2012-12-14

# Nouns and Verbs in the Tagalog Mental Lexicon

Linda Walton
*Brigham Young University - Provo*

Nouns and Verbs in the Tagalog

Mental Lexicon

Linda Walton

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Arts

Wendy Baker Smemoe, Chair
Deryle Lonsdale
David Eddington

Department of Linguistics

Brigham Young University

December 2012

ABSTRACT

Nouns and Verbs in the Tagalog
Mental Lexicon

Linda Walton
Department of Linguistics, BYU
Master of Arts

The purpose of this research was to study grammatical categories in the Tagalog mental lexicon using lexical decision tasks. Some linguists question whether words in Tagalog can be classified as nouns and verbs (Foley, 1998; Kaufman, 2011) because most root words can be inflected for any grammatical function and because verbs cannot be used in their uninflected form. Previous studies with English and German (Kauschke and Stenneken 2008) have shown that participants respond differently to nouns and verbs in lexical decision tasks. These studies have also shown that participants respond differently to transitive and intransitive verbs in lexical decision tasks. It was assumed that if nouns and verbs exist in Tagalog, response times to Tagalog lexical decision tasks will show similar patterns to those performed in English and German.

Two experiments were performed to examine whether words are classified as nouns and verbs in the Tagalog mental lexicon and whether other factors affected that classification. For the experiments, native speakers of Tagalog participated in lexical decision tasks and response times were measured. The first experiment tested the classification of root nouns and verbs. Contrary to findings in other languages, there was no significant difference between response times to nouns and verbs. However, there were differences in response times to nouns from different semantic categories and to verbs with different morphosyntactic structures.

The second experiment examined the classification of inflected nouns and verbs. Again, the results showed no difference between response times to nouns and verbs. There was also no difference between transitive and intransitive verbs. However, there was a slight difference between verbs of different voice inflections.

The results of the experiments suggest the while the grammatical classes of nouns and verbs may not be the most important features of words in the Tagalog mental lexicon, they may still play a role since different features, semantics or morphosyntactics, did affect the responses to words from the different categories.

Keywords: Tagalog, mental lexicon, grammatical categories, psycholinguistics, lexical decision task

ACKNOWLEDGMENTS

TABLE OF CONTENTS

## LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

"It is a widely held although too rarely examined belief that all languages possess at least the basic categories of noun and verb" (Kaufman, 2009).

The differentiation between the grammatical categories of 'noun' and 'verb' is a generally accepted language universal, with nouns prototypically denoting entities and verbs prototypically denoting processes (Laudanna and Voghera, 2002). The designations of 'noun' and 'verb' are also evidenced morphologically with different category markings, such as tense and aspect for verbs and number and case for nouns. Syntactically, the verb typically denotes the event while the noun denotes participants in the event. The categories of 'noun' and 'verb' are flexible within different languages but are still considered to be universal. English and many other languages exhibit a clear distinction between such grammatical categories (Kauschke and Stenneken, 2008).

But many other languages, which are less commonly studied by linguists, don't seem to have such clearly defined categories. For many Austronesian languages, for example, the division between nouns and verbs is so blurry that the existence of the division is questioned. Do 'nouns' and 'verbs' exist in these languages? And if they don't, are such grammatical categories really language universals?

Tagalog, a language of the Philippines, is one language for which the distinction between nouns and verbs seems unclear. Several notable studies challenging the existence of grammatical categories in Tagalog, and other languages, have been published (Foley, 1998; Gil, 2009; Kaufman, 2009). For every such publication is a series of rebuttals, often within the same journal or conference as an accompanying alternative point of view (Aldridge, 2009; Baker, 2009;

Himmelmann, 2009; Koch and Matthewson, 2009; Kroeger, 1998). Most of the arguments up to this point have focused on theoretical analyses—particularly morphological and syntactic evidence—with both sides providing valid arguments and never reaching a real conclusion.

One of the central issues in the arguments about Tagalog grammatical categories is root words. The Tagalog lexicon is made up of root words and affixes. Roots carry meaning and can stand alone. However, the function of the root is determined either by affixation or by preceding particles. A verb form is typically inflected, while a bare root in a sentence is typically identified as a noun. This leads some linguists to suggest that roots are nominal. However, such bare roots are still typically marked as nouns in the sentence by a preceding particle, and there are nominal inflections.

For English, inflections and derivations of the word *bake* include *baker, baking,* and *unbaked*. Inflections of the word *create* include *creator, creative, creativity,* and *creation.* But for Tagalog, the inflectional morphology is richer, with regularized inflections denoting places where an event occurs and objects used in the event. In Tagalog, inflections for *bake* are extended to, among others, baking-place, baking-instrument, and baked-thing.

The Tagalog root word *linis* 'clean' or 'cleanliness' can be inflected in many different ways, including the following: *ka-linis-an* 'cleanliness;' *ipa-linis* 'to get someone to clean something;' *linis-in* or *mag-linis* 'to clean;' *l-um-inis* 'to become clean;' *magpa-linis* or *pa-linis-in* 'to get something cleaned;' *ma-linis* 'clean' (adj); *pagkama-linis* 'purity;' *pag-li-linis* 'purification;' *pagpapakama-linis* 'sanitation;' *pan-linis* 'cleanser;' and *taga-linis* or *tagapag-linis* 'person who cleans.' The bare root *linis* would typically occur as a noun, preceded by a noun-marking particle. But, like many words in Tagalog, it can also occur uninflected as an

imperative verb. Many of the inflected forms may also function as either nouns or verbs within a sentence. So it is difficult to define nouns and verbs in Tagalog.

While previous studies have cited some lexical evidence as a basis for opposing or supporting the concept of grammatical categories in Tagalog (e.g., Blake, 1916, 1950; Foley, 1998; Kaufman, 2009), these studies have based their arguments more heavily on syntactic evidence, even when discussing lexical items. Little research has been done on the grammatical categories for lexical items without reference to syntax. Because much of the grammatical relations in Tagalog are overtly marked in the syntax (such as with focus markers), it is unclear from the syntax whether the words have inherent categories or whether the categories are only part of the syntax.

In addition, the studies that have been done have used only theoretical approaches. These theoretical approaches propose interesting and plausible explanations of Tagalog grammatical relations. But some of these analyses seem to be simply reorganizing and relabeling the same data. All of the analyses are based solely on the external production of the language, and interpretations of the data are subject to the language biases of the linguist. The study of syntax had led to many insights about Tagalog. However, different approaches, especially those that investigate the intuitions and tendencies of native Tagalog speakers, could expand our understanding of the language and either verify or refute the existence of grammatical categories as a universal phenomenon.

The purpose of the present study was to approach Tagalog grammatical categories using a different method of research—to study native speakers' decisions about the language and to focus on lexical items instead of syntax. A recent study in German (Kauschke and Stenneken, 2008) modeled a method for studying grammatical categories from a psycholinguistic

perspective. The study used native speaker responses to lexical decision tasks to show that words in the mental lexicon are categorized as nouns and verbs with accompanying morphosyntactic and semantic information. Results showed that participants responded more quickly to nouns than to verbs, suggesting that such categories are differentiated. Since the results of the study were fairly conclusive, it was assumed that if words are similarly categorized in the Tagalog mental lexicon, conducting a similar study in Tagalog would also provide conclusive results about grammatical categories in Tagalog.

Using the study by Kauschke and Stenneken (2008) as a model, the present study was designed to answer the following questions about Tagalog:

1. Are Tagalog root words categorized as nouns and verbs in the mental lexicon?
2. Are inflected forms categorized as nouns and verbs in the mental lexicon?
3. Do other factors, such as affix, focus type, and transitivity, affect grammatical categorization in the mental lexicon?

The present study consisted of two experiments in which native Tagalog speakers responded to visual lexical decision tasks. The lexical decision tasks required participants to determine whether a string of letters corresponded to actual words in Tagalog as the words appeared on a computer screen. This method of research allows for an analysis of how native speakers categorize individual lexical items on a subconscious level.

The stimuli for each experiment included real and nonce (made up) words. The first experiment tested whether root words (uninflected nouns and verbs) were categorized separately as nouns and verbs. This was done by comparing the participants' response times between the nouns and the verbs using the same assumptions and methodology described in Kauschke and Stenneken, (2008). The second experiment tested response times to morphologically complex

forms to determine how inflected forms were categorized. The stimuli included inflected nouns and verbs with different affixes, voices, and transitivity. For each verb affix, half of the stimuli were transitive and half were intransitive. Response times were compared between the nouns and the verbs, as well as between the different verb affixes and the transitive and intransitive verbs.

<div align="center">Terms</div>

*Tagalog:* The designation 'Tagalog' is often used interchangeably with the term 'Filipino,' one of the national languages of the Philippines (along with English). Filipino is based on Tagalog but with vocabulary from other regional languages (Lewis, 2009). The distinction between Tagalog and Filipino is not always clear: it seems to be more political than linguistic. The terms are often used interchangeably and some consider 'Filipino' to be an alternative name for Tagalog (Dryer, 2011). For the purposes of this study, no distinction in this study was made between the two.

*Inflection:* Because it is difficult to determine whether different aspects of Tagalog morphology are inflectional or derivational, the term *inflection* is used broadly here to refer to any morphological process of affixation.

*Grammatical Terms:* Terms used to describe Tagalog grammar vary greatly between publications, particularly for the description of noun phrases and argument positions. For the present study, the following terms will be used to describe Tagalog grammar.

*Focus*: a noun phrase functioning as the main argument of the verb.

*Non-focus:* a noun phrase which is an argument of the verb, but not the main argument

*Focus-marking particle*: one of three particles which precedes a noun phrase and indicates whether the NP is the focus, non-focus, or oblique. *Ang* marks the Focus NP, *ng* marks a non-focus NP, and *sa* marks an oblique NP.

Additionally, inflectional affixes will be set off from the root word through hyphenation in the text of this study to make identifying the roots and affixes easier. For instance, *magluto* 'to cook' from the root *luto* 'cook' or 'cooked' and prefix *mag-* is written *mag-luto* or *bumili* 'to buy' from the root *bili* 'buy' and the infix *–um-* is written *b-um-ili*. This does not reflect traditional orthography except when a vowel-initial word is inflected with the prefix *mag-* and its allophones. Hyphenating *mag-abot* 'to hand to' from the root *abot* 'reach' and the prefix *mag-* is the standard representation.

## Delimitations

One difficulty with conducting a study of Tagalog speakers is that most of them are multilingual. Due to the fact that English and Tagalog are the national languages of the Philippines and both languages are part of the standard curriculum, regardless of the local language, it is difficult to find monolingual Filipinos. In order to participate in this study, it was also important that participants be highly literate and comfortable using a computer since participation consisted of reading stimuli words on a computer screen and responding to the stimuli using the keyboard. Because of this, most of the participants were bilinguals and trilinguals, highly fluent in at least Tagalog and English. It is acknowledged that such multilingualism may have affected the participants' responses, but since the participants identified Tagalog as their first language and they were living in the Philippines at the time of the study and speaking Tagalog on a daily basis, it was assumed that their responses were still viable.

Other difficulties with conducting this research centered around the fact that there has been so little research on Tagalog. First, there was no publically available corpus from which to create the initial stimuli list. This left me to create a word list essentially from scratch. However,

the stimuli list was reviewed by native speakers to ensure that it was as accurate and useful as possible. The second difficulty was the lack of psycholinguistic research on Tagalog. This lack of preceding research meant that I didn't find much directly related research on which to base my conclusions or to use as a comparison. But that lack of preceding research was also one of the reasons this study was conducted, as a starting point for psycholinguistic research on the Tagalog mental lexicon and on grammatical categories in Tagalog. It is hoped that this study will lead to a continuation of psycholinguistic research on Tagalog which will provide a clearer picture of the language.

Outline

Chapter 2 provides a more detailed description of Tagalog and the problems with categorizing nouns and verbs in the language. It also provides a review of previous research on grammatical categories in the mental lexicon and a detailed description of the study by Kauschke and Stenneken (2008) on which this study was based.

Chapter 3 details the research design, including information about the research participants, the stimuli, the experiments, and the procedure.

Chapter 4 shows the results of the experiments. For Experiment 1, response times are compared and analyzed between the nonce words and the real words and between root nouns and root verbs. Response times are also compared between the biological and man-made nouns and between verbs with different numbers of potential affixes. For Experiment 2, response times are compared and analyzed between nonce words and real words; between inflected nouns and verbs; between verbs inflected for different focus types; and between transitive and intransitive verbs.

Chapter 5 discusses the implications of the results and suggests directions for further research.

CHAPTER 2

BACKGROUND

This chapter provides background information necessary for understanding the present study on nouns and verbs in Tagalog. The purpose of the study is to add to the previous research on grammatical categories in Tagalog by approaching the problem from a psycholinguistic perspective. For the study, native Tagalog speakers responded to two lexical decision tasks which were designed to help answer the question of whether Tagalog words are categorized as nouns and verbs in the mental lexicon. The results of the two experiments were analyzed for differences between response times to root noun and verbs; inflected nouns and verbs; verbs inflected for different focus types; and verbs inflected as transitive and intransitive.

The first section of this chapter offers a basic description of Tagalog and introduces some of the problems encountered in linguistic analyses of the language including problems associated with identifying grammatical categories in roots and affixes. The second section includes information on the mental lexicon and an overview of the study on nouns and verbs in German which was the basis for the present study.

Grammatical Categories in Tagalog

The Philippines is an independent island nation located Southeast Asia with a population of more 93 million people, the twelfth highest population in the world ("World Population Prospects, the 2010 Revision," 2011). Of the 171 native languages in Philippines (Lewis, 2009), eight are considered to be major languages: Tagalog, Cebuano, Ilokano, Bikol, Hiligaynon, Waray, Kapampangan, and Pangasinan. But Tagalog is one of the two national languages, along with English, and is spoken (at least as an L2) by most of the population.

Tagalog is a Malayo-Polynesian language of the Austronesian language family. It is a morphologically complex VSO language, traditionally described as ergative/absolutive (Reid, 2002). But the syntactic structure has also been described as symmetric (Foley, 1998) and copular (Kaufman, 2009). One of the most notable aspects of Tagalog and other Philippine type languages is the complex voice system which Kroeger (1998) explains is defined by three characteristics: multiple voice categories (more than three), non-demotion of the agent in a non-active clause, and a 'patient preference.'

### The problem with defining grammatical categories in Tagalog

While many linguists assume that nouns and verbs exist in all languages (Laudanna and Voghera, 2002), linguists studying Tagalog often question whether grammatical categories are really universal. Gil (2009) suggests that many languages lack a distinction between nouns and verbs, including Tagalog, Riaus, Indonesian, Tongan, and Broschart. Many root words in Tagalog seem equally well-suited to be used as nouns, verbs, or adjectives through common affixation (Kess, 1967). Through inflection, root words can be made noun-like, verb-like, or adjective-like, and there does not seem to be much distinction between Tagalog grammatical categories (Gil, 1993; Himmelmann, 2005). It is even argued that Tagalog grammatical categories at the root word level can only be divided into 'function words' and 'content words' (Himmelmann, 2005). For the purpose of convenience, however, different forms of words will be referred to as 'nouns' and 'verbs' through the remainder of this paper. These categorizations will be based on the common functions of such words, but using these terms does not mean that such categorizations are absolute.

Nouns and verbs are traditionally distinguished in many different ways and at many different levels: lexically, morphologically, syntactically, and semantically. Nouns typically refer to entities while verbs refer to processes. It is assumed that nouns and verbs are differentiated in the lexicon and the category information plays a role in lexical organization (Laudanna and Voghera, 2002). Nouns and verbs also tend to differ in morphological properties. Syntactically, verbs assign case to noun phrases and carry argument structure. Semantically, nouns tend to be more concrete and imaginable than verbs (Bates et al., 1991). So these basic grammatical categories of nouns and verbs are distinguished by converging properties and usage among words of the same category and divergence between the two categories. When there does not seem enough consistent information to distinguish between the categories, the existence of categories may be questioned.

### Roots are difficult to categorize

The first problem with distinguishing between grammatical categories lies in the fact that root words can be identified as belonging to multiple categories. This is not uncommon cross-linguistically, but it does seem to be especially prevalent in Tagalog. Blake (1916a) offers one of the earliest linguistic analyses of Tagalog and divides the lexicon into two classes of words: roots and particles. Blake explains that verbs are formed by combining particles (affixes) with roots, and that verbs rarely appear uninflected. However, he does not offer any explanation for distinguishing between root nouns and root verbs. His extensive treatments of nouns (1950) and verbs (1916) offer descriptions of phonological changes as well as inflectional and derivational morphology of each category but do not seem to distinguish between grammatical categories at the root level. Blake uses the root *sulat* 'write' as an example in his writings on nouns and his writings on verbs. Listing *pag-sulat* 'act of writing' and *sulat-an* 'table or paper on which

something is written' as nouns (1950) and *s-um-ulat* 'to write,' *sulat-in* 'to write (something),' *i-sulat* 'to write (down) something and *sulat-an* 'to write to or write on' as verbs (1916b). Blake does not address the problem of grammatical categories at the root level, but focuses on morphologically designated categories.

