The Application of Cognitive Linguistics to Introductory Language Materials

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入門語学教材への認知言語学の応用

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Abstract

Although there has been a significant amount of research on the constraints working memory can have on the language acquisition process, consideration regarding second language learning materials development remains largely unexplored. This paper draws upon findings in cognitive linguistics to make practical recommendations about L2 learning materials at the activity and unit level. It is concluded that through the contextual introduction of lexical items, repetition of syntactical form, and the addition of guided productive activities will result in less stress on the working memory of the learner and increase the efficiency of the learning process.

Keywords: Cognitive linguistics, Practical application, Working memory

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抄　　録

　ワーキングメモリが言語習得プロセスに与える制限については多くの研究がなされているが、第二言語学習の教材開発に関する考察はほとんど行われていない。本論文では、認知言語学の知見をもとに、アクティビティやユニットを分析し、第二言語学習教材について実践的な提言を示す。語彙の文脈的導入、対象文法の繰り返し、サポート付きの産出的活動の追加などにより、学習者のワーキングメモリへの負担を軽減し、学習プロセスの効率を高めることができると結論づけている。

キーワード：認知言語学、実用化研究、ワーキングメモリ

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Introduction

Over the past 35 years, cognitive linguistics (CL) has gradually gained acceptance as both a theory of the language acquisition process and as a means to increase the efficiency of language pedagogy in practical settings. In contrast to factors such as learners' language analytic ability, it has been suggested that working memory is a

stronger predictor of success in the learning of semantic noun classes (Dardon & Jeong, 2021). Firmly centered on research concerning working memory and learners' usage of it, CL can be used to tailor instruction and classroom materials to the cognitive abilities of learners, thus reducing the burden on the learner and increasing efficiency.

Literature Review

Attention, which refers to learners' conscious focus on linguistic features (Schmidt, 1990), suggests that by guiding their concentration, learners can perceive, process, and store new information. Similarly, it has been suggested that attention is necessary in bringing about changes in interlanguage (Segalowitz, 2007). CL also draws heavily on the role of working memory in the learning process. Miller (1956) demonstrated that the maximum number of chunks or ideas that the human brain can process simultaneously is around seven. However, more recent estimates have been revised to three to four chunks for the average person, garnered from results in benchmarking studies (Oberauer et al., 2018). These findings indicate that learners have a limited attention span, and that what they choose to focus on, whether intentionally or incidentally is indicative of what they will learn. With the vast amount of linguistic information that learners might be exposed to, many may feel overwhelmed as they attempt to process new lexical items and syntax. A common learning strategy to overcome this difficulty is the use of chunking, which is done naturally by learners. Lewis (1997) suggested that at least half of native language usage comes from chunking, which indicates a large degree of word association as well as fluency development. Therefore, it is possible to envision the interlanguage (IL) of learners as a series of differently clustered schemata that connect together through chunked associations. Since chunks are a final characteristic of a proficient language user, the use of classroom techniques that help learners develop them would be highly beneficial. Boers (2006) demonstrated a correlation between the instruction of formulaic expressions and increases in perceived oral proficiency.

CL theory also offers two complementary ideas as explanation for why a few explicit exposures to new lexical items and syntax are not enough for learners to acquire and retain knowledge. Connectionism, popularized by Ellis (2003), describes the nature of the human mind to create probabilistic knowledge about language, based on frequency of exposure and context. Learners are exposed to comprehensible input, they begin to develop a sense of what is correct and incorrect based on derived probabilities. According to Ellis (2003), this is how native speakers acquire their L1, with little feedback from parents about usage aside from pragmatics. In terms of degree of exposure, Nation (2008) estimated that as many as twenty exposures to vocabulary are necessary for retention.

Second, CL demonstrates that deeper processing of information is necessary for

retention to take place (Boers, 2013). This refers to the amount of analysis and evaluation that new linguistic information receives while it is held in working memory. The idea of additional processing as a means to further develop linguistic knowledge is reflected in other SLA theories, such as the Output Hypothesis (Swain, 2005) through use of metalanguage, and the Interaction Hypothesis (Long, 1996) through negotiation for meaning. Exposure should thus be derived that exposure should be both numerous and involve some form of additional processing, such as interaction, discussion, or summary. Additionally, the human mind is multifaceted in that it can experience language through a number of forms. This is the basis for Dual Coding Theory (Paivio, 2010), which refers to the idea that a learner can expand on initially learned items through the use of mental imagery and association with pre-existing knowledge. This additional step can further improve retention.

