

Toward the Study of the Acquisition of L2 Lexical Competence

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1. Introduction

The purpose of this paper is to situate the study of word stress acquisition in the framework of second language acquisition studies and to present a *raison d'être* for increased insights into foreign language learning and teaching. In order to identify the status of what is termed 'lexical competence' or 'lexical knowledge,' we will trace theories on communicative competence by reviewing related studies published over the past several decades. Second, we explore theories on the structure of the lexical entry and the nature of lexical competence and its development in L2 learning/acquisition. The distinction between explicit knowledge and implicit knowledge will be introduced and expounded. Third, some representational aspects of the morphological and phonological structures of derived words will be discussed. The last part of this article considers issues concerning the role of word stress in language comprehension and production, the theory of input-driven learning, and the relevance of frequency in L1 and L2 acquisition.

2. Components of communicative competence

This section provides a review of theories concerning what is termed 'communicative competence' and considers where in one's communicative competence the lexicon holds its presence. Following Hymes' (1972) proposal of the notion of communicative competence in critical reaction to the linguistic competence/performance dichotomy by Chomsky (1965)¹, Canale and Swain (1980) and Canale (1983) proposed some modifications. The version which Canale (1983) propounded includes the following four components:

Components of communicative competence

1. Grammatical competence
2. Sociolinguistic competence
3. Discourse competence
4. Strategic competence

¹Hymes (1972) introduced a model of communicative competence in terms of whether or not a given expression is formally possible, whether or not it is feasible, whether or not it is appropriate, and whether or not it can in fact be done. His work thus served as the solicitor for the subsequent studies referred to herein.

A number of studies have been published over the years to develop Canale's theory. For example, Widdowson (1989) elaborated the notion of competence and emphasized its relevance to language teaching. Bachman's (1990) model of communicative competence is composed of grammatical, sociolinguistic, illocutionary, textual, and strategic competences. Littlemore and Low (2006), emphasizing the importance of metaphor in language, argue for metaphoric competence as an element of communicative competence. As an extension of Canale's theory, Murata (1994, p. 9) provides a succinct picture that helps us to understand how these four subcompetences are related to each other and to other types of communication rules/skills.

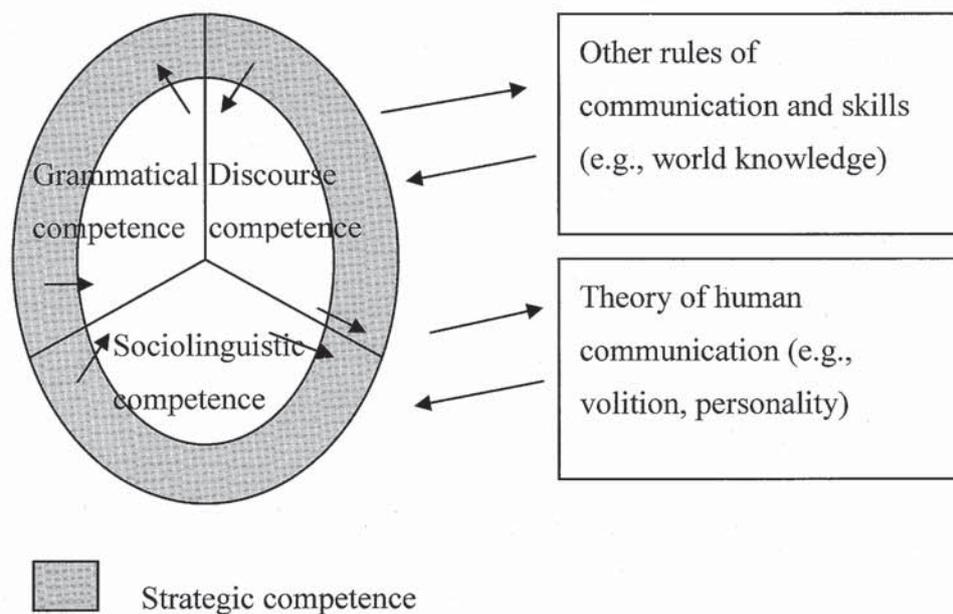


Figure 1 : Canale's (1983) model of actual communication² (adapted from Murata, 1994, p.9)

Figure 1 suggests that the stated four competences are not equal in their qualification — strategic competence is characterized for its specific involvement with the other three competences. It should also be pointed out that the status of lexical competence has remained vague in Canale's (1983) work and subsequent studies published by others. In fact, grammatical competence is merely postulated as knowledge on lexical items and on rules of morphology, syntax, sentence-grammar, semantics, and phonology.

Thus, there is a striking paucity of discussions on the status of the lexicon in L2 acquisition studies from a theoretical perspective although we do find a number of empirical studies on vocabulary learning and teaching. The mental lexicon is a hypothetical construct which is used to describe a variety of mental activities and psychological phenomena. Given

²For a recent study on the relations between communicative competence and personality, see Ludo and Vermeer (2002).

the idea of viewing human verbal activities as a sort of information processing, we assume the lexicon to deal with information relating to words to be stored and expressed via a set of operations of linguistic information processing. Thus, to approach learners' acquisition of the properties of words, whether they are simplex or complex, as part of their lexical competence, it seems reasonable to treat lexical competence as a component independent of grammatical competence, because lexical items themselves can manifest their own properties due to their interactions with the other competences. For example, we may incline toward modifying Canale's (1983) model, as Figure 2 shows, so as to make more explicit the interactions that take place between the lexical competence and the other three competences.³