Like Blake, Bloomfield (1917) distinguishes between full words and roots (or particles). Full words (inflected or uninflected), according to Bloomfield, act as attributes, subjects, or predicates and can take on any syntactic function. He lists *bahay* 'house,' *kain* 'eat,' and *para* 'likeness' all as roots. Bloomfield recognized that all 'full words' were syntactically the same, functioning in any position in the sentence and using the same roots for both nominal and verbal inflections between his two descriptions. But Bloomfield also identified words and phrases as 'transient' and 'static' types. Transient words 'express an element of experience as impermanent,' such as *bili* 'buy.' All other words are static, such as *panyo* 'handkerchief' and *bata* 'child.' This distinction between transient and static types is similar to the distinction between nouns and verbs but does not translate directly to grammatical categories and does not explain inflections. Thus, both Blake (1916) and Bloomfield (1917) demonstrate that it is difficult to determine whether a root word is either a noun or a verb.

The second problem with distinguishing between nouns and verbs is that root words are grammatically marked at the syntactic level so there is no way to determine from the syntax whether the root itself (pre-syntax) is a noun or a verb, or whether categorization is solely determined by the syntactic marking. Tagalog lexical words are either roots or inflected forms (Ramos, 1971). Roots carry meaning and can stand alone; however, the syntactic function of the root is determined either by affixation or by preceding particles. A noun phrase is marked by one of three preceding particle paradigms: *ang, ng*, or *sa*. *Ang* marks the focus of the sentence, which

is sometimes considered to be the 'subject' or 'topic' of the clause. Other arguments of the verb are marked by *ng*. In the case of a ditransitive verb, a clause may have multiple *ng* phrases. Oblique NPs are marked by *sa* (Foley, 1998). In the English sentence 'The boy bought a dog at the store,' Tagalog focus particles would be applied as in (1).

**(1) Focus marking particles**

*Ang*-boy bought *ng*-dog *sa*-store.

In the example in (1), 'boy,' marked by *ang*, is the focus of the sentence, the main argument of the verb 'bought.' 'Dog,' marked by *ng* is also an argument of the verb, but it is not the main argument. Here it is the object of the verb, but that is not necessarily always the case. 'Store' is marked by *sa* as an oblique noun phrase, not an argument of the verb.

Verbs are typically verbal roots inflected through affixation (Schachter and Otanes, 1972). Nouns can be inflected, but can also appear as bare roots preceded by a focus-marking particle. Through inflection and focus-marking, any root can conceivably function as a noun or a verb (Kess, 1967)—which is the initial basis for most of the arguments denying a distinction between Tagalog nouns and verbs.

The third problem is that verbal inflection can be applied to roots which appear to be noun-like and noun-marking particles can precede roots which appear to be verb-like. Noun-like roots, such as *almusal* 'breakfast,' can be inflected for aspect; verb-like roots, such as 'to cook,' can be preceded by a focus-marking particle. The sentences in (2), show the root words *almusal* 'breakfast' and *luto* 'to cook' functioning as both nouns and verbs. The focus of the sentence, the *ang* phrase, is parsed as FOC (focus) and other arguments, *ng* phrases, as NF (non-focus arguments). Features of the verbs, such as aspect and voice, are not parsed.

**(2) Roots function in multiple categories**

    a.    Nag-luto        ang lalaki       ng almusal
        Cook              FOC=man      N-FOC=breakfast
        *The man cooked breakfast.*

    b.    K-um-ain        ang bata        ng luto           niya.
        Eat               FOC=child     N-FOC=cook      2.SG.POSS
        *The child ate what he cooked* or *The child ate the thing he cooked.*

    c.    B-um-ili         ang lalaki       ng kain          natin.
        Buy               FOC=man      N-FOC=food      1.PL.POSS
        *The man bought our food.*

    d.    Nag-almusal    ang pamilya    kanina.
        Breakfast        FOC=family   earlier
        *The family ate breakfast (breakfasted) earlier.*

In the above sentences, different root words function as both nouns and verbs. In (2a), *luto* 'cook' is inflected as a verb, while in (2b), *luto* appears as a bare root and is preceded by a focus-marking particle. The root word *kain* 'eat' is used in (2c) as a verb, but in (2d) as a noun. The root word *bili* 'buy', which is inflected as a verb in (2b) can also function as a noun.

<u>Previous theories of grammatical categories in Tagalog.</u>

        Some recent theories attempt to address the problem of root word grammatical categories by grouping Tagalog roots into a single category: Kaufman (2009) states that all roots are nominals and all inflections are nominalizations, while Foley (1998) argues that all roots are precategorial and all inflections are verbalizations. Both of these theories hold some merit but also raise questions and are discussed in turn below.

Theory 1: All roots are nominal

        The first theory to explain nouns and verbs in Tagalog is that all roots are nominal. Kaufman follows a preceding theory that all predication in Austronesian languages is copular (Lopez, 1928; Seiter 1975) and all predicates are nominal (Capell, 1964; Starsota, Pawley and

Reid, 1982). Kaufman asserts that all root words belong to a single macro-category,that all

lexical roots are nouns, largely because 'all roots obtain an essentially nominal interpretation

when used independently.' In other words, bare roots typically function as nouns in a sentence.

But Kaufmann further asserts that inflected forms are also nouns, that all content words

are nouns, and that the language is devoid of verbs. In his analysis, aspectually inflected forms

like *k-um-ain* 'ate' (actor focus) and *k-in-ain* 'ate' (object focus) are actually the nominalizations

'eater of' and 'eaten one' Under this assessment, all sentences are equative as shown by the

examples from Kauffman in (3).

**(3) Equative sentences**

    a.   K-um-ain               ng daga         ang pusa
          ACTFOC.CPL=eat   N-FOC=rat   FOC=cat
          *The cat was the eater of the rat.*

    b.   K-in-ain                ng pusa        ang daga
          OBJFOC.CPL=eat   N-FOC=cat  FOC=rat
          *The rat was the eaten one of the cat.*

The glosses in (4) show an interpretation of the VPs as NPs. Essentially, the copular or

equative analysis would interpret the sentences to mean NP1=NP2.

**(4) Equative sentences**

       NP1          NP2
       The cat   =   the eater of the rat
       The rat   =   the one eaten by the cat

In (4), there are no verb phrases, only two noun phrases which are referent to each other.

This equative interpretation has been suggested by others previously (Lopez, 1941; Capell, 1964;

Schachter and Otanes, 1972). This idea is further supported by the fact that non-focus arguments

resemble genitive nouns—the *ng* particle which marks the non-focus NP also marks genitive

NPs (Lopez, 1941). So interpreting the non-focus NPs as genitives, rather than arguments of a verb, is reasonable.

**(5) Non-focus NPs as genitives**

    a.   Ang pagkain        ng pusa
         FOC=food         POSS=cat
         *The food of the cat*

    b.   K-in-ain          ng daga      ang pagkain  ng pusa
         OBJFOC.CPL=eat  N-FOC=rat  FOC=food    POSS=cat
         *The rat ate the cat's food (the food of the cat)*

The sentence in (5b) has two NPs marked by *ng*. The first, *ng daga* 'the rat' is the non-focus argument of the verb and the actor of the sentence. But the second, *ng pusa* 'of the cat' is a possessive NP modifying the focus argument *ang pagkain* 'the food.' This brings into question the relationship between the three NPs. If the non-focus argument is structurally identical to the genitive, it brings into question the analysis of non-focus NPs as arguments of a verb—instead, the analysis of verbs as noun and the *ng* phrases as modifiers of those nouns seems quite plausible. This analysis then supports the idea of an equational sentence structure, which might support the idea of nominalism.

Theory 2: All roots are precategorical

In contrast to Kaufman's arguments, Foley (1998) claims roots are precategorial or lack any category. He bases his lexical category arguments on questions about verbal roots. Foley points out that root verbs lack argument structure: within the syntax, verbs are always marked for voice (through affixation), which then designates the argument structure. He questions whether a verb root lacking argument structure is a verb at all. Argument structure generally distinguishes

verbs from nouns, so without argument structure, it is difficult to support that distinction (Laudanna and Voghera, 2002).

Evidence from affixation to support Foley's (1998) claims for precategoriality include the following: (1) nearly any content word can be marked for voice and (2) there are no unique nominalization affixes. These two points will be discussed in more detail below.

First, nearly any root word can be inflected for voice and aspect. Lexical roots depicting objects, such as which are generally described as nouns, are commonly inflected as verbs.

**(6) Verbal inflections of nouns**

|   |   |   |   |   |
|---|---|---|---|---|
| a. | *bato* | rock | *b-um-ato* | to stone |
| b. | *payong* | umbrella | *mag-payong* | to use an umbrella |
| c. | *basketbol* | basketball | *mag-basketbol* | to play basketball |
| d. | *kamay* | hand | *kamay-in* | to use one's bare hands |
| e. | *suklay* | comb | *suklay-an* | to comb someone's hair |

The root words listed in (6) would typically be assigned the category of 'noun.' But *bato* 'rock' can be inflected to form a verb meaning 'to stone.' Other forms of the word would include the aspectual inflections *b-um-a-bato* 'is stoning' and *ba-bato* 'will stone.' But other languages have words that can be used as both nouns and verbs, or for which there are homonymic nominal and verbal forms, including the word *stone* in English. But in Tagalog, these constructions are not anomalies; they are morphologically regular and productive, although some forms are semantically irregular. Applying the prefix *mag-* to most nouns typically means 'to use [noun],' as in (6b) or 'to do [noun]' as in (6c). Foley (1998) notes that even obliquely marked NPs 'can be verbalized via a voice affix.' For instance, he notes that the oblique NP *sa Maynila* 'at Manila'

can be inflected as *p-um-a-sa Maynila* 'go to Manila,' which is also cited in Schachter and

Otanes (1972).

Second, in addition to the fact that both root nouns and case-marked NPs can be

verbalized, Foley (1998) states that there are no unique nominal affixes—all nominal affixes are

also verbal affixes. So, while the nominal suffix *–an* often designates a 'location for [noun],' *–an*

is also a location-focus or goal-focus verbal affix.

**(7) Homophony between verbal and nominal affixes**

    a.   *aral-in*     VERB   to study something

    b.   *aral-in*     NOUN  what is being taught

    c.   *punta-han*  VERB  to go to a person or place

    d.   *punta-han*  NOUN  the place to which one is going

**(8) Homophony between verbal and nominal affixes**

    a.   P-in-unta-han    ko        ang palengke          kahapon
         Go-OF-comp     NF-1st-sg   FOC-market         yesterday
         *I went to the market yesterday.*

    b.   Ni-lakad        ko        ang p-in-untahan     kahapon
         Walk-OF-comp  NF-1st-sg   FOC-destination-Comp  yesterday
         *I walked to the destination yesterday.*

The examples in (7) show instances where the same affixes, *-in* and *–an,* inflect the same

roots, *aral* 'study' and *punta* 'go,' nominally and verbally. In addition, the sentences in (8) show

the nominalized and verbalized forms of *punta*. The nominalized form in (8b) is not only

inflected for grammatical category but also for aspect, which further brings into question the

distinction between inflected nouns and verbs in Tagalog. Many common Tagalog affixes can

inflect forms for multiple grammatical categories, including the verbal affix *mag-*. However, the

application of *mag-* as a nominal affix is not as productive or semantically predictable as *–an* and *–in.*

As an explanation for inflected forms, Foley (1998) suggests that all Tagalog inflections are really verbalizations—as opposed to Kauffman's (2009) claim (described above) that inflections are all nominalizations. One evidence for verbalization is the assertion that even inflected forms that appear to be nominal or gerundive seem to have undergone verbalization first: 'the inflection of gerunds is subject to allomorphic variation, but these variations are directly determined by the allomorphic variation in the voice affixes.' Foley offers the following examples:

**(9) Gerund patterns**

|  | Verb |  | Gerund |  |
|---|---|---|---|---|
| a. | *d-um-ating* | to come | *pag-dating* | coming |
| b. | *um-alis* | to leave | *pag-alis* | leaving |
| c. | *ma-tunaw* | to melt | *pag-ka-tunaw* | melting |
| d. | *ma-buyo* | to get involved | *pag-ka-buyo* | getting involved |
| e. | *mag-aral* | to study | *pag-a-aral* | studying |
| f. | *mag-luto* | to cook | *pag-lu-luto* | cooking |

The pattern in (9) shows that *–um-* verbs correspond with *pag-* gerunds; *ma-* verbs correspond with *pag-ka-* gerunds; and *mag-* verbs correspond with gerunds prefixed by *pag-* and a reduplication of the first CV of the root. This correspondence is also noted in Palmer (2003) and Clarito (2000). Foley (1998) states that the roots must be inflected as verbs before they become gerunds.

Roots can also be adjectivally inflected. The word *ganda* 'beauty' can be inflected with the prefix *ma-* to create the adjective *ma-ganda* 'beautiful.' *Ganda* can also be inflected as a verb or other noun forms as in (10).

**(10) Multiple grammatical category inflections for the root *ganda* 'beauty'**

| | | | |
|---|---|---|---|
| a. | *ka-ganda-han* | ADJECTIVE | beauty |
| b. | *ganda-han* | NOUN | to make something beautiful |
| c. | *ma-ganda-han* | VERB | to be attracted by the beauty of someone or something |
| d. | *ma-ganda-hin* | VERB | to consider something or someone to be beautiful |
| e. | *magpa-ganda* | CAUSATIVE VERB | to make beautiful |
| f. | *napaka-ganda* | ADJECTIVE | very beautiful |
| g. | *pagandahan* | NOUN | beauty contest |
| h. | *mga pampaganda* | PLURAL NOUN | anything used as a means to beautify someone or something |

The word *kain* 'consumption of food' has even more possible inflections, including *pag-kain* 'food,' *k-um-ain* 'to eat,' *kain-an* 'a place where one eats,' *maka-kain* 'to be able to eat,' *ma-kain* 'to be eaten,' *maki-kain* 'to join others in eating,' and *pagpapa-kain* 'the act of feeding others,' and *mapa-kain* 'to be able to get someone to eat.'

## Problems with the previous theories

Problem 1: Distinction of other categories

The first (and somewhat simple) argument in favor of differentiating between grammatical categories (nouns and verbs) for root words is the existence of true adverbs (Baker 2009). While agentive nominalizations can include a theme, they cannot include an adverb, as in Baker's examples in (11).

**(11) True adverbs**

a. P-um-asok             nang madalas   sa opisina    si Ben
   ACTFOC.CPL=enter      often           OBL=office   FOC=Ben
   *Ben went to the office often.*

b. B-in-atikos         siya         uli          ng mga guro
   OBJFOC.CPL=criticize   3.SG.FOC    again      N-FOC.PL=teacher
   *He was criticized again by the teachers.*

The sentences in (11) both contain true adverbs, *madalas* 'often' and *uli* 'again,' which refutes Kaufman's theory that *p-um-asok* 'enter' and *b-in-atikos* 'criticize' would be an event-denoting nominalizations, rather than verbs. However, Baker's (2009) argument for adverbs is somewhat flawed since *madalas*, if anything, is an adjective; it is a derivation of the root word *dalas* 'frequency,' with the adjectival affix *ma-*. The preceding particle *nang* seems to mark adjectives as adverbs (English, 1986), but *nang* is also a conjunction and a linking particle, so classifying *nang madalas* as an adverb might be questionable. The adverb in (11b), *uli,* seems more distinctly adverbial as it denotes frequency and is not inflected or marked by a particle. But can *uli* be inflected as a verb or a noun? Yes, like most Tagalog roots, the adverb *uli* can undergo inflection—which makes the syntactic position of *uli* in (11b) even more interesting because it does appear as a bare root (unlike most verbs) without a marking or linking particle (unlike most nouns). If there are adverbs—especially if there are root word adverbs, which are lexically and syntactically adverbial—then there must be verbs, and, if so, Kauffman's theory of nominalization is refuted.

Problem 2: Unique nominal affixes

A second argument in favor of distinguishing between nouns and verbs is proposed by Kroeger (1998) who refutes Foley's argument that there are no nominal affixes. Kroeger identifies *taga-* as a solely nominal affix which refers to a place of nativity or an occupation

(English, 1986). If there is a distinctly nominal affix, which cannot be verbal, then there must be a distinction between nouns and verbs at some level.

**(12) Unique nominal affixes, *taga***

    a.   *taga-Maynila*    NOUN    from Manila [person]

    b.   *taga-luto*         NOUN    cook [person]

    c.   *taga-laba*        NOUN    person who does laundry

Additionally, the prefix *tag-* expresses a particular time or season for something (English, 1986; Schachter and Otanes 1972) and is strictly used as a nominal affix.

