Japanese Verb-Form Transformation by Early Second-Language Learners

by

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ABSTRACT

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This thesis explores ways in which 12 learners of Japanese as a foreign language transform morphologically complex verbs taught as whole words. Written data, collected via a grammar test, and oral data, collected via think-aloud protocols, were used to explore verb-form transformation to the gerund (*-te*) form. These data were analysed to determine processes participants utilised during derivations. Resulting data indicate participants (1) are largely unaware of morphology, (2) cannot identify consonant-final verb-roots, (3) focus on verb-final characters during categorisation, (4) derive the gerund using prior knowledge – generally grammar rules, (5) link to vocabulary, morphological, phonological, and grammar knowledge during derivations, and (6) differ in performance as measured by the grammar test through utilising types of knowledge differently and in combinations. This implies current pedagogy may not heed learning preferences of learners. This thesis identifies types of knowledge involved during verb transformation tasks and suggests research into task-appropriate lessons.

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DEDICATION

To my grandparents.

Mary Weir

and the memory of

Ronald Weir

Dorothy Jean Steffanick

Michael Steffanick

CHAPTER ONE: INTRODUCTION

1.1 Purpose of the Study

Second language (L2) learners of Japanese as a foreign language (JFL), who study in a classroom setting, are presented with morphologically complex verbs as chunks of formulaic language or invariant forms. The text-book *Genki 1: An Integrated Course in Elementary Japanese 1* (Banno, Ohno, Sakane, & Shinagawa, 1999) is the first widely used JFL text-book to mention explicit verbal roots; however, it does so only briefly before returning to the standard practice of listing verbs in vocabulary lists as complex words. It is common practice in modern text-books to categorise these verbs as vowel- (V) or consonant (C)-final stems that have suffixes associated with each verb-form. JFL learners are then taught to transform verbs between forms using a modified version of a traditional tool, a process called *katuyou*, which was developed for use with invariant forms and adheres to the phonotactics of Japanese. This verb-transformation system itself developed based on the qualities of Japanese phonology and phonetic scripts,[1] in which CV sequences are virtually atomic.

There has been extensive research in the literature of Japanese morphology (e.g., Kawaguchi, 2000; Nishiyama, 1998; Volpe, 2005), phonetics and phonology (e.g., Ishihara, 1991; Itô & Mester, 2004; Hirayama, 2009), and syntax (e.g., Hiraiwa, 2005; Iida & Sells, 2008; Kishimoto, 2007) that identifies verbal roots and affixes via the use of

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[1]   Categories are distinguished by the variation of the vowel preceding a verbal ending. For example, the same vowel always precedes the ending of *itidan* 'one-row' verb stems in all their forms whereas one of five possible vowels will precede the ending of *godan* 'five-row' verb stems (Kodansha, 1998).

Romanised Japanese. Contemporary text-books do not contain lessons that take full advantage of identifying morphemes via Romanisation. Current verb-transformation pedagogy only utilises this concept insofar as verb categorisation and relies on a learner's awareness of the V- or C-finality of a given verb stem. It is apparent that authors of contemporary Japanese language text-books, such as Banno et al. (1999), acknowledge the need to distinguish morpheme boundaries but do not do so clearly in grammar lessons and any effort to do so is left to third parties, such as curriculum developers, language departments, or instructors. Furthermore, research in applied linguistics illustrates the importance of focusing on verb-form and accuracy (e.g., Kanda & Beglar, 2004), learner awareness of verb-forms and accuracy (e.g., Leow, 2001), and interactions between verb forms vis-à-vis meaning and comprehension (e.g., Lee, 1998).

This thesis supplies qualitative and quantitative analyses of the processes utilised during the transformation of verbs to the gerund form, and proposes four types of knowledge employed during this process by adult JFL learners whose first language is English. The collector used in this study is a grammar test that measures the accuracy of a learner's process by simulating how he or she processes unknown vocabulary (Lee, 1998). This begins to address whether or not current pedagogy is effective for all JFL learners in terms of language acquisition. Finally, I reveal trends and tendencies in types of knowledge and processes learners use that suggest relationships with scores.

1.2 Outline

In this study of how beginner adult JFL students who are native speakers of English transform verbs, this first chapter outlines the goals of the present research.

Chapter two presents a review of previous research in Japanese phonetics, phonology, morphology, relevant pedagogy, L2 learner strategy use, and relevant experimental studies in applied linguistics. Chapter three poses research questions and describes methodology regarding participants, written and oral data collection, qualitative and quantitative analyses, and the use of descriptive statistics. Chapter four presents the results of the data analyses as well as a discussion of the findings, describing the tendencies of participants during the verb-form transformation process. Chapter four also discusses the limitations of the research and discusses pedagogical implications and its contributions to second language acquisition and the understanding of how participants transform known and unknown Japanese verbs. Chapter five provides the conclusion of this thesis.

CHAPTER TWO: LITERATURE REVIEW

This section presents a review of the literature focusing on five key areas relevant to the theoretical understanding of Japanese verbs, the principles underpinning the ways in which they are taught, and their acquisition by JFL learners: phonetics and phonology, morphology, verb form transformation, language learner strategies, and previous experimental research in applied linguistics.

2.1 Japanese Phonetics and Phonology

The goal of this subsection is to show the link between the sounds and rhythmic nature of the Japanese language and its orthography, as well as its basic phonotactics. Learning sounds and phonetic orthography is generally the first task for JFL learners as they learn to read, write, and speak simple sentences. Banno et al. (1999) note in the introduction of *Genki 1* that Japanese is a pitch accent language where "syllables are pronounced either in high or low pitch" (p. 22). Nonetheless, vocabulary lists and lessons within the text do not indicate or address pitch accent. Evaluating pronunciation is beyond the scope of the present research, and so this subsection is limited to a discussion regarding orthography and the role it plays in how JFL learners are taught, rather than a discussion of segmental quality or pitch accent.

The phonetic inventory of standardised Tokyo Japanese comprises roughly five vowels and sixteen consonants (Hirayama, 2009). This inventory is attested in the *fifty*

sounds of Japanese[2] wherein sounds are each represented by a grapheme from the phonetic orthographies of *hiragana* and *katakana*. Certain characters composing the phonetic orthographies may represent phonetic changes via diacritics, which are ancillary marks appended to the character (e.g., the *hiragana* character representing /fu/ ふ can become /bu/ ぶ and /pu/ ぷ by adding the diacritic ゛ or ゜ respectively). Modern *hiragana* contains forty-six distinct graphemes and two diacritics (Hatasa, 2002). Of the fifty sounds, one is a singleton C {/n/}, five are singleton Vs {/a/, /i/, /u/, /e/, and /o/}, and the rest are CV sequences (e.g., /ka/, /sa/, /ta/, etc.). Thus, a minority of graphemes represent one phoneme each and the vast majority of graphemes represent two phonemes each. Japanese linguists traditionally worked with a timing unit termed *onsetu*, which led McCawley (1968) to define the Japanese phonetic orthography as a morary rather than a syllabary.[3] Within this framework, Japanese words comprise a number of *onsetu* that can be counted as follows (adapted from McCawley, 1968, p. 2):

(1) *bunpou*   'grammar'   4 *onsetu*: {bu_1-n_2-po_3-u_4}

It is clear that the idea of *onsetu* arose from the notion that a timing unit that can comprise either a single phone or a sequence of two phones and *hiragana* is simply a

---

[2]   Fifty sounds (*gozuuon* 五十音), reflects the traditional arrangement of symbols into a table with ten columns and five rows (Kodansha, 1999).

[3]   Syllabary: a collection, set, system, list, or table of written characters which each represents a syllable (McCawley, 1968).

collection of written representations of these units (Hatasa, 2002). The transition from *onsetu* to mora, which is a timing unit (McCawley, 1968), as the base unit for the analysis of Japanese is almost a matter of terminology. Ishihara (1991) proposed a three-step moraification process for Japanese words based upon acoustic research by Yoshiba (1983, chap. 2, p. 14):

(2) Moraification

 a. Assign every V with a mora if it does not have one in the underlying representation (UR): if a V has a mora in the UR, add a mora so that the V is dominated by two morae.

 b. If a C precedes the V, incorporate the C into the mora dominating the V.

 c. Assign every remaining C with a mora.

 The application of Ishihara's process in (2) to (1) illustrates the one-to-one mapping of *onsetu* to mora:

(3) a. μ   μ μ   b. μ   μ μ   c. μ μ   μ μ
    bu n po u   *bu n po u*   *bu n po u*
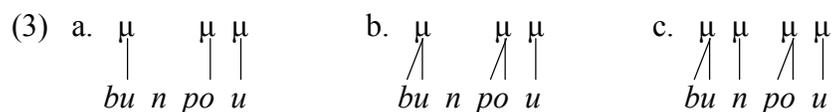
In an L2 context, lessons typically focus on the *fifty sounds* and phonetic orthography before shifting to vocabulary, grammar, and the logographic orthography *kanji*. By transliterating (3) from Romanised Japanese to *hiragana*, the link between morae, phonemes, and their orthographical representation is clear:

(4) μ μ μ μ
     /| | /| |
    /bu/ /n/ /po/ /u/
    ぶ ん ぽ う
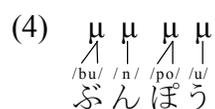
Because *hiragana* developed due to the need for a visual representation of both a timing unit and sound, L2 pedagogical materials that utilise this orthography are well suited for pronunciation lessons with respect to rhythm. Ishihara (1991) concluded that three moraic structures result from his moraification process, all of which are attested in (4) as shown in (5) (chap. 2, p. 15):

(5) a.   μ   b.   μ   c.   μ
             | /| |
             V   CV   C
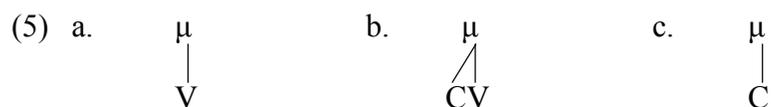
While it is clear that a single C can constitute a well-formed mora, /n/ was noted previously as being the only singleton C attested in the fifty sounds and the phoneme is represented in *hiragana* as ん or Romanised as *n*. Any V constitutes a well-formed mora and as such, /a/, /i/, /u/, /e/, and /o/ are attested in the fifty sounds and represented respectively in *hiragana* as あ, い, う, え, and お or Romanised as *a, i, u, e*, and *o*. Although it could seem possible that the moraic C, /n/, can be followed by a moraic V, this is not attested in the Japanese language, and Ishihara (1991) suggested a rule for mora merger (chap. 2, p. 35):

(6) μ   μ   μ
     | | /\
     C   V   =   CV

In the case of the moraic C, /n/, followed a moraic V, the product is limited to /na/,

/ni/, /nu/, /ne/, or /no/. These CV sequences are all attested for in the fifty sounds and the

so-called *na*-line receives its name from the eponymous product of the merger in (7):

(7) Mora Merger: moraic /n/ + moraic /a/

     μ   μ   μ
     | | /\
     /n/   /a/   =   /na/

As the fifty sounds and *hiragana* are acquired, L2 learners are exposed to な, に, /na/ /ni/

ぬ, ね, and の both aurally and visually. Through lessons, L2 learners should become /nu/ /ne/ /no/

aware that the preceding CV sequences have durations of one mora each rather than two

morae each, and the concepts of mora merger and metrical structures are learnable

regardless of first language (L1) (Archibald, 2005). Likewise, L2 learners should also

become aware that an identical VV sequence forms a long V as illustrated in (8)

(McCawley, 1968, p. 8):

(8) μ   μ   μ μ
     | | \ /
     /o/   /o/   =   /o:/

L2 learners who are exposed to standard varieties of Romanised orthography will encounter /o:/ as *oo, ō* or *ô*. Furthermore, the same representations are typical for the sequence /ou/. Exposing L2 learners to *hiragana* offers them a finer visual representation of pronunciation than Romanisation because /o:/ and /ou/ must be represented as おお and おう respectively. Geminate Cs occur and are always followed by a V to create a CCV sequence that consists of two morae (C_1CV_2). A geminate C is indicated by the character っ,[4] which adopts the phonetic information of the subsequent C (e.g., って represents /t:e/ and っで represents /d:e/). This character is not used to indicate a geminate /n/ sound because the character ん can do so (e.g., んな represents /n:a/). Geminate Cs are sometimes formed by a rule of progressive voicing assimilation that dictates the second C in a CC cluster must adopt the voice feature [±voice] of the initial C (Itô & Mester, 2003). After L2 learners become literate in *hiragana*, it serves as the basic orthography in pedagogical materials and the focus of lessons shifts to vocabulary and grammar.

With this outline of how the Japanese language sounds, the importance it places on rhythm, and its orthography, I now transition from sounds to words and grammar in the same manner as a JFL learner would in the classroom.

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[4]   By itself, this character represents a mora and indicates a geminate C but contains no other phonetic information and cannot occur on its own.

2.2 Japanese Verbal Morphology

This subsection outlines the theory behind the presentation of Japanese verbs to JFL learners, the morphological elements of Japanese verbs, and how learners acquire them.

In an L2 classroom environment, it is hard for a learner to escape vocabulary-building exercises and lists. The notion that vocabulary lists contain words is unsophisticated and a true understanding of what appears on these lists is worthy of close attention in the case of verbs. A Japanese verb phrase (VP) requires, at minimum, a root[5] and an inflectional suffix with an optional auxiliary (Shibatani, 1990). In early L2 classroom settings, every verb that is presented on a vocabulary list to learners is a complex word, acquired as an invariant form in the polite, non-past form (Kawaguchi, 2000). These finite verbs all bear an inflectional suffix that denotes either non-past or past tense and may also inflect for style with respect to social register as follows (adapted from Spencer, 2008, p. 1000):

(9)   *tabe-* 'eat'

    a.   Affirmative forms, polite

       Non-past: *tabemasu*

       Past: *tabemasita*

---

[5]   Root: "a base that cannot be analyzed further - i.e., a base that consists of a single morpheme" (Haspelmath, 2002, p. 274).

b.   Affirmative forms, plain:

    Non-past: *taberu*

    Past: *tabeta*

It is standard practice for L2 text-books to present verbs within vocabulary lists as inflected for non-past tense and inflection for style, regarding social register, may vary from book to book. For example, non-past forms in (9) may be presented in a vocabulary list with either the polite, more formal, inflection for style or the plain, more casual, inflection:

(10) a.   polite   or   b.   plain

        tabemasu   *taberu*

Although inflection for style can vary, verbs appear initially in the form of (10)a within introductory L2 text-books, such as *Nihongo Shoho* (Suzuki & Kawase, 1981), *Minna no Nihongo 1* (3A Corporation, 2001), and *Genki 1* (Banno et al., 1999). The *Genki* (Banno et al., 1999) series of text-books is used in many JFL programmes, including those at post-secondary institutions in British Columbia. Given these facts, verbs initially presented to an adult JFL student in a classroom setting should generally appear in *hiragana*, rather than Romanisation, as follows:

(11)   *hiragana*   Romanisation   English

   a.   たべます   *tabemasu*   'eat'

   b.   のみます   *nomimasu*   'drink'

The verbs listed in (11) are each acquired in the polite, non-past form as a lemma (Kawaguchi, 2000).[6] Because of this, JFL learners first understand each entire word as the representation of an action. As JFL learners progress, text-books provide grammar lessons that teach past tense and the negative counterparts of the basic polite forms in (9)a. Consequently, an L2 learner would have the following information regarding (11)a:

(12)   Romanisation   Gloss

   a.   *tabemasu*   eat

   b.   *tabemasita*   eat.PST

   c.   *tabemasen*   eat.NEG

   d.   *tabemasen desita*   eat.NEG COP.PST

Dulay and Burt (1974) demonstrated that the order in which morphemes are acquired in L2 is bound to the natural order of the target language rather than the native language of the learner, and so JFL learners begin with tense (e.g., past and non-past) and polarity (e.g., affirmative and negative) before learning the gerund form. Also, L2 learners acquire Japanese verbal morphology in a sequential manner that supports

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6   "Lemmata contain the meaning of lexical items and the syntax of each word" (Pienemann, 1998, p. 62).