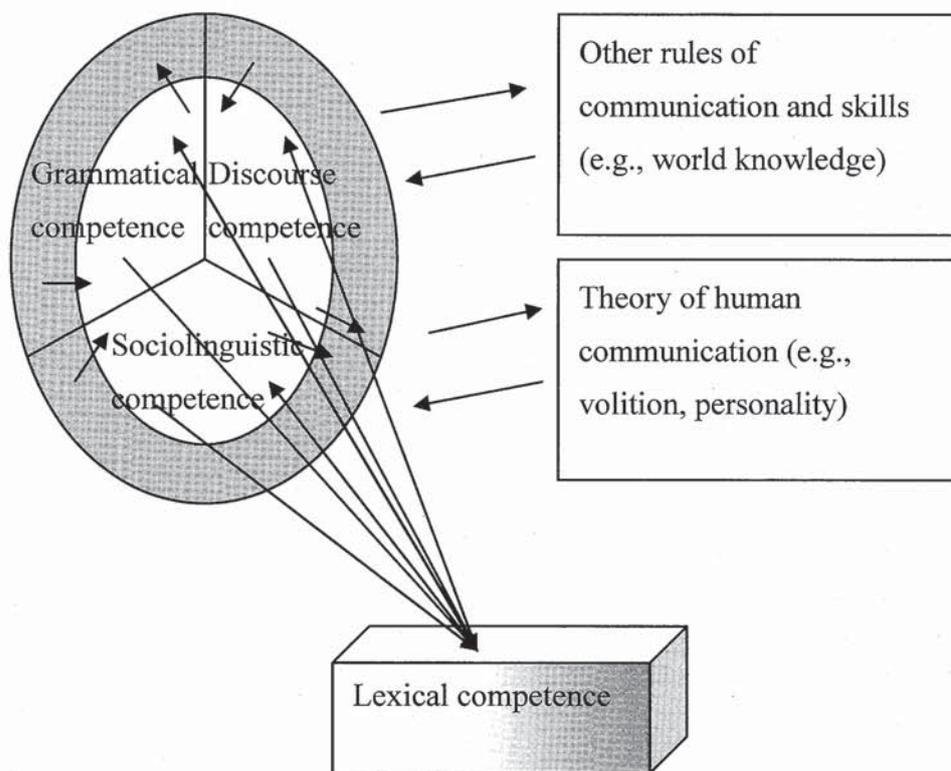


Figure 2 : A revised model of communicative competence

3. Explicit language knowledge and implicit language knowledge

This section attempts to narrow down what is meant by the acquisition of lexical knowledge. Two types of knowledge are generally accepted – explicit knowledge and implicit knowledge. For instance, Schacter (1992) describes the former type of knowledge as "knowledge that is expressed as conscious experience and that people are aware that they possess; the everyday uses of such terms as 'seeing' and 'remembering' refer to explicit

³Needless to say, we may as well remain neutral about the model in Figure 2 until we collect a sufficient amount of empirical data to verify its validity.

knowledge" (p.11113). The latter type is employed when performing a task "without any corresponding phenomenal awareness" (p.11113). It is also expressed unintentionally and automatically. He adds that "dissociations between explicit and implicit knowledge are providing important new insights into the fundamental nature of perception, memory, and conscious experience" (p.11113). Explicit knowledge and implicit knowledge are also referred to as declarative knowledge and procedural knowledge, respectively. In the context of language learning, declarative knowledge of language refers to knowledge on the conscious facts the learner has about the language; procedural knowledge refers to the intuitive information upon which the language learner operates in order to produce responses in the target language (Bialystok, 1978; Spolsky, 1989a, 1989b). As for L2 lexical performance, Jian (2000, p.66) presents three driving forces for second language lexical performance:

Driving forces for L2 lexical performance

- (1) The lexical knowledge the L2 learner has about a word
- (2) The lexical competence the learner has developed
- (3) The use of L2 words on the basis of their L1 translations

The terms 'lexical knowledge' and 'lexical competence' in Jian's theory are in fact parallel to declarative knowledge and procedural knowledge. The third force, which seems to be a type of strategic competence, helps compensate a missing representation by taking advantage of what is available from the learner's L1.

4. Language comprehension and production: the role of the lexicon

The importance of investigating representational aspects of L2 vocabulary development is emphasized by Jian (2000). He states as follows:

The psycholinguistic study of second language acquisition has three interrelated aspects: the study of representation, the study of acquisition, and the study of processing. Any theory of second language acquisition is incomplete without a representation component, because, as pointed out by Levelt (1989), representation and processes cannot be studied independently of each other. However, compared to acquisition and processing, representation has received little attention from second language researchers. This is also true in the study of vocabulary acquisition in a second language (L2). Much effort has been made to understand how L2 vocabulary can be acquired under different learning conditions and what factors influence the effectiveness and patterns of L2 vocabulary acquisition. However, the question of how

L2 lexical information is represented in the mental lexicon has largely been ignored. This may partly explain why, more than one decade after L2 vocabulary acquisition became one of the hottest areas of applied linguistics and second language acquisition, we are still short of a conceptual framework within which we can discuss the findings of numerous L2 vocabulary studies (Jian, 2000, p.47).