**(13) Unique nominal affixes, *tag***

    a.   *tag-init*    NOUN    hot season

    b.   *tag-ulan*    NOUN    rainy season

    c.   *tag-ani*    NOUN    harvest time

Kroeger (1993) uses the sentences in (14) to illustrate how verb inflection affects focus: (a) actor-focus; (b) object-focus; (c) location-focus; (d) benefactive focus and (e) instrument-focus. Kroeger prefers the term 'voice' to 'focus' and describes the *ang*-marked NP as nominative, *ng* as genitive, and *sa* as dative. So the description of the sentences differs here, but the data is still relevant for illustrating the effect of verbal affixes on focus-marking.

**(14) Focus types**

a. B-um-ili              ang lalaki     ng isda      sa tindahan
   ACTFOC.CPL.buy   FOC=man    N-FOC=fish  OBL=store
   *The man bought fish at the store.*

b. B-in-ili              ng lalaki      ang isda      sa tindahan
   OBJFOC.CPL=buy   N-FOC=man   FOC=fish     OBL=store
   *The man bought the fish at the store.*

c. B-in-il-han         ng lalaki      ng isda      ang tindahan
   LOCFOC.CPL=buy   N-FOC=man   N-FOC=fish  FOC=market
   *The man bought fish at the store*

d. I-b-in-ili            ng lalaki      ng isda      ang bata
   BENFOC.CPL=buy   N-FOC=man   N-FOC=fish  FOC=child
   *The man bought fish for the child*

e. Ip-in-am-bili       ng lalaki      ng isda      ang pera
   INSFOC.CPL=buy   N-FOC=man   N-FOC=fish  FOC=money
   *The man bought fish with the money.*

Sentences (14a) and (14b) include the same roots for the verb and for the noun respectively. But in (a), *luto* is an actor-focus verb, so *Ialaki* 'man' is the focus. In (14b), *luto* is a object-focus verb, so *isda* 'fish' is the focus. Sentences (14c) and (14d) are much like (14a) and (14b), with the focus changing from and actor-focus to an object-focus. But in (14e), that same verb is marked as a location-focus verb, and *palengke* 'market,' which was only an oblique in (14c) and (14d) is now the focus of the sentence. Both the actor *lalaki* 'man and the object *isda* 'fish,' which were the foci of the previous two sentences remain arguments of the verb. So that *binilhan* is actually a ditransitive with a focus and two other arguments. Sentence (14d) is also a ditransitive but with a benefactive focus.

Problem 3: Different nominal and verbal inflections

Kroeger (1998) offers several points of evidence that suggest a distinction between nouns and verbs in some inflected forms: stress placement and vowel deletion. The examples in (15) show that stress placement is different for many affixed forms between the noun and the verb.

The root words are inflected with the same affixes (*-an* or *–in*) and have identical nominal and verbal forms except that primary stress differs.

**(15) Different stress placements in nominal and verbal inflections**

| Root | Noun | Verb |
|---|---|---|
| | | |
| a. *hiram* 'to borrow' | *hiráman* 'place to borrow from' | *hiramán* 'to borrow from (someone)' |
| b. *aral* 'to study' | *aralín* 'lesson' | *arálin* 'to study (something)' |
| c. *tahi'* to sew | *tahí'an* 'tailor's shop' | *tahi'án* 'to sew (something)' |

The examples in (15) show that stress placement is sometimes different for otherwise identical inflected forms. Although there does not seem to be a pattern to this stress placement, the fact that the difference exists at all suggests there is differentiation between grammatical categories, at least in the inflected forms. Even more distinguishing than different stress placements is the fact that some inflected forms undergo vowel deletion in one grammatical category, but not in the other (16).

**(16) Vowel deletion in different inflections**

| Root | Noun | Verb |
|---|---|---|
| | | |
| a. *bili* buy | *bilíhin* 'something to buy' | *bilhín* 'to buy (something) |
| b. *bili* buy | *bilíhan* 'market' | *bilhán* 'to buy (somewhere)' |
| c. *bigay* ' give' | *bigáyan* 'mutual exchange of gifts' | *bigyán* 'to give (something)' |

In (16a) and (16b), the root word *bili* 'buy' is inflected with the affixes *–(h)in* and *–(h)an* to create both a noun and a verb for each affix. But where the verbal forms *bilhin* and *bilhan* undergo vowel deletion, the nominal forms do not. Likewise, in (19c) for the affixed forms of *bigay* 'give' undergo a vowel deletion in the verbal form but not the nominal. While this type of

vowel deletion may not be frequent, the fact that separate noun and verb forms exist, again, suggests that there is a distinction between inflected nouns and verbs throughout the language.

Problem 4: Nominalization of nominals?

Baker (2009) argues directly against Kauffman's suggestion that all inflections are nominalizations with one simple question—can a nominal be nominalized? The process of 'nominalization' requires that a word from *another category* (verb, adjective, adverb, etc) be used as a noun. But if there is no other category to draw from (i.e. if all roots are nouns) then nominalization cannot exist.

<div align="center">Conclusion</div>

A number of factors make categorizing nouns and verbs in Tagalog difficult: root words can be identified as belonging to multiple categories; root words are usually marked in some way at the syntactic, not lexical, level; and verbal inflection can be applied to roots which appear to be noun-like and noun-marking particles can precede roots which appear to be the most verb-like. So it is difficult to determine grammatical categories simply based on word lists and syntactic representations.

<div align="center">Grammatical categories in the mental lexicon</div>

Where grammatical categories may not be clearly distinguishable from studying Tagalog syntax, a study on the Tagalog mental lexicon may offer a different perspective. The mental lexicon is the organization of words in the mind—something like a mental dictionary, though much more complex (Fellbaum, 1998). It allows us to recognize words through either auditory or visual stimuli (Lowe, 1997). The lexicon must to some extent include phonological, morphological, syntactic, and semantic information about words (Jarema et al., 2002).

Many different models have been proposed to describe the organization of the mental lexicon, including the connectionist model and the dual-mechanism model (Yaden, 2007). The connectionist model proposes that all forms of a word are represented separately in the mental lexicon. This means that all inflections of a word have separate entries and there are no underlying inflectional rules. Though there is some evidence to support this model (Dabrowska 2004, Orsolini and Marslen-Wilson 1997), much of this research has been conducted on English, an inflectionally poor language (Clahsen, 1999). The dual-mechanism model, on the other hand, proposes that regularly inflected forms are generated through rule-based morphology but irregular forms are stored (Pinker, 1999). Research on German (Clahsen 1999, 1995) has shown that speakers distinguish between regular and irregular forms, which supports the theory that the lexicon includes both lexical entries and rules.

Methods of studying the mental lexicon usually focus on either word processing or production. Lexical processing tasks (Meyer and Schvaneveldt, 1971; Kostic and Katz, 1987; Sereno and Jongman, 1997; Kauschke and Stenneken, 2008) and neurological studies (such as neuroimaging) (Siri et al., 2007; Yang et al., 2011) focus on processing, while naming tasks (Pechman and Zerbst, 2002; Evrard, 2002; Vigliocco, Vinson, and Siri, 2005), production tasks (Kempen and Huijbers, 1983; Koenig, Mauner, and Bienvenue, 2002; Plemenou, Bard, and Brannigan, 2002), and corpus studies (Huang, Ahrens, and Chen, 1998) focus on production. Both lines of research contribute to knowledge about the mental lexicon.

One type of lexical processing task widely used in mental lexicon studies is lexical decision tasks. Lexical decision tasks measure how quickly participants respond to stimuli (visual or audio) in order to make inferences about how words are processed. In a visual lexical decision task, participants view words (or nonwords) and classify them in some way, often in

terms of whether the individual words are 'real' or not. One of the greatest benefits of lexical decision tasks is that they offer "an uncomplicated dependent measure that is easily amenable to both latency and accuracy analyses" (Jarema et al., 2002).

Lexical decision tasks have provided great insights into the mental lexicon. Meyer and Schvaneveldt (1971) found that semantically related words were responded to more quickly than unrelated words, suggesting that semantically related words are in some way connected in the mental lexicon. Gerhard and Barry (1999) found that both word frequency and age of acquisition affect processing. Higher frequency words and words which are acquired earlier are processed more quickly than lower frequency words and words acquired later. And Forbach, Stanners, and Hochhaus (1974) found that words which have been primed are processed more quickly, showing that the memory search process can be altered.

Lexical decision tasks can be used to show how grammatical categories affect processing in the mental lexicon. Kostic and Katz (1987) found processing differences for nouns, verbs and adjectives in Serbo-Croatian. Their results showed a strong inflectional influence on all three categories. For nouns, nominative forms were processed more quickly, and for verbs and adjectives, higher frequency inflectional forms were responded to more quickly than other forms. These results suggest that inflectional processing is affected by the number of possible inflections for each grammatical category. Sereno and Jongman (1997) found that English nouns were responded to faster than English verbs and proposed that this may be due to the different inflectional structures of nouns and verbs in English.

It is assumed that "grammatical knowledge is represented in the lexicon and plays the role of an organizational principle. The basic grammatical knowledge relates to the words' syntactic category, or grammatical class, and its major function is to provide the means by which

words can be combined in syntactic frames" (Laudanna and Voghera, 2002). Two issues that are significant to this research are the role of grammatical categories in the mental lexicon and the organization of different morphological forms. In particular, the question of whether grammatical category information is stored in the mental lexicon will help to answer questions about the existence of nouns and verbs in Tagalog.

Many studies have found strong evidence to suggest that grammatical categories are an organizing feature of the mental lexicon. Some of the strongest evidence for this has been found in observations of adults with selective language impairment. In some cases, impairment has been shown in verb processing (Caramazza and Hillis, 1991; Daniele et al., 1994); and in other cases, impairment has been shown in noun processing (Daniele et al., 1994). The fact that a person can show a deficit of words in one grammatical category but not in another supports the distinction between grammatical categories: they are an important organizing feature of entries in the mental lexicon.

Research on normal adults has also shown a differentiation between nouns and verbs. Comprehension tasks (Spenney and Haynes, 1989), lexical decision tasks (Sereno and Jongman, 1997; Kauschke and Stenneken, 2008), naming tasks (Kauschke and von Frankenburg, 2007), and recall tasks (Laudanna, Gazanelli, and Martinoa, 2003) have shown faster response times for nouns than for verbs. Studies on child language acquisition (Snedeker, Brent, and Gleitman, 2008) and on bilingual acquisition (Dóczi, 2006) also demonstrate that nouns and verbs are acquired differently.

A number of studies have found evidence to support the role of grammatical categories in processing. Hsu, Tzeng, Hung, and Tai (1998) found that participants recognized Chinese compounds faster when the compounds were a combination of two words of the same

grammatical category (noun-noun or verb-verb) rather than of differing categories. Their findings suggest that grammatical categories are not only part of the lexical entry, but that they play a role in processing as well. The studies showing that nouns are processed faster than verbs also provide evidence for the role of grammatical categories in processing. (Spenney and Haynes, 1989; Sereno and Jongman, 1997; Kauschke and Stenneken, 1998). In these studies, participants respond more quickly to nouns than they do to verbs. Such results have been observed in a number of languages, including English (Spenney and Haynes, 1989), German (Kauschke and Stenneken, 1998), and Serbo-Croatian (Kostic and Katz, 1987). The reason for the processing difference is not fully understood, but the research shows that there is a difference—that words we refer to as 'nouns' and 'verbs' are different types of words at a basic level within the mind.

Another central issue for any discussion about the mental lexicon is how lexical entries are represented and how they are organized and connected. In particular it is not known how morphology is stored and accessed—are all the different morphological forms of a word stored in one entry together? Are they stored separately? Are they connected? Is morphology part of the lexicon at all? (See Sereno and Jongman (1997) for a discussion of these issues).

Sereno and Jongman (1997) investigated whether inflected words are listed in the lexicon or only base forms are listed in the lexicon and morphologically complex forms are derived by rule. They conducted three experiments, the first examining differences in the processing of nouns and verbs, the second and third examining inflectional morphological issues in nouns.

The purpose of the first experiment was to compare the processing of nouns and verbs using a lexical decision task. The stimuli included 24 'pure' nouns (words used only as nouns), 24 'pure' verbs (words used only as verbs), and 48 nonce words. Participants viewed one word at a

time and responded by pressing a button to signal whether the stimulus was a 'word' or 'nonword.' Participants responded significantly faster to nouns than to verbs. Sereno and Jongman (1997) suggest that one explanation for the processing difference between nouns and verbs may be the inflectional structure of each class of words. The base form of a noun is the singular form and the inflectional structure includes plurals and possessives, while the base form of a verb is the infinitive and it is inflected as first-, second-, and third-person forms with both singular and plural forms. To test their hypothesis about the influence of inflectional structure on processing, Sereno and Jongman (1997) conducted second and third experiments comparing base nouns and their plural inflections. Results showed that response times were faster for both high frequency base nouns and for high frequency plural inflections over low frequency base nouns and low frequency plural inflections. These results suggest that frequency of each morpheme of the inflected form affects processing, not the inflection alone. From these experiments, they conclude that morphologically regular nouns in English "may not be derived by rule from a single, uninflected lexical entry."

It is also possible that both forms (the root and the inflection) may exist simultaneously (Deutsch, Frost, and Forster, 1998). Eye-tracking studies have shown frequency effects on processing for inflected forms. Beauvillain (1996) showed stem frequency effects in French for prefixed and suffixed words that were 10 letters or longer. Niswander-Klement and Pollatsek (2006) studied the effects of word frequency and root frequency in English prefixed words (*remove*). They observed a significant root frequency effect for longer words and a word frequency effect for shorter words.

Deutsch, Frost, and Forster (1998) studied the role of roots and verbal patterns (a sequence of vowels or vowels and consonants to which the root is added) in the lexical access of

Hebrew verbs. Through the use of masked primes in both lexical decision and naming tasks, they found that verb primes of the same conjugation pattern but a different root did facilitate faster word recognition and naming. Similar effects were found for verb primes with the same root. Based on these findings, they suggest that for inflected verbs, the verbal pattern morphemes, as well as the roots, are represented and connected in the mental lexicon. However, research on Hebrew nouns does not show the same pattern (Frost, Forster, and Deutsch, 1997). For Hebrew nouns, the root word priming affected responses, but patterns did not. While these findings are specific for Hebrew, they do present strong evidence for a distinction between nouns and verbs in the mental lexicon, as well as for connections between morphologically related forms, particularly with respect to verbs.

Research on Italian has also shown that different grammatical information affects processing for verbs. In a recall experiment, Laudanna, Gazanelli, and Martinoa (2003) found that inflected verb forms in certain conjugations were recalled more often than forms in other conjugations. Results showed that both mood and conjugation type played a role in recall. For nouns, on the other hand, syntactically salient information, such as gender and number, showed no effect. As with Hebrew, the specific effects may apply only to Italian or other related languages, but it provides evidence for grammatical categories in the lexicon and different organizing principles within those categories.

One recent study which showed particularly clear evidence for the roles of grammatical categories in processing and for a differentiation between nouns and verbs in the mental lexicon was that of Kauschke and Stenneken (2008). In their study on German, Kauschke and Stenneken used lexical decision tasks to better understand differences in noun and verb processing. Two different experiments indicated that nouns are processed faster than verbs. One of the goals of

the experiments was to investigate grammatical categories in the mental lexicon with regard to semantic content, syntactic information, and morphological features.

The purpose of the first experiment was to establish the 'noun advantage' in German—to show that nouns were processed faster than verbs. Participants responded to uninflected nouns and verbs. The nouns were categorized as biological nouns and man-made nouns (semantic subcategories) because faster responses have been previously reported for man-made over biological objects (Lloyd-Jones and Humphreys, 1997). The verbs were categorized as transitive and intransitive verbs (syntactic subcategories). Results showed that participants responded more quickly to nouns than to verbs, as has been shown in several studies cited above. In the second experiment, also a lexical decision task, participants responded to nouns and verbs which were inflected with orthographically identical suffixes (morphological subcategories). Results from this experiment again showed that nouns were processed faster than verbs, which indicates that syntactic information, such as argument structure in verbs, does affect word processing, but semantic information may be less influential than the syntactic information (Kauschke and Stenneken, 2008).

The purpose of the second study was to determine the effect of morphology on processing in the mental lexicon. This experiment was identical to the first but with 20 participants responding to 240 stimulus words, 120 real German words and 120 nonce words. The real German words were inflected with one of three suffix forms, -(e)n; -s or -t; or -e. Each suffix subset had corresponding homographic forms for nouns and verbs. Results showed that the noun advantage persisted for all suffix forms, meaning that given a noun and a verb with identical suffixes and similar morphological complexity, the noun is still processed faster (Kauschke and Stenneken, 2008).

The results of both experiments provide strong evidence that syntactic information plays an important role in the mental lexicon. In both experiments, more syntactically simple words were processed more quickly than syntactically complex words, nouns were processed faster than verbs, and intransitive verbs were processed faster than transitive verbs. Kauschke and Stenneken (2008) observe that this further supports the findings of Kim and Thompson (2000) who found that aphasic patients produced verbs with fewer arguments more accurately than verbs with more arguments. Although the man-made/biological subcategorization had no effect on processing, semantic effects were still considered influential because of the semantic properties object/action, which cannot be separated from the grammatical categories noun/verb. Morphological effects, however, seemed diminished when morphological complexity was controlled in the second experiment (Kauschke and Stenneken, 2008). Obviously multiple factors affect word processing, but what seems clear here is that grammatical categories do play a role in the German mental lexicon.