Pienemann's Processability Theory (1998), as outlined in (13) (adapted from Kawaguchi, 2000, pp. 240-242):

(13) Stage 1 (invariant forms): a verb is acquired in a basic form, based on the input, as a lemma (e.g., *tabemasu* 'eat' or *nomimasu* 'drink').

Stage 2 (lexical): semantics are mapped directly onto the verbal. For example, the polite negative is formed by alternating the auxiliary (e.g., *-masu* and *-masen*), which involves the simple retrieval of the auxiliary from the mental lexicon and no information is exchanged between the verb and the auxiliary.

Stage 3 (phrasal): information exchange occurs between morphemes within phrases. This is the first stage where the internal structure of a verb is analysed and there is information exchange between morphemes within the verb phrase.

Stage 4 (inter-phrasal): information exchange occurs across phrases. For example, information is exchanged between the verb phrase and adverbial phrase in order to generate the conjunctive adverbial formation *nom-i-nagara* (drink-CONJ-while).

As L2 learners transition from (11) to (12), they enter Pienemann's second stage, the lexical stage, and begin to acquire lexical-semantic morphemes (Kawaguchi, 2000). So, a learner's understanding of L2 morphology shifts away from a Word and Paradigm style model wherein a verb's meaning is mapped to different invariant forms, as in (14)a, because he or she begins to map meaning to the verb and the auxiliary, as in (14)b:

(14) Meaning association shift

a. Word and Paradigm model   b. Lexical-semantic morphemes

Word	Paradigm	Verb	Auxiliary
	tabemasu		*-masu*
	'eat'		NONPST
	tabemasita		*-masita*
tabemasu	'ate'	*tabe-*	PST
'eat'	*tabemasen*	'eat'	*-masen*
	'not eat'		NEG
	tabemasen desita		*-masen desita*
	'did not eat'		NEG COP.PST

Kawaguchi (2000) argued that L2 learners do not analyse the boundaries between stems[7] and affixes during Pienemann's lexical stage of acquisition because they are merely alternating the auxiliary portion of the verb, as in (14)b.

    The verb-form transformation process can be slightly different for V- and C-final verbs. Itô and Mester (1994) stratified the Japanese lexicon into sub-lexicons including a native Japanese, *Yamato*, stratum and a Sino-Japanese stratum, which indicates a correlation between the phonological shape of verbs and their classification as *Yamato* or Sino-Japanese. This distinction is apparent insofar as *Yamato* verb roots typically end in a C {/t/, /r/, /m/, /b/, /n/, /k/, /g/, /s/} or the V /a/ and Sino-Japanese verb roots typically

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[7] Stem: "the base of an inflected word form" (Haspelmath, 2002, p. 274).

end in either the V /i/ or /e/. Because all VPs require an inflectional suffix, the root

contained in a VP is a stem (Shibatani, 1990). Based on traditional Japanese grammar

and verb categories, Itô and Mester (2004) divided verbal stems into two categories: C-

final and V-final, which includes /i/ and /e/ but excludes /a/. L2 learners are taught about

these two categories but Kawaguchi (2000) suggested that a learner's comparison of

forms, as represented in (14)a, may not clearly identify C-final stems. If a learner were to

compare the data in (11) using the model in (14)b, stems could be identified as follows:

(15) a. *tabe-masu*   b. *nomi-masu*

      eat-POLITE.NONPST   drink-POLITE.NONPST

      Although both (15)a and (15)b each contain a correctly identified stem, the root

(*nom*-) of (15)b is not accurately identified. Additionally, *-masu* is morphologically

complex. Whereas the root in (15)a is V-final, the root in (15)b is C-final,

notwithstanding the stem-final /i/, which generally indicates a V-final root. The root of

(15)a is *tabe*- and the root of (15)b is *nom*- (Itô and Mester, 2004). Although a Japanese

VP requires only a root and an inflectional suffix, JFL learners are initially presented

with verbs inflected for both style and tense. It is well attested in the literature of

Japanese morphology that inflection for style surfaces as the suffix *-mas-* for polite and -

ϕ- for plain. Itô and Mester (2004) and Nishiyama (1998) asserted that allomorphs exist

for most verbal suffixes depending on whether the stem to which they affix is V- or C-

final, with *-ru* representing plain, non-past tense for the former and *-u* for the latter.

Accordingly, (15)a and (15)b can be segmented as follows:

(16) a.   *tabe-mas-u*   b.   *nom-i-mas-u*

        eat-POLITE-NONPST   drink-ϕ-POLITE-NONPST

What appeared in (15)b to be a root-final /i/ is actually an epenthetic V (Ishihara, 1991). Nishiyama (1998) argued further that regarding verbs, /i/ is the only epenthetic V. A lexicalist approach considers entire words to be formed and stored within the lexicon, complete with derivational and inflectional affixes (Iida & Sells, 2008). This representation closely resembles the knowledge of a learner utilising invariant forms, the first stage of acquisition (Pienemann, 1998). However, as L2 learners transition to the lexical and phrasal stages of Pienemann (1998), the mental lexicon could contain whole words and morphemes. In an L2 instructional setting, a learner is armed with the notion that verbal roots are either V- or C-final and, as in (14)b, *-masu* affixes to V-final roots and *-imasu*, or perhaps *-i-masu*, affixes to C-final roots. Yet, because all C-final roots presented in this form contain an epenthetic /i/ and V-final roots end in either /i/ or /e/, a learner must remember explicitly whether a verb is V- or C-final considering the following data:

(17)	Romanisation	V/C finality	English
a.	*kimasu*	V-final	'wear(above waist)'
b.	*kikimasu*	C-final	'hear'
c.	*karimasu*	V-final	'borrow'
d.	*kirimasu*	C-final	'cut'

The distinction between V- and C-finality, plus the internal structures of the verbs in (17), may be unimportant or unapparent to an L2 learner in the early stages of acquisition but their importance grows as text-books and the classroom become ripe with grammar lessons containing various verb forms. Also, the need for a finer knowledge of stem-affix boundaries becomes important as grammar lessons begin to include verb forms that lack inflection for polite style. Eventually, a learner will be expected to understand the verbs from (17) as follows in the plain, non-past form, where the suffix indicating polite style, *-mas-*, is replaced with *-ϕ-* to inflect for plain style (presented in Romanisation for readability):

(18)   Romanisation   V/C finality   English

   a. *kiru*   V-final   'wear(above waist)'

   b. *kiku*   C-final   'hear'

   c. *kariru*   V-final   'borrow'

   d. *kiru*   C-final   'cut'

The allomorphs of the past tense suffix, *-ru* and *-u*, provide a clear need for L2 learners to differentiate between V- and C-final verbs. Furthermore, the complication of the epenthetic /i/ in (17) has been eliminated – replaced with the complication that the past tense allomorph following /r/-final verbs is *-u*. Consequently, (18)a and (18)d are homophones with no salient difference when compared in their written forms and out of context. Thus, the learner's lexicon evolves to include morphemes that supplement or

replace invariant forms. During this stage, Kawaguchi (2000) suggested a learner selects affixes according to the stem-affix boundary. Accordingly, a learner should draw at least the following associations to distinguish between (18)a and (18)d:

(19) Meaning association shift

a. *kiru* 'wear(above waist)'		b. *kiru* 'cut'	
	-masu		*-imasu*
ki-	POLITE.NONPST	*kir-*	POLITE.NONPST
wear(above waist)	*-ru*	cut	*-u*
	NONPST		NONPST

This subsection has outlined the composition of Japanese verbs, including their two strata of roots to which allomorphs of various suffixes may affix. Additionally, it has covered ways in which verbs may be presented in pedagogical materials and how a learner's understanding of verbal morphology progresses. I now move from theory to application, as what follows describes how JFL learners are taught verbs and to derive various verb-forms.

2.3 Verb-form Transformation

The purpose of this subsection is to outline the way L1 Japanese learners are taught grammar and compare it to the way L2 learners are taught in modern text-books, such as *Genki 1*. Also, the relationship between Japanese phonetic orthography and verb-

form transformations will be clarified, along with ways Romanisation could be used to help JFL learners recognise morpheme boundaries.

In traditional Japanese grammar lessons, verbs are transformed from one form to another via a process called *katuyou*, which is tied to the phonetic orthography of the language. This process is predicated on the variability of the final sound of a verb stem or the V that follows it. There are two categories of regular verbs in traditional Japanese grammar and the final V of an *itidan* 'one-row' verb root remains constant when preceding any given ending, whereas the V following the stem of a *godan* 'five-row' verb will vary between /a/, /i/, /u/, /e/, and /o/ in at least one verb-form (Kodansha, 1998). Essentially, a five-row verb has a C-final stem, which is followed by a V that can vary depending on the suffix. To demonstrate this method, the five-row verb *hanasu* 'talk' will be changed from the plain, non-past form to the polite, non-past form (20), then to the plain, negative, non-past form (21), and finally to the potential, plain, non-past form (22):

(20) plain, non-past → polite, non-past

はなす →   はな[す → し]ます →   はなします

hanasu →   *hana[su → si]masu* →   *hanasimasu*

talk.NONPST   [*katuyou* process]   talk.POLITE.NON-PST

(21) plain, non-past → plain, negative, non-past

はなす →   はな[す → さ]ない →   はなさない

hanasu →   *hana[su → sa]nai* →   *hanasanai*

talk.NONPST   [*katuyou* process]   talk.NEG.NONPST

(22) plain, non-past → potential, plain, non-past

はなす →　　　　　はな[す → せ]る →　　　　　はなせる

hanasu →　　　　　*hana[su → se]ru* →　　　　　*hanaseru*

talk.NONPST　　　　　[*katuyou* process]　　　　　talk.POTENTIAL.NONPST

When the phonetic orthography *hiragana* is used, it may be unclear to JFL learners where the boundary between the individual morphemes of these verbs lies. Text-books, such as *Genki 1*, first teach these boundaries by contrasting two categories of verbs: *ru*-verbs and *u*-verbs, which correlate with one-row and five-row verbs respectively. In chapter three, *Genki 1* explains that a *ru*-verb is formed by adding the suffix -*ru* to a verb base and an *u*-verb is formed by adding the suffix -*u* to a verb base (Banno et al., 1999). Furthermore, Banno et al. (1999) have provided an illustrative example in *Genki 1*, included in (23) (p. 58):[8]

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[8]　In *Genki*, only the so-called verb bases appear in Romanisation. I have added Romanisation to all other items that appear in *kanji* and *hiragana*.

(23) Regular conjugation patterns

	ru-verb	*u*-verb
verb bases	*tabe*	*ik*
dictionary forms	食べる (to eat) ^{taberu}	行く (to go) ^{iku}
present, affirmative	食べます ^{tabemasu}	行きます ^{ikimasu}
present, negative	食べません ^{tabemasen}	行きません ^{ikimasen}
stems	食べ ^{tabe}	行き ^{iki}

In order to avoid confusion, it should be noted that Banno et al. (1999) have used the term verb base in (23) to reference what I have thus far called a root. According to Haspelmath (2002), an affix may attach to a base, which can also be called a stem in the case of inflected words. Therefore, what Banno et al. (1999) have termed stems in (23) would have to be inflected words wherein the roots *tabe-* and *ik-* surface with allomorphs of the conjunctive suffix, -*ϕ* and -*i* respectively, to form *tabe* and *iki*. However, this does not appear to be the case and it is simply stated that these so-called stems are what precede -*masu* in words such as *tabemasu* 'eat' and *ikimasu* 'go'. For the sake of consistency, as well as accuracy, I will continue to use Haspelmath's (2002) definitions and restate them in (24):

(24) Base: "the base of a morphologically complex word is the element to which a morphological element applies" (p. 266).

Root: "a base that cannot be analyzed further - i.e., a base that consists of a single morpheme" (p. 274).

Stem: "the base of an inflected word form" (p. 274).

Upon examination of (23), it is clear that Banno et al. (1999) have presented verbs via a Word and Paradigm approach, as seen in (14)a, and the inclusion of the verb roots *tabe-* and *ik-* suggests a push toward the lexical-semantic model of (14)b. Yet, by simply reading *Genki 1*, a learner would have to realise on his or her own that *tabe-* maps to 'eat' and *ik-* maps to 'go' because it is not stated. Furthermore, Banno et al. (1999) have termed affixes such as *-ru, -u,* and *-imasu* as suffixes but do not state their meanings. So, JFL learners are left to map meanings onto morphemes by themselves. If the authors of *Genki 1* had chosen only the lexical-semantic model, the example in (23) could have been presented to learners as follows:

(25)	*ru*-verb	*u*-verb
verb roots	*tabe-* (eat)	*ik-* (go)
dictionary forms	*tabe-ru*	*ik-u*
polite forms	*tabe-masu*	*ik-imasu*
polite, negative forms	*tabe-masen*	*ik-imasen*

To help guide the learner to map semantic meaning onto the suffixes, (25) would also require an explanation about each suffix and its allomorphs, such as how *-ru* and *-u* both represent the plain, non-past verb form in (19). The major difference between (23)

and (25) is that the division between root and suffix is clear for both *ru*-verbs and *u*-verbs

due to Romanisation[9] and there is no need to mention a so-called verb base or verb stem.

However, an example like (25) is not an option in *Genki 1* because Banno et al. (1999)

abandoned Romanisation in chapter two, just before the first grammar lesson dealing

with verb conjugation in chapter three. Due to this decision, the so-called verb bases of

(23) are the first and last instances of morphemes occurring in Romanisation. Also, the

so-called verb stems of (23) are included because of orthographical reasons. Although -

masu can occur in the phonetic orthography *hiragana*, it is impossible to represent -*imasu*

this way and so the so-called *verb stems* are introduced in order to eliminate C-final

stems and provide a CV sequence before the suffix -*masu*.

Due to the use of the phonetic orthography *hiragana*, it may not be possible for

JFL learners to recognise morpheme boundaries of C-final *u*-verbs, as discussed in

section 2.2. Additionally, Banno et al. (1999) have encouraged rote memorisation of

verbs by suggesting JFL learners memorise words as a set in the following manner (p.

59):[10]

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[9]   Although the use of a Romanised orthography for teaching Japanese has long been debated, research by

Hatasa (2002) demonstrated that there is no difference in language acquisition between learners who are

taught lessons using either Romanised or phonetic orthographies.