Generally, a lexical entry is considered to contain the following specifications : phonology, orthography, morphology, syntax, and semantics. Specifications on these aspects are assumed to be represented in two components of a lexical entry – the form (lexeme) and the lemma. Jian (2000, p.48) states that the form contains specifications relating to morphological variations, spelling, and pronunciation, and the lemma contains information on the meaning and part of speech of the word. The following diagram illustrates the four components (cf. Levelt, 1989 ; Handke, 1995; Jian, 2000):

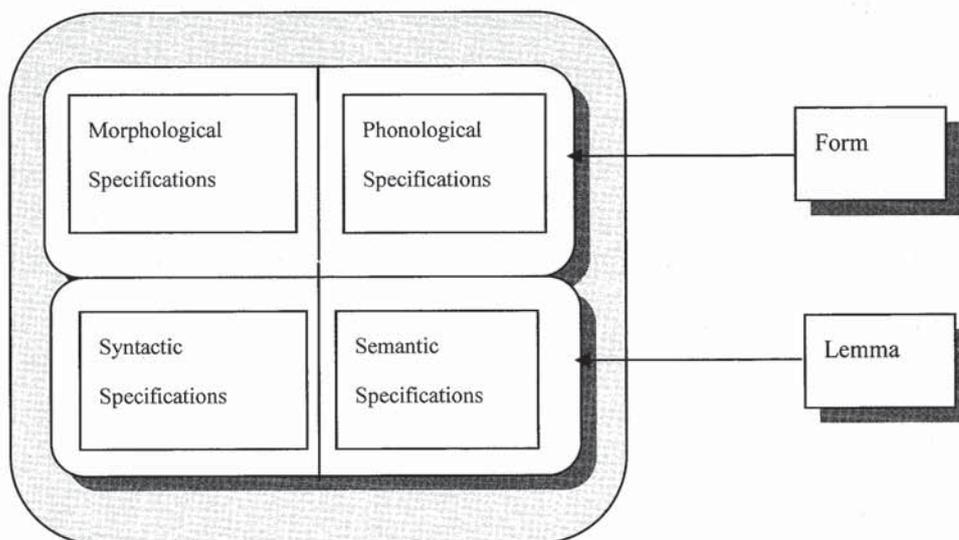


Figure 3 : The structure of the lexical item

5 . Phonological encoding and representations at the morphology-phonology interface

As Figure 1.3 illustrates, the morphological and phonological specifications are stored in the formal part of the lexicon. During language production and comprehension, phonological coding takes place to concatenate words into a phonetic plan,⁴ based on their lemma

⁴Levelt (1989, p.9), assuming a procedure-based architecture of language production and comprehension, uses the term 'phonetic plan' to indicate the output of a component called the formulator, which translates fragments of messages into a linguistic structure by means of *grammatical encoding* and *phonological encoding*. For a more detailed discussion on this issue, see Levelt (1989, pp.11-12).

information. The segmental and suprasegmental properties of each word are retrieved from the lexicon and put into use. Doubtlessly, the quantity and quality of the knowledge which L1 speakers possess is significantly different from what an L2 learner can demonstrate about the same language. As Jian (2000) suggests, it may also be possible that the learner does not have any internal structure or representation of a given word at all in the initial stage due to the absence of relevant rule(s) to be employed.

5.1 Morphological representation

Morphology deals with the production of new words from existing ones. It is generally accepted that a word with more than a single element is not made by means of a mere concatenation of its constituents (morphemes) but is hierarchically organized. Morphemes are grouped into two types: free morphemes, which can occur as independent words and bound morphemes, which can occur only when combined with another free or bound morpheme to form an independent word. Bound morphemes include stem morphemes and affixes. Word formation processes include inflection, derivation, and compounding. In particular, derivational morphology is concerned with processes in which affixation and compounding take place to create new lexical items. Affixation in English includes suffixation and prefixation. There are at least two types of suffixes in light of their phonological behavior – stress-changing (or rhythmic) suffixes and stress-neutral suffixes, to which we will return in the following section. There are restrictions that serve to distinguish between well-formed and ill-formed structures. Levelt (1989, pp.286-287), following Selkirk's (1982) word formation theory, presents the following examples:

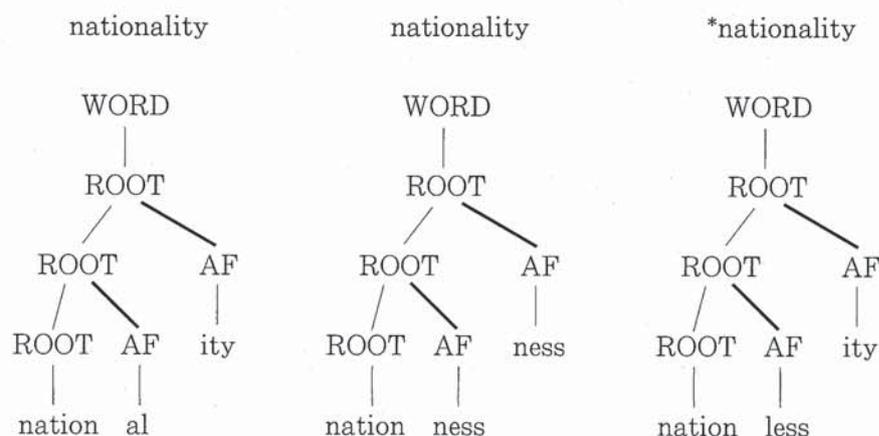


Figure 4 : Morphological representations of well-formed *nationality*, *nationless*, and ill-formed **nationlessity*

We see that there is a striking difference between *-ity* and *-ness*, both of which derive nouns from adjectives, with respect to what type of suffixation can take place prior to their attachment – *-ity* cannot be added to adjectives ending in *-less* (and *-full*), whereas *-ness* does not have such a restriction.⁵

5.2 Phonological representation

There are two types of elements that determine the representation of the phonetic content of a word – segmental and suprasegmental (Levelt, 1989, p.290). Segmental phonology is concerned with the representation of strings of segments and their changes; suprasegmental phonology covers areas such as syllable structure, stress assignment, rhythm and intonation. Halle and Vergnaud (1987) assume a system of phonological representation made up of a set of tiers connected by two planes that extend rightward along the time axis.