This level of clarity has been lacking in studies of Tagalog grammatical categories. Previous studies have thoroughly analyzed Tagalog grammatical categories based on morphology and syntax as it appears in spoken and written language. But studies on the mental lexicon, such as the one conducted by Kauschke and Stenneken (2008), could provide new insight in to the question of whether grammatical categories exist in Tagalog. The analysis is based on native speaker responses and provides calculable results—both of which are lacking in previous theoretical research.

Kauschke and Stenneken's (2008) first experiment comparing basic nouns and verbs divided into four subcategories (man-made/biological nouns, intransitive/transitive verbs) seems particularly well-suited for a study of Tagalog root words because it provides a way of analyzing

the words without other morphology and syntax. Many of the problems with analyzing Tagalog grammatical categories occur because root words can function in syntactic categories, but a lexical decision allows the word to be analyzed alone, as just a word, not part of syntax.

Research on multiple languages has shown distinct differences between the storage and processing of nouns and verbs in the mental lexicon, as well as differences in the effects of syntactic information on each category. A lexical decision task study, similar to that of Kauschke and Stenneken (2008), may provide evidence that such differences are also present for Tagalog. Additionally, because Tagalog is so structurally different from the languages in previous studies on the mental lexicon, studies on Tagalog may provide new insights into the mental lexicon in general. Previous studies have shown morphological complexity (Kauschke and Stenneken, 2008) to be a driving factor in differentiating between nouns and verbs, and Tagalog is a morphologically complex language, so studies which exploit that complexity would be well-suited for this and other related languages.

This study seeks to answer the following questions through a lexical decision task study of Tagalog:

1. Are Tagalog root words categorized as nouns and verbs in the mental lexicon?
2. Are inflected forms categorized as nouns and verbs in the mental lexicon?
3. Do other factors, such as affix, focus type, and transitivity, affect grammatical categorization in the mental lexicon?

CHAPTER 3

RESEARCH DESIGN

The purpose of the current study was to determine whether Tagalog speakers categorize words in the mental lexicon in a way similar to other languages (such as German). In order to do so, this study used two response time lexical decision tasks. Research was conducted in October of 2010, in Manila, Philippines. The current chapter discusses the participants, stimuli and method to examine this research question as well as the method of data analysis.

Pilot Study

I conducted a pilot study previous to starting the actual experiment described above.  For this pilot study, I used  visual lexical decision tasks to address the question of whether the grammatical categories of nouns and verbs exist in the Tagalog mental lexicon and followed the methods of Kauschke and Stenneken (2008). Four different experiments were performed using different types of Tagalog words. The first experiment tested whether Tagalog root words (uninflected forms) are categorized as nouns and verbs. The second experiment tested whether inflected forms are categorized as nouns and verbs. The third experiment tested whether transitivity (morphosyntactic information) affected processing. The fourth experiment tested whether verbs inflected for different focus-types (also morphosyntactic information) affected processing. The actual data for the pilot study will not be presented here because the pilot study was never intended for publication and participants were not required to sign a consent form (see Appendix A) allowing their responses to be published. Also because the number of participants was small, and in some experiments the stimulus set was so small, the results were not only inconclusive, but unreliable for making any assertions about the language

Although the results for the pilot study were inconclusive, a comparison of the results from Experiment 1 with those of Experiment 2 suggested the possibility that root words may not be grammatically categorized, since the response time differences between nouns and verbs were so much more consistent for the inflected forms. Experiment 3 indicated that inflected forms are grammatically categorized, but showed that transitive forms were responded to more quickly than intransitive, which was surprising given that transitive verbs include more complex morphosyntactic information. The results from Experiment 4 showed no real pattern of response times to verbs inflections of different focus sets, but these results may have been affected by the fact that actor-focus verbs were inflected with a prefix and other focus-type verbs were inflected with a suffix.

Designing and conducting the pilot study did lead to a better experiment design for the present study. First, the number of experiments was reduced from 4 to 2 because participants grew tired of the lexical decision tasks, which likely affected their performance. Also the stimuli were more carefully chosen and reviewed to be as noun-like or verb-like as possible—due to the time constraints of the pilot study, some of the stimuli were less clear in terms of grammatical category, making the results less useful. The number of stimuli for Experiment 2 was also increased. Experiments 2, 3, and 4 were combined for the present study, to compare grammatical categories, transitivity, and focus-type. The length of time allowed for responses to inflected forms was increased because many participants had complained that they did not have time to even read the words. The number of participants was increased to 31 and the age and first language of the participants was controlled to yield more accurate responses. The test-taking environment was also controlled. For the pilot study, the lexical decision tasks were in several cases administered in the participants' homes where they were frequently interrupted. But for the

present study, participants responded to the lexical decision tasks in a quiet, public environment with very few distractions. The data for the present study was analyzed using t-tests to indicate whether or not differences across word forms were statistically significant. Overall, the pilot study was not useful in terms of data, because the present study shows very different responses to the various comparisons, but it did provide me with background experience and knowledge for designing the present study.

<div align="center">Participants</div>

Thirty-one participants participated in the experiments. Participants were native Tagalog speakers between the ages of 18-32 (mean age: 23) living in the vicinity of Manila, Philippines at the time of the study. Fourteen participants were male, seventeen were female. On the preliminary questionnaire, all 31 participants identified themselves as native speakers of Tagalog, 26 participants identified Tagalog as the primary language spoken in the home where they were raised; five participants listed other languages of the Philippines. All participants listed Tagalog as the primary language of their school and the primary language they use in their daily life. Thirty participants also identified themselves as having some level of fluency in English. Twelve participants claimed fluency in at least one additional language beyond Tagalog and English.

Participants were not questioned regarding their level of education. However, in conversation, most participants indicated that they were currently attending a university or had already graduated from a university. University-educated participants were chosen because they all had experience using a computer and were used to completing tasks similar to those used in the study.

Each participant signed a consent form approved by the IRB prior to participation and was offered a copy of that consent form. In addition, each participant was compensated with PHP 350 (approximately 8.00 USD).

## Experiments

Based on the results of the pilot study, two experiments were conducted in the current study. These two experiments determined whether Tagalog speakers categorize words as nouns and verbs in the mental lexicon. The first experiment focused on Tagalog root words and the second on inflected forms.

## Experiment 1

The purpose of the first experiment was to determine whether the Tagalog root words are grammatically categorized in the mental lexicon. Stimuli were presented from two categories, based on the experiment by Kauschke and Stenneken (2008): nouns and verbs. If root words in the mental lexicon in Tagalog are categorized as either nouns or verbs, semantic and morphosyntactic information should influence the lexical decision and lead to different response times for the categories, most likely showing a noun advantage.

The original study (Kauschke and Stenneken, 2008) of grammatical categories in the German mental lexicon used visual lexical decision tasks to 'establish the noun advantage in German'—to show that nouns were accessed in the mental lexicon more quickly than verbs. The grammatical categories of nouns and verbs were further subcategorized into biological and man-made nouns and intransitive and transitive verbs to further discover whether semantic and morphosyntactic information played a role in processing the words. As noted previously, the semantic categories of biological and man-made nouns seemed to make no difference on

response time, but that aspect was still included in the present study. Kauschke and Stenneken did note different response times between intransitive and transitive verbs, but since Tagalog root words are not marked for transitivity, this aspect was not applicable to the present study.

Experiment 1 only tested different response times to Tagalog nouns and verbs in root form. The nouns were further subcategorized as biological and man-made nouns.

Stimuli

Since the purpose of the experiment was to determine whether categories such as nouns and verbs exist in Tagalog root words, selecting words to represent each category was somewhat difficult. In order to make the test results as definitive as possible, words selected to represent the respective categories needed to be as noun-like or verb-like as possible. All nouns had to describe either visible or tangible entities and verbs had to describe actions.

The list of stimuli was created by the researcher and reviewed by native-speaker consultants. There was no frequency list for Tagalog from which to create the list of stimuli. Additionally there were no usable corpora available. Some linguists have used the internet as a Tagalog corpus (Zuraw, 2010) but the lack of canonized Tagalog spelling, along with the complex morphological system, would have made it difficult to create a valid list of frequent root words.

Without a frequency list or corpora available, I chose to use a list of commonly used words in an attempt to find the most frequent words. Initially, I created a list of potential stimuli based on my own knowledge of the language and word lists in introductory Tagalog grammar books (Aspillera, 1993; Ramos, 1985). This method of choosing words seemed valid for choosing frequent words for the following reasons. First, as a second language learner of Tagalog who spent most of her time in the Philippines among people who were also L2 speakers

of Tagalog, I have a vocabulary which consists of common words and forms which are used in everyday conversations about topics such as the weather, the landscape, and daily life. Thus, my experience has mostly been with common and most frequent words. Second, the grammar books were intended for second language learners, and therefore it could be assumed that the included vocabulary lists focuses on common words as well. Words with common homonyms or homographs, such as *báta* 'child' and *batâ* 'robe,' were not included. The stimuli for Experiment 2 were also reviewed for the number of possible usages and category variation among the different usages (English, 1986; Ramos, 1986). Inflected forms listed in the dictionary with multiple grammatical categories were eliminated because such words were assumed to be less clearly identified with one category or another.

The lists of potential stimuli were emailed to 3-5 native-speaker consultants in a spreadsheet who then categorized the words by typing either *N* for 'noun' or *V* for 'verb' next to the word. The consultants were instructed not to look up the words or consult with other speakers, but rather to assign categories based their first impression. Many studies have used native speaker judgments for different aspects of research including grammaticality (McFadden, 2004) and L2 proficiency (Barnwell, 1989). Given the disagreement between linguists on how to classify Tagalog words and the lack of other resources, native speaker judgments provided a practical solution to the initial problem and a functional list of stimuli that are the best possible representatives of each category. All of the words selected as stimuli for Experiment 1 were unanimously identified as nouns or verbs by five native speakers.

The stimulus set for Experiment 1 (see Table 2 and Table 3) consisted of 80 uninflected root words (40 nouns and 40 verbs) and 80 nonce words. All stimuli were disyllabic, with syllables following the typical Tagalog patterns of CV or CVC. Some words, such as *iwas*

'leave' appear to have vowel-initial syllables. However, orthography does not account for glottal stops which precede such syllables in speech (French, 1988). Since word length could affect response time, all stimuli ranged between 4 and 7 characters. Definitions for the stimuli (see Table 1 and Table 2) were compiled from several dictionaries (Blake, 2011; English, 1986; "Google Translate," 2010; "Tagalog-dictionary.com," 2004). Parts of speech listed for the root words differed from one source to another. In English (1986), most of the root words are listed as nouns and some as adjectives. But other sources (Aspillera, 1993; M. Blake; "Tagalog-dictionary.com," 2004) list many root words as verbs. The root words *sunod* 'to obey' and *tulog* 'to sleep,' which are included in the root verb stimuli for Experiment 1 (see Table 2), were frequently listed as adjectives and only assigned adjectival definitions. However, the five native-speaker consultants all identified *sunod* and *tulog* as verbs, and they were also listed as verbs in the *Handbook of Tagalog Verbs* (Ramos, 1986). This disagreement among the various resources, as well as between the resources and the responses of the consultants further points to the general ambiguity of grammatical categories in Tagalog.

Kauschke and Stenneken (2008) divided the stimuli for their Experiment 1 (which is similar to the Experiment 1 of the current study) further into the subcategories of biological nouns and man-made nouns. Although their findings did not show any processing advantage for one type of noun over the other, that division was also replicated in the present study because it cannot be assumed that if the subcategory was not relevant in German it would not be relevant in Tagalog. Kauschke and Stenneken also divided the verbs in Experiment 1 into the subcategories of intransitive and transitive. Their findings did show a processing advantage for intransitive verbs over transitive. But since transitivity is assigned to Tagalog verbs by inflectional affixes,

root words have no transitivity (Foley, 1998), so it would not have been possible to categorize

the Tagalog verbs based on transitivity.

**Table 1, Experiment 1 stimuli - Nouns**

| Root Nouns | | | Root Nouns | | |
|---|---|---|---|---|---|
| *ahas* | B | snake | *kanin* | M | rice, boiled or steamed |
| *bakod* | M | fence | *kilay* | B | eyebrow |
| *bawang* | B | garlic | *kotse* | M | car |
| *bolpen* | M | pen | *kuko* | B | fingernail |
| *braso* | B | arm | *lapis* | M | pencil |
| *buhok* | B | hair | *lupa* | B | earth (loose earth or dirt) |
| *buko* | B | a young coconut | *palda* | M | skirt |
| *bundok* | B | mountain | *pinggan* | M | dish; plate |
| *dahon* | B | leaf of a plant | *pusa* | B | cat |
| *dila* | B | tongue | *puso* | B | heart |
| *dingding* | M | wall of a room or house | *puto* | M | a kind of white cake made from rice flour |
| *gatas* | B | milk | *relo* | M | watch; clock |
| *gripo* | M | faucet | *saging* | B | banana |
| *ibon* | B | bird | *silya* | M | chair |
| *ilong* | B | nose | *sine* | M | movie |
| *ipis* | B | cockroach | *singsing* | M | ring |
| *isda* | B | fish | *sobre* | M | envelope |
| *itlog* | B | egg | *sopas* | M | soup |
| *kahon* | M | box; chest | *tela* | M | cloth; fabric |
| *kalye* | M | street | *ulam* | M | viand; any dish eaten with cooked rice |

Table 1 shows the root nouns for Experiment 1. The stimuli are marked for their semantic

categories biological (B) or man-made (M). Table 2 shows the root verbs for Experiment 1.

**Table 2, Experiment 1 stimuli – Verbs**

| Root Verbs | | Root Verbs | |
|---|---|---|---|
| *abot* | to reach for | *linis* | to clean |
| *alis* | to take away, to remove, to depart | *lipad* | to fly |
| *basag* | to break glass accidentally | *luhod* | act of kneeling |
| *bigay* | to give | *nood* | to watch, to view |
| *bili* | to buy, to purchase | *palo* | to spank, to whip |
| *dala* | to bring; carry | *payag* | to give permission |
| *dikit* | to stick, to adhere, to get stuck | *punta* | to go |
| *dinig* | to hear | *sabi* | to say, to tell, to relate |
| *gising* | to wake up, to awaken | *sakay* | to ride in a vehicle, to board a vehicle |
| *hinga* | to breathe | *sara* | to close |
| *hingi* | to ask for | *sunod* | to obey |
| *hintay* | to wait; to wait for | *takbo* | to run |
| *hiram* | to borrow | *talon* | to jump, to leap |
| *hiwa* | to cut with a blade or knife | *tanggap* | to receive, to accept, to admit |
| *hugas* | to wash | *tapon* | to discard, throw away, spill |
| *hulog* | to fall, to drop | *tingnan* | to look at |
| *kain* | food, act of eating | *tulog* | to sleep |
| *kinig* | to listen | *turo* | to teach, to point to, to point at |
| *kuha* | to get, to obtain | *tuto* | to learn, to become skillful |
| *ligo* | to bathe | *usap* | to talk with another, to converse |

<u>Nonce Words</u>

The nonce words were created to look as much like the real Tagalog words as possible. All were disyllabic for Experiment 1 and trisyllabic for Experiment 2 following CV and CVC patterns with sounds and clusters commonly found in Tagalog (French, 1988). The words were created using only the 21 orthographic characters common for representing native Tagalog words: this is the same system of characters used to represent English excluding *c, f, j, q,* and *v* (Llamzon, 1976). These characters do sometimes occur in Tagalog words which have been borrowed from Spanish or English but are typically replaced with other graphemes (such as *k* for *c*) or with other phonemes (such as *p* for *f* and *b* for *v*). Tagalog includes an additional phoneme *ŋ* which is represented by the graphemes *ng*. To create viable nonce words, letters in real

Tagalog words were altered in some way as in *piro* from *biro* 'joke'; *galas* from *gatas* 'milk'; *kila_* from *kilay* 'eyebrow' (see Table 3). All nonce words were checked against Tagalog dictionaries to avoid unintentionally using real words. Nonce word lists were also reviewed by native speaker consultants to check that they were viable constructions, but not actual words. However, this did not account for all possible recent slang terms.