[10]   I have added Romanisation and a gloss for this example, it appears only as *kanji* and *hiragana* in *Genki*.

(26) 行く　　　　　-　　　　行きます

    iku　　　　　　　*ikimasu*

    go.NONPST　　　　go.POLITE.NONPST

    The present research focuses on the gerund form, which is introduced in chapter

six of *Genki 1*. At this point, vocabulary lists have introduced verbs as either *ru*-verbs or

u-verbs and JFL learners should be able to categorise verbs as such. In the case of gerund

form transformations, the process is more complex than what has been discussed thus far.

This is because the gerund suffix, *-te*, is always C-initial and can force the root of a C-

final *u*-verb to change in order to avoid violations of Japanese phonotactics. In addition

to providing verb sets, as in (26), Banno et al. (1999) have provided the following

grammar rules for the gerund form transformation (pp. 118-119):[11]

  (27) *ru*-verbs

    食べる → 　　食べて　　　(*taberu → tabete*)

    u-verbs with final う, つ, and る

    会う　　→　　会って　　　(*au → atte*)

    待つ　　→　　待って　　　(*matu → matte*)

    とる　　→　　とって　　　(*toru → totte*)

---

[11]　I have added Romanisation to the grammar lesson from *Genki* but not a gloss because understanding the

meanings themselves is unimportant here, seeing what is presented to the learner is more important.

u-verbs with final む, ぶ, and ぬ

読む　→　読んで　　　(*yomu* → *yonde*)

遊ぶ　→　遊んで　　　(*asobu* → *asonde*)

死ぬ　→　死んで　　　(*sinu* → *sinde*)

u-verbs with final く

書く　→　書いて　　　(*kaku* → *kaite*)

u-verbs with final ぐ

泳ぐ　→　泳いで　　　(*oyogu* → *oyoide*)

u-verbs with final す

話す　→　話して　　　(*hanasu* → *hanasite*)

　In (27), the goal of the lesson is to impress upon the learner that the underlined

final character of the dictionary form, on the left, is replaced with the underlined

character(s) of the gerund form, on the right. Banno et al. (1999) have included a

footnote stating that verbs ending in *aru*, *oru*, or *uru* are "always *u*-verbs," whereas those

ending in *iru* or *eru* are "often *ru*-verbs" (p. 118). Hence, *Genki 1* suggested that the

learner focus on the final character of a given verb and possibly the V before it in order to

categorise the verb as a *ru*-verb or an *u*-verb. Furthermore, *Genki 1* promoted grouping

u-verbs by their final character in order to associate them with various endings in the

following manner:[12]

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[12]　This manner of grouping endings has been put to a song that is included in *Genki 1* (Banno et al., 1999).
Students at both institutions in this study are taught the song with the intention of it helping them memorise
this paradigm.

(28) う, つ, る   →   って   (*u, tu, ru → tte*)

     む, ぶ, ぬ   →   んで   (*mu, bu, nu → nde*)

     く   →   いて   (*ku → ite*)

     ぐ   →   いで   (*gu → ide*)

     す   →   して   (*su → site*)

Once again, the use of the phonetic orthography *hiragana* could make it difficult for JFL learners to recognise individual morphemes and Banno et al. (1999) have suggested the rote memorisation of each verb as a set, as in (26), this time including the gerund form. Example (29) represents (27) with morpheme boundaries via Romanisation while maintaining the underlined portion in order to illustrate clearly why the phonetic orthography *hiragana* cannot be used to do so:

(29) 食べる →   食べて   *tabe-ru*   →   *tabe-te*

     会う   →   会って   *a-u*   →   *at-te*[13]

     待つ   →   待って   *mat-u*   →   *mat-te*

     とる   →   とって   *tor-u*   →   *tot-te*

     読む   →   読んで   *yom-u*   →   *yon-de*

     遊ぶ   →   遊んで   *asob-u*   →   *ason-de*

---

[13]   Verbs such as *au* 'meet' are of the Yamato stratum and pattern with C-final roots. In their plain negative form, a root-final /w/ occurs.

死ぬ	→	死んで	*sin-u*	→	*sin-de*
書く	→	書いて	*kak-u*	→	*kai-te*
泳ぐ	→	泳いで	*oyog-u*	→	*oyoi-de*
話す	→	話して	*hanas-u*	→	*hanasi-te*

It is clear from the comparison of the underlined portions of the verbs in (29) that verb roots can undergo changes when suffixed with *-te*. Furthermore, a learner who memorises words as invariant forms or sets, as *Genki 1* has suggested, would be unlikely to recognise a verb root, which could be why Banno et al. (1999) have not mentioned the so-called verb bases or verb stems in (27) whatsoever. Additionally, JFL learners could be more comfortable with the paradigm in (28), wherein final characters are simply dropped and replaced, than they would be with the morphophonologically complex model as in (30):

(30) verb stem] + *-te*

{/i/, /e/}	→	] + *-te*
{/a,o,u/, /t/, /r/}	→	/t/] + *-te*
{/k/, /g/}	→	/i/] + -{*te, de*}
{/m/, /b/, /n/}	→	/n/] + *-de*
{/s/}	→	] + /i/ + *-te*

For a learner to truly comprehend (30) and process these sound changes of the root and suffix, he or she would have to be at the phrasal stage of acquisition where

information is exchanged between morphemes within a phrase (Kawaguchi, 2000).

Considering that JFL learners are encouraged by Banno et al. (1999) to memorise words

as invariant forms, it is likely that they are hovering around stage one, or possibly two,

where meaning begins to be mapped onto individual morphemes.

And so, JFL learners are taught to categorise verbs based on the V- or C-finality

of the root into categories, such as *ru*-verb and *u*-verb respectively, in order to derive

various verb forms. Yet, in the case of deriving the gerund, JFL learners are taught to

first categorise a given verb and then remove its final character and add the appropriate

te-form ending (Banno et al., 1999). Further, rote memorisation of verbs as invariant

forms in sets, such as 'drink' {*nomu, nomimasu, nonde*}, is encouraged. These facts raise

the questions of how various JFL learners approach this derivation process and what they

actually understand at this point in their learning. In order to approach questions such as

these, a review of some relevant literature from Applied Linguistics follows.

2.4 Language Learner Strategies

The present research explores the verb-form transformation process of early JFL

learners, which can be influenced by individual learners' strategy preferences. This

subsection introduces the concept of language learner strategies and some of the research

regarding strategies that learners can employ when learning and using L2.

The use of strategies can differentiate successful language learners from

unsuccessful language learners (Gass & Selinker, 2001). Each individual strategy is not

inherently helpful or harmful, but instead "essentially neutral until it is considered in

context" (Ehrman, Leaver, & Oxford, 2003, p. 315). According to Ehrman et al. (2003),

useful strategies are relevant to the task, link with other such strategies, and fit the learning style of a learner. Strategies can be employed during learning and use, which has been argued to create a distinction between language strategies during language learning and language use (Cohen, 1998, 2003, 2005).

Oxford (2003) indicated that there are hundreds of individual strategies. L2 learning strategies "are the conscious or semi-conscious thoughts and behaviors used by learners with the explicit goal of improving their knowledge and understanding of a target language" (Cohen, 2003, p. 280). Conscious use of language strategies is crucial when determining whether a process constitutes a strategy or not (Cohen, 1998). Within the Strategy Inventory for Language Learning (SILL) framework (Oxford, 1990), six categories were developed for research regarding learning strategies (adapted from Oxford & Burry-Stock, 1995, p. 5):

Memory strategies, such as grouping, imagery, rhyming, and structured reviewing.

Cognitive strategies, such as reasoning, analysing, summarising (all reflective of deep processing), as well as general practicing.

Compensation strategies (to compensate for limited knowledge), such as guessing meanings from the context in reading and listening and using synonyms and gestures to convey meaning when the precise expression is not known.

Metacognitive strategies, such as paying attention, consciously searching for practice opportunities, planning for language tasks, self-evaluating

one's progress, and monitoring error.

Affective (emotional, motivation-related) strategies, such as anxiety

reduction, self-encouragement, and self-reward.

Social strategies, such as asking questions, cooperating with native

speakers of the language, and becoming culturally aware.

SILL is one of various strategy taxonomies among others (e.g., Cohen, 1998;

O'Malley & Chamot, 1990), and these theoretical approaches to strategies can contain

"overlaps among the strategy groups within each system, as well as among various

systems" (Swain, Huang, Barkaoui, Brooks, & Lapkin, 2009, p. 5). This could be a result

of a combination of factors such as, the reliance on "participants' *reported use* of

strategies rather than observations of learner/test-taker behaviour" (Swain et al., p. 5).

Additionally, Huang (2010) argued that varied purposes of learner behaviour indicate it is

possible for an action to represent the use of multiple strategies. In terms of learner

strategies while performing a task, categories of learner strategies have been identified

based on their function and the retrieval category is relevant to the present study (adapted

from Cohen, 1998, pp. 6-7):

Retrieval strategies would be those strategies used to call up language

material from storage, through whatever memory searching strategies the

learner can muster.

Cohen (1998) argued that these four subsets of language learner strategies can be further subdivided in a similar manner to that of SILL (e.g., cognitive, meta-cognitive, affective, or social). Learners utilise language use strategies "once material is already accessible, even in some preliminary form" (Cohen, 2005, p. 276). The cognitive strategies identified in SILL can be used to retrieve previously learned information from memory and manipulate target language structures (Cohen, 2003) through reasoning and analysis (Ehrman et al., 2003). Swain et al. (2009) argued that strategies can be used "to manage or carry out cognitive processes with the goal of successful test performance" (p. 2). In L2 testing situations, the cognitive strategy "linking with prior knowledge" can be employed to access long-term memory in order to retrieve information (Purpura, 1997, pp. 293-297). Another cognitive strategy, "applying rules" can also be used for this purpose and is essential to effective learning and use (Purpura, 1997, pp. 306-308).

The number or variety of strategies used during a given language task should not be used as a predictor for success, as some tasks may require only a few, successfully used, strategies and other tasks may require more (Cohen, 1998). In fact, Huang (2010) argued that individual learners should manage "a repertoire of strategies that work in various contexts to complete specific tasks" (p. 19), rather than focus on learning a large number or wide variety of strategies. Also, the usefulness of a given strategy can be relative depending on the characteristics of the task (Ehrman et al., 2003), as well as that of the learner, language structure, and context (Cohen, 1998). Indeed, Swain et al. (2009) suggested a strategy framework that "takes account of the history of the strategy user, the tasks to which the strategies are applied, and the broader context of use" (p. 56).

The verb-form transformation task is assumed to be highly cognitive and make use of memory based on the review of the literature regarding strategy use in this subsection. With this in mind, participants are expected to retrieve existing knowledge, link to previous knowledge, and apply rules. One goal of this thesis is to investigate the types of prior knowledge accessed and linked to during the verb-form transformation process from the non-past form to the gerund form. To address this, data have been collected via a written grammar test and think-aloud protocols that elicited verbal reports from participants regarding the types of knowledge accessed and linked to during the task.

2.5 Experimental Research in Applied Linguistics

This subsection shifts to studies regarding L2 learners in an SLA context. First, I review Hatasa (2002) that focused on the orthography in which JFL is taught. Then, move to Kanda and Beglar (2004) that compared teaching methods for verb form transformations. Next, Lee (1998) focused on comprehension versus input processing. And finally, Leow (2001) that explored awareness-raising regarding written input.

To investigate the effects of delaying the introduction of *hiragana*, Hatasa (2002) utilised native speakers of English in two university entry-level JFL classes: a control class, to which *hiragana* was introduced immediately, and an experimental class, to which the same materials were provided in Romanised Japanese for nine weeks. By week ten, both groups had the same knowledge of *hiragana*. A post-test was given to fifty-two participants in the sixteenth week of semester one and a delayed post-test was given eight weeks later to the twenty-five participants who took Japanese the following semester. The two groups were controlled balance via the Modern Language Aptitude

Test, the Ground Embedded Figure Test, and a simulated oral proficiency interview.

Each class met for one hour, five days per week. Both post-tests revealed that the use of

Romanisation produced no significant difference in oral-aural skills, grammatical

knowledge, and reading performance over the immediate introduction of *hiragana*.

These results suggest that the early introduction of *hiragana* does not interfere with a

learner's early phonological development (Hatasa, 2002). Furthermore, the use of

Romanised orthography did not encourage use of L1 phonology, nor did it result in more

efficient reading development due to familiarity. Likewise, the early introduction of

hiragana had no facilitative effect on reading development (Hatasa, 2002). In conclusion,

Hatasa (2002) found no significant difference between the immediate or delayed

introduction of *hiragana* in JFL curricula and no empirical evidence was found that

familiarity with *hiragana* positively affects L2 *kanji* learning, so it remains speculative

that the use of Romanised orthography could possibly delay the introduction of *kanji*.

Verb-form transformations in L2 classes are premised on the V- or C-finality of verb

stems and *hiragana* cannot be used to represent C-final verb stems, so Romanised

Japanese could be used for purposes of clarity. Because Hatasa (2002) suggests no

developmental differences between JFL learners who begin with *hiragana* and those who

begin with Romanised Japanese, the use of Romanised Japanese in the L2 classroom is

inconsequential to my current study.

Beyond the issue of whether or not Romanised Japanese will stunt the

development of JFL learners, pedagogical issues related to how verb forms are taught

must be addressed. In EFL classes at a Japanese high school, Kanda & Beglar (2004)

tested the effectiveness of grammar instruction based upon the four pedagogical

principles of teaching form-function relations, comparing related word forms, promoting learner autonomy, and providing opportunities for generative use. The study comprised ninety-five participants in three separate classes: the control group, in which grammar instruction was given in a teacher-fronted, rote style utilising the grammar translation method; an experimental group wherein the four principles were applied to grammar instruction; and, a second experimental group wherein the treatment was applied to an even greater degree. Accurate usage of the progressive tense was analysed on both a post-test and a delayed post-test. Although no significant differences were found between the two experimental groups, both experimental groups did outperform the control group. These results suggest that lessons focusing on verb tense accuracy may create a balance between communicating meaning and focusing on form (Kanda & Beglar, 2004). Furthermore, Kanda & Beglar (2004) posited that learners who are communicatively successful may be unmotivated to achieve grammatical accuracy. The present research attempts to gain insight into the transparency of Japanese verb forms by examining how JFL learners perceive Japanese morphosyntactic forms, compare related word forms, and generate new forms.

Lee (1998) tested seventy-one university students of Spanish as a foreign language to examine the effects of verbal morphology on reading comprehension and input processing. Three versions of a written passage were distributed at random to participants: the first passage contained subjunctive verbs, the second contained finite forms, and the third contained invented morphological endings. Data were collected using a word recognition task and an exercise wherein participants were instructed to recall, in English, the main ideas and details of the passage. Morphological

characteristics of the verbs in the input affected comprehension yet did not affect identification of the verbs in the input (Lee, 1998). All participants identified the verbs within the passage equally. There was no difference between the recall of invented verb forms and the infinitive form. However, the recall of the subjunctive verb form was significantly lower and Lee (1998) posited that the explanation for this is that the subjunctive form was the most complex of the three forms, due to it having the most allomorphs, and therefore the hardest to recall. Also, there was no significant correlation between comprehension and input processing scores. Because of this, Lee (1998) suggested that input processing and comprehension are different processes and that there is not necessarily a correlation between a learner's ability to process input and his or her comprehension of it. If what Lee (1998) suggested is true, then participants within the present study should be able to identify morphological characteristics, such as morphemes, and process invented verbs without comprehending their full meaning.