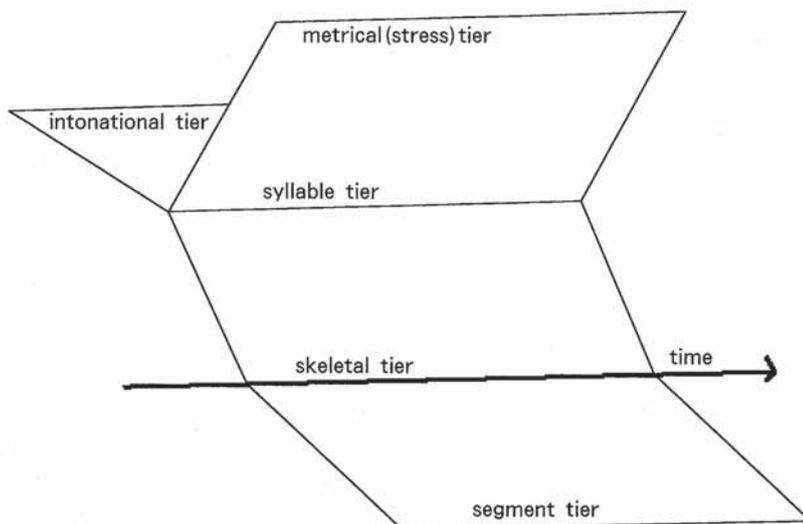


Figure 5: Representational tiers for an articulatory plan

Segments are anchored to skeletons on the skeletal tier, and the skeletons are organized into syllables. The metrical tier is the region where word stress assignment takes place based on the syllable structure of the given word. On another tier are represented intonation contours for input structures. For example, the noun *astonishment* takes on the following representation:

⁵For studies on suffix types and constraints on suffixation, see Siegel (1974), Kiparsky (1982a, 1982b) and Selkirk (1982) among others.

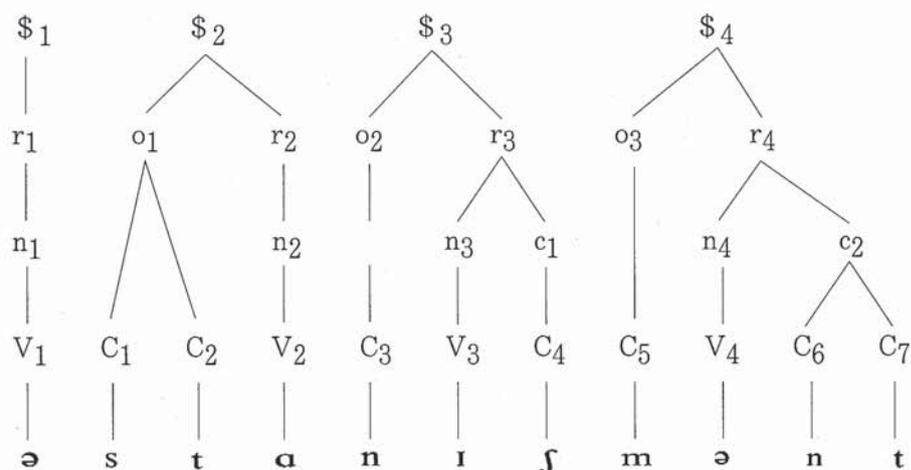


Figure 6 : The syllable structure for *astonishment*⁶

6. Word stress assignment

6.1 General properties

In prosodic terms, English is categorized as a stress language that produces different degrees of prominence. Word stress comprises different aspects. It is widely accepted that there are multiple correlates responsible for the realization of a stressed syllable (Adams, 1979, p.60). Kager (1995), for example, points out that a manifestation of syllable prominence involves positional, qualitative, and morphological factors. Prominent syllables are characterized by their potential capability of bearing pitch movements, longer duration, and higher intensity (p.367).

Linguistic stress is a mental phenomenon as well (Tzakosta, 2004, p.39). It is not surprising that realizations of word stress are closely connected with more than a single component of one's linguistic competence. L1 speakers of English, who have little difficulty telling which syllables are to be pronounced with emphasis, are considered to possess implicit knowledge on word stress. This type of knowledge arguably dictates the way in which given linguistic properties are formed into an output representation. Linguistic studies have shown that locations of word stress by and large can be predicted by rule. As for L2 phonology acquisition research, however, "few studies have systematically examined how L2 suprasegmentals are learned or have identified what factors influence their learning" (Trofimovich & Baker, 2006, p.2). In his exploration into how L2 lexical competence develops from the L1-based initial stage to the complete L2 stage, Jian (2000) argues that lexical