**Table 3, Experiment 1 stimuli – Nonce words**

| | | | |
|---|---|---|---|
| abod | dikay | kayaw | piking |
| akad | duhod | kila | piro |
| alip | duro | lahok | poon |
| angang | dusa | langip | puhat |
| bakad | gadon | laplap | puko |
| bakay | galas | layaw | pulay |
| bakog | gamon | liko | puna |
| basok | guso | luso | satas |
| batang | habay | maat | sipad |
| bilay | halon | magat | solak |
| biwa | hawas | maka | sukan |
| bolat | hira | matag | sulay |
| busag | husod | matak | suto |
| buso | isap | ngata | taging |
| dakop | kaan | ngaya | talag |
| dalay | kalay | noka | taya |
| dama | kangaw | pago | tipa |
| dawag | kappa | panggaw | tubog |
| digang | kata | panog | tukay |
| digaw | katal | pantay | tuwan |
| abod | dikay | kayaw | piking |

Procedure

    Experiment 1 was conducted as a visual lexical decision task. The lexical decision task was created and run using DMDX software on an HP Pavilion dv6500 Notebook PC. For the lexical decision task, participants were presented with one stimulus word at a time and asked to determine whether the stimulus word was a Tagalog word or not. Participants were instructed to

press the key on the keyboard labeled YES if the stimulus presented was a real Tagalog word. Participants were instructed to press the key labeled NO if the stimulus was not a real word (was a nonce word). The appropriate keys on the keyboard were labeled 'yes' and 'no' in both English and Tagalog since both English and Tagalog forms are commonly used by Tagalog speakers. A third key was labeled 'continue,' which the participants were instructed to press when they were ready to move on to the next set of stimuli.

Response times were measured to determine the length of time required to process each type of word. Stimuli appeared on the screen for 510 milliseconds followed by a blank screen for up to 1000 milliseconds; participants had a total of 1500 milliseconds to respond to each of the stimuli. Each participant completed a 'practice' experiment prior to beginning of each actual experiment. Stimuli for each experiment were presented in random order. Groups of stimuli were divided by 'break times,' during which participants could pause to rest briefly from the experiment. 'Break times' could last as long as the participant chose. Participants were instructed on the screen to 'Press CONTINUE' to continue to the next set of stimuli when they were ready. Each participant completed the experiments in a different order to reduce the effects of priming from one experiment to another.

Data Analysis

A series of paired t-tests was used to compare results within the experiment. Incorrect responses were excluded from analysis. Responses from participants whose mean response time was two standard deviations from the group mean response time were also discarded. (A standard deviation is the variation from the mean value.) Response times to nouns and verbs were compared, as well as response times to real and nonce words

<u>Experiment 2</u>

The purpose of Experiment 2 was to determine whether inflected word forms are grammatically categorized in the Tagalog mental lexicon; and if the inflected forms are grammatically categorized, what features affect that categorization—grammatical category, transitivity, or focus type. Again, following the procedure of Kauschke and Stenneken (2008), stimuli were presented from different grammatical categories, marked by different affixes. Two nominal affixes (*ka-* and *–an*) and two verbal affixes (*mag-* and *–in*) were used. Although each affix can mark words for other grammatical functions, these particular affixes seem to occur most often in the grammatical functions indicated. The two verbal affixes subcategorize for different focus types, and half of the verbs from each affix were intransitive while the other half were transitive.

In their second experiment, Kauschke and Stenneken (2008) sought to further investigate the effects of the noun advantage with morphological complexity. They used a visual lexical decision task to test different processing times for inflected nouns and verbs. The nouns were marked for plural and the verbs were marked for person with orthographically identical suffixes—meaning each pluralizing morpheme was identical to a person-marking morpheme.

For the present study, Experiment 2 did test response times to inflected nouns and verbs. However, the features of plurality and person are not relevant to a study of Tagalog since plurality is marked by a clitic and most nouns are not marked for person. Orthographically dissimilar nominal and verbal affixes were used because they were considered to be more clearly identified with the respective grammatical categories. Since focus-type and transitivity are important features of Tagalog verb morphology, half of the verbs were actor-focus and the other

half were location-focus. Within each focus type, half were intransitive and the other half were transitive. In addition, two prefixes and suffixes (one from each grammatical category) were used to investigate whether affix placement affected processing.

So Experiment 2 tested response times to words inflected for the grammatical categories of noun and verb, as well as verbs inflected for focus-type and transitivity.

Stimuli

The purpose of Experiment 2 was to determine whether inflected words are categorized as nouns and verbs in the mental lexicon. The words selected as stimuli for Experiment 2 were not as easily categorized as those in Experiment 1. Three of the five native-speaker consultants did not respond to the second set of word lists, so responses for the Experiment 2 word lists came from only two consultants. For the responses which were received, consultants did not agree on the categorization of many of the words. Additional word lists were sent to the consultants in order to create more options for potential stimuli. But again, it was difficult to get responses from the consultants. Even after the lists were sent to additional consultants, there were only 2-3 responses per word list. But the words with the most consensus from the most consultants were selected.

The stimulus set for Experiment 2 (see Table 4 and Table 5) consisted of 160 words, 20 words from each category: *ka-* (partner) nouns,–*an* (location) nouns, *mag-* (action) verbs, and –*an* (locative) verbs, along with 80 nonce words (20 prefixed by *ka-*, 20 suffixed by –*an,* 20 prefixed by *mag-*, and 20 suffixed by -*an*). These affixes were selected because they were monosyllabic affixes that frequently designate a particular grammatical category. Two prefixes (*ka-* and *mag-*) and two suffixes (-*an* and –*in*) were selected. All verbs were in the infinitive form because aspectual inflection often involves reduplication and infixation which would introduce

more variables and could affect processing. All nouns were singular since plurality is marked by preceding clitic.

All of the affixes used can designate other grammatical categories. This kind of polysemy is common for Tagalog affixes. For example, the prefix *ma-* can attach to descriptive roots like *pula* 'red' and *ganda* 'beauty' to produce the adjectives *mapula* 'reddish' and *maganda* 'beautiful.' But when *ma-* is added to the root *kita* 'see,' it produces the object-focus abilitative verb *makita* 'to be able to see' (Clarito, 2000). But the affixes that were selected have fairly clear meanings and uses within the respective categories and are common affixes in everyday use which can be widely applied.

The noun prefix *ka-* can prefix a root word to form a noun denoting some kind of companion or partner, as in *ka-laro* 'playmate' from the root word *laro* 'play' (see Table 4). But it can also form a verb with a reduplicated first syllable that references a recent event, as in *ka-a-alis* 'just left' from the root *alis* 'to depart.'

The noun suffix *–an* designates a place where something occurs. *Aklat-an* 'library,' from *aklat* 'book,' designates a place for books and *tinda-(h)an* 'store,' from *tinda* 'sell,' refers to a place for selling things. But *–an* can also be used as a location-focus verb, such as *sulat-an* 'to write to someone,' from *sulat* 'write.'

The verb prefix *mag-* most typically affixes an actor-focus verb, often denoting an intentional action or some kind of external movement (Schachter and Otanes, 1972) as in *mag-handa* 'to prepare' from *handa* 'ready' or *mag-ipon* 'to collect' from *ipon* 'collection' (see Table 4). *Mag-* added to certain roots creates a noun referring to an occupation: *mag-* added to *bukid* 'farm' creates *magbukid* 'farmer.' Prefixing *mag-* to other roots, like *ama* 'father' or *asawa*

'spouse,' results in nouns referring to a dual relationship, *mag-ama* 'father and child' and *mag-asawa* 'husband and wife' or 'married couple.'

The suffix *–in* forms location-focus verbs, typically transitives that denote actions which affect the goal (Schachter and Otanes, 1972), such as *hal(u)-in* 'to mix together' from *halo* 'mixture.' But there are some *–in* intransitives, as well, typically those in which the focus is affected by something else as *langgam-in* 'to be infested with ants' from *langgam* 'ant.'

For the study by Kauschke and Stenneken (2008) nouns and verbs with homographic affixes were intentionally used for Experiment 2. Because the distinctions between grammatical categories are clearer, the homographic affixes allowed them to more clearly show a difference in processing times based solely on grammatical category. However, the category distinctions for Tagalog affixes are much less clear and affixes carry more features which add potential factors to the processing times. In addition, while *mag-* verbs are frequent, common, and semantically regular, *mag-* nouns are not frequent or common, and have semantic irregularities. *–An* nouns and verbs are frequent and common, but *–an* verbs are sometimes ditransitives which could add another level of complexity to processing the words. So the four affixes chosen were selected because they are commonly used in the respective grammatical categories and with some level of semantic regularity.

In studying Tagalog verbs, the factors most relevant were transitivity and focus type. So the two verb affixes subcategorize for different focus types, *mag-* for actor-focus and *–in* for location-focus. The verbs categories also included both transitive and intransitive forms, 10 transitive and 10 intransitive for each verb affix. The transitivity for the verbs in Table 5 are marked to the right of each Tagalog verb. Intransitive verbs are listed as 'I' and transitive verbs are listed as 'T.' All stimuli were trisyllabic and ranged from 7-10 characters.

**Table 4, Experiment 2 stimuli – Nouns**

| *Ka-* Nouns | | *-an* Nouns | |
|---|---|---|---|
| *kagalit* | enemy | *aklatan* | library |
| *kagawad* | member | *bukiran* | field |
| *kaklase* | classmate | *dagatan* | pond |
| *kalakad* | a companion in taking a walk | *digmaan* | war; warfare |
| *kalaro* | playmate | *gubatan* | wilderness |
| *kalihim* | secretary | *hagdanan* | staircase |
| *kapatid* | sibling | *hapunan* | dinner |
| *kasalan* | wedding | *harapan* | foreground |
| *kasama* | companion | *higaan* | cot |
| *kabahay* | housemate | *langitan* | heaven |
| *katalo* | antagonist | *listahan* | list |
| *katulong* | a helper; an assistant | *palayan* | rice paddy |
| *kawani* | employee | *paraan* | way |
| *katabi* | adjacent | *sampayan* | clothesline |
| *kabata* | youth | *sayawan* | a dance |
| *kasakay* | fellow passenger | *simbahan* | church (building) |
| *kaloob* | gift | *tahian* | tailor's or dressmaker's shop |
| *kaanib* | person of the same sect or party | *tindahan* | store |
| *kahati* | owner of half of something | *tubigan* | pond |
| *kasapi* | member | *upuan* | seat; a thing to sit upon |

Table 4 shows the noun stimuli for Experiment 2. Table 5 shows the verb stimuli for Experiment 2, which are marked as being transitive (T) or intransitive (I).

**Table 5, Experiment 2 stimuli – Verbs**

| *Mag-Verbs* | | | *-in* **Nouns** | | |
|---|---|---|---|---|---|
| *maghanda* | T | to prepare | *antukin* | I | to be overcome by drowsiness or sleepiness |
| *magtago* | T | to hide | *apuyin* | I | to burst in to flame; to burn |
| *mag-away* | I | to quarrel or fight | *bigasin* | T | to mill |
| *magbati* | I | to greet | *bugbugin* | T | to trounce; to thrash; to maul |
| *magbihis* | I | to clothe | *buhatin* | T | to lift up |
| *magdilig* | T | to sprinkle | *duguin* | I | to have a hemorrhage |
| *mag-ipon* | T | to collect, gather together | *gabiin* | I | to be late in the evening |
| *magbiro* | I | to tease, make fun of | *ganapin* | T | to accomplish |
| *maghatid* | T | to bring, to escort | *ginawin* | I | to chill; to feel cold |
| *magtsismis* | I | to gossip | *haluin* | T | to mix together |
| *mag-ingat* | I | to beware | *hanapin* | T | to search |
| *mag-iyak* | I | to cry | *iwanin* | T | to leave |
| *magsunog* | T | to burn | *lagnatin* | I | to have a fever |
| *mag-aral* | T | to study | *langawin* | I | to be infested or covered with flies |
| *magdagdag* | T | to add | *langgamin* | I | to be infested with ants |
| *magtawa* | I | to mock | *nakawin* | T | to loot, steal |
| *magpasyal* | I | to tour | *sukatin* | T | to measure |
| *magpaypay* | I | to fan | *tawagin* | T | to call |
| *mag-akyat* | T | to climb | *ubuin* | I | to suffer from a cough |
| *magsuot* | T | to wear | *uhawin* | I | to become thirsty; to suffer from thirst |

Nonce words for Experiment 2 (see Table 6) were created using the same method as those for Experiment 1 but with the addition of affixes. The same affixes were applied to the nonce words as to the real words: *ka-*, *-an*, *mag-*, and *–in*.

**Table 6, Experiment 2 stimuli – Nonce words**

| kakunta | hamakan | mag-aya | datayin |
|---------|---------|---------|---------|
| kapaas | balagan | magbilaw | baybawin |
| kasinta | laganan | magkinko | kalahin |
| kaabi | sabotan | magdira | hangahin |
| kagaba | looman | maghaban | labadin |
| kasupog | sudaban | maglenga | ngalabin |
| kapunga | parparan | magmanman | palomin |
| kahabay | kinanan | magsolot | silobin |
| kaipat | mawahan | magtagi | talokin |
| kadumo | layapan | magdada | bulapin |
| kakanga | ngapahan | maggano | kupuhan |
| kalimpo | magihan | magkaan | lapawin |
| kasayal | payalan | maglagan | harakin |
| karamis | ampayan | magmalta | kalipin |
| kalibo | sasatan | magpakay | pingihin |
| kasusit | gadatan | magsipel | abunin |
| kapuo | takihan | magtipa | sopatin |
| kalalis | katakana | magtrigo | makarin |
| kagapaw | rapanan | mag-anggin | tulunin |
| kanuko | histahan | magdumo | upanin |
| kakunta | hamakan | mag-aya | datayin |

Procedure

      The procedure for Experiment 2 was the same as for Experiment 1. But because the

words for the second experiment consisted of longer strings of letters, and since processing

inflected forms presumably takes longer than uninflected forms, time for the second experiment

was increased. Participants were allowed a total of 2250 milliseconds to respond to each of the

stimuli, which is one and a half times longer than for the first experiment. Stimuli appeared on

the screen for 748 milliseconds, followed by a blank screen for 1502 milliseconds; this division

was a bit odd, but it was closest to a 760/1490 split (which would have been one and half times

510/1500ms) that DMDX would run on the laptop used.  The programming specifies the total

duration of each item (2250) in milliseconds, but the length of time the item will appear on the

screen is specified in 'ticks,' which are based on the setup on the specific machine. So for the laptop used, the frame duration was 44 ticks (748ms)—45 ticks was too long, so 748ms was the closet to one and half times the milliseconds of the first experiment.

Each participant completed a 'practice' experiment prior to beginning of each actual experiment. Stimuli for each experiment were presented in random order. Groups of stimuli were divided by 'break times,' during which participants could pause to rest briefly from the experiment. 'Break times' could last as long as the participant chose. Participants were instructed on the screen to 'Press CONTINUE' to continue to the next set of stimuli when they were ready. Each participant completed the experiments in a different order to reduce the effects of priming from one experiment to another.

Data Analysis

A series of paired t-tests was used to compare results within each experiment. Incorrect responses were excluded from analysis. Responses from participants whose mean response time was two standard deviations from the group mean response time were also discarded. For Experiment 2, response times were compared between nouns and verbs; actor-focus and location-focus verbs; and intransitive and transitive verbs.

Conclusion

The purpose of the study was to determine whether Tagalog speakers differentiate categorize words as nouns and verbs in the mental lexicon. Following the research of Kauschke and Stenneken (2008), two experiments were conducted using lexical decision tasks. For the experiments, native Tagalog speakers responded to stimuli words on a computer screen. The

words were either real (nouns and verbs) or nonce. Participants were instructed to indicate

whether the word on the screen was real or not by pressing a key on the keyboard. The first

experiment tested whether root words were categorized as nouns and verbs. Stimuli consisted of

40 nouns, 40 verbs, and 80 nonce words. The second experiment tested whether inflected forms

are categorized as nouns and verbs. Stimuli included 80 nouns and 80 verbs with different

inflections, as well as 160 nonce words. Results were analyzed using paired t-tests.

CHAPTER 4

RESULTS

The purpose of this research was to determine whether Tagalog speakers categorize

words as nouns and verbs in the mental lexicon. Native Tagalog speakers participated in two

lexical decision tasks. The first experiment tested responses to root words and included 40 nouns,

40 verbs, and 80 nonce words. The nouns were subcategorized as biological and man-made

nouns. The root verbs were not intentionally divided into two groups, but the results of the

experiment do suggest a division between the root verbs based on morphological possibilities.

The second experiment tested response times to inflected words and included 40 nouns, 40 verbs,

and 80 nonce words. Twenty of the nouns were inflected with the nominal prefix *ka-* and 20 with

the nominal suffix *–an*. Twenty of the verbs were inflected with the verbal prefix *mag-* and 20

with the verbal suffix *–in*. Of the verbs, 10 from each affix group were transitive and the other 10

were intransitive. The words for each experiment were presented in randomized order and

response times were recorded using DMDX software. A series of paired t-tests was used to

compare results within each experiment.

## Experiment 1

The purpose of the first experiment was to determine whether root words are categorized

as nouns and verbs. The noun category was further divided into biological and man-made nouns

to determine whether semantic information affected processing. Although the verbs were not

subdivided into any categories, the results showed a division between verbs by the number

possible inflections.