Leow (2001) explored whether reading comprehension and awareness of targeted verb forms were affected by written input enhancement, which can utilise typographical cues, such as fonts, shading, and underlining, in order to enhance the implicit saliency of input forms. Thirty-eight participants were recruited from Spanish as a foreign language classes then split into an enhanced input group and a control group with unenhanced verb forms. A written passage was given to each group in which the experimental treatment underlined all verbs and emboldened all formal imperative morphemes. A multiple recognition test was implemented and immediate recognition was gathered on-line utilising think-aloud protocols. The data collected indicate no significant difference between reported noticing of enhanced versus unenhanced input and no significant

difference in reading comprehension. Leow (2001) posited that enhanced input may not

apply to forms in a reading passage and that noticing and higher levels of awareness,

while interacting with L2, may be different in written discourse as opposed to in a puzzle.

Also, the positive relationship between enhanced input and processing of targeted forms

was not superior for intake and comprehension to that of unenhanced input. Thus, Leow

(2001) concluded that the process of raising awareness of L2 linguistic features is more

internal, on the part of the learner, than external, on the part of the instructor, and

although this process contributes to the intake of grammatical information, it may require

meta-awareness[14] to begin. The results of Leow (2001) suggest that awareness,

specifically meta-awareness of verbal morphology should relate directly to the accuracy

in written production of verb forms, which I seek to measure in my study.

2.6 Summary

Few would argue that pedagogical material for L2 English classes take more

advantage of contemporary linguistic theory than those used in JFL classes. As

demonstrated in this chapter, researchers seem to have accepted the assertion of Shibatani

(1990) that every Japanese verb phrase must house a root and an inflectional suffix.

Furthermore, researchers, such as Itô & Mester (1994, 1998, 2003, 2004), have

consistently used Romanised orthography to illustrate morpheme boundaries in

illustrative examples. However, research in applied linguistics has indicated that

Romanised Japanese is generally utilised by Japanese teaching professionals as a bridge

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[14]   A learner's reporting of his or her "cognitive registration of the incoming stimuli" (Leow, 1997, p. 473).

to phonetic orthographies, such as *hiragana*, while JFL learners become accustomed to Japanese phonology (Hatasa, 2002). Consequently, there is an incongruity between the manners in which linguistic research and JFL text-books explain verbal morphology and verb form transformations.

Text-books, such as *Genki 1*, are beginning to introduce explicitly the concept of verbal roots as V- or C-final and Kanda & Beglar (2004) underscored the importance of focusing on verb tense, urging perception studies of verb forms and their transparency. Furthermore, Lee (1998) stated work must be done to categorise strategic interactions with forms and meaning. Leow (2001) suggested a link between awareness and accurate written production of targeted verb forms in SLA. If L2 learners are to gain a deep understanding of a target language by utilising pedagogical materials that are grounded in contemporary linguistic theory, then these issues must be addressed.

It is unclear in which stage of acquisition JFL learners are when they first encounter the gerund verb form because they are consistently urged by Banno et al. (1999) to memorise verbs as sets of invariant forms. This infers that it is also unclear whether or how JFL learners approach identifying verbal morphology because they are also taught to categorise verbs as either *ru*-verbs or *u*-verbs based on root V- or C-finality. Additionally, JFL learners are taught a rule paradigm for the gerund form transformation based on the final character of the verb when written in the phonetic orthography *hiragana*, which could disrupt with the way in which JFL learners categorise verbs. For these reasons, the present study examines the processes and types of knowledge employed by beginner JFL learners during the derivation process of the gerund form and

the nature of the main task, a grammar test, is expected to affect the strategies reported by

participants as well as their cognitive processes (Swain et al., 2009).

CHAPTER THREE: METHODOLOGY

In this section, I state the research questions of the present study and explain participant selection along with their background information. Then, I describe the procedures, data collection, the coding scheme, and data analysis.

3.1 Research Questions

This research focuses on adult L2 learners of introductory JFL, whose L1 is English. These learners are taught a method of verb-form transformation rooted in Japanese phonotactics and to categorise verbs based on stem V- or C-finality. The goal of this research is to explore the verb-form transformation process and attempt to answer the following questions:

1. Are participants aware of verb stems?

2. How do participants identify verb stems?

3. How do participants determine stem-finality?

4. How do participants derive verb-forms?

5. What types of knowledge are involved in these processes?

6. Do the processes of participants who scored correctly differ from those who did not, and if so, how?

3.2 Participants

Twelve participants were recruited from the pool of first year Japanese language students at two post-secondary institutions in British Columbia, Canada. These students were enrolled in introductory courses and had recently covered chapter six of *Genki 1*, containing the lesson on the gerund verb form, within the same month that data were collected. Native speakers of Japanese, advanced L2 learners of Japanese, and those who had studied at an institution in Japan were not included in the study. The participants were adult L2 learners of JFL, educated in a classroom setting. The population of the study comprises native speakers of English in order to attempt to control for L1 influence on the acquisition of L2 morphology, following Lowie (1998). The participants were recruited voluntarily via invitations distributed in-class. Background information of participants was collected via a questionnaire prior to data collection and can be found in Table 1:

Table 1

Participant Background Information

Information	Value
N	12 (8 female, 4 male)
Language level	beginner, 2nd semester
Native Language	English
Age	17 - 40; *M* = 23
M time speaking Japanese	1 hr 20 min per day (self reported)
M time studying Japanese	1 hr per day (self reported)

Information	Value
Language learning experience	French {K - 8/12} (*n* = 4)
(self reported)	Introductory Korean (*n* = 1)
	Introductory Chinese (*n* = 2)

3.3 Procedures

Over a period of five weeks, I made arrangements to meet with participants individually in a private office where data collection took place. Participants began by taking up to five minutes to complete a background information questionnaire, found in Appendix A, which was used to collect the information found in Table 1. Following completion of the background questionnaire, participants were given oral instructions for a grammar test, found in Appendix B. The instructions directed participants to take the test while saying out loud everything that came to mind while completing each item and audio recordings were made in order to collect oral data. Participants were then given the collector containing the grammar test and directed to read these instructions before beginning the test. Although each participant was told that he or she had a total of thirty minutes to complete the grammar test, the time taken by each participant ranged from five minutes to twenty-four minutes

3.3.1 Data collection.

Written and oral data were collected from each participant via a written test, Appendix B, and an audio recording. The written test comprised twenty-two verbs, representative of every type of root-final segment {/i/, /e/, /a/, /t/, /r/, /m/, /b/, /n/, /k/, /g/,

/s/} twice. The verbs have been invented and were constructed to follow the morphophonological rules of Japanese to ensure no previous knowledge of the individual words, which were therefore unfamiliar to all participants and emulate how they interact with unknown vocabulary (Lee, 1998). The words were checked by a native speaker of Japanese in order to ensure they were both meaningless[15] and authentic sounding. These verbs appear in *hiragana*, without the Romanisation provided in the following examples, and without any context or meaning. The verbs appear in both the polite non-past form (e.g., たべます), followed by the plain non-past form (e.g., たべる).

Participants were instructed to write each verb in its gerund form (e.g., たべて) while think-aloud protocols were followed to elicit the process by which each participant derived the verb's gerund form. The think-aloud process began with instructions for participants to say out loud everything that came to mind while completing each item on the grammar test, which should have caused them to label and encode the content of their short term memory (Ericsson & Simon, 1993). According to Ericsson and Simon (1993), this verbalization process explicates thought content and causes participants to take more time for the task but the authors hypothesised it "does not change the structure of the process for performing the main task" (p. 79). The oral instructions given to participants were read directly from a script found in Appendix C, which mirrors the written instructions on the grammar test found in Appendix A, in order to standardise instructions

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[15] Although it was brought up that the final character -*nu* in the plain, non-past form could represent the plain negative ending in Shogunate era Japanese, the participants' knowledge of this fact is highly unlikely.

and avoid potentially affecting data by giving even slightly different instructions to each

participant (Gass & Mackey, 2000).

Aside from this script, Appendix C contains the protocols followed during data

collection. This includes reminders to ask participants to maintain the think-aloud

process, aside from backchanelling (e.g., I see), if they seemed to stop and not react or

respond to statements or questions during the grammar test or clarifying instructions. If a

participant began speaking softly to himself or herself during the grammar test, he or she

would be asked to speak more loudly. When participants seemed to stop the think-aloud

process during a sustained pause, I asked only questions such as "Could you keep telling

me what you're thinking" and "Could you keep thinking out loud," which, according to

Ericsson and Simon (1993), do not require direct answers and the information reported

following these prompts is the same that would be reported spontaneously. Also, these

types of questions encourage participants to continue explicating their thought processes

and do not lead them to explain their thoughts, which can alter the thought process

(Ericsson & Simon, 1993). Specific questions seeking clarification regarding what a

participant said during the think-aloud process were not asked until after he or she had

finished the grammar test. These were all general questions, found in Appendix C, that

were not used to probe short-term or episodic memory and did not target specific items

on the test.

3.3.2 Coding Scheme.

The think-aloud procedure reported cognitive processes (Ericsson & Simon,

1993). The data collected during the think-aloud procedure reflected rules and

knowledge stored in the long-term memory of participants that were accessed in order to influence their cognitive process (Ericsson & Simon, 1993). The cognitive process itself, thinking during the task, operates at an unconscious level (Gass & Mackey, 2000). During language use, learners utilise various types of strategies, such as cognitive, metacognitive, or social (Cohen, 2005; Ehrman et al., 2003; Oxford & Burry-Stock, 1995; Swain et al., 2009). Cohen (2003) argued that cognitive strategies are relevant during tasks such as manipulating language structures, which suggested participants would utilise them during the grammar test. Purpura (1997) indicated that learners may employ cognitive strategies dealing with prior knowledge and rules in L2 testing situations. It is therefore possible that research utilising a grammar task could elicit verbal reports of strategy use from participants that are different from those found in research utilising communication tasks, such as Cohen (1995) or Swain et al. (2009). Hence, strategies where participants link to existing knowledge formed the basis of the coding scheme, which was designed to explore and identify the grammar rules and types of prior knowledge accessed by participants during the verb-form transformation process on the grammar test.

The coding scheme was also designed with the possibility of revision in mind, specifically the types of prior knowledge identified,[16] due to the unpredictable nature of this type of data (Gass & Mackey, 2000). After analysing the think-aloud data, the coding scheme ultimately identified four types of prior knowledge that participants linked

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[16]   Sample data collected before the main study identified the application of grammar rules and linking the items on the collector to known vocabulary.

to in order to perform the verb-form transformation task: vocabulary, the Japanese sound system, morphology, and explicit grammar rules. Links to these types of knowledge and the application of the explicit grammar rules presented in Banno et al. (1999) constitute the coding scheme categories in Table 2:

Table 2

Coding Scheme Categories with Examples

Knowledge	Characteristic	Example
Vocabulary	Links to known vocabulary	"I try to remember one of the verbs that I do know that has the same ending."
Phonology	Links to known, allowable sound structures	"…either *furaite* or it's with the small *tu* [*furaitte*], I'm going to put *furaite* because it sounds better."
Morphology	Overtly identifies a verb root, stem, or base for affixation	"I'm copying what I think is the root of the verb."
Grammar	Applies an explicit grammar rule	"When we learn the rules for *te*-form we learn that *su* turns into *site*."

To constitute a use of Vocabulary knowledge from Table 2, data must have shown a clear indication of the participant linking input from the invented verbs on the test or output to a word that the participant has learned in order to derive an answer. Examples of data indicating this are found in Appendix D. For participants who used this type of

knowledge, the retrieval of verbs in their various forms was part of the derivation process during the task.

The participant linking output to his or her knowledge of Japanese phonotactics, as understood by the participant, indicated a use of Phonology knowledge from Table 2. Further examples can be found in Appendix E. This was a comparison of the output to the participant's own conception of allowable sound structures, or Japanese phonotactics, that were retrieved from long-term memory as part of the derivation process. This knowledge was used by participants in order to judge whether or not output sounded close to or far from his or her own conception of Japanese phonology.

The data must have indicated that a learner was actively trying to identify a specific verb root, stem, or base for affixation in order to count as an example of Morphology knowledge from Table 2. For these participants, retrieving knowledge of how to identify morphemes and apply rules for affixation of a suffix to the root, stem, or base of a verb was a step of the verb-form transformation task, and Appendix F contains more examples.

The Grammar knowledge category from Table 2 was reserved for data that indicated the application of an explicit grammar rule, typically learned via the classroom or text-book. Regarding this type of knowledge, the retrieval and application of explicit verb-form transformation rules from prior grammar lessons was crucial to the derivation process. Examples of these data are found in Appendix G.

3.3.3 Data analysis.

Quantitative data were amassed by scoring each verb in its gerund form on every written test as either correct or incorrect. With these data, Microsoft® Excel® 2008 for Mac version 12.2.5 was used to calculate descriptive statistics and generate charts. The oral think-aloud data collected during the grammar test were transcribed and then coded, by two individual coders, based on the coding scheme. Each of these two coders individually analysed all the transcriptions of the verbal report data in order to identify the types of knowledge each participant retrieved and linked to during the think-aloud session for each item on the grammar test. The four types of knowledge identified are found in Table 2 in section 3.3.2. An inter-coder reliability rating of 100% was achieved through agreement between the two coders upon each instance of an identified form of knowledge based upon the coding scheme's criteria in section 3.3.2.

Instances wherein multiple types of knowledge were indicated by the data during the verb-form transformation process were coded under multiple categories. For example, regarding Item #21 (*zorimimasu / zorimu*) P8 reported:

Excerpt #1: I'm just thinking that *ri* sounds really weird to say like *zorite*, like I just haven't heard it before so in a verb I'm trying to think of other verbs that have a *ri* and then *te* next to it so I'm just wondering if that sounds kind of weird and if that would end up like I should be adding the *mi* or the *mu* to the end because without it it sounds odd so I'm wondering which one to do, but I think I'm just going to, *zorimite* sounds like, I don't know more unfamiliar so I'm just going to put *zorite* even though it

sounds odd still to me and I don't know what it is but that's what I'm

going to put.

In the underlined portion of this verbal report, P8 retrieved two types of knowledge in

order to derive a gerund form for this item. P8 used prior knowledge of phonology to

judge whether possible answers sounded similar to known vocabulary. So in this case,

during the derivation process there is an indication of both the Phonology category and

the Vocabulary category based on the criteria of the coding scheme in section 3.3.2.

Similarly, P3's verbal report for Item #1 (*hekesimasu* / *hekesu*) indicated both the

Grammar category and the Phonology category:

Excerpt #2: First look at the *masu* form then I look at the dictionary form

and take away the, I guess the ending, or take away *su* and *su* is replaced

by *site* for the most part so then I say *hekesite* and to me kind of if it

sounds right it kind of works.

