(PSU) _____くらい(In English)・(他の教育機関) _____くらい(In English)

Appendix G
Korean Language Questionnaire

설문지: **IELP** 학생들

(대답은 반드시 영어로 써 주세요.)

인적사항

이름_____

PSU의 IELP 단계 (E-V)_____

국적과 생년월일_____

모국어_____

말할 수 있는 다른 언어_____

영어사용경험 – 몇몇 질문은 Suter에서 발췌함.

1A) 당신이 살았었던 영어권 국가들을 써 주세요. (예를들면, 호주, 캐나다, 영국, 미국등)

_____

1B) 각각의 나라에서 얼마동안 살았었습니까?

국가	기간

2A) 영어가 모국어인 사람이나 사람들과 살았었던 적이 있습니까?

_____

2B) 만약 그렇다면, 얼마동안이었습니까?

_____

3A) 영어로 말하는걸 처음 배운게 몇살 때 입니까?

_____

3B) 집에서 영어로 말합니까?

_____

3C) 집에서 영어로 말하는데 쓰는 시간이 당신이 말하는데 쓰는 전체 시간중 얼마나 됩니까? **–0, ¼, ½, ¾,** 전부?

_____

4) 집밖에서 당신이 영어로 말하는데 쓰는 시간이 당신이 말하는데 쓰는 전체 시간중 대략 얼마나 됩니까? **0, ¼, ½, ¾,** 전부?

A. 학교에서 _____

B. 일하는데서 _____

C. 친구들과 어울릴 때 _____

D. 그외 (자세히) _____

5) 당신은 영어를 말하는 사람들과의 대화를 시도하는 편입니까?

거의 전혀 _____거의 않하는 _____ 가끔 _____ 종종 _____ 항상

_____

(0) **(1/4)** **(1/2)** **(3/4)** **(1.00)**

6) 정식영어수업 (교실에서)을 받은 게 몇년 정도 됩니까, 당신의 나라에서 받은 것도 포함해서?

_____

7) 영어 집중연수를 (매일 **2.5**시간 이상) 받은게 지금까지 **PSU**의 **IELP**까지 포함해서 전부 몇년입니까?

PSU에서 _____ 다른 곳에서 _____

Appendix H

Mandarin Questionnaire

調查表：IELP 學生

生平簡歷：

姓名_____
在 P.S.U.所讀 IELP 的水平（E-V ）_____
國籍 & 生日_____
本國語言_____
其他會講的語言_____

講英文的閱歷--- 下列聞題中有一布份是從 Suter(1976) 中索取的。
1A) 例舉您曾經居住過的說英文的國家: (例：澳大利亞，加拿大，英國，美國)

1B) 您在這些國家各住了多久？

哪些國家	多長時間

2A) 您曾經是否有過以英文爲母語的室友？
_____

2B) 如果有的話，有多久？_____

3A) 您第一次接觸到 (學講) 英文時是多大年齡？_____
3B) 您在家里講英文嗎？_____
3C) 您在家里說英文的時間所占的百分比是多少—0，1/4，1/2，3/4，全部？_____

4A) 您在家庭以外說英文的時間所占的百分比是多少--0，1/4，1/2，3/4，全部？

A. 在學校_____
B. 在公司_____
C. 同朋友在一起_____
D. 其他（詳盡）_____
_____

5A) 您主動同講英語的人聊天嗎？

几乎沒有_____少有_____有時_____時常_____一貫_____
0 ¼ ½ ¾ (1.00)

6A) 您總共受了多少年的正規英文教育，包括您在自几國家所上的英文課？

_____

7A) 您總共受了多少年的強化英文訓練 (一天 2 ½ 小時)，包括您在 P.S.U. IELP 所有的時間？

在 P.S.U. _____在別處_____

Appendix I

Thai Language Questionnaire

แบบสอบถามสำหรับนักศึกษา IELP

กรุณาตอบเป็นภาษาอังกฤษ**เท่านั้น**

ข้อมูลส่วนตัว

ชื่อ _____

ระดับชั้นในหลักสูตร IELP (E-V) ที่ PSU _____

ประเทศที่เกิดและวันเดือนปีเกิด _____

ภาษาแม่ _____

ภาษาอื่นๆที่สามารถพูดได้ _____

ประสบการณ์ในการใช้ภาษาอังกฤษ

1A) กรุณากรอกรายชื่อของประเทศที่ใช้ภาษาอังกฤษเป็นภาษาประจำชาติที่คุณเคยอาศัยอยู่ (เช่น ออสเตรเลีย แคนาดา อังกฤษ และ อเมริกา)

1B) คุณอาศัยอยู่ในแต่ละประเทศในข้อข้างบนเป็นเวลานานเท่าใด

ประเทศ

เป็นเวลา ปี

2A) คุณเคยอาศัยอยู่กับคนที่พูดภาษาอังกฤษเป็นภาษาแม่บ้างหรือไม่ _____

2B) ถ้าเคย เป็นเวลานานเท่าใด _____

3A) คุณอายุเท่าใด ตอนที่คุณเรียนภาษาอังกฤษเป็นครั้งแรก _____

3B) คุณใช้ภาษาอังกฤษพูดกับคนที่บ้านหรือไม่ _____

3C) คุณใช้เวลาพูดภาษาอังกฤษกับคนที่บ้านเป็นสัดส่วนเท่าไร ถ้าเปรียบเทียบกับเวลาที่คุณคุยกับที่บ้านทั้งหมด