<u>Real and nonce words</u>

A comparison was first done between the response times to real and nonce words (see

Table 7) to verify that participants did respond more quickly to real words. It was expected that

participants would respond more quickly to real words than to nonce words because it takes less

time to access a word that is stored in the mental lexicon than to determine that a word is not

there. Accuracy for real words was 96.5% and for nonce words was 72%. Individual wrong

responses were excluded from the analysis. The mean response time for real words was 651.9413

ms and for nonce words was 729.2534 ms. A paired t-test comparing the response times for each

participant to real and nonce words showed a significant difference ($p<0.001$) in favor of real

words.

**Table 7, Experiment 1 results - real and nonce words**

| Category | Mean response time (ms) | p-value |
|---|---|---|
| Real words | 729.2534 | $p<0.001$ |
| Nonce words | 651.9413 | |

The comparison between real and nonce words establishes that participants did recognize

the real words as Tagalog words, and that they responded, as would be expected, more slowly to

nonce words than to real words.

<u>Nouns and Verbs</u>

Based on previous research, it was expected that response time would be faster for nouns

than for verbs. An analysis of the responses to the real Tagalog words revealed that accuracy for

nouns was 97% and for verbs was 96%. Incorrect responses were excluded from analysis. Most

of the missed words were nonce words, meaning that either the participants marked the nonce

words as real words or did not respond in time. Just over half of the real words (41) were

incorrectly judged as nonce words by at least one person. Of the 41 words which were

incorrectly labeled as nonce words, 24 of those instances were incorrectly identified by only once. The most frequently missed word was *tuto* 'to learn,' which was mis-identified by 11 of the 31 participants. The next most frequently mis-identified word was *bolpen* 'pen,' which was mis-identified by 5 participants. It was determined that all responses from any participant whose overall mean response time was two standard deviations from the group mean response time would be discarded, as per common methodology for this type of data (Jamieson and Mewhort, 2009). The standard deviation for Experiment 1 was 166.5876. Two standard deviations was 333.1752. Since the mean time for the Experiment 1 was 872.2371, participants whose overall mean times exceeded 1205.412 milliseconds were eliminated. Only one participant had a mean response time of 1432.5872, and those responses were eliminated prior to the statistical analyses. The other 30 participants had mean response times within two standard deviations of the group mean response time. Of the 30 participants whose responses were included in the analysis, the longest response time was 1114.911 milliseconds and the shortest was 556.7162 ms.

The mean response time to nouns (646.89 ms) was only slightly faster than the mean response time to verbs (656.99 ms). While in general nouns were responded to more quickly than were verbs, a paired t-test comparing the reaction times to the 40 nouns and 40 verbs (see Table 8) showed no significant difference (p=0.3913).

**Table 8, Experiment 1 results - nouns and verbs**

| Grammatical Category | Mean response time (ms) | p-value |
|---|---|---|
| Nouns | 646.89 | p=0.3913 |
| Verbs | 656.99 | |

The noun *pusa* 'cat' had the fastest mean response time at 579.1352 ms and received correct responses from all participants, followed closely by the noun *gatas* 'milk' at 579.72 ms and was mis-identified by only one participant. The third highest response time was to the verb

*sabi* 'to say' at 583.4365 ms. The slowest response time at 782.185 ms was to the verb *tuto* 'to learn,' which was also the most frequently missed word. The second most frequently missed word, *bolpen* 'pen,' also had the second slowest mean response time at 775.1308 ms.

Sixteen verbs occurred among the top forty fastest response times for real words and sixteen nouns occurred in the slowest forty (see Table 9). This seems to go against the assumption that nouns would have faster response times, since nearly half of words with the fastest response times were verbs. However, among the fastest verbs were *sunod* 'obedient' and *tulog* 'asleep.' Both of these words were categorized as nouns or adjectives in reference books, not as verbs. However, the native-speaker consultants all identified these words as verbs, so for this study they were categorized as such. Sixteen nouns occurred among the slowest half of the response times. Of those 16 nouns, 14 were man-made nouns and only 2 were biological nouns, *bawang* 'garlic' and *buko* 'a young coconut.'

**Table 9, Experiment 1 results - Fast verbs and slow nouns**

| Root verbs with fast response times | | Mean response time (ms) |
|---|---|---|
| *kain* | food, act of eating | 589.13 |
| *tulog* | to sleep | 593.21 |
| *alis* | to take away, to remove, to depart | 599.12 |
| *ligo* | to bathe | 602.55 |
| *turo* | to teach, to point to, to point at | 608.13 |
| *bigay* | to give | 612.45 |
| *bili* | to buy, to purchase | 613.72 |
| *hintay* | to wait; to wait for | 614.32 |
| *punta* | to go | 620.81 |
| *sunod* | to obey | 625.35 |
| *hiwa* | to cut with a blade or knife | 632.63 |
| *kuha* | to get, to obtain | 633.66 |
| *lipad* | to fly | 646.19 |
| *usap* | to talk with another, to converse | 646.47 |
| *linis* | to clean | 647.52 |
| *sabi* | to say, to tell, to relate | 682.34 |

| Root nouns with slow response times | | Mean response time (ms) |
| --- | --- | --- |
| *bolpen* | pen | 775.13 |
| *sopas* | soup | 744.56 |
| *palda* | skirt | 717.35 |
| *bakod* | fence | 716.79 |
| *pinggan* | dish; plate | 715.44 |
| *sine* | movie | 707.54 |
| *bawang* | garlic | 699.17 |
| *singsing* | ring | 682.88 |
| *gripo* | faucet | 682.34 |
| *sobre* | envelope | 680.47 |
| *dingding* | wall of a room or house | 678.81 |
| *silya* | chair | 676.16 |
| *buko* | a young coconut | 672.35 |
| *puto* | a kind of white cake made from rice flour | 671.16 |
| *tela* | cloth; fabric | 665.45 |
| *kahon* | box; chest | 659.13 |

Biological and Man-made Nouns

Previous studies found that semantic differences, such as biological/man-made, affected response times in categorizing nouns in English (Lloyd-Jones and Humphreys, 1997; Humphreys et al., 1999). The mean response time for biological nouns (618.5349 ms) was much faster than the mean response time for man-made nouns (675.2529 ms). The standard deviation was 46.8711 with an average time of 646.2022 ms. A paired t-test comparing the processing of biological and man-made nouns (see Table 10) did show a significant difference between response times ($p < 0.0001$) in favor of biological nouns. This suggests some semantic influence on processing times.

**Table 10, Experiment 1 results - biological and man-made nouns**

| Subcategory | Mean response time (ms) | p-value |
|---|---|---|
| Biological nouns | 618.5349 | p<0.0001 |
| Man-made nouns | 675.2529 | |

As with the results to the noun-verb comparison, the results for the noun subcategories vary from those of Kauschke and Stenneken (Kauschke and Stenneken, 2008), which showed no significant difference between response times to biological and man-made nouns. For Tagalog there was a statistically significant advantage for nouns identified as biological over man-made nouns.

<p style="text-align:center">Verbs</p>

The verb root stimuli were not subcategorized for the purposes of this study. Tagalog verb roots are neither transitive nor intransitive and uninflected forms do not select a focus type. However, the results of the experiment point toward an unexpected trend in the response times to verbs. Root verbs which can be inflected by a greater number of verbal affixes were responded to more quickly than root verbs which can be inflected by fewer verbal affixes.

As the results of Experiment 1 were being reviewed, it was noted that the root verbs with shorter response times seemed to be roots to which almost any inflectional affix could be applied and that the root verbs with the longest response times seemed to be those to which only one or two inflectional affixes could be applied. The number of possible common inflectional affixes were noted and counted for each root verb. Due to the great number of inflectional affixes in Tagalog for most roots, only high frequency basic affixes which inflected for the indicative mood were counted: *mag-*, *-in*, *i-*, *um-*, and *–an*. In the case of some words, *ika-*, *ipang*, and other affixes were also included because they are considered to be common affixes for that particular

root word (Ramos, 1986). Twenty of the verbs had 3 or more potential inflections and twenty

had fewer than 3 (see Table 11).

**Table 11, Experiment 1 - verb affixes**

| Root verb | | Affixes | Total number of possible affixes | Mean response time (ms) |
|---|---|---|---|---|
| *sara* | to close | *mag-, i-, -an, -um-, ika-* | 5 | 686 |
| *abot* | to reach for | *mag-, i-, -an, -um-, -in* | 5 | 658.32 |
| *hingi* | to ask for | *-um-, -in, -an, i-* | 4 | 654.01 |
| *alis* | to take away, to remove, to depart | *mag-, -in, -an, -um-* | 4 | 599.12 |
| *hiwa* | to cut with a blade or knife | *mag-, -in, -an, -um-* | 4 | 632.63 |
| *hugas* | to wash | *mag-, -an, ipang-, ipag-* | 4 | 675.39 |
| *kuha* | to get, to obtain | *-um-, -in, -an, i-* | 4 | 633.66 |
| *hiram* | to borrow | *-um-, -in, -an, i-* | 4 | 650.41 |
| *sabi* | to say, to tell, to relate | *mag-, -in, -an* | 3 | 682.34 |
| *punta* | to go | *mag-, -an, -um-* | 3 | 620.81 |
| *tapon* | to discard, throw away, spill | *mag-, i-, -um-* | 3 | 670.05 |
| *bigay* | to give | *mag-, i-, -an* | 3 | 612.45 |
| *bili* | to buy, to purchase | *um-, -in, -an* | 3 | 613.72 |
| *dala* | to bring; carry | *mag-, -in, -an* | 3 | 652.13 |
| *dikit* | to stick, to adhere, to get stuck | *mag-, i-, -um-* | 3 | 652.29 |
| *turo* | to teach, to point to, to point at | *mag-, i-, -an* | 3 | 608.13 |
| *hulog* | to fall, to drop | *mag-, i-, ma-* | 3 | 655.22 |
| *kain* | food, act of eating | *-um-, -in, -an* | 3 | 689.13 |
| *linis* | to clean | *mag-, -in, ipang-* | 3 | 647.52 |
| *sunod* | to obey | *-um-, -in, -an* | 3 | 625.35 |
| *gising* | to wake up, to awaken | *-um-, ma-* | 2 | 654.43 |
| *usap* | to talk with another, to converse | *mag, pag- -an* | 2 | 646.47 |
| *nood* | to watch, to view | *m-, -in* | 2 | 708.64 |
| *sakay* | to ride in or board a vehicle | *-um-, an* | 2 | 656.88 |
| *tuto* | to learn, to become skillful | *ma-, -an* | 2 | 782.18 |
| *basag* | to break glass accidentally | *-um-, in-* | 2 | 675.48 |
| *dinig* | to hear | *maka-, ma* | 2 | 690.76 |
| *hintay* | to wait; to wait for | *mag-, -in* | 2 | 614.32 |
| *tanggap* | to receive, to accept, to admit | *-um-, -in* | 2 | 676.61 |
| *tingnan* | to look at | *um-, -in* | 2 | 774.42 |
| *tulog* | to sleep | *ma-, -an* | 2 | 693.21 |
| *takbo* | to run | *-um-, -in* | 2 | 663.85 |
| *talon* | to jump, to leap | *-um-, -an* | 2 | 659.44 |
| *palo* | to spank, to whip | *mag-, -in* | 2 | 705.65 |

| lipad | to fly | -um- | 1 | 646.19 |
|-------|--------|------|---|--------|
| payag | to give permission | -um - | 1 | 661.29 |
| hinga | to breathe | -um- | 1 | 682.34 |
| kinig | to listen | ma- | 1 | 725.39 |
| ligo | to bathe | ma- | 1 | 602.55 |
| luhod | act of kneeling | -um- | 1 | 740.12 |

Mean response times were compared between root verbs with 3 or more possible verbal affixes and root verbs with fewer than 3 possible affixes using a paired t-test. This analysis demonstrated that participants responded more quickly to root verbs with 3 or more possible verbal affixes than to root verbs with fewer possible affixes ($p = .0026$). (See Table 12.) The mean response time for root verbs with 3 or more possible affixes was 635.989 ms. For root verbs with fewer than 3 affixes, mean response time was 677.988 ms.

The same analysis was performed for the root nouns to determine whether the number of possible inflectional affixes also affected root nouns. The number of common possible affixes for each root noun were noted and counted. Many nouns had no common inflected forms. All root words (nouns and verbs) were then compared and analyzed based on the number of possible affixes. Forty-one root words had two or more possible affixes and thirty-nine had fewer than two. In order to have an equal number of words to compare, thirty-nine root words were analyzed from each group. The analysis did not show any statistical significance ($p=0.5977$) for the comparison of possible affixes among both nouns and verbs (see Table 12). The mean response time for words with 2 or more affixes was 646.677ms and the mean response time for words with fewer than 2 affixes was 652.081ms.

**Table 12, Experiment 1 results - number of affixes**

|  | Mean response time for roots with more affixes (ms) | Mean response time for roots with fewer affixes | p-value |
|---|---|---|---|
| Verbs | 635.989 | 677.988 | p=0.0026 |
| All roots | 646.677 | 652.081 | p=0.5977 |

<u>Discussion</u>

The purpose of Experiment 1 was to determine whether Tagalog root words are categorized in the mental lexicon as 'nouns' and 'verbs' through analyzing response times to lexical decision tasks. The results of the experiment did not show a significant difference between processing times for nouns and verbs. While a study conducted with German participants (Kauschke and Stenneken, 2008) showed a strong noun advantage, the present study found no such preference. However, Experiment 1 did show that biological nouns were responded to more quickly than man-made nouns. This also differs from the study of German participants which found no significant difference between the noun subcategories. The difference shown for Tagalog suggests that some amount of semantic information may be affecting processing in the mental lexicon.

The results of Experiment 1 also indicated that when verb roots were subcategorized according to the number of possible inflectional affixes, verb roots where more inflectional forms were possible showed significantly faster response times. When the analysis of possible inflectional affixes was applied to all root words (nouns and verbs) the results showed no significant difference between mean response times, which, again, points to a difference between nouns and verbs.

Experiment 2

Tagalog morphology determines syntactic information, such as verb argument structure (Foley, 1998), which has been shown to affect verb processing (Kauschke and Stenneken, 2008). Thus, the purpose of the second experiment was to determine whether inflected words are categorized as nouns and verbs, and whether the inflectional features of focus type and transitivity affect processing in the mental lexicon. The stimuli included 40 nouns, 40 verbs, and 80 nonce words. Twenty of the nouns were inflected with the nominal prefix *ka-* and 20 with the nominal suffix *–an*. Twenty of the verbs were inflected with the verbal prefix *mag-* and 20 with the verbal suffix *–in*. Of the verbs, 10 from each affix group were transitive and the other 10 were intransitive.

Analysis of the results determined that accuracy was 86% for nouns and 85% for verbs. Incorrect responses were excluded from analysis. As in Experiment 1, responses from participants whose mean response time was two standard deviations from the group mean response time were also excluded. The mean response time was 1031.932 ms. The standard deviation is 197.4099 ms and two standard deviations from the mean response time is 394.8199 ms. Based on these criteria, one of the thirty-one participants was eliminated with a mean response time of 1432.587. This was the same participant whose responses were eliminated from the results of Experiment 1.

Experiment 2 was more complex than Experiment 1 because affixes affect not only the grammatical category, but also focus type and transitivity. Response times were compared between nouns and verbs; differing verbal affixes; and transitive and intransitive verbs and analyzed using a series of paired t-tests.

Real and Nonce Words

As with Experiment 1, response times to the real and nonce words for Experiment 2 were also compared. A t-test showed a significant difference ($p<0.001$) between response times. Response times to real words (791.76 ms) were faster than response times to nonce words (917.72 ms).

**Table 13 Experiment 2 results - real and nonce words**

| Category | Mean response time (ms) | p-value |
|----------|------------------------|---------|
| Real words | 791.76 | $p<0.001$ |
| Nonce words | 917.72 | |

Inflected Nouns and Verbs

The purpose of this comparison was to determine whether inflected nouns and verbs were processed differently. Experiment 1 showed no difference between response times to uninflected nouns and verbs. But Experiment 2 included nominal and verbal inflections which could more clearly identify the grammatical category of the words.

The noun stimuli included 20 forms with the prefix *ka-* and 20 with the suffix *–an* (seeTable 3). The verb stimuli included 20 roots with the prefix *mag-* and 20 with the suffix *–in* (see Table 4). However, the *–an* nouns were coded incorrectly for the experiment making the response times for the *–an* nouns obsolete. So response times were compared separately between the *ka-* nouns and each verbal affix group.

A paired t-test of the response times to the *ka-* nouns and *mag-* verbs (see Table 14) showed no significant difference between response times ($p=0.863$). The mean response time to nouns (767.41 ms) was again slightly faster than the mean response time to verbs (772.28 ms). But the difference between response times to nouns and verbs was actually less than the difference between response times for the root words in Experiment 1.

A second paired t-test of the response times to the *ka*- nouns and *–in* verbs (see Table 15) did show a significant difference (*p*=0.029). The mean response times to nouns (767.41 ms) were faster than the mean response times to verbs (844.87 ms).