The underlined portion of this verbal report indicated the retrieval and application

of not only the grammar rule regarding /s/-final verbs, discussed in section 2.3, but also

linked to the participant's phonological knowledge in order to judge whether or not the

output sounded acceptable.

The data collected were analysed in order to address the six research questions.

Furthermore, the data captured the tendencies of how participants transformed verbs on a

per root-final-segment basis.

CHAPTER FOUR: RESULTS AND DISCUSSION

The results of the written and oral data are reported and analysed with descriptive statistics in this chapter, followed by the limitations of the methodology, the pedagogical implications of this research, and directions for future research.

Test scores of participants range from 5 (22.73%) to 22 (100%), with a mean of 16.58 (75.38%), a median of 18.50 (84.09%), and a *SD* of 6.05.[17] Individual scores are shown in Table 3:

Table 3

Individual Scores

Stem	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
i	2	2	1	2	2	2	2	1	2	2	2	2
e	2	2	2	2	2	2	2	2	2	2	2	2
a	0	0	2	2	2	2	2	2	2	2	2	0
t	0	2	0	2	2	2	2	0	2	2	2	0
r	0	2	2	0	2	2	2	1	2	2	2	0
m	0	2	2	2	2	2	2	0	2	2	2	2

[17] The results of participants from each institution are similar: range of scores = 5 - 22 and 6 - 22, *M* = 16.43 (74.68%) and 16.80 (76.36%), and *SD* = 5.97 and 6.87. These large standard deviations found throughout the results are representative of a wide range of scores that deviate from the mean, indicative of an abnormal distribution curve and a high degree of variability in the distribution of scores (Healey, 2007).

Stem	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
b	0	0	2	2	2	0	2	0	2	2	2	2
n	0	1	1	2	2	0	2	0	0	2	2	2
k	0	2	0	2	2	0	2	0	2	2	2	1
g	0	2	0	2	2	0	2	0	2	2	2	2
s	1	2	2	2	2	2	2	0	2	2	2	2
Total	5	17	14	20	22	14	22	6	20	22	22	15
	(23%)	(77%)	(64%)	(91%)	(100%)	(64%)	(100%)	(27%)	(91%)	(100%)	(100%)	(68%)

Note. P = Participant

What follows is an analysis of the processes and strategies utilised by participants during the verb-form transformation that addresses the research questions of this study and explores the individual results shown in Table 3.

4.1 Question One: Are Participants Aware of Verb Stems?

The first question addresses whether or not the participants are aware of verb stems, the morphological base to which a suffix is affixed. Of the twelve participants, only P1 and P4, scoring 5 (22.73%) and 20 (90.91%) respectively, made an overt reference to finding a root in order to attach the suffix -*te* as part of their derivation process. Both P1 and P4 had a problem identifying verb stems and their average accuracy regarding V-final stems is 100%, whereas their average accuracy regarding C-final stems is 0%, indicating they are unable to do so.

Given that only 2 (16.67%) participants sought to identify verb stems, the results suggest that participants were not generally aware of morphological features, which Leow (2001) argued contributes to the intake of grammatical information. Furthermore, these participants are only accurate with V-final verbs. In terms of Processability Theory (Pienemann, 1998), JFL learners approach the second stage where meaning is mapped to lexical items, but not to the actual root and suffix in the case of C-final verbs. Indeed, current pedagogy regarding the gerund form promotes the memorisation of words as invariant forms, the first stage, and the identification of chunks of the verb, which cross morpheme boundaries. According to Kawaguchi (2000), the gerund form transformation is a process at the third stage of acquisition where information is exchanged between morphemes within the verb phrase. To help learners move to the third stage, Lowie (1998) argued that awareness of morphology stimulates a learner to match meaning with form. In these terms, current pedagogy does not promote comprehension of the transformation process. This leads to the question of how P1 and P4 identified verb stems.

4.2 Question Two: How Do Participants Identify Verb Stems?

The second question explores the processes by which participants identify verb stems. The participants who overtly attempt to identify verb stems, P1 and P4, do so by a process of removal. P1 and P4, scoring 5 (22.73%) and 20 (90.91%) respectively, removed the final character from the plain, non-past form in order to identify what they termed the root and appear oblivious to morpheme boundaries regarding C-final verbs and McCawley's (1968) moraification process from section 2.1. Further, although P1

removed a portion of both verb-forms provided on the collector in order to identify the root, P4 considered only the plain, non-past verb forms during this process, as shown by the data in Table 4:

Table 4

Verb Stem Identification Processes

Participant	Data Excerpts
P1	P1: "…I'm copying what I think is the root of the verb"
	R: "How do you figure out what the root is?"*
	P1: "The first thing I do is if I'm looking at the polite form I take off the *masu* and if I'm looking at the dictionary form then I take off the last character and then, but it's not as simple as that because if I look at *hekesimasu* [Item #1] I think that I would need to remove the *si*, the *simasu*, and then I take *he* and the *ke* and I add the *te* so my guess is that it's *hekete*"
P4	P4: "So this ended in *su* and hopefully I'm not wrong and if it's *su* then you convert to *site* and I just tack it on to the root, which is *heke* [Item #1]"
	P4: "…I didn't look at this column [polite, non-past] the entire time. There's no point because everything is based on the root so this is just a conjugated form so I think that would just screw you up to look at this"

Note. P = Participant; R = Researcher; *asked retrospectively after the test

Leow (2001) posited that meta-awareness of verbal morphology should relate directly to accuracy in written production of verb forms. Yet, these participants successfully identified only V-final stems. Reasons for this could be caused by the phonetic orthography *hiragana* or confusion about what a stem, or root, actually is. As discussed in sections 2.1 and 2.2, morphological boundaries occur after a *hiragana* character with respect to V-final stems, but occur inside these characters with respect to C-final stems. Section 2.3 also covers the terminology presented to adult JFL learners whose first language is English: verb base and verb stem. Strictly speaking, what Banno et al. (1999) have termed verb base equates to a morphological root and verb stem equates to the portion of a given verb that occurs before *-masu* in the polite, non-past form. The crucial distinction between what Banno et al. (1999) have termed verb stem and the true morphological stem, the focus of this question, is the fact that the two are always identical with respect to V-final verbs and always different with respect to C-final verbs.

In the case of Item #1 on the collector, which appears in Table 4, the stem and root are each *hekes-*, and the portion that precedes *-masu* is *hekesi*. Participants had been taught to identify these items as verb base and verb stem respectively, but P1 and P4 identified both as *heke* as if the verb were V-final rather than C-final. Although P4's process was consistent, P1's process was inconsistent and involved determining whether or not to include the character before *-masu* as part of the stem. Nonetheless, the processes of both participants lead them to identify all stems as V-final and they are therefore incapable of identifying a C-final stem, which helps explain the participants'

test scores. Given this and the fact that the majority of participants do not attempt to identify verb stems, I move to how participants categorise verbs.

4.3 Question Three: How Do Participants Determine Stem-Finality?

The question of how JFL learners determine stem-finality is based on the assumption that this is the first step of the verb-form transformation process. As section 2.3 mentions, verb-form transformation lessons encourage JFL learners to memorise verbs in sets and to categorise verbs as *ru*-verbs and *u*-verbs, V- and C-final respectively, based on their final *hiragana* character, and sometimes the V before it (Banno et al., 1999). When learning the gerund form, this distinction is crucial because different rules apply to each category and C-final verbs are subcategorised further during this grammar lesson.

No participants determined verb root-finality insofar as identifying the final segment of a given verb in the process of deriving the gerund form. Instead, all participants who categorised verbs did so by means of examining the final character of the plain, non-past form as Banno et al. (1999) have suggested in chapter six of *Genki 1*. This outcome is unsurprising because JFL learners do not generally encounter grammar lessons that focus on verbal morphology and the identification of specific morphemes, such as a root or suffix. Grammar lessons typically focus on the rote memorisation of explicit rules and patterns such as "remove the *hiragana* character *u*, *tu*, or *ru*, and add *tte*" (adapted from Banno et al., 1999, pp. 118-119).

Additionally, instructions given without the use of Romanisation do not allow for the morphological segmentation of C-final verbs. Romanisation does not harm

acquisition (Hatasa, 2002), but even if such instructions were given, JFL learners must be ready to integrate this form of segmentation into their derivation process (Ellis, 2005). For JFL learners to comprehend verbs in this manner they would have to be ready for, or already at, stage three of Processability Theory wherein information exchange occurs at the phrasal level (Pienemann, 1998), between morphemes within a syntactic phrase, as discussed in section 2.2. Now, I move on to an examination of the processes by which participants derive the gerund.

4.4 Question Four: How Do Participants Derive Verb-Forms?

How participants are taught to derive the gerund verb-form in Banno et al. (1999) is a multifaceted process that begins with verb categorisation. This question explores whether and how participants categorised verbs and compare their forms.[18] To begin the examination of the derivation process, an analysis of the methods by which these participants identified verbs as *ru*-verbs or *u*-verbs, V- or C-final stems respectively, can help explain their individual scores:

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[18] The order of appearance and segmentation of this portion of the transformation process from strategies is for organisational purposes only and is not meant to imply a standard order of operations.

Table 5

Verb Categorisation Methods with Scores

Method	*N*	Range of Scores	*M*	*SD*
V-final category only	2	5 - 6	5.50 (25.00%)	0.71
C-final category only	1	15	15.00 (68.18%)	n/a
V- and C-final categories	9	14 - 22	19.22 (87.37%)	3.38

Table 5 includes three verb categorisation methods wherein two methods contain only one verb category (e.g., V- or C-final) and each of these different processes yields distinctly different results. Neither P1 nor P8, who employed only the V-final category in Table 5, explicitly mentioned verb categories. P1 and P8 treated all verbs as V-final and scored correctly on C-final verbs only by means of strategic use of prior knowledge. Because of this, P1 and P8 never provide the voiced suffix allomorph *-de* in their answers. The sole participant who utilised only the C-final category from Table 5, P12, also made no mention of verb categories but seems to have treated all verbs as C-final due to the application of the explicit grammar rules associated with C-final verbs, discussed in section 2.3 example (28). However, this participant confused the rule wherein the final *hiragana* characters *u*, *tu*, and *ru* are replaced with *tte* by replacing the endings with only *te*. This error results in the correct answers for V-final tokens and incorrect answers for all six C-final tokens ending in /a/, /t/, and /r/. The correct answers yielded by this particular categorisation method would not likely be recognised by an instructor as the by-product of a mistake. Furthermore, this error may not be plainly obvious to listeners when an L2 learner speaks because the difference between /t/ and the geminate /t:/ may

be unnoticed or overlooked. Also, Kanda and Beglar (2004) argued that successful communication might stifle grammatical accuracy. The remaining nine participants utilised V- and C-final categories, *ru*-verbs and *u*-verbs, as Banno et al. (1999) have instructed. Although P2 termed the two categories *ru* and non-*ru* and P4 termed them regular and irregular, the categories equate to *ru*-verbs and *u*-verbs respectively so I count P2 and P4 as using V- and C-final categories. Also, P4 mistook all C-final verbs as irregular but still applied regular grammar rules to them.

Another means by which participants identified verbs was the comparison of verb forms. The collector provided two verb-forms for each item: the polite, non-past *Polite form* and the plain, non-past *Dictionary form*. As discussed in section 2.2, verbs in the polite, non-past form end in either the V /e/ or /i/ followed by suffix *-masu*. Because this environment can indicate a V-final verb stem, the plain, non-past forms were provided in order to indicate which verb stems were C-final. In fact, only the plain, non-past verb-form is required in order to transform all but /r/-final verbs to the gerund form. The majority of participants compared both of the verb-forms in this situation, as illustrated by P6, "when it's [plain, non-past form] the *ru* then it's always a tricky *u*- or *ru*-verb, so I just look at the *-masu* form [polite, non-past form] and see if it has a *ri* in it then it's probably an *u*-verb." The results of how many participants compared the provided verb-forms follow in Table 6:

Table 6

Verb-form Comparison with Scores

Comparison	*N*	Range of Scores	*M*	*SD*
Both provided forms	10	5 - 22	17.30 (78.64%)	5.52
None	2	6 - 20	13.00 (59.09%)	9.90

Table 6 illustrates that the majority of participants compared both of the verb-forms provided on the collector as part of their derivation process, notwithstanding P1 who compared the forms yet still categorised all verbs as V-final. However, P4 and P8 did not compare forms and used only the plain, non-past verb-form during the transformation to the gerund form. P8 categorised all verbs as V-final and derived the gerund via use of prior knowledge discussed in section 4.6. The remaining participant who did not compare forms, P4, produced an expected error in which both /r/-final verbs were not distinguished from V-final verbs. P4 focused solely on the final *hiragana* character of the plain, non-past form and treated every verb ending in *ru* as a V-final verb. I now move to the strategies employed by participants during the verb-form transformation process.

4.5 Question Five: What Types of Knowledge are Involved in These Processes?

To address the question of what types of knowledge participants employed during the verb-form transformation process, I begin with a discussion of the types of knowledge identified by an analysis of the think-aloud data. Next, I cover the effects of the presence and absence of each type of knowledge on individual answers to items on the collector.

Finally, this question concludes with further examination of the combination of these types of knowledge during the process of deriving the target form.

The presence and absence of each type of knowledge with respect to scores is discussed in subsections 4.5.1 through 4.5.4. The scores of participants who did or did not use each of the four types of knowledge are displayed in Table 7:

Table 7

Employed versus Unemployed Knowledge Categories with Scores

Knowledge	Participants	N	Range of Scores	M	SD
Vocabulary	P1, P2, P6, P7, P8, P9	6	5 - 22	14.00 (63.64%)	7.13
No Vocabulary	P3, P4, P5, P10, P11, P12	6	14 - 22	19.17 (87.12%)	3.71
Phonology	P1, P3, P4, P5, P6, P8, P9	7	5 - 22	14.43 (65.58%)	6.83
No Phonology	P2, P7, P10, P11, P12	5	15 - 22	19.60 (89.90%)	3.36
Morphology	P1, P4	2	5 - 20	12.50 (56.82%)	10.61
No Morphology	P2, P3, P5, P6, P7, P8, P9, P10, P11, P12	10	6 - 22	17.40 (79.09%)	5.27
Grammar	P2, P3, P4, P5, P6, P7, P9, P10, P11, P12	10	14 - 22	18.80 (85.45%)	3.46

Knowledge	Participants	*N*	Range of Scores	*M*	*SD*
No Grammar	P1, P8	2	5 - 6	5.50	0.71
				(25.00%)	

Note. P = Participant

4.5.1 Vocabulary knowledge.

Participants who used Vocabulary knowledge score an average of 14.00 (63.64%) and those who did not use it score 19.17 (87.12%). The results in Table 7 suggest that linking the test item input to known verbs and their conjugated forms can be a viable means of transforming verbs. However, this works for some and not others because it comes with the caveat that the learner must be able to identify the input in some way, such as by categorisation or form comparison, and then accurately link it to the forms of known vocabulary. This method is used successfully by P2, P6, P7, and P9, who average 18.25 (82.95%), and unsuccessfully by P1 and P8, who average 5.5 (25.00%). For example, P9 scores 20 (90.91%), linked Item #18 (*miwabimasu* / *miwabu*) to the verb *asobu* 'play' in the underlined portion of the excerpt:

> Excerpt #3: *Miwabu, bu, bu, bu, bu, asobu, asonde*, that's something I use
> too is *asobu* 'cause you learn it quite early. It's *asobu* and so I always just
> work with it and so whenever I hear something with *bu* I go *asobu* I go
> *asonde*, so I always know the ending is that so *miwande*.