⁶The symbols used in the diagram are \$ = a syllable, r = a rime, n = a nucleus, o = an onset, c = a coda, V = a vowel, and C = a consonant, respectively.

knowledge and lexical competence differ in that the former type of knowledge "is represented outside the lexical entry" and the latter type exists "within the lexical entry" (p.66). He also suggests that the application of lexical knowledge requires a certain level of conscious awareness whereas lexical competence is procedural knowledge that is executed automatically (Jian, 2000, p.66). Following Kager (1995, p.367) and Levelt (1989, p.299), let us summarize some general tendencies in English stress assignment:

General tendencies in stress assignment

1. The rime of a syllable is important – a heavy syllable, which holds more than a single V in its rime position, attracts an extra beat while a light syllable, which is made up of a single V only, fails to do so.
2. Stress is rhythmic in systems where stressed and unstressed syllables alternate and where adjacent stresses are avoided. Sequences of two stressed syllables are strongly disfavored, and sequences of unstressed syllables (more than two) are also disliked.
3. Prominence hierarchy may occur among multiple stresses.

In view of formal phonological theory, a number of attempts have been made since Chomsky and Halle (1968) to account for the mechanism of stress assignment, their fundamental assumption being that the system for determining word stress constitutes part of the speaker/hearer's linguistic competence (Chomsky & Halle, 1968; Hayes 1981, 1995; Halle & Vergnaud, 1987; Giegerich, 1992).

6.2 Primary and subsidiary stresses in polymorphemic/polysyllabic words

Polysyllabic words undergo further differentiation of degrees in spoken form (Giegerich, 1992, p.179). Halle and Vergnaud (1987) describe the way in which subsidiary stresses are assigned in polysyllabic words: "... the placement of subsidiary stresses depends crucially on the placement of the main stress. When main stress falls on the penult, the subsidiary stresses fall on even-numbered syllables counting from the end of the word; when main stress falls on the antepenult, subsidiary stresses fall on odd-numbered syllables counting from the end of the word" (p.228). The following words exemplify these two types:

Realizations of subsidiary stress

1. Primary stress on the penult: *ònomàtopoéia*, *Ápalàchicóla*, *arístocrátic*
2. Primary stress on the antepenult: *sèrendípity*, *Càlifórnia*, *hàmamèlidánthemum*

Word stress is liable to word structure (Fudge, 1984). Highly detailed examinations of the

influence of morphology, i.e., word structure, on the placement of word stress were conducted by Chomsky and Halle (1968), and their theory received numerous critical reviews and evolved into a theory called Lexical Phonology during the period of the 1970s through the late 1980s (Kiparsky, 1982a, 1982b; Mohanan, 1982). The location of primary stress in a derived word may shift from its original syllable to another syllable according to which type of suffix is attached to the given base word. Studies have uncovered complex interactions between morphology and phonology in the lexical component of grammar. Generally, there are different classes of derivational suffixes with respect to stress assignment: stress-shifting and stress-neutral (Siegel, 1974, pp.111-113; Giegerich, 1992, pp.190-191). They are also called Class I and Class II affixes respectively.⁷ Class I includes such suffixes as *-ation*, *-ity*, *-ize*, and *-ic* while Class II includes *-ment*, *-ness*, *-ing*, and *-able*, to name a few.

Classes of derivational suffixes

1. Rhythmic/Stress-shifting (Class I) suffixes: *-ity*, *-ion*, *-tion*, *-ation*, *-ate*, etc.
2. Stress-neutral (Class II) suffixes: *-ment*, *-ness*, *-less*, *-ive*, *-able*, *-ly*, etc.

Typically, rhythmic suffixes can yield a relocation of primary stress on the base form to another syllable in the derived form, and by extension it can affect the occurrences of subsidiary stresses, which is largely dependent on the placement of the primary stress. On the contrary, neutral suffixes do not affect stress assignment at all – the stress(es) on a base word remain on the same syllable(s) in the derived word. Let us cite two examples of stress shift:

Stress shift due to suffixation

- a. *invìte* + *-átion* → *ínvítátion*
- b. *decláre* + *-átion* → *dèclarátion*

In both cases, the attachment of *-ation* moves the primary stress to the penultimate position, i.e., the first syllable of the suffix, and then a secondary stress is attracted to the initial syllable, with an intervening unstressed syllable between the primary-stressed syllable and the secondary-stressed syllable.

Next, let us discuss how stress is assigned and represented on a given word. In Halle and Vergnaud's (1987) theory of English stress assignment, *sandal* and *invite* are given the

⁷See Siegel (1974) and Plag (2003) for discussions on the distinction between Class I and Class II affixes.

following representations:⁸

<i>sandal</i> (noun)	<i>invite</i> (verb)
Line 3 *	Line 3 *
Line 2 (*)	Line 2 (*)
Line 1 (* *)	Line 1 * (*)
Line 0 san dal	Line 0 in vite

Figure 7: Metrical structures on *sandal* and *invite*

The grid structures in the diagrams above are comprised of several distinct levels. The lowest level (Line 0) refers to the segmental level, where segments are organized into syllables in accordance with certain principles governing syllabification (Kahn, 1976; Kiparsky, 1979; Selkirk, 1982b). On the next level (Line 1) foot formation takes place. On this level the syllables are pulled together pair-wise so as to form trochees, with the left element specified as the head of the unit. In the example above, the strings *decla* and *ration* have a trochaic foot respectively. On the highest level (Line 3), then, feet are organized into a prosodic word whose rightmost element serves as the head of the entire structure. Figures 8 and 9 illustrate metrical structures assigned to words derived by suffixation:

Line 3 *	Line 3 *
Line 2 (*)	Line 2 (*)
Line 1 (* *)	Line 1 * (* *)<*>
Line 0 so lemn	Line 0 so lemni ty

Figure 8: Metrical structures on *solemn*, *solemnity*, and *solemnness* ⁹

⁸Note that Figure 7 only displays the resulting surface metrical representation for the given two words instead of giving their intermediate representations generated by the application of stress rules. As is widely acknowledged, the knowledge an L1 speaker possesses about his or her native language and the knowledge an L2 learner possesses at a given time are different in quantity and quality. The present study rather assumes a usage-based model of language acquisition (Bybee, 2001) although Halle and Vergnaud's way of metrical representation is employed for its clarity. See Halle and Vergnaud (1987, pp.227ff) for a detailed discussion on their proposed system of English stress assignment.

⁹An asterisk in angled brackets indicates a syllable which is not considered for stress assignment. This is called extrametricality. See Halle and Vergnaud (1987, pp.18-19) for a detailed examination of this effect.

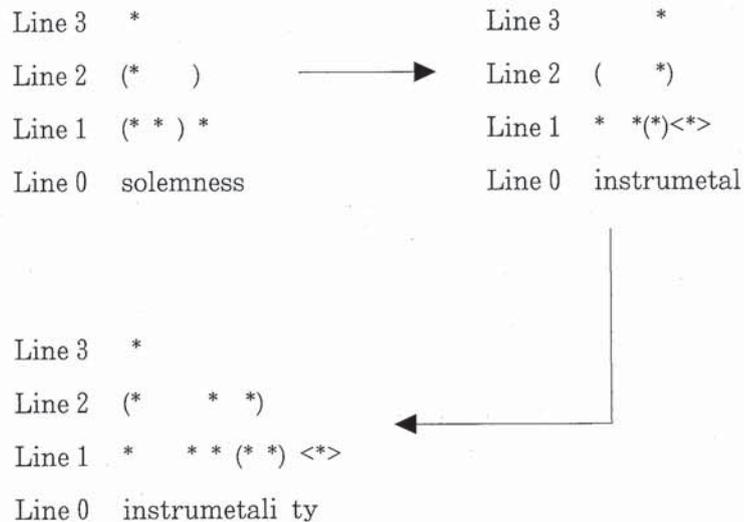


Figure 9: Metrical structures on *instrument*, *instrumental*, and *instrumentality*

Thus, the procedure for assigning word stress, despite its rule-governed nature, requires the speaker to perform highly complex computations, and L1 English speakers do distinguish these classes of suffixes and assumedly manipulate rules of stress assignment and relevant morpho-phonological alternations. Although it is highly likely that learners construct their L2 English grammars whose organizations are fundamentally different from that of L1 English, theories of representation in formal linguistics provide us with analytic tools with which to describe characteristics of L2 competence.

7. Phonetic realizations of word stress

In phonology, categorical terms such as 'primary stressed', 'secondary stressed', and 'unstressed' are employed to indicate distinctions in the loudness of the syllables in the word. As was stated in the preceding section, discoveries achieved in phonological theory over the past several decades have shown that locations of word stress are mostly predictable: namely that they are rule-governed and reflect the speaker's procedural knowledge. In phonetic terms, stressed syllables are considered stronger than unstressed syllables with respect to amplitude (or intensity), pitch, and duration. In general, content words have at least one syllable that attracts stress, and polysyllabic words often carry more than one syllable with different degrees of prominence perceived as primary and subsidiary stresses. Phonological studies have shown that locations of word stress can be predicted by rule in many cases, and these rules are considered to be part of L1 speakers' procedural knowledge of the language.

It should be kept in mind that what is referred to as linguistic stress is not in fact a single, uniform entity. As Laver (1994, p.511) points out, stress is a gradient phenomenon in phonetics and "the phonetic realization of any syllable can be said to show a greater or less

degree of stress relative to the manifestation of some other syllable." As for acoustic correlates of linguistic stress, it is generally accepted that there are certain elements that give rise to differences in stress levels. Mattys (2000, p.254) states that "it is suprasegmental variables, such as frequency, duration, and amplitude, that determine stress perception." Laver (1994, p.511) suggests four dimensions: quality, duration, loudness, and pitch. Galves, Garcia, Duarte, and Galves (2002) propose an approach to rhythmic classes based on sonority. Ramus, Nespor, and Mehler (1999) used the duration of vocalic intervals and consonantal intervals in an attempt to investigate rhythm perception by infants with different linguistic backgrounds.¹⁰ In Chapters 8 through 10, we examine recorded samples of production performance by a group of learners in light of their acoustic phonetic properties in comparison with L1 English speakers' performance.