**Table 14, Experiment 2 results, ka- nouns and mag- verbs**

| Affix | Mean response time (ms) | p-value |
|---|---|---|
| *Ka*- nouns | 767.41 | *p*=0.863 |
| *Mag*- verbs | 772.28 | |

**Table 15, Experiment 2 results, ka- nouns and -in verbs**

| Affix | Mean response time (ms) | p-value |
|---|---|---|
| *Ka*- nouns | 767.41 | *p*=0.029 |
| *-in* verbs | 844.87 | |

## Focus Types

A third comparison was performed between response times to *mag*- verbs and *–in* verbs. These verb affixes were selected for the experiment in order to compare different verb focus types. *Mag*- is an actor-focus affix and *–in* is an object-focus affix. Both are frequent and common in the language, but because they have a different argument structure, it was assumed that one affix would be processed more quickly than the other, that the difference in morphosyntactic structure would affect processing in a way similar to transitivity.

In the study by Kauschke and Stenneken (2008), inflected verb forms were only analyzed for transitivity. But focus-type is an important feature of Tagalog verb inflections, so it was necessary to compare verbs based on focus-type, as well as transitivity.

The results of a paired t-test comparing the response times of the mag- verbs to –in verbs (or in other words X verbs to Y verbs) showed that there was a possibly significant difference (*p*=0.047) where *mag*- verbs were processed more quickly (772.28 ms) than *–in* verbs (844.87 ms).

**Table 16, Experiment 2 results - focus types**

| Affix | Focus type | Mean response time (ms) | p-value |
|---|---|---|---|
| *Mag-* | Actor | 772.28 | *p*=0.047 |
| *-in* | Object | 844.87 | |

<div align="center">Transitivity</div>

Response times were also compared between transitive and intransitive verbs to determine whether transitivity affects processing times. Verbal affixes in Tagalog typically determine transitivity. However, many affixes subcategorize for both transitive and intransitive verbs. *Mag-* and *–in* verbs are frequently transitive, but there are some intransitive words for both inflections.

Of the 20 *mag-* verbs, 10 were transitive and 10 were intransitive. Likewise, the group of *–in* verbs also included 10 transitive and 10 intransitive stimuli. Response times to both the *mag-* and *–in* transitive verbs were compared with response times to the *mag-* and *–in* intransitive verbs. The resulting paired t-test analysis showed no significant difference between the response times (*p*=0.710). Response times to transitive verbs (797.07 ms) were slightly faster than to intransitive verbs (810.32 ms). But since this difference is not statistically significant, it suggests that transitivity has little effect on processing in the mental lexicon for Tagalog verbs.

Kauschke and Stenneken (2008) found that transitivity did affect processing for inflected German verbs, where intransitive verbs had faster response times than transitive verbs, presumably because intransitive verbs have less syntactic information and can therefore be processed more quickly. But this does not appear to be the case for Tagalog, at least not with regard to these particular affixes.

**Table 17, Experiment 2 results - transitivity**

| Transitivity | Mean response time (ms) | p-value |
|---|---|---|
| Transitive | 797.07 | *p*=0.710 |
| Intransitive | 810.32 | |

## Discussion

The purpose of Experiment 2 was to determine whether inflected words are categorized as nouns and verbs, and whether the inflectional features of focus type and transitivity affect processing in the mental lexicon. For German, Kauschke and Stenneken (2008) found that for inflected forms, nouns were again processed more quickly than verbs. In addition, they found that intransitive verbs were responded to more quickly than transitive verbs. But their findings differ greatly from the results of the present study which showed no significant difference between response times to nouns and verbs. This lack of difference does not rule out the existence of grammatical categories in Tagalog, but does suggest that for Tagalog, grammatical categories are not as relevant in the mental lexicon as in German.

Response times did, however, show a significant difference between verbs inflected with different affixes. The *mag-* verbs were responded to more quickly than the *–in* verbs. While it is unclear why *mag-* was responded to more quickly, the results do suggest that inflectional affixes are more relevant to processing in the mental lexicon than grammatical categories.

The comparison between transitive and intransitive verbs showed no significant difference.  As with grammatical categories, it seems that transitivity is a less relevant feature in the Tagalog mental lexicon than for German.

## Conclusion

To determine whether Tagalog speakers categorize words as nouns and verbs in the mental lexicon, native Tagalog speakers participated in two lexical decision tasks. Response

times were analyzed using a series of paired t-tests. The first experiment tested responses to root words. Results of Experiment 1 showed no significant difference between response times to nouns and to verbs. However, there were differences between subcategories in each group. Participants responded more quickly to biological nouns than to man-made nouns, suggesting that some semantic information does affect processing. Participants also responded to root verbs with more potential affixes than to root verbs with few potential affixes. The reason for this difference is unclear, but it suggests that some amount of morphological or syntactic information affects the processing of root verbs in the mental lexicon. Overall the results of Experiment 1 indicate that semantic and morphosyntactic information affect root word processing in the mental lexicon, but that grammatical categories, such as noun and verb, may be of less importance.

Experiment 2 tested responses to inflected forms. Again response times showed no significant difference between response times to nouns and verbs. But response times did show a slight preference for *mag-* verbs over *–in* verbs. This could be due to a number of different factors, including the difference in focus-type, a difference in frequency of usage, or simply a preference for prefixes over suffixes. Response times to transitive and intransitive verbs showed no significant difference.

Results from the two experiments showed no difference in response times to different grammatical categories. But different affixes did seem to affect processing. In Experiment 1, root verbs with a greater number of potential inflectional affixes were responded to more quickly and in Experiment 2, verbs prefixed with *mag-* were responded to more quickly. This indicates inflectional affixes as a significant factor in the mental lexicon.

CHAPTER 5

CONCLUSION

The purpose of this study was to determine whether Tagalog speakers categorize words as nouns and verbs in the mental lexicon. Previous research on multiple languages has shown that speakers respond differently to words of different grammatical categories (Kostic and Katz, 1987; Sereno and Jongman, 1987). Following the research of Kauschke and Stenneken (2008), this study used lexical decision tasks to investigate the effects of grammatical category on Tagalog speakers' processing of both root words and inflected forms.

Discussion of Experiment 1

Nouns versus Verbs

Experiment 1 tested response times to uninflected root words. Of the 160 real words, half were identified as nouns and half as verbs. Results showed no significant difference in response times to root words of the different categories. This lack of differentiation between response times for nouns and verbs suggests that the grammatical categories of noun and verb may not be relevant to processing of root words in the Tagalog mental lexicon. For Kauschke and Stenneken (2008), the noun advantage was clearly established for German; and for Sereno and Jongman (1997), it was established for English. But for Tagalog, the response times between nouns and verbs were very similar, showing that there is no statistical significance between the response times to nouns and verbs.

The results of this analysis could point toward one of several possibilities: precategoriality (Foley, 1998), nominalization (Kauffman, 2011), or simply a lack of categorical effect on processing—either root words have no category, all root words are the same category, or grammatical category is simply not relevant to processing. It is also possible that the native

speakers who determined the root words' grammatical categories miscategorized some of the words. However, all five native-speaker consultants agreed on the categorization of all stimuli used in Experiment 1.

Findings for previous languages have shown differences between nouns and verbs and have also each shown other variation in what morphosyntactic and semantic information affects categorization. For instance Deutsch, Frost, and Forster (1998) found that for Hebrew, verb conjugation pattern affected processing, and Laudanna, Gazanelli, and Martinoa (2003) found that for Italian, syntactic information affected verb processing, but not noun processing. While Lloyd-Jones and Humphreys (1997) found a difference between processing biological and man-made nouns for English, Kauschke and Stenneken (2008) did not find the same effect for German. So although there do seem to be some strong tendencies across many languages to categorize nouns and verbs in the mental lexicon, this may not be a language universal.

However, the effects of the man-made/biological semantic categories on nouns and number of affixes on verbs (discussed below) do support some level of differentiation between nouns and verbs. These effects were only seen in the respective categories, which implies that the categories exist to some extent. In their study on Italian, Laudanna, Gazanelli, and Martinoa (2003) found that while mood and conjugation affected the processing of verbs, gender and number did not affect the processing of nouns. This does not mean Italian nouns do not have gender and number, but it suggests that gender and number are not salient organizational features in the Italian mental lexicon the way that mood and conjugation are for Italian verbs. Likewise, it is possible that grammatical categories do exist in the Tagalog mental lexicon, but they are simply not salient organizational features, while other factors such as number of affixes do impact lexical processing.

Biological versus Man-made Nouns

For Tagalog there was a statistically significant advantage for nouns identified as biological nouns over man-made. Previous research from Lloyd-Jones and Humphreys (1997) showed that in English, man-made nouns such as clothing and furniture were responded to more quickly than biological nouns such as fruits and vegetables. This semantic distinction was not manifested for German (Kauschke and Stenneken, 2008). For Tagalog the results were the opposite of those for English, with biological nouns being processed faster.

This does not necessarily mean that those divisions are the source of the difference. Other factors could have affected the difference in processing times. For instance, most of the man-made words are Spanish borrowings, while most of the biological words are Tagalog. But Spanish borrowings have been incorporated into the Tagalog language for several centuries, and the spelling and pronunciation have been altered to reflect standard Tagalog spellings and pronunciations. The Tagalog word *kotse* 'car,' for instance, comes from the Spanish *coche* 'car.' It is unlikely that the etymology of the words directly affected processing time—rather it is correlational because many words for man-made objects were introduced into the Philippines by the Spanish—words for different technological advances like a 'clock' *relo* or 'faucet' *gripo* were naturally borrowed from Spanish.

Another potential factor is age of acquisition, which has been shown to affect processing (Gerhard and Barry, 1999). It is possible that words for biological nouns were acquired earlier than the words for man-made nouns. Kauschke and Stenneken (2008) were able to account for age of acquisition by using a controlled subset for age of acquisition and found that that factor had no significant affect on response times. However, since no age of acquisition data was

available for Tagalog, this factor could not be controlled or accounted for. However, most words do seem common in the language and typical for early acquisition.

As for encountering the biological and man-made objects in everyday life, the participants who participated in the study were living in or near the large metropolitan area of Manila at the time of the study, attending college and working in office jobs. They were as much surrounded by 'cars' and 'pens' as they were by 'snakes' and 'cockroaches.'

So while there is no definitive explanation for the difference in response times, it is possible that some sort of semantic information caused the faster response times to biological nouns as it did for English (Lloyd-Jones and Humphreys, 1997). The idea of biological and man-made categorization supports the overall concept of grammatical categorization because it can only really be applied to nouns. It would not seem worthwhile to attempt to categorize words like *hingi* 'ask' or *hulog* 'fall' by those same semantic categories. So if a semantic categorization is relevant for one group of words (nouns) and not for another (verbs), that further suggests a division between types of words.

<u>Verbal affixation</u>

Another clear difference was in the comparison between verbs with different numbers of potential affixes. This is similar to results in Hebrew (Frost, Forster, and Deutsch, 1997) where verbs were inflectionally connected in the mental lexicon, but nouns were not. Syntactic information also played a role in Italian verb processing (Laudanna, Gazanelli, and Martinoa, 2003). Kostic and Katz (1987) found that processing in Serbo-Croatian was also influenced by the number of possible inflections. The salient inflectional information differed for each language, but the overall effect was the same: inflectional information had a greater effect on verb processing than on noun processing. So it is possible that some amount of morphosyntactic

information is playing a role in Tagalog root verb processing, and that root verbs with more morphosyntactic possibilities or with more morphosyntactic information are processed more quickly. This suggestion opposes the findings for German (Kauschke and Stenneken, 2008) where intransitive verbs, which are morphosyntactically more simple, were responded to more quickly than transitive verbs, which are more morphosyntactically complex.

However, when the analysis of possible inflectional affixes was applied to all root words (nouns and verbs) the results showed no significant difference between mean response times. This further supports the findings of Frost, Forster, and Deutsch (1997); Laudanna, Gazanelli, and Martinoa (2003), and Kostic and Katz (1987) that noun processing is less affected by inflectional and morphosyntactic information.

The overall lack of categorial differentiation would seem to support the notions of Kaufman (2011), that all roots are nouns, or Foley (1998) that roots are precategorial. But together, the results of Experiment 1 suggest that different *subcategorizations* are applicable specifically to nouns and specifically to verbs. While nouns are semantically subcategorized as biological and man-made, verbs are morphosyntactically subcategorized by the number of possible affixes. So although there was no significant difference between response times to nouns and verbs as a whole, there does seem to be some division of the grammatical categories. If all root words were nouns, then why would inflectional affixes be a salient feature of some roots, but not of others? This could be simply a differentiation between different types of nouns, but why differentiate between nouns this way and not include the category of 'verb,' especially when verb processing has been more affected by inflectional information cross-linguistically?

Precategoriality (Foley, 1998) seems slightly more plausible because it does not favor one category over the other. It might allow that object-type words are semantically categorized

while action-type words are morphosyntactically categorized. But then there is a division: object-type words and action-type words, words which are semantically categorized and words which are syntactically categorized (Bates et al., 1991). So again, the subcategorization seems to align with traditional notions of noun and verb.

Even though grammatical category did not directly affect response times, aspects within the respective categories do seem to have affected response times suggesting that root words are categorized grammatically at least to some degree.

## Discussion of Experiment 2

Experiment 2 tested response times to inflected nouns and verbs. Inflections included two nominal and two verbal affixes. For each verbal affix, half of the words were transitive and half were intransitive.

### Inflected Nouns and Verbs

It was expected that since inflected forms include more morphosyntactic information, such as argument structure, there would be greater differentiation than for root forms. However, response times to *ka-* nouns and *mag-* verbs showed no significant processing difference. As with the results of Experiment 1, this may be due to any number of factors, including incorrect coding or frequency differences. Since the native-speaker consultants had more difficulty categorizing the inflected forms than the roots, miscategorization may have occurred. However, this difficulty may further suggest a lack of category salience in the Tagalog mental lexicon, particularly with regard to inflected forms. In the initial word lists, consultants disagreed as to the categories of many potential stimuli including *mag-sine* 'to go to the movies' and *hiram-in* 'to borrow,' both of which are affixed with verbal affixes and seem clearly event-like. In

addition, the root *hiram* 'borrow' was unanimously categorized as a verb, but the inflected—which has focus and argument structure like a verb—was not. These words were not included in the final stimuli, but the disagreement over categorization for these words, which seem clearly verbal from a theoretical standpoint, emphasizes the lack of differentiation between nouns and verbs in inflected Tagalog forms.

This lack of category differentiation for inflected form conflicts with evidence from multiple other languages, including Hebrew (Deutsch, Frost, and Forster, 1998), Italian (Laudanna, Gazanelli, and Martinoa, 2003), and German (Kauschke and Stenneken, 2008). So it may be that some other factor within the stimuli set, such as frequency, or age of acquisition, which were not accounted for, negated the effect of grammatical category. However, these factors were accounted for as much as possible within the study. While some overall results from previous studies did converge, many of the results were language-specific. For instance the Hebrew research focused on verbal patterns, which are not a part of any of the other languages mentioned above. The Tagalog inflectional system is different from Hebrew, German, and Italian, so it follows that there will be some language-specific results.

Despite clear distinctions from previous Tagalog research between inflected nouns and verbs (Blake, 1916, 1950; Schachter and Otanes, 1972; Kroeger, 2008), these results suggest that grammatical categories are no more a salient feature of inflected forms than of root forms. Kaufman (2011) does assert a lack of categorical division between inflected nouns and verbs. But the results of the comparison between focus types (below) would seem to subvert Kaufman's claim that all inflections are nominalizations; focus types, which determine verbal argument structure are differentiated. This may be a case where, as with root words, grammatical category

is not a salient organizational feature for inflected forms in the mental lexicon. But that does not

rule out the possibility that inflected forms are grammatically categorized.

<div align="center">Verb Transitivity and Focus Types</div>

Response times were also compared between verb focus types, as well as between

transitive and intransitive verbs. Results showed a slight difference in favor of *mag-* verbs (actor

focus) over *–in* verbs (object focus). However, the difference only reached ($p=0.047$), so it is still

somewhat inconclusive. Additionally, since there was only one affix of each focus type, the

difference could be due to factors other than focus, including frequency of the affix or position of

the affix  (*mag-* is a prefix and *–in* is a suffix). But focus type seems to be a salient

morphosyntactic feature of Tagalog verbs, especially given the results of Experiment 1 where

verb roots were differentiated based on the number of potential affixes. This participant would

benefit from further research on multiple affixes of each focus type.

The comparison of transitive and intransitive verbs showed no significant difference.

However, even in inflected forms it is difficult to determine transitivity of a verb. Many verbs

which could take two—or even three—arguments frequently appear with fewer arguments. So as

with the comparison between inflected nouns and verbs, the lack of difference between transitive

and intransitive may be due to incorrect coding or to other factors, such as frequency. But it is

also possible that transitivity is not a salient feature of Tagalog verbs the way the focus type

(potentially) is because transitivity is less distinctly coded and is determined by multiple factors.