Keeping theory in mind, it is important to emphasize the practical application of CL principles in the classroom. Examples of this may include management of unknown vocabulary and grammatical features, an approach to activity instruction based on step mastery, or gradual increases in learner expectations and autonomy. Focusing specifically on vocabulary, vocabulary size has been demonstrated to be a major predictor of linguistic proficiency (Meara, 1980). Therefore, the development of a large vocabulary should be a learning objective. To accomplish this, a shift away from common practices such as list making and teaching opposites together should be taken (Nation, 2008). More effective methods that encourage vocabulary acquisition include the use of embodiment techniques to facilitate physical associations with words, as well as the separation of elaborate illustrations from texts to eliminate distraction (Boers, 2013). Content should be level-appropriate, as described in Krashen's Input Hypothesis (1985). Additionally, Nation (2007) suggested that 98% of lexical items should be known in order to facilitate vocabulary acquisition. Any more would overburden the working memory of some learners, resulting in a reduced learning rate. With more comprehensible input, time can be made for increased contextual exposure. Lastly, research has demonstrated that positive evidence is far more beneficial for learners than negative, which can lead to bad habit formation (Terrace, 1963). Rather than providing only explicit feedback, teachers should also present models and examples of the learning objectives.

Through practical application, it is possible to make recommendations regarding constructive changes to existing language materials that can both reduce the burden on the working memory of the learner and subsequently decrease necessary time on task. This paper will make such recommendations about a popular English textbook that can be applied broadly to language learning materials in general.

Methods

In this paper, a popular English textbook series used in Japanese junior high schools, *New Crown English Series 1* (Saitou et al., 2008) will be analyzed. In each analysis, the purpose will be to identify cognitive processes used by learners, indicate areas of the learning materials that adhere to CL concepts, and locate possible areas of improvement. As most learners have very limited exposure to English in primary education in Japan, this textbook constitutes their first academic association with the language. From the text, three activities were chosen to be analyzed for CL elements, followed by a wholistic analysis of an entire unit.

Analysis

The text introduces learners to a variety of basic vocabulary and syntax. Although initially units provide ample amounts of visual references, they are gradually decreased over the course of the book.

Activity One

The first activity of each unit represents a targeted vocabulary acquisition activity. It consists of two full-page cartoon drawings. Numbers are attached to target items instead of linguistic representations. There are many scattered items. Here, learners are meant to listen and identify the item they have heard. On the second page, a different view of the room is presented with all vocabulary words displayed.

This activity clearly pushes learners to focus attention on vocabulary items by developing associations between aural and visual input. As demonstrated by Segalowitz (2007), conscious focus on language features is necessary for learning to take place. The items are primarily English loan words that exist in Japanese. Therefore, the content should be comprehensible for most learners. On the second page, learners revisit the same words for the purpose of reading and spelling. As this type of activity usually involves repetition of a native teacher's pronunciation, the activity establishes meaning, then form. Research has shown that learners must attend to meaning before they can address form (VanPatten, 1989). However, necessary exposure for vocabulary acquired is certainly more than once or twice through listening comprehension (Nation, 2008).

Looking at this activity critically, it attempts to introduce new vocabulary as single items. There are no syntactical structures introduced and no connection between the words given, thus no opportunity for learners to chunk the information or develop associations with other known vocabulary. Chunking should be implemented as a means to develop word association, pragmatic usage, and fluency (Lewis, 1997). Secondly, this activity does not offer opportunities for deeper processing. The implementation of a

drawing game might give learners the chance to process the information more deeply, through the imagery associated with Dual Coding Theory (Paivio, 2010). Having learners practice the listening and identifying activity in pairs would also be beneficial as it connects to rote reuse of the target items.

Activity Two

Next is a two-part activity designed to help learners develop fluency in counting. The first part asks learners to look at a picture with various animals and people in a park. The learners must write down the corresponding number of each in the boxes provided, and then complete a two-line dialogue. The second part of the activity asks learners to return to the vocabulary pages mentioned in activity one to count items and make sentences about them using the verb *see*.

Similar to the last activity, the attention of learners is directed to a specific linguistic feature; in this case, numbering. Additionally, a small amount of chunking is used with the verb *have* as a means to develop fluency. As demonstrated by research about practice (DeKeyser, 2007; Anderson & Lebiere, 1998), repetition of form and expression can result in reductions in pausing and error rates. Since no new lexical items are introduced, learners are free to focus on the form required in expressing numbers. Additionally, revisiting previous vocabulary will increase fluency.

In terms of criticism, this activity offers very little interaction beyond the short dialogue frame. Thus, it runs