0 ¼ ½ ¾ ตลอดเวลา

4) คุณคิดว่าอัตรส่วนองเวลาที่คุณใช้พูดภาษาอังกฤษนอกบ้านกับเวลาที่คุณอยู่นอกบ้านทั้งหมดเป็นเท่าไร

ไม่เลย ¼ ½ ¾ ตลอดเวลา

A: ที่โรงเรียนหรือมหาลัย_____

B: ที่ทำงาน _____

C: เวลาพบปะสังสรรค์กับเพื่อนๆ_____

D: อื่นๆ (โปรดระบุ)_____

5) คุณเคยเริ่มที่จะพูดกับฝรั่งก่อนบ้างหรือไม่

เกือบไม่เคย_____ นานๆที_____ บางครั้ง ____บ่อยๆ _____ตลอดเวลา _____

0 ¼ ½ ¾ 1.0

6) คุณได้เรียนภาษาอังกฤษมากี่ปี (เรียนในห้องเรียน) ให้นับรวมเวลาที่เรียนในประเทศของคุณด้วย

_____

7) คุณได้เรียนหลักสูตรเร่งรัดภาษาอังกฤษ (Intensive English) เป็นเวลานานเท่าไร (หลักสูตรที่ใช้เวลา 2 ½ ชั่วโมงหรือมากกว่าต่อวัน) รวมถึงเวลาที่เรียนในหลักสูตร IELP ที่ PSU ด้วย

เรียนที่ PSU เป็นเวลา _____ ปี เรียนที่อื่นๆเป็นเวลา _____ปี

Appendix J

Table J1
Z-Scores for each subject, questions 1 through 8

Subject	Z-Scores							
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**
E1	-1.15	0.02	1.40	-0.67	-0.34	0.21	-0.43	1.47
E2	-0.95	-0.26	1.40	1.52	-0.34	1.21	-0.43	0.15
E3	-1.64	-0.20	-0.62	-0.67	-0.34	0.21	2.39	0.15
E4	-1.24	-0.65	-0.95	-1.76	-0.34	-1.81	-0.43	-1.17
E5	-1.15	-0.65	-0.95	-1.76	-0.34	-1.81	-0.43	-1.17
E6	0.62	3.36	0.73	1.52	-0.34	-0.80	1.68	1.47
E7	-0.56	-0.65	0.096	-1.76	-0.34	0.21	-0.43	-1.17
E8	-0.36	-0.65	-0.95	1.52	-0.34	2.22	-0.43	0.15
E9	-0.56	-0.65	-0.95	0.42	-0.34	0.21	-0.43	-1.17
V1	1.61	-0.65	-0.62	0.42	-0.34	0.21	-0.43	0.15
V2	0.62	-0.65	-1.29	-0.67	-0.34	0.21	-0.43	0.15
V3	0.62	0.91	1.40	-0.67	-0.34	-0.48	-0.43	0.15
V4	1.21	0.47	0.73	0.42	3.29	0.21	-0.43	1.47
V5	0.62	0.02	-0.62	0.42	-0.34	-0.80	-0.43	-1.17
V6	-0.36	-0.53	-1.29	0.42	-0.34	0.21	2.39	-1.17
V7	0.62	0.69	1.40	-0.67	-0.34	-1.81	-0.43	-1.17
V8	0.62	-0.65	0.73	-0.67	2.08	0.21	-0.43	0.15
V9	1.41	0.69	-0.62	0.42	-0.34	1.21	-0.43	1.47

Appendix K

Table K1
Oneway ANOVA for Level E

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	516.743	1	516.743	.007	.932
Within Groups	6125066.12	86	71221.699		
Total	6125582.86	87			

Note. Irregularly Inflected

Table K2
Oneway ANOVA for Level E

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13667.556	1	13667.556	.195	.660
Within Groups	6175176.10	88	70172.456		
Total	6188843.66	89			

Note Regularly Inflected

Table K3
Oneway ANOVA for Level V

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14277.167	1	14277.167	.618	.434
Within Groups	2008936.07	87	23091.219		
Total	2023213.24	88			

Note. Irregularly Inflected

Table K4
Oneway ANOVA for Level V

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	62906.045	1	62906.045	1.540	.218
Within Groups	3593703.56	88	40837.540		
Total	3656609.60	89			

Note Regularly Inflected

APPENDIX K, cont.

Table K5
Oneway ANOVA for Levels E and V Together

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	5.066E-02	1	5.066E-02	.000	.999
Within Groups	9015982.94	175	51519.903		
Total	9015982.99	176			

Note. Irregularly Inflected?

Table K6
Oneway ANOVA for Levels E and V Together

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	366.939	1	366.939	.006	.938
Within Groups	10884006.5	178	61146.104		
Total	10884373.4	179			

Note. Regularly Inflected?