So while *mag-* verbs are distinctly actor-focus, they are not distinctly transitive or intransitive.

Overall, the results of Experiment 2 were similar to the results of Experiment 1 in that

they showed no significant differences between nouns and verbs, but did show an effect for

inflectional affixes of verbs. While inflected verbs were not differentiated by transitivity (like

German), they were differentiated by focus type, which is a morphosyntactically salient feature of Tagalog verbs. This again points to a language-specific organizational feature in the mental lexicon, not unlike the Hebrew inflectional types (Frost, Forster, and Deutsch, 1997).

## Implications

While many of the results of this study showed no category effects or were inconclusive, the results from both experiments showed statistically significant data related to inflectional affixes. For the root words, the potential number of affixes affected verb processing. For the inflected verbs, the actor-focus *mag-* verbs were processed slightly faster than the object-focus *–in* verbs. While the difference for the inflected forms was slight, the combined results from Experiment 1 and Experiment 2 suggest that verbal affixation does affect storage and processing in the Tagalog mental lexicon. Additionally, although neither experiment showed an effect for grammatical categories, the effect of verbal affixes suggests that there is a categorial difference in keeping with the findings from other languages.

While the lack of differentiation between nouns and verbs opposes previous research, the effect of inflectional affixes supports the findings of Frost, Forster, and Deutsch (1997); Laudanna, Gazanelli, and Martinoa (2003); and Kostic and Katz (1987) that inflectional affixes are an organizational feature of verbs in the mental lexicon. The categorization of those affixes is language-specific. But it would seem that even uninflected forms are connected to, and affected by, potential inflections and inflectional types.

In contrast, inflectional affixes did not seem to affect noun processing. The semantic categories of biological and man-made nouns did affect processing for the root words. This suggests that for nouns, semantic information may be more salient than morphological information.

The effect of inflectional affixes on some verbs and the effect of semantic categories on nouns implies a division between the grammatical categories. As stated previously, prototypcial verbs assign case and carry argument structure, while prototypical nouns tend to be concrete and imaginable (Bates et al., 1991). Based on the results of Experiment 1, this description does seem to apply to Tagalog root words and provide a basis for distinguishing between nouns and verbs in the mental lexicon.

## Limitations

Several limitations were encountered in the process of designing and conducting this research. One of the first difficulties was in selecting stimuli. Since there has not been much corpus research on Tagalog, the lack of a frequency dictionary at the time of the study made it difficult to determine the best stimuli to use in the study. Another problem came with finding native-speaker consultants to assist in categorizing words. Several consultants agreed to participate but were then unable to complete the categorization. A limitation that played an even larger role in the selection of stimuli was then the disagreement among the consultants as to how to categorize many of the potential stimuli, particularly the inflected forms. Other limitations included difficulties in finding native speakers who met the initial criteria and were willing to participate. While most participants were able to complete the experiments in a quiet room, a few participants completed the experiments in noisier locations, which may have been distracting.

## Future Research

The results of this study suggest several avenues for future research, particularly with regard to inflections. A comparison of response times to sets of the same root words inflected with different affixes could show the effect of individual affixes or preferences for certain affixes. Common monosyllabic affixes such as *mag-*, *-in, -um-*, *-an*, and *ma* could be considered.

Other studies might compare verbal roots with verbal affixes and verbal roots with nominal affixes, as well as nominal roots with verbal affixes and nominal roots with nominal affixes to further compare the effects of inflection on individual roots and to verify the irrelevance of grammatical category on word processing.

BIBLIOGRAPHY

Adelaar, K. A., & Himmelmann, N. (2005). *The Austronesian languages of Asia and Madagascar*. London; New York: Routledge.

Aldridge, E. (2009). Minimalist Questions for the Nominalist Analysis of Tagalog Syntax. *Theoretical Linguistics, 35,* 1, 51-62.

Aspillera, P. S. (1993). *Basic Tagalog for foreigners and non-Tagalogs*. Rutland, Vt: Charles E. Tuttle.

Baker, M. C. (2009). On some ways to test Tagalog nominalism from a crosslinguistic perspective. *Theoretical Linguistics, 35,* 1, 63-71.

Bates, E., Chen, S., Tzeng, O., Li, P., and Opie, M. (1991). The noun-verb problem in Chinese aphasia. *Brain and Language, 41,* 2, 203-33.

Beauvillain, C. (1996). The integration of morphological and whole-word form information during eye fixations on prefixed and suffixed words. *Journal of Memory and Language, 35***,** 801–820.

Blake, F. R. (1916). The Tagalog Verb. *Journal of the American Oriental Society, 36,* 396-414.

Blake, F. R. (1950). Tagalog Noun Formation. *Journal of the American Oriental Society, 70,* 4, 271-291.

Blake, M. (2011). Bansa.org. 2010.

Bloomfield, L. (1917). *Tagalog texts with grammatical analysis*. Urbana, Ill.

Capell, A. (1964). Verbal systems in Philippine languages. *Philippine Journal of Science, 93*, 231-249.

Caramazza, A., & Hillis, A.E. (1991). Lexical organization of nouns and verbs in the brain. *Nature, 349*, 788-790.

Clahsen, H. (1999). The dual nature of the language faculty. *Behavioral and Brain Sciences, 22* (6):1046-1055.

Clarito, L. L. B. (2000). *The Tagalog prefix ma- as peircian firstness of secondness.*

Dąbrowska, Ewa. (2004). *Language, Mind and Brain: Some Psychological and Neurological Constraints on Theories of Grammar*. Edinburgh University Press, Edinburgh and Georgetown University Press, Georgetown.

Daniele, A., Giustolisi, L., Silveri, M. C., Colosimo, C., & Gainotti, G. (January 01, 1994). Evidence for a possible neuroanatomical basis for lexical processing of nouns and verbs.*Neuropsychologia, 32,* 11, 1325-41.

De Guzman, V. P. (1978). *Syntactic derivation of Tagalog verbs*. Honolulu: University Press of Hawaii.

Deutsch, A., Frost, R., & Forster, K. I. (1998). Verbs and nouns are organized and accessed differently in the mental lexicon: evidence from Hebrew. Journal of Experimental Psychology. *Learning, Memory, and Cognition, 24*, 5, 1238-55.

Dóczi, B. (2006). Mapping the mental lexicon of pre-intermediate learners: Word associations in a depth of word knowledge elicitation task. In M. Nicolov & J. Horváth (Eds.), *University of Pécs Roundtable 2006: Empirical Studies in English Applied Linguistics*

Dryer, M. S. (2011). Language page for Tagalog. *The World Atlas of Language Structures Online*. from http://wals.info/languoid/lect/wals_code_tag.

English, L. J. (1986). *Tagalog-English dictionary*. Manila, Philippines : National Book Store.

Evrard, M. (2002). Ageing and Lexical Access to Common and Proper Names in Picture Naming. *Brain and Language, 81,* 174-179.

Fellbaum, C. (1999). *WordNet: An electronic lexical database*. Cambridge, Mass: MIT Press.

Foley, W. A. (1998). *Symmetrical voice systems and precategoriality in Philippine Languages*. Paper presented at the 3rd LFG conference, Brisbane, Australia.

Forbach, G. B., Stanners, R. F., and Hochhaus, L. (1974). Repetition and practice effects in a lexical decision task. *Memory and Cognition, 2,* 2, 337-339.

French, K. M. (1988). *Insights into Tagalog : reduplication, infixation, and stress from nonlinear phonology*.Dallas, TX : Summer Institute of Linguistics ; Arlington : The University of Texas at Arlington.

Gerhand, S., and Barry, C. (1999). Age of acquisition, word frequency, and the role of phonology in the lexical decision task. *Memory and Cognition, 27,* 4, 592-602.

Gil, D. (1993). Syntactic categories in Tagalog. *Pan-Asiatic Linguistics: Proceedings of the Third International Symposium on Language and Linguistics, 3,* 1136-1150.

Gil, D. (2009). Austronesian nominalism and the thinginess illusion. *Theoretical Linguistics, 35*(1), 95-114.

Google Translate. (2010).

Himmelmann, N. (2005). Tagalog. In K. A. Adelaar and N. Himmelmann (Eds.), *The Austronesian languages of Asia and Madagascar*. London ; New York: Routledge.

Himmelmann, N. P. (2009). Notes on Tagalog nominalism. *Theoretical Linguistics, 35*(1), 115-123.

Hsu, C. F., Tzeng, O. J. L., Hung, D. L. and Tai, J. H. Y. (1998). Syntactic effects at sublexical level of word recognition in Chinese. Paper presented at the First International Workshop on Written Language Processing, New South Wales University, Sydney, Australia.

Huang, C.-R., Ahrens, K., & Chen, K-j. (1993). A Data-driven Approach to the Psychological Reality of the Mental Lexicon: Two Studies on Chinese Corpus Linguistics.

Jamieson, R., and Mewhort, D. J. K. (2009). Applying an exemplar model to the serial reaction-time task: Anticipating from experience. *The Quarterly Journal of Experimental Psychology, 62,* 9, 1757-1783.

Jarema, G., Libben, G., Kehayia, E., Libben, G., and Jarema, G. (2002). Mental Lexicon Research in the New Millennium. *Brain and Language, 81*, 1-2.

Kaufman, D. (2009). Austronesian nominalism and its consequences: A Tagalog case study. *Theoretical Linguistics, 35*(1), 1-49.

Kauschke, C., & Stenneken, P. (2008). Differences in Noun and Verb Processing in Lexical Decision Cannot be Attributed to Word Form and Morphological Complexity Alone. *Journal of Psycholinguistic Research, 37,* 6, 443-452.

Kempen, G. & Huijbers, P. (1983)., The lexicalization process in sentence production and naming: indirect election of words, Cognition, Volume 14, Issue 2, September 1983, Pages 185-209.

Kess, J. F. (1967). *Syntactic features of Tagalog verbs*.

Koch, K., & Matthewson, L. (2009). The lexical category debate in Salish and its relevance for Tagalog. *Theoretical Linguistics, 35,* 1, 125-137.

Koenig, J. P., Mauner, G., & Bienvenue, B. (2002). Class specificity and the lexical encoding of participant information. *Brain and Language, 81*.

Kostić, A., & Katz, L. (1987). Processing differences between nouns, adjectives, and verbs. *Psychological Research, 49,* 4, 229-36.

Kroeger, P. (1993). *Phrase structure and grammatical relations in Tagalog*. Stanford, CA: Center for the Study of Language and Information.

Kroeger, P. (1998). 1998. Nouns and verbs in Tagalog: a reply to Foley. Presented at the 3rd Lexical-Functional Grammar Conference, Brisbane, Australia.

Kyae-Sung Park, U. L. (2007). *The unaccusative-unergative distinction in resultatives: evidence from Korean L2 learners of English*. Paper presented at the 2nd Conference on Generative Approaches to Language Acquisition North America, Somerville, MA.

Laudanna, A., and Voghera, M. (2002). Nouns and verbs as grammatical classes in the lexicon. *Italian Journal of Linguistics, 14,* 1, 9-26.

Lewis, M. P. (2009). Ethonologue: Languages of the World. from SIL International Online http://www.ethnologue.com/

Llamzon, T. A. (1976). *Modern Tagalog : a functional-structural description*. The Hague : Mouton.

Lloyd-Jones, T., and Humphreys, G. W. (1997). Perceptual differentiation as so source of category effects in object processing: Evidence from naming and object decision. *Memory and Cognition, 25* (1), 18–35.

Lopez, C. (1941). *A manual of the Philippine national language*. Manila: Bureau of Print.

Lowe, W. (1997). Meaning and the mental lexicon. In M. E. Pollack (Ed.), *Proceedings of the Fifteenth international joint conference on Artifical intelligence* (Vol. 2, pp. 1092-1097). San Francisco: Morgan Kaufmann Publishers, Inc.

Naylor, P. (1995). Subject, topic, and Tagalog syntax. In D. C. Bennett (Ed.), *Subject, voice and ergativity : selected essays*. London: School of Oriental and African Studies.

Niswander-Klement, E. and Pollatsek, A. (2006). The effects of root frequency, word frequency, and length on the processing of prefixed English words during reading. *Memory and Cognition, 34*, 685-702.

Palmer, G. (2003). The Tagalog prefix category PAG. In E. H. Casad (Ed.), *Cognitive Linguistics and Non-Indo-European Languages* (pp. 193-221). New York: Mouton de Gruyter.

Pechmann, T. &Zerbst, D. (2002). The activation of word class information during speech production. Journal of Experimental Psychology. *Learning, Memory, and Cognition, 28*, 1, 233-43.

Plemmenou, E., Bard, E. G., and Branigan, H. P. (2002). Grammatical Gender in the Production of Single Words: Some Evidence from Greek. *Brain and Language, 81*, 236-241.

Ramos, T. V. (1971). *Tagalog structures*. Honolulu: University of Hawaii Press.

Ramos, T. V. (1985). *Conversational Tagalog : a functional-situational approach*. Honolulu: University of Hawaii Press.

Ramos, T. V. (1986). *Handbook of Tagalog verbs : inflections, modes, and aspects*. Honolulu : University of Hawaii Press.

Reid, L. A. (2002). Determiners, Nouns, or What? Problems in the Analysis of Some Commonly Occurring Forms in Philippine Languages. *Oceanic Linguistics, 41*(2), 295-309.

Schachter, P., and Otanes, F. T. (1972). *Tagalog reference grammar*. Berkeley: University of California Press.

Sasse, H-J (2001), "Scales between naurines and verbiness", in Haspelmath et al., eds. (2001), *Language Typology and Language Universals*. New York: De Gruyter.

Sasse, H.-J. (2009). Nominalism in Austronesian: A historical typological perspective. Comments on Daniel Kaufman's Austronesian Nominalism and its consequences. *Theoretical Linguistics Theoretical Linguistics, 35* (1), 167-181.

Sereno, J. A., & Jongman, A. (1997). Processing of English inflectional morphology. *Memory & Cognition, 25,* 4, 425-437.

Siri, S., Tettamanti, M., Cappa, S. F., Rosa, P. D., Saccuman, C., Scifo, P., & Vigliocco, G. (2008). The Neural Substrate of Naming Events: Effects of Processing Demands but not of Grammatical Class. *Cerebral Cortex, 18,* 1, 171-177.

Snedeker, J, Brent M, Gleitman L. 2001. The changing character of the mental lexicon: An information-based account of early word learning.

Tagalog-dictionary.com. (2004).

Vigliocco, G., Vinson, D. P., & Siri, S. (2005). Semantic similarity and grammatical class in naming actions. *Cognition, 94,* 3, 91-100.

. World Population Prospects, the 2010 Revision. (2011). 2011, from http://esa.un.org/unpd/wpp/Sorting-Tables/tab-sorting_population.htm

Yaden, B. (2007). The Processing and Representation of Verbal Inflection: Data from L1 and L2 Spanish. *Hispania, 90,* 4, 795.

Yang, J., Tan, L. H., & Li, P. (2011). Lexical representation of nouns and verbs in the late bilingual brain. *Journal of Neurolinguistics, 24,* 6, 674-682.

# APPENDIX A

INFORMED CONSENT

Tagalog Research Project

**Introduction**

This research is being conducted by Linda Walton of Brigham Young University, Provo, Utah, USA, to understand noun and verb processing in Tagalog. You are invited to participate as a research subject because you are a native Tagalog speaker.

**Procedures**

You will be asked to respond to words on the computer screen by pressing labeled keys on the keyboard. Your responses and response times to the words will be recorded. You may also be asked to wear noise-canceling headphones during the procedures to reduce distractions. You will be asked to complete 2 different language activities. Altogether the activities will take about 1 hour of your time.

**Risks**

There are minimal risks or discomforts associated with participating in this research project and include some discomfort and/or nervousness that occur when being a research subject. If you feel uncomfortable during the testing session, you can take breaks periodically between sets of words, during which time you can remove the headphones. You can also discontinue your participation at any time.

**Compensation and Benefits**

For participating in this study, you will receive a $350PHP after completing both language activities. If, for any reason, you do not complete both activities, you will not be compensated.

The results of this project will provide researchers with a better understanding of how native Tagalog speakers process language.

**Confidentiality**

Participation in this research project is voluntary and you are free to withdraw from participating in this project at any time. Your performance in this research project will be kept completely confidential, and your name will never be mentioned or used in any publications or presentations of the results of this project.

**Questions about the Research Study**

If you have any questions or concerns, you may contact the faculty sponsor of this research, Dr. Wendy Baker (801-422-4714, wendy_baker@byu.edu).

page 1 of 2 _____initials

**Questions about Your Rights as a Research Participant**

If you have questions regarding your rights as a research participant, you may contact BYU IRB Administrator at (801) 422-1461, A-285 ASB, Brigham Young University, Provo, UT 84602, irb@byu.edu.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

I have read and understand the above, and I voluntarily agree to participate in this research project. I understand that I may keep a copy of this form.

_____   _____

Signature of Participant          Date

page 2 of 2 _____initials