8. The role of word stress

Next, we discuss the role of word stress in recognition and production in L2 learning and identify the issues with which the discussions in the following chapters are concerned. As was mentioned in the Introduction, prosody plays a significant role in both listening and reading comprehension. Gow and Gordon (1993, p.545) pointed out that stress in spoken language processing had been the subject of considerable experimentation and theorizing, but there was notable lack of attention to the study of the acquisition of word stress in the early 1990s. Colombo (1991, p.71), for example, admitted that lexical stress was a neglected topic that had been highly underrepresented in the studies on reading. In recent years, however, researchers have shown increased interest in exploring adult L2 learners' acquisition of word stress. For example, Wayland, Guion, Landfair, and Li (2006) conducted a set of experiments on ten native Thai speakers to investigate the influence of syllabic structure, lexical class, and stress patterns of known words on their acquisition of the English stress system, and their results suggested that "late learners of English may rely heavily on word-by-word learning of stress patterns and are less likely to abstract generalities about stress placement by syllabic structure and lexical class" (Wayland, et al., 2006, p.304). Guion's (2005) comparative study on early and late Korean-English bilinguals and English speaking monolinguals with respect to their knowledge of English word stress reports that both subject groups were able to correctly stress English words. In addition, she presents the following observation:

¹⁰In Ramus et al. (1999) a vocalic interval is referred to as the time span between the onset and the offset of a vowel or a vowel cluster and a consonant interval as the time span between the onset and the offset of a consonant or a consonant cluster.

The early bilinguals demonstrated a somewhat reduced reliance on patterns of syllabic structure and lexical class compared to the monolinguals, whereas the latebilinguals showed an even greater reduction of reliance on patterns of syllabic structure and very little reliance on patterns of lexical class. Like the monolinguals, however, both bilingual groups made use of stress patterns of phonologically similar words (Guion 2005, p.529)

In a similar vein, Guion (2006) noted that the late bilingual groups relied most heavily on the stress patterns of phonologically similar known words to determine stress on the non-words. This analogical extension of stress would seem to demonstrate at least a limited resonance between words in the late learners' lexicon (Guion, 2006, p.487).¹¹

Note that all the studies reviewed so far center around placement of primary stress irrespective of whether words are morphologically simplex or complex. Recall that there are two types of suffixes in English – stress-changing and stress-neutral. Nonetheless, little has been known about the effect of suffix type on the acquisition of knowledge of English word stress assignment. In L1 English stress acquisition research, we find Jarmulowicz's (2000, 2002, 2006) studies on school children's ability to judge where stress falls in suffixed words. Jarmulowicz (2002, p.201) points out:

With more exposure to derivations with a given suffix, a stress-rule associated with that suffix can be learned and applied in novel words. This is most clearly seen with *-tion* derivations... Neither group of children had difficulty judging stress placement on the real derivations with *-tion*, and they were more accurate judging nonsense derivations with *-tion* than with either *-ity* or *-ic*.

In her study Jarmulowicz (2006) found that stress accuracy was maintained at ceiling levels for neutral derived words, while a steady improvement was observed as to words with rhythmic suffixes. Her study also revealed that retention of stem stress in the derived forms was the predominant pattern. Notable investigations have thus been made into the acquisition of lexical stress at the morphology-phonology interface by L1 English speakers and L2 English learners. By contrast, we see that Japanese EFL learners' declarative and procedural knowledge of the same area have not been documented in empirical or descriptive terms even to a minimum degree.

¹¹Guion (2006, p.487) continues: "The question arises as to whether the ability to associate words by phonological similarity is transferred from the first language or whether it is an emergent ability stemming from the entrenchment of the second language..."

9. Input-driven language learning: the role of frequency

Effects of frequency have been extensively discussed in the field of psycholinguistics with respect to word recognition and access. They also seem to constitute an area for research into language learning and development. In this context, Bybee's (2001) view on the role of frequency is important and therefore worth reviewing. She claims that "the frequency with which individual words or sequences of words are used and the frequency with which certain patterns recur in a language affects the nature of mental representation and in some cases the actual phonetic shape of words (p.1)." She also argues that "the focus on structure needs to be supplemented with a perspective that includes more than just structure, a view that includes two other important aspects of the language phenomenon — the material content or substance of the language, and language use (p.2)."¹² Some of the principles of the usage-based model which Bybee (2001, pp.6-8) presents are as follows:

1. Experience affects representation. The use of forms and patterns both in production and perception affects their representation in memory. High-frequency words and phrases have stronger representation in memory. High-frequency words and phrases have stronger representations in the sense that they are more easily accessed and less likely to undergo analogical change. Low-frequency words are more difficult to access and may even become so weak as to be forgotten. The lexical strength of words may change as they are used more or less in different contexts. Patterns (represented as schemas) that apply to more items are also stronger and more accessible, and thus more productive than those applying to fewer items. This is in contrast to modular approaches in which representations and rules or constraints are all static and fixed, and in which all rules or representations in the same component have the same status (for instance, all being equally accessible no matter how many forms they apply to).
2. Mental representations of linguistic objects have the same properties as mental representations of other objects. [...] Mental representations do not have predictable properties abstracted away from them, but rather are firmly based on categorizations of actual tokens.
3. Categorization is based on identity or similarity. Categorization organizes the storage of phonological concepts.
4. Generalizations over forms are not separate from the stored representation of forms

¹² Bybee (2001, p.2) adds that "[t]he SUBSTANCE of language refers to the two polar ends — phonetics and semantics — that language molds and structures, the two ends between which language forms the bridge. Language USE includes not just the processing of language, but all the social and interactional uses to which language is put."

but emerge directly from them.

5. Lexical organization provides generalizations and segmentation at various degrees of abstraction and generality. Units such as morpheme, segment, or syllable are emergent in the sense that they arise from the relations of identity and similarity that organize representations.

