ABSTRACT

Psycholinguistic Reality of Formulaic Sequences:
Evidence from Japanese EFL Learners

by
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This dissertation attempts to explore how Japanese EFL learners store and process high-frequency multiword strings, i.e., formulaic sequences (FSs) in their mental lexicon. To test the holistic hypothesis that FSs are stored and retrieved as single lexicalized units, six experiments were conducted. Chapter 1 presents an overview of usage-based theory in Cognitive Grammar and previous studies on the representation and processing of FSs in the first language (L1) and the second language (L2). In Chapter 2, three experiments were performed to examine the processing advantage of FSs in context-independent processing. Fifty-five intermediate Japanese EFL learners were assigned to each experiment: a word-order appropriateness judgment task (WOAJ) for Experiment 1, a reading aloud task (RA) for Experiment 2, and a familiarity judgment task (FJ) for Experiment 3. The hypothesized holistic processing of FSs was investigated by comparing reaction times and error rates for three types of sequences: FSs, nonformulaic sequences (NonFSs), and ungrammatical sequences (UnGs) in the word-order appropriateness judgment task, and by comparing reading latency and the rates of speech and errors in the reading-aloud task. The effects of familiarity with whole sequences on their processing were examined in the familiarity judgment task by using a 6-point rating scale. The results
of Experiment 1 revealed that FSs were processed significantly faster with much fewer errors than the other sequences, thereby indicating that EFL learners benefit from the processing advantage of FSs. The results of Experiment 2 showed that the reading latency for FSs was significantly shorter than that of NonFSs and UnGs, and that the speech rate of FSs was significantly higher than that of the counterparts. These findings indicate that FSs have a phonologically coherent representation and are stored as single lexicalized units in the mind. The overall results of Experiments 1 and 2 demonstrated the processing advantage of FSs from both aspects of recognition and production in a context-independent situation, suggesting the possibility that the FSs are stored and processed as single lexical entries in the minds of EFL learners. The results of the familiarity judgment task demonstrated that the familiarity ratings of FSs were significantly higher than the ratings of the other sequences. Moreover, results showed that sequence familiarity and frequency of occurrence are the essential factors that facilitate the processing of FSs. It is noteworthy that the participants with lower proficiency also enjoy the same processing advantage of FSs as those with higher proficiency, indicating that holistic processing of FSs may be introduced in the early stage of second language development.

Considering the laboratory design of Experiments 1 and 2 in which the stimulus items were independently presented out of context, there was a vital need to investigate the holistic hypothesis of FSs in a more naturalistic environment of reading. Therefore, in Chapter 3 the psycholinguistic reality of FSs was explored in a context-dependent situation from both aspects of recognition and production. Experiment 4 was designed to measure how FSs are processed and function in the process of reading comprehension. A self-paced reading (SPR) paradigm
was adopted to examine the processing advantage of FSs in the minds of Japanese learners of English by devising a presentation method. The sentences were presented in word-by-word manner; however, the target and control word strings were presented as a whole to secure the hypothesized holistic processing of FSs. The target FSs and their counterpart NonFSs were embedded into identical sentences to clarify the processing advantage of FSs over NonFSs within the same context, and illuminate the facilitating effect of FSs on the processing of their subsequent words. The results of Experiment 4 demonstrated that the reading rates for FSs were significantly higher than the reading rates for NonFSs in reading comprehension in the upper and lower groups of 42 participants. This finding clearly indicates the possibility that FSs are retrieved and processed holistically in reading comprehension, suggesting that learners benefit from their integrated representation of FSs during sentence processing. Particularly noteworthy is that the formulaicity effect extended to the processing of the words after the FSs from the aspects of (a) between the FS- and NonFS-embedded sentences and (b) within a FS-embedded sentence. In the aspect of (a) between the sentences, the reading rates of the words after the FSs were significantly higher than the same words after the NonFSs. The facilitating effect of FSs on the following words was confirmed at the third words after the FSs in the upper group and at the final words in the FS-embedded sentences in the lower group. These phenomena could be interpreted as the outcome of efficient resource allocation due to the reduced cognitive load of FSs, which would lead to less demand at sentence wrap-up in reading comprehension. In the aspect of (b) within a FS-embedded sentence, the higher reading rates of FS over the subsequent words was confirmed in the upper group, suggesting that the participants with higher proficiency
read FSs much faster than any other following words in the sentence. The faster reading rates for FSs than any other consecutive words may indicate their psychological unit status in the minds of Japanese learners of English. To further explore the holistic nature of FSs from a productive aspect, Experiment 5 was performed to determine whether FSs exhibit the phenomenon of postulated phonological coherence in a reading-aloud paradigm. Thirty-eight participants were asked to read a sentence aloud immediately after it appeared on a monitor. The results demonstrated that FSs were articulated significantly faster and more accurately with fewer pauses. Under the assumption that pauses mirror the cognitive process of lexical access, the faster speech rates with fewer pauses within FSs could be an indicator of cohesive phonological representation in the mind.

In Chapter 4, Experiment 6 examined the effects of exposure frequency in restructuring and strengthening the representation of multiword sequences in the L2 mental lexicon. In a classroom setting, a text-shadowing task was assigned to undergraduate students. Through the sound-utilizing training of shadowing, the amount of exposure to the target items was carefully controlled with six times (SH6) for the treatment group and three times (SH3) for the control group. The results showed that in a pre-, post-, and delayed-post design all the participants increased their productive and receptive knowledge of the target phrases after the training. However, the impact of exposure frequency was much larger on the acquisition of productive knowledge with constantly higher percentage gains in SH6 than in SH3 not only immediately after the training but also after an interval of four weeks, while no statistical difference between the groups was found in receptive knowledge. Moreover, the significantly lower retention rates of productive knowledge
would also suggest the importance of exposure frequency in establishing a more entrenched representation of multiword expressions to gain formulaicity in mind as a single unit status for more productive use of language.

Given the overall results of a series of experiments, the psycholinguistic reality of FSs was confirmed from the aspects of recognition and production both in the context-independent and context-dependent situations. It also indicates the possibility that EFL learners are sensitive to the distribution of formulaic expressions and more likely to create an integrated mental representation in proportion to the amount of exposure to the FSs.