Unlike P9, who used this type of knowledge successfully, P1 scores 5 (22.73%) and was unable to link the input to known vocabulary. Also, P8 scores 6 (27.27%) and focused only on whether or not sound structures were attested in known vocabulary. When

considering the output *zorite* regarding Item #21 (*zorimimasu / zorimu*) P8 reported, "I'm

trying to think of other verbs that have a *ri* and then *te* next to it…so I'm just wondering

if that sounds kind of weird." This indicates and is coded as a use of both Vocabulary

knowledge and Phonology knowledge, as mentioned in section 3.3.3. It is crucial to note

that P8's process only identified sounds, such as *ri* followed by *te*, and did not retrieve

vocabulary knowledge from long-term memory in order to link to verbs in their various

forms while generating output.

When linking input to known vocabulary in the target form, it seems that

participants may or may not link to the words Banno et al. (1999) have used consistently

as prototypical examples throughout *Genki 1*.[19] For instance, regarding the /m/-final Item

#12 (*yugomimasu / yugomu*) P2 reported, "*yugomu, yugomu, mu*, I think *yomu, yonde*"

and P6 reported, "and *yugomu* is like *yomu* so *yonde* so *yugonde*." Conversely, P9

reported linking to *nomu* 'drink', "*yugomu, nomu*, oh wait again *nomu* is *nonde, yugonde*"

and P7 reported, "*yugomu, yugomimasu*, so that would be *yugonde*, which is similar to

nomu, which is *nonde*." So, whereas P2 and P6 link to the prototypical example of

Banno et al. (1999) for /m/-final verbs, P7 and P9 both link to another /m/-final verb from

a previous vocabulary lesson in *Genki 1*.

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[19] For example, the verb *yomimasu / yomu* 'read' (*yonde* in the gerund form) has been used consistently by

Banno et al. (1999) as the prototypical example for /m/-final verbs in *Genki 1* during grammar lessons.

4.5.2 Phonology knowledge.

According to Eckman, Abdullah, and Iverson (2003), "L2 phonology is a highly abstract enterprise parallel to the phonologies of primary languages, rather than – as has often been assumed – a mere imitation of the target language's pronunciations" (p. 170). As indicated in Table 7, participants who linked to phonological knowledge average 14.43 (65.58%) and those who did not average 19.60 (89.90%). Regarding Phonology knowledge, participants seem to be in the process of developing an interlanguage phonology[20] that allows them to judge what sounds Japanese to them and what does not. For example, while deriving Item #5 (*tinagimasu* / *tinaide*), P5, who scores 22 (100%), reported:

> Excerpt #4: So, *tinaide*, I just kind of have to say it to myself just to see if
> it sounds right 'cause even if a lot of times even if I feel like the
> information I have is telling me that's the way I need to do it I like to hear
> the sound of it because I find it helps me a lot to know whether or not I'm
> on track or at least it helps assure me anyway.

In addition to judging answers, the data indicate that linking to phonological knowledge is also used to categorise verbs. While determining whether Item #4 (*habimasu* / *habiru*) is V- or C-final, P5 reported:

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[20]   Interlanguage is "the language produced by a nonnative speaker of a language (i.e., a learner's output)" (Gass & Selinker, 2001, p. 455). It is an "evolving, variable linguistic system" (Tarone, 2007, p. 845) wherein the target language phonology can contain both correct L2 information and incorrect information transferred from L1 (Archibald, 2005).

> Excerpt #5: If I drop the *ru* and just add the *masu, habimasu*. Does that
>
> sound correct? Had it been like an *o* sound or something like that <u>it would</u>
>
> <u>have been like *haomasu* and it wouldn't have sounded right and I probably</u>
>
> <u>would have figured that it would have been an *u*-verb</u> and I would have
>
> had to use *ri*.

In the underlined portion of this excerpt, P5 linked to phonological knowledge in order to

determine that Item #4 (*habimasu* / *habiru*) is /i/-final rather than /r/-final and then

applied the correct grammar rule.

P8 scores 6 (27.27%) and categorised all verbs as V-final and used a combination

of Vocabulary and Phonology knowledge during the transformation process to determine

whether or not output sounded similar to known vocabulary. This particular participant

also used Phonology knowledge to judge whether or not a geminate /t/ is required when -

te is suffixed by linking to existing phonological knowledge. For example, for Item #8

(*dakirimasu* / *dakiru*) P8 reported, "with *ki* sometimes or with *gi* like the *i* sound I just

think maybe you need a stronger sounding *t* again no reason just from listening." The

results of this process are erratic and so verbs ending in /i/, /r/, /g/, and /s/ inconsistently

end in *-tte*. This participant scores correctly on both /a/-final verbs and further probing is

needed to determine whether or not this is due to chance, as this is the only C-final verb

on which P8 consistently derived correctly.

The gerund form transformation preserves the initial C of the suffix and

sometimes alters the final segment of the root (e.g., *kik-u* 'hear-NONPST' becomes *kii-te*

'hear-GERUND' and *kir-u* 'cut-NONPST' becomes *kit-te* 'cut-GERUND'), which is a

process that can cause problems during learning (Eckman et al., 2003). Indeed, the data

indicate that participants who link to phonological knowledge might not have completely

trusted it when deriving the gerund form using both the Phonology category and grammar

rules. For instance, on Item #18 (*miwabimasu* / *miwabu*), P3 reported, "replace *bu* with

nde, *miwande*, doesn't sound right." Similarly, regarding Item #7, (*notesimasu* / *notesu*)

P4 reported, "if it ends in *su* you convert to *site*…and if I was right about *su* the first time

this one should be *notesite*, it sounds kind of weird though but whatever." In both of

these cases, the participants derived the correct answer by the application of grammar

rules, but the participants each judged their output negatively when linking it to their own

interlanguage phonology. P3, P4, and P6 average 16 (72.73%) and seem to have trusted

their knowledge of grammar over their interlanguage phonology by keeping answers

derived via grammar rules while still appearing sceptical of how these answers sound.

This relates to Chikamatsu's (2006) finding that L1 English speakers learning Japanese

switch to a visual form of word recognition when a given word occurs out of context, to

ensure the appropriate orthographical characters are present rather than relying on how a

word sounds, except in the case of poor readers.

Overall, use of Phonology knowledge seems to have helped participants during

the process of verb-form transformation in terms of categorising verbs and judging output.

Also, participants did not always seem to trust their own negative judgements, but linking

to prior knowledge of phonology does seem to lead to a sense of assurance for some.

4.5.3 Morphology knowledge.

Explicitly identifying a root, stem, or base in order to affix a suffix demonstrated

a link to morphological knowledge. The categorisation of a verb as V- or C-final did not

constitute a use of morphological knowledge because participants identified verbs as *ru*-verbs and *u*-verbs based on the final orthographical character of the plain, non-past form rather than the stem-final segment. As discussed in section 4.2, P1 and P4 attempted to identify verb stems and the process by which they did so is flawed and cannot yield C-final stems. P1 and P4, who linked to morphological knowledge, average 12.50 (56.82%) and the remaining ten, who did not link to morphological knowledge, average 17.40 (79.09%), as indicated in Table 7. P1 scores 5 (22.73%) and linked consistently to morphological knowledge by identifying what this participant considered a verb root and suffixing -*te*, without the use of grammar rules. In the case of V-final stems, P1 provided the correct target forms but seems to lack the understanding of morphophonology required to identify C-final stems and properly apply phonological processes to the individual morphemes during the transformation process. For example, for Item #1 (*hekesimasu* / *hekesu*), someone who is aware of morphophonological details could identify the stem *hekes*-, insert an epenthetic *i,* and suffix -*te* to derive *hekesite*.

The second participant who used morphological knowledge, P4, scores 20 (90.91%) and identified verb roots by removing the final *hiragana* character of the plain, non-past form. Again, all V-final stems are identified correctly but C-final stems cannot be identified in this manner. Unlike P1, this participant did apply grammar rules and replaced the removed portion of each verb with a chunk that comprised the final segment of the verb stem along with the suffix. For example, on Item #3 (*bamitimasu* / *bamitu*) P4 reported, "*bamitu*, if it ends in *tu* it becomes little *tu* plus *te* and the root is *bami* so *bamitte*."

In sum, each participant who used this type of knowledge was unable to identify C-final stems and therefore cannot rely on knowledge of morphology alone to derive the gerund form. This coincides with the findings of Kanda and Beglar (2004) wherein verb-forms are not necessarily transparent to the learner and the authors therefore stressed the importance of lessons that focus on verb-form accuracy with clearly indicated morphological information that promotes transparency, which, according to Lowie (1998), may be a general principle of L2 acquisition.

4.5.4 Grammar knowledge.

The most dramatic range of scores regarding the use of prior knowledge employment belongs to Grammar knowledge. Participants who utilised this strategy linked to knowledge of grammar rules taught in verb-form transformation lessons. As shown in Table 7, the participants who applied grammar rules score an average of 18.80 (85.45%) and those who did not score an average of 5.50 (25.00%). Grammar rules from section 2.3, such as "with *ru*-verbs, the rule is very simple: take off *ru* and add *te*," (Banno et al., 1999, p. 118) are taught in classes and appear in the text-book *Genki 1*, which has been used by these participants. So, this lack of grammar rule application could imply that P1 and P8 have not yet acquired explicit grammar knowledge.

The majority of participants did utilise the Grammar strategy and their scores range from 14 (63.64%) to 22 (100%). For example, P10 scores 100% and on Item #2 (*torenimasu / torenu*) reported, "okay this one is *nu* and what do you do for that one, I just have to remember what the rule is I think it's *nde* isn't it, *mu bu nu* is *nde* for *te* form." In fact, the Grammar knowledge category is the only one of the four types of knowledge

that some participants used independently of other types of knowledge – P10, P11, and P12 used only the Grammar strategy and average 19.67 (89.39%). This average could have been 22 (100%) but P12 scores 15 (68.18%) and lowers the average due to an incorrect grammar rule regarding {/a/, /t/, /r/}-final verbs: *u*, *tu*, and *ru* become *te* rather than *u, tu,* and *ru* become *tte*.

Forgetting or an inaccurate recollection of grammar rules is to blame for the bulk of the incorrect answers provided by participants who employed knowledge of Grammar. Also, only P5 and P12, who score 22 (100%) and 15 (16.18%) respectively, reported using the grammar rule song presented by Banno et. al (1999). This song is meant to assist JFL learners in the memorisation of these grammar rules in the lesson regarding transformation to the gerund verb-form. P12 sang the song once in order to write down the grammar rules and P5 actually sang the song for each item on the collector in order to derive the gerund form. However, P11 scores 22 (100%) and indicated knowledge of the song but reported, "I just use the rules, the rules that you learn in the book. There's a weird song, I don't know how it goes." The seven remaining participants who utilised Grammar knowledge did not mention the song and its relationship with their memorisation of grammar rules is beyond the scope of this study.

The data indicate that P5 used the song to remember grammar rules and P11 had memorised the grammar rules, but did not know the lyrics to the song, which essentially list grammar rules. P5 and P11 have each memorised the grammar rules perfectly but have done so in the way that best suited them individually: P5 by means of a music based pedagogical tool and P11 by rote memorisation. The dichotomy shown between these

two participants regarding the song illustrates the fact that individual learners can have
different language strategy preferences (Ehrman et al., 2003).

4.5.5 Combining types of knowledge.

With the exception of P10, P11, and P12, who utilised only Grammar knowledge,
the majority of participants employed a combination of types of knowledge during the
verb-form transformation process. How these types of knowledge were combined could
depend on the individual participant and his or her own preferences, as suggested by
Cohen (2003), Ehrman et al. (2003), and Oxford (2003). Individual participants each
tended to choose different combinations of types of knowledge, and Table 8 contains a
list of these tendencies:

Table 8

Types of Knowledge Employed by Individual Participants Ranked by Score

Participant	Vocabulary	Phonology	Morphology	Grammar	Score
P5	-	√	-	√	22 (100.00%)
P7	√	-	-	√	22 (100.00%)
P10	-	-	-	√	22 (100.00%)
P11	-	-	-	√	22 (100.00%)
P4	-	√	√	√	20 (90.91%)
P9	√	√	-	√	20 (90.91%)
P2	√	-	-	√	17 (77.27%)
P12	-	-	-	√	15 (68.18%)

Participant	Vocabulary	Phonology	Morphology	Grammar	Score
P3	-	√	-	√	14 (63.64%)
P6	√	√	-	√	14 (63.64%)
P8	√	√	-	-	6 (27.27%)
P1	√	√	√	-	5 (22.73%)

Note. P = Participant; √ = type of knowledge is employed

The twelve participants produced seven different combinations of types of knowledge that individuals might have applied differently (Cohen, 2003). P10, P11, and P12 utilised only Grammar knowledge. The remaining nine participants combined types of knowledge, as shown in Table 9, and three of the six combinations were utilised by two participants each while three more were utilised by one participant each. Two of the combinations with one participant each are utilised P1 and P8, who did not utilise Grammar knowledge, scoring 5 (22.73%) and 6 (27.27%) respectively. The remaining participants utilised combinations containing Grammar knowledge and their scores range up to a minimum of 20 (90.91%), wherein three different combinations were utilised by participants who score 22 (100%). Strategies themselves, such as linking to prior knowledge, are inherently neutral in terms of effectiveness and so no one combination is clearly preferable over the others, but their effectiveness can differ depending on who uses them (Cohen, 2003), as illustrated in Table 9:

Table 9

Combinations of Types of Knowledge with Scores

Combination	N	Range of Scores	M	SD
Voc + Pho + Mor	1	5	5.00 (22.73%)	n/a
Voc + Gra	2	17 - 22	19.50 (88.64%)	3.54
Pho + Mor + Gra	1	20	20.00 (90.91%)	n/a
Pho + Gra	2	14 - 22	18.00 (81.82%)	5.66
Voc + Pho + Gra	2	14 - 20	17.00 (77.27%)	4.24
Voc + Pho	1	6	6.00 (27.27%)	n/a
Gra	3	15 - 22	19.67 (89.39%)	4.04

Note. Voc = Vocabulary; Pho = Phonology; Mor = Morphology; Gra = Grammar

With a clear idea of the various processes participants applied during the verb-form transformation process, the differences between the processes of participants who score well and those who score poorly are explored next.