In L2 acquisition studies, Ellis (2002) suggests that "frequency is a fundamental cognitive mechanism in every domain of language processing: phonology, phonotactics, reading, spelling, lexis, morphosyntax, pragmatics, sentence production, and comprehension" (Gass & Mackey, 2002, p.250). Gass and Mackey (2002) further argue that although there are areas in which simple frequency explanations seem questionable due to the fixed sequential orders of learning linguistic items, "the existence of developmental sequences does not necessarily rule out a role for frequency. A number of researchers have argued that, when learners are not at the correct developmental level to make immediate use of input, it may be stored and made available at a later time for processing and use (Gass, 1997; Mackey & Philip, 1998). If frequency is argued to play a role in such a process, further specification of a frequency-based account would be helpful. For example, can patterns be derived from the input, stored in long-term memory, and activated when learners are ready to make (and strengthen) the connections? If so, what governs the activation of these patterns?" (p.254).

They further suggest that it is of central importance to address the issue of how frequency effects interact with other aspects of second language acquisition, pointing out that "longitudinal studies of the effects of input frequency and L2 learning outcomes, involving learners at different stages of learning and considering the role of the L1, are crucial next steps in the ongoing debate and investigation of frequency effects" (Gass & Mackey, 2002, p. 257).

Looking back over the fields of foreign language learning and teaching, we see that there was once significant emphasis on the importance of repetition when the behaviorist view of learning was dominant. The claim was that learning was secured by means of habit formation only, but teaching methods based on such a view were severely criticized and dismissed, due to its simplistic theoretical foundation. In recent years, however, there has been an increased attention among researchers to the reinterpretation of imitation and repetition in L1 and L2 learning from a cognitive perspective. As for L1 learning, Bybee (2001, pp.8-9) argues that some aspects of language are shaped by repetition and we get lexical strength through repetition. In addition to the commonly acknowledged token frequency and type frequency, Harrington and Dennis (2002) examine the effect of task frequency, which they argue "is readily evident in the well-established relationship between practice and skill

development" (p.161). Referring to what Schmidt (1992) called knowledge-strengthening, they further state that "[p]ractice of a particular form or structure will typically lead to increased facility in using that knowledge" (p.161).

Yamaoka (2006) presents a reinterpretation of imitation and repetition in foreign language learning, introducing two types for imitation – rote imitation and encoding imitation, and two types of repetition – "repetition of the same identical utterance" and "repetition of different types of utterances having the same form-meaning connection" (Yamaoka, 2006, p. 5). He claims that, despite their stigmatic association with a mechanical, behaviorist view of language learning, imitation and repetition are indispensable especially in foreign language learning as they play an active role in providing the learner with opportunities with which they can experience connecting form and meaning (Yamaoka, 2006, p.6).

10. Input as exposure to the target language

What is commonly held about the mastery of a foreign language is that it takes the learner an astounding amount of time to arrive at the level of proficiency with which he or she can use the target language for a wide range of contexts, i.e., to acquire the system of doable procedural knowledge of the language. This time factor of language learning can and should be a point for serious exploration because any discussion on teaching methodology does not seem fully tenable unless we take into consideration the amount of input to which learners are exposed as the length of contact with the target language has a great impact on the subsequent development of their interlanguage. Hato (2006, pp.6-22) argues that learners proficiency levels in a foreign language are strongly correlated with the accumulated hours of learning, but systematic data are lacking which would help describe them in light of the amount of time they have spent on their second language – little research has been conducted regarding how much progress can be achieved in a particular period of time under a particular instructional setting.¹³

¹³The Foreign Service Institute (FSI) of the United States compiled approximate learning expectations for speakers of different languages as their L1. The expectations are based on the length of time it takes to achieve their speaking and reading criteria. The National Virtual Translation Center says that FSI students, who "are almost 40 years old, are native speakers of English, and have a good aptitude for formal language study, plus knowledge of several other foreign languages", study full time to achieve professional speaking and reading proficiency. For Category I languages which are closely related to English they spend 575 to 600 class hours plus three to four hours per day of directed self-study. For Category III languages that include Japanese and Korean which are very different from English, 2,200 class hours are required – 88 weeks plus their second year of study spent in the country where the language is spoken.

11. Conclusion

This article has presented an overview of notions and constructs developed in linguistics, psycholinguistics, natural language processing, language acquisition and learning studies in relation to the study of L2 learners' phonological and morphological competence. The discussion began with a critical review of theories of communicative competence to establish the status of the lexicon, i.e., lexical competence, as an indispensable entity. It was argued that knowledge of words, which often comes under discussion in holistic terms, should not be treated as a mere appendage to grammatical competence but should be addressed in its own right.

The nature of lexical knowledge in second language acquisition was discussed in light of the dichotomy between declarative knowledge and procedural knowledge. With a focus on the structure of the lexical entry, especially on the form part representing specifications on word formation (morphological competence) and word stress placement (phonological competence), it was argued that special consideration should be taken into theories of representation in order to probe features of learners' declarative and procedural knowledge of word structure and word stress, and theoretical devices for representing morphological as well as prosodic structures were introduced. It was pointed out that word stress plays an important role both in language comprehension and production.

Also examined was the role of input in language acquisition and proposed that frequency be recognized as an important factor in explaining the acquisition of language knowledge. It was argued that repetition should be reappraised as a means of substantiating declarative knowledge into automatic, procedural knowledge. In addition, the discussion extended to the role of the frequencies with which learners are exposed to a given linguistic item are actually further affected by the total length of time they work on the given item.

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