4.6 Question Six: Do the Processes of Participants Who Scored Correctly Differ from Those Who Did Not, and if So, How?

This question explores whether participants who score correctly have a different process than those who score incorrectly. I begin with a discussion of the general tendencies of participants with high scores vis-à-vis those with low scores. Then, I compare scores with root-final segments. I have arranged the scores into three tiers, high, mid-range, and low. These tiers are derived from the grading schemes used by both

institutions from which the participants were recruited. In the Japanese departments of these institutions, scores of 80% and above are within the A-range of grades, scores between 60% and 79% are within the C-range and B-range of grades, and scores below 60% are minimal, or failing grades. As such, I include scores of 80% and above in the high tier, scores between 60% and 79% in the mid-range tier, and scores below 60% in the low tier, as shown in Table 10:

Table 10

Participants Grouped by Score

Tier	*N*	Range of Scores	*M*	*SD*
High	6	20 - 22	21.33 (96.97%)	1.03
Mid-range	4	14 - 17	15.00 (68.18%)	1.41
Low	2	5 - 6	5.50 (25.00%)	0.71

One half of participants compose the tier containing high scores: P4, P5, P7, P9, P10, and P11, with an average of 21.33 (96.97%). This group of participants categorised verbs as V- or C-final during the derivation process. Within this group, all four types of knowledge are attested and individual participants combined them in different ways. As discussed in section 4.5.2, individual participants tended to trust their knowledge of grammar when deriving the gerund form more than their knowledge of interlanguage phonology, which develops over time (Eckman et al., 2003). P4 and P9 made one error each: P9 treated both /n/-final verbs as /k/-final, due to confusion regarding grammar

rules, and P4 treated both /r/-final verbs as V-final due to not comparing both provided verb-forms in the input.

The two participants with the lowest scores, P1 and P8, average 5.5 (25%) and have been discussed in detail throughout sections 4.4 and 4.5. So, I will now summarise their tendencies. Both of these participants did not explicitly categorise verbs, but treated all verbs as V-final by default. Also, these participants utilised every knowledge category except Grammar knowledge, which suggests no explicit knowledge of the grammar rules presented in *Genki 1* by Banno et al. (1999). The fact that P1 and P8 did not exhibit explicit knowledge of grammar rules, but all participants who score well do, could suggest a relationship between this type of knowledge and scores. Additionally, P1 and P8 used Vocabulary knowledge but did not relate the input to known words that pattern in the same manner as the target form. Other participants who used Vocabulary knowledge did so in combination with Grammar knowledge, which could indicate a relationship between the two types of knowledge when thinking in terms of how verbs pattern in different verb-forms.

The mid-range tier in Table 10 includes P2, P3, P5, and P12, who average 15 (68.18%). These participants categorised verbs as V- and C-final and combined types of knowledge in a variety of ways. In order to examine the verb-form transformation test scores and idiosyncratic processes of individual participants within these tiers, I turn to their general trends regarding correct and incorrect scores based on stem-finality:

Table 11

Scores Grouped by Root-final Segment

Group	Tokens	*N*	Range of Scores*	*M*	*SD*
{i, e}-final	48	12	22 - 24	23.00 (95.83%)	1.41
{a, t, r}-final	72	12	16 - 18	17.00 (70.83%)	1.00
{m, b, n}-final	72	12	14 - 20	16.67 (69.44%)	3.06
{k, g}-final	48	12	15 - 16	15.50 (64.58%)	0.71
{s}-final	24	12	21	21.00 (87.50%)	n/a

Note. Each of the 11 root-final segments occurs twice on the grammar test. Since 12 participants each produced 2 tokens per root-final segment, the possible range is 0 - 24.

Regarding V-final stems, Table 11 suggests that participants had no problem deriving the gerund form. Of the 48 tokens, the /i/-final Item #14 (*sakimasu / sakiru*) is incorrectly derived twice with a geminate /t/ as *sakitte* by P3 and P8. These seem to be simple mistakes because P3 and P8 correctly transformed all other V-final verbs. The majority of participants also score well on /s/-final verbs, with all three incorrect scores belonging to P1 and P8, who did not use Grammar knowledge. One reason for this high level of performance could be that /s/-final verbs and V-final verbs transform in a similar manner regarding the polite, non-past form: *-masu* is replaced with *-te*.

The scores of the remaining segment groups seem similar, with the exception of the /k/- and /g/-final segment group that is slightly lower. To investigate groups, I turn to

the results of their individual components that are shown by root-final segment scores in Table 12:[21]

Table 12

Total Scores by Root-final Segment

N	i	e	a	t	r	m	b	n	k	g	s
12	22	24	18	16	17	20	16	14	15	16	21
	(92%)	(100%)	(75%)	(67%)	(71%)	(83%)	(67%)	(58%)	(63%)	(67%)	(88%)

Note. There are two tokens per root-final segment

Within the group of /a/-, /t/-, and /r/-final verbs, there are mistakes and systematic errors that result in an average score of 17 (70.83%), as shown in Table 11. The errors that produce incorrect scores regarding /a/-final stems are the result of inaccurate grouping and rules. For example, P12 grouped /a/-final verbs with /k/-final verbs and applied an inappropriate grammar rule, while P12 did not geminate /t/ for this entire group (/a/-, /t/-, /r/-final). The only consistent trend regarding /t/-final verbs is that all errors were made by P1, P3, P8, and P12, who treated these verbs as if they were V-final, even when categorised as C-final. Finally, all incorrect scores with respect to /r/-final

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[21] The collector contains two tokens for each of the eleven root-final segments. Of these, the total scores differ between tokens by 2 for /i/-final verbs and by 1 for /r/-, /k/-, and /s/-final verbs, but do not differ for the remainder of root-final segments. These results are found in Appendix H.

verbs are a result of these verbs being treated as V-final due to a lack of verb categorisation or improper categorisation.

In the /m/-, /b/-, and /n/-final group, the average score in Table 11 is 16.67 (69.44%), but the average score for /m/-final verbs is 20 (83%), as indicated in Table 12. P1 and P8 consistently score incorrectly on /m/-final verbs due to classifying them as V-final and made the same error with /b/- and /n/-final verbs. Additional errors involving /b/-final verbs were produced by P2 and P6. P2 grouped /b/-final verbs with {/a/, /t/, /r/}-final verbs and removed *bu* then added *tte*. P6 also grouped /b/-final verbs in the same manner and commented that -*te* must become -*de* because the diacritic that denotes voicing[22] present on the *hiragana* character *bu* must persist, and so replaceed *bu* with *dde*. The /n/-final verbs exhibit the widest range of incorrect scores. P9, who scores incorrectly only on /n/-final verbs, did not remember the exact grammar rule for verbs ending in *nu* and grouped it with /k/-final verbs due to use of Phonology knowledge, replacing *nu* with *ite*. P6 replaced *nu* with *ne* twice via use of Vocabulary knowledge and a misconception that the gerund form of the verb *sinu* 'die' is *sine*, the imperative form of 'die'. This participant noted this knowledge of *sine* 'die!' was acquired from watching Japanese animation.

The group comprising /k/- and /g/-final verbs scores the lowest in Table 11 at 15.50 (64.58%). Aside from P1 and P8, who categorised all verbs as V-final, P3 and P6 made consistent errors. Regarding /k/-final verbs, they applied the rule for the {/a/, /t/, /r/}-final group and replaced *ku* with *tte*. With respect to /g/-final verbs, P3 and P6

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[22]   As mentioned in section 2.1, the orthographical character representing /te/ becomes /de/ in this case.

treated these verbs as V-final but chose the gerund suffix allomorph *-de* instead of *-te*.

Although the rules for /k/- and /g/-final verbs are similar, they have been presented by

Banno et al. (1999) as two separate rules because /k/-final verbs suffix the allomorph *-te*

and /g/-final verbs suffix the allomorph *-de*. This could suggest that suffix allomorph

selection could be more salient than, or perhaps memorised independently from, the

grammar rules presented in section 2.3, example (28). Nonetheless, the average scores

are quite similar for these segments at 15 (63%) and 16 (67%) respectively.

An argument could be made that a participant may exhibit problems deriving

verbs due to the size of his or her own verbal lexicon.[23] For example, the verb *sinu* 'die'

is the only /n/-final verb in modern Japanese (Kodansha, 1999), and /n/-final verbs

represent the lowest score, 14 (58%) of any root-final segment represented in Table 12.

At this point in their studies, these participants were somewhere between chapters six and

ten of *Genki 1* and have been presented with somewhere between 54 and 78 different

verbs in Banno et al. (1999). Even by chapter ten, Banno et al. (1999) have presented

only one /b/-final verb and three different /s/-final verbs. The gerund form has been

taught in chapter six of *Genki 1* and what follows is chart that illustrates the total amount

of verbs learned from chapter five to chapter ten, arranged by group:

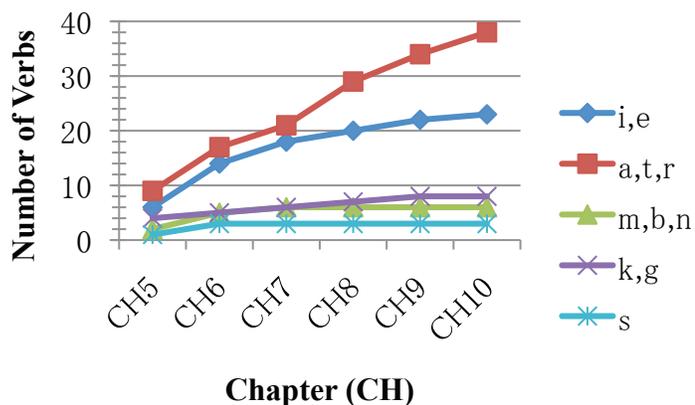[23]   The verbal lexicon is all the verbs that exist within the mental lexicon (Volpe, 2005).

Figure 1. Verbs presented in the text-book *Genki 1* by root-final segment.

The {/a/, /t/, /r/}-final group is represented the most in *Genki 1* but participants only score an average of 17.00 (70.83%). Of the C-final verbs, the /s/-final group is represented the least yet participants score 21.00 (87.50%), which could possibly be due to how similar this specific transformation is to that of V-final verbs regarding the polite, non-past form. The {/m/, /b/, /n/}-final and {/k/, /g/}-final verb roots are represented much less than {/a/, /t/, /r/}-final verb roots but exhibit similar scores, as indicated in Table 11. With respect to the verbal lexicon of participants, the proportional distribution of each root-final segment group maintains a consistent pattern throughout chapters six through ten of *Genki 1*:
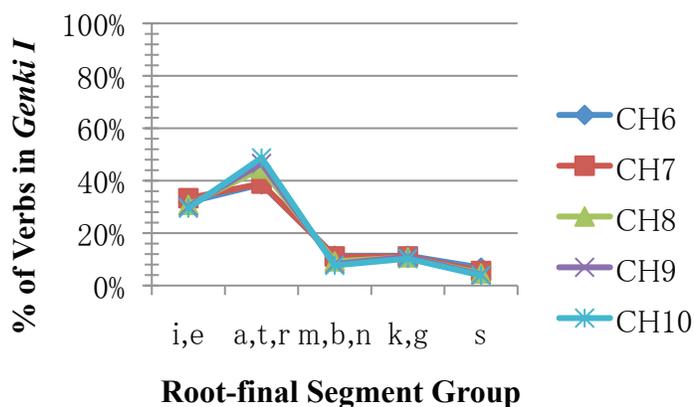
Figure 2. Percentage of verbs in *Genki I* per chapter (CH) by root-final segment group.

If the number of distinct verbs of a given root-finality presented by Banno et al. (1999) were predictive of correct scores, there should be a similar distribution of scores by root-final segment group. This does not seem to be the case, as indicated by the following chart:
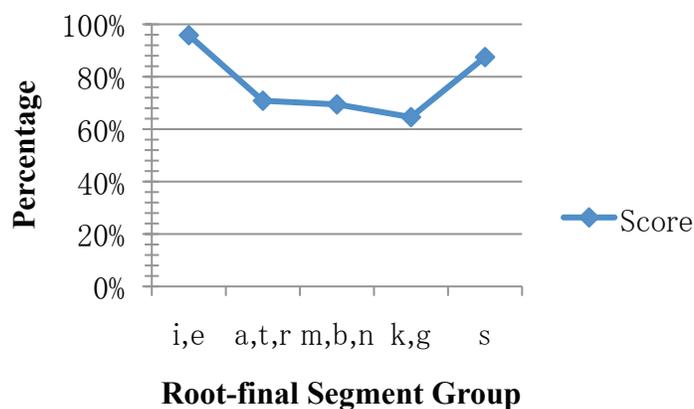

Figure 3. Average score by root-final segment group.

In-depth analyses determining the relationships between performance and vocabulary with each root-final segment are beyond the scope of the present research and are left to future study.

4.7 Summary

It is clear that verb-form transformation is a complex operation with no one set procedure for the transformation process that is clearly preferable over others. In this chapter, data indicate participants may or may not have categorised verbs before the application of grammar rules from *Genki 1* (Banno et al., 1999), if they categorised them at all. Also, knowledge of grammar rules was not always exhibited and could indicate a lack of rule-based knowledge (Ellis, 2005). Participants tended to focus on the final *hiragana* character of a given verb when determining which grammar rule to apply, suggesting underdeveloped morphological knowledge or a lack thereof (Lowie, 1998). Finally, individual participants each had their own idiosyncrasies that shaped how they derived verbs, both correctly and incorrectly, and utilised various types of knowledge, to which they linked via strategies that can combine with each other dynamically during the process of derivation (Cohen, 2003; Ehrman et al., 2003; Oxford, 2003).

4.8 Limitations of the Study

The data collected during this study have enabled the identification of four types of knowledge to which participants linked while they transformed Japanese verbs, but there are some limitations. First, due to time constraints, data were collected from each participant only once. Testing each participant multiple times would have generated

more data and enabled a re-test for reliability over time, if no learning occurred in between (Seliger & Shohamy, 2008). In addition to more data, post-tests or delayed post-tests during the semester in which data were collected may have allowed for inferential statistics or been able to measure the effect of the Japanese lessons participants received from their institutions (Seliger & Shohamy, 2008).

Second, statistically significant inferrential[24] results rely heavily upon sample size (Lazaraton, 2005). There is no firm rule regarding a minimum sample size for quantitative analyses in the field of applied linguistics, although the number 30 was once proposed (Lazaraton, Riggenbach, & Ediger, 1987). As Pett (1997) indicated, the issue of minimum sample size is "inextricably linked to issues of statistical power and also needs to be confined to the requirements of specific statistical tests (e.g., multiple regression, t tests, and ANOVA)" (p. 55). Furthermore, it is crucial to consider subgroups used during analyses (Pett, 1997). The present study is small ($N = 12$) and participants are grouped into subgroups to analyse their tendencies. For example, combinations of types of knowledge are analysed in subgroups ($n = 1, 2,$ or 3 per combination) and parametric and non-parametric analyses of the relationship between combinations of types of knowledge and scores "would be rendered impossible given the resulting small and unequal sample sizes ($n = 2$ or 3 per group)" (Pett, 1997, p. 56). It seems that only Grammar knowledge could be tested independently of other types, as P10, P11, and P12 use no other type of knowledge, but the participants who do not use

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[24] Inferential statistics is a "technique that allows researchers to generalize from samples to populations" (Healey, 2007, p. 396).

Grammar knowledge, P1 and P8, use different combinations of types of knowledge. This creates unequal, extremely small sample sizes (n = 3, 1, and 1 respectively). Additionally, the variable of verb categorisation as V- or C-final is introduced during the verb-form transformation process wherein P10 and P11 use both categories, P12 uses C-final only, and P1 and P8 use V-final only. In addition to small and uneven samples, which are not randomly selected, the presence of more than two variables violates assumptions behind nonparametric tests designed to compare two ordinal variables, such as Spearman's rho (Pett, 1997). For these reasons, the present study does not make use of inferential statistics.

The third limitation is that although oral data are collected successfully via audio recordings, video recordings would be preferable in order to observe visually the written revisions participants made to their answers during the grammar test. Additionally, the think-aloud protocol is a form of verbalised self-report of the cognitive process (Ericsson & Simon, 1993), in which the participants might not have explicated every thought.[25] Futhermore, verbal reports of grammar features could indicate "preexisting explicit knowledge or an aptitude for grammatical analysis" (Ellis, 2004, p. 264).

Fourth, due to the pool of participants available, it was not possible to test participants on verb-forms that share a transformation pattern with the gerund such as the plain past, conditional, or enumerative forms. If participants were to know these verb-forms, future research could collect more data and it may be possible to determine

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[25] For further discussion of the limitations think-aloud, please see Ericsson and Simon (1993) and Gass and Mackey (2000).

whether or not individuals use different strategies or processes when deriving different verb-forms that share a transformation pattern.

4.9 Implications and Future Research

This subsection presents the ways in which this research contributes to SLA and could inform JFL pedagogy regarding L1 English speakers, in addition to directions for future research.

Lee (1998) found that input processing and comprehension may be separate processes and therefore JFL learners, in this case, could be capable of processing input in tasks, such as verb-form transformations, without understanding the meaning of the words themselves (e.g., eat or drink). This infers that correct answers on tests, such as grammar tests, may not indicate actual language acquisition (Ellis, 2004). By using invented verbs, this study suggests that current pedagogy regarding verb-form transformations promotes a system of processing verbs based on practicing rules that can be separated from the comprehension of a verb's meaning, supporting the findings of Lee (1998). Essentially, learners are able to transform verbs via pure rule and pattern memorisation associated with a verb-form, such as gerund or past tense, which can be separated from the understanding of the meaning of the verb. Nonetheless, further discussion of the underpinnings of current pedagogy and questions regarding what JFL learners at this level may comprehend is beyond the scope of this research because the focus is on how participants currently transform verbs.

The text-book *Genki 1* by Banno et al. (1999) is shown to promote rote memorisation of terse grammar rules and words as invariant forms. By no means does

this method reflect modern teaching pedagogy that takes into account learning styles and strategies (Cohen, 2003; Oxford et al., 1990) or communicative approaches that foster knowledge of meaning-form relationships (Fotos & Ellis, 1991; Nassaji & Fotos, 2004). This suggests the source of the rift between the average scores of participants who indicated knowledge of grammar, 18.80 (85.45%), and those who did not, 5.50 (25.00%). Even with the reading and dialogue exercises Banno et al. (1999) provide, it could be that learners, such as P1 and P8, may not notice the target form and do not acquire it (Nassaji & Fotos, 2004).

Think-aloud data indicate four types of knowledge that participants linked to via language strategies during the verb-form transformation process: vocabulary, morphology, phonology, and grammar. Only 3 (25%) of the participants in the current study used grammar rules alone to transform verbs and they average 19.67 (89.39%), yet the majority of the participants, 7 (58%), average 18.43 (84%) by combining knowledge of grammar with other types of knowledge based on individual language learner strategies (Cohen, 2003; Ehrman et al., 2003; Oxford, 2003). Therefore, the language learner strategies employed by participants in the present study could potentially be integrated into pedagogical materials if instructors and institutions have not already done so. Further research is required in order to examine whether verb-form transformation would benefit from training learners to develop their strategies with student-centred lessons focusing on individual strategy preferences, strategy awareness raising, and possibly strategy training.

The present study indicates that participants have deficiencies in types of knowledge beyond grammar rules. Also, 10 (83%) of the participants do not indicate

prior knowledge of morphology and the 2 (17%) who do cannot identify C-final verb-stems. It is anticipated that an emphasis on morphology could be used to make stem-affix boundaries more transparent to JFL learners, possibly via the use of Romanised orthography, which is not harmful to development (Hatasa, 2002). This could contribute to raising awareness of forms and help build and retain vocabulary (Lowie, 1998). Vocabulary knowledge is used by 6 (50%) of the participants, who average 14.00 (63.64%), and it can be used for accurate verb-form transformations. Furthermore, vocabulary knowledge has been linked to the ability to infer the meaning of words from context (Nassaji, 2004). A learner stores vocabulary items in his or her lexicon along with the phonemes that compose the words (Eckman et al., 2003), and these phonemes may contribute to the development of his or her interlanguage phonology.

Although the three major categories of Japanese verbs are V-final, C-final, and irregular verbs, this research is limited to V- and C-final verbs. Japanese irregular verbs do not pattern as simply V- or C-final, they transform erratically and must be memorised individually.[26] Hence, irregular verbs require prior knowledge of an individual verb in its various forms, but the collector in the present study comprises invented verbs specifically to ensure that participants cannot use prior knowledge of the items during the grammar test, following Lee (1998). And so, irregular verbs could not be tested with this methodology and participants were not informed of the presence or absence of irregular

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[26] For example, the root of the irregular verb 'come' (*kimasu* / *kuru*) is unclear (e.g., *ki-*, *ku-*, or *k-*) and its gerund form is *kite*. The gerund form indicates that 'come' patterns like a V-final verb, but V-final verbs may not end in /u/ (Banno et al., 1999).

verbs on the grammar test. Future studies could explore the strategies and types of knowledge involved during the transformation of irregular verbs that do not fit standard conjugation patterns.

Also, L2 learners of Japanese, and possibly other agglutinative languages, could likely utilise similar processes with respect to other word types or verb-forms. In the case of Japanese, adjectives operate in a similar manner to verbs morphologically and actually share a number of suffixes. In fact, Japanese verbs reach an inter-phrasal stage in some forms wherein the affixed auxiliary is housed in an adjectival or adverbial phrase and is further inflected with corresponding adjectival suffixes (Kawaguchi, 2000). Additionally, the morphophonological transformations found in the derivation of the gerund mirror those found in derivation of other forms, such as the plain past, conditional, and enumerative. Hence, JFL learners who attend to morphological knowledge will have increased "type-familiar processing" (Lowie, 1998, p. 202) and could transfer their knowledge from this form to related forms. Further research is necessary to test these predictions and determine the processes used by learners who score correctly and incorrectly on various root-final segments.

More research is required to build upon and analyse the tendencies of JFL learners who transform verbs successfully and unsuccessfully as well as the interrelationships between types of knowledge they employ, including how the use of strategies, types of knowledge, and their interrelationships may evolve over time. A larger scale study could probe verbal reports of language learners with various L1s or proficiency levels and possibly identify more strategies and types of knowledge different learners employ or the effects of different instructional methods in an experimental study.

CHAPTER FIVE: CONCLUSION

The present research attempts to examine the complexities L2 learners can face during the acquisition process of an agglutinative language like Japanese that can exhibit complex morphophonological changes during the affixation, or verb-form transformation, process. In the present study, early JFL learners whose L1 is English do not seem to have a true knowledge of verbal morphology with respect to verb roots. Rather than attending to root-finality, verbs are generally categorised by these learners as ending in *ru* or *u* before the application of grammar rules via the identification of the final character written in the phonetic orthography *hiragana*. These learners memorise grammar rules wherein the final *hiragana* character, which represents the final sound of a given verb, is removed and replaced with a chunk that contains a portion of the verb-stem and the entire suffix in the case of C-final verbs. In some cases, learners retrieve an entire word from long-term memory as an invariant form during the verb-form transformation process. Also, learners can transform verbs via memorisation alone and may do so without comprehending meaning.

During the verb-form transformation process, think-aloud data indicate learners may employ Vocabulary, Morphology, Phonology, and Grammar knowledge. Learners who scored successfully make heavy use of grammar knowledge and the majority of them combine types of knowledge in various ways. Makers of JFL pedagogical materials can draw upon the findings of the present research in order to generate new materials that address learning preferences. The findings are a reminder that the L2 language teacher should consider the needs of each individual student because the data indicate tools, such

as grammar rule practice, mnemonic devices like songs, and dialogue tasks may not be enough to help every student acquire language. Learners at this stage are still in the process of acquiring interlanguage morphology, syntax, and phonotactics in addition to vocabulary and they can do so at different speeds and in different manners.

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APPENDIX A

Background Information Questionnaire

Please fill out the following information:

Background Information		
Gender:	Age:	Place of Birth:
Educational Experience:		
First Language(s):		

Language Learning Experience	
Language(s)	Current Knowledge Level / Ability

Location(s) of Japanese Study / Learning:	
Number of hours per day speaking Japanese:	
Number of hours per day studying Japanese:	
Length of stay in Japan (if applicable):	

When finished, please await instructions before turning over this page.

APPENDIX B

Grammar Test

I am interested in what you think about as you perform the following exercise. Please

narrate what you are doing by 'thinking aloud' while you compare the Polite '－ます' and

Dictionary '－る' forms of each verb before you write down the Gerund '－て' form. By

'think aloud,' I want you to say out loud everything that comes to your mind while you

complete each item (#1-22).

Verb #	Polite '-ます' form	Dictionary '-る' form	Gerund '-て' form
1.	へけします	へけす	
2.	とれにます	とれぬ	
3.	ばみちます	ばみつ	
4.	はびます	はびる	
5.	ちなぎます	ちなぐ	
6.	げはびます	げはぶ	
7.	のてします	のてす	
8.	だきります	だきる	
9.	かべます	かべる	
10.	ぴさいます	ぴさう	
11.	ひすぎます	ひすぐ	
12.	ゆごみます	ゆごむ	
13.	こらいます	こらう	
14.	さきます	さきる	
15.	ぬもきます	ぬもく	
16.	ふらにます	ふらぬ	
17.	そつります	そつる	
18.	みわびます	みわぶ	
19.	よろきます	よろく	
20.	わせます	わせる	
21.	ぞりみます	ぞりむ	
22.	ねせちます	ねせつ	

APPENDIX C

Guiding Script

Before the test:

- Give the background information questionnaire to the participant and allow them to complete it.

- Read instructions for the grammar test to the participant:

  "I am interested in what you think about as you perform the following exercise. Please narrate what you are doing by 'thinking aloud' while you compare the Polite '－ます' and Dictionary '－る' forms of each verb before you write down the Gerund '－て' form. By 'think aloud,' I want you to say out loud everything that comes to your mind while you complete each item (#1-22)."

- Allow for questions regarding clarification of the instructions.

- Inform participant that the session will last 30 minutes.

- Begin audio recording.

- Ask participant to read the instructions and begin the grammar test.

During the test:

- Ask the participant to think out loud of he or she seems to stop doing so.

- Do not provide reactions or responses to statements or questions.

Table 13

Post-Test Questions

Questions seeking clarification of statements made during the think-aloud session
R to P1: "How do you figure out what the root is?"
R to P5: "How do you tell if it's an *u*-verb?"
R to P8: "Why do you think some verbs need emphasis?"
R to P9: "How do you tell if it's a *ru*-verb?"

Note. R = Researcher; P = Participant

APPENDIX D

Excerpts Illustrating Vocabulary Knowledge

Table 14

Vocabulary Knowledge Example Data

Examples of Linking to Known Vocabulary

P1: "…but I don't recognise the verb then I think about a verb that I do know that ends in the same character."

P2: "…sometimes I relate it to words I'm familiar with."

P6: "…I try to remember one of the verbs that I do know that has the same ending."

P7: "…I'm trying to think of other verbs that are similar."

P8: "…trying to think of other words that might be similar."

P9: "…*yugomu*, *nomu*, oh wait again *nomu* is *nonde*, *yugonde*."

Note. P = Participant

APPENDIX E

Excerpts Illustrating Phonology Knowledge

Table 15

Phonology Knowledge Example Data

Examples of Linking to Known Phonology

P1: "…I try to evaluate whether it sounds Japanese to me or not - whether or not it sounds awkward."

P3: "…I say *hekesite* and to me kind of if it sounds right it kind of works."

P4: "And if I was right about *su* the first time this one should be *notesite*, it sounds kind of weird though but whatever."

P5: "I just kind of have to say it to myself just to see if it sounds right 'cause even if a lot of times even if I feel like the information I have is telling me that's the way I need to do it I like to hear the sound of it because I find it helps me a lot to know whether or not I'm on track or at least it helps assure me anyway."

P6: "*zorimu*, *zorinde*, *zo*, *rin*, that doesn't really sound right but."

P8: "I just thought like *furate*, like, I just thought it didn't sound like proper I thought like *furaite* sounded better, again just kind of yeah just sounds more easier to say if that makes any sense it just sounds easier to say so I figure if I don't know something if it sounds easier to pronounce maybe it's right."

P9: "…either *furaite* or it's with the small *tu* [*furaitte*], I'm going to put *furaite* because it sounds better."

Note. P = Participant

APPENDIX F

Excerpts Illustrating Morphology Knowledge

Table 16

Morphology Knowledge Example Data

Examples of Linking to Known Morphology
P1: "…I'm copying what I think is the root of the verb."
P4: "…I just tack it on to the root, which is *heke*."

Note. P = Participant

APPENDIX G

Excerpts Illustrating Grammar Knowledge

Table 17

Grammar Knowledge Example Data

Examples of Linking to Known Grammar Rules
P2: "…*gu* is *ide*."
P3: "…I'm trying to think what we learned in class with endings and what ones are grouped together."
P4: "…if it ends in *gu* or *ku* then if it ends in *ku* you change it to, you get rid of that and you change it to *ite* I think but if it's *gu* then you change it to *ide*."
P5: "…*torenu, u tu ru tte mu bu nu nde*, so *torende*."
P6: "…*bamitu*, that's *tu* so *tte*."
P7: "…when we learn the rules for *te*-form we learn that *su* turns into *site*."
P9: "…I have a photographic memory so I just go to the page in the book that has all the *te* forms."
P10: "…I just have to remember what the rule is, I think it's *nde* isn't it, *mu bu nu* is *nde* for *te* form."
P11: "…*gehabu, bu* is, *u tu ru mu bu, bu* yeah *nde*."
P12: "…*hekesu, te* form, *u tu ru te, mu bu nu nde, ku ite, gu ide, su site, hekesite*."

Note. P = Participant

APPENDIX H

Scores per Root-final Segment by Token

Table 18

Scores per Root-final Segment by Token

Segment	Token 1	Token 2	*SD*
i	12 (100.00%)	10 (83.33%)	1.41
e	12 (100.00%)	12 (100.00%)	0.00
a	9 (75.00%)	9 (75.00%)	0.00
t	8 (66.67%)	8 (66.67%)	0.00
r	9 (75.00%)	8 (66.67%)	0.71
m	10 (83.33%)	10 (83.33%)	0.00
b	8 (66.67%)	8 (66.67%)	0.00
n	7 (58.33%)	7 (58.33%)	0.00
k	7 (58.33%)	8 (66.67%)	0.71
g	8 (66.67%)	8 (66.67%)	0.00
s	10 (83.33%)	11 (91.67%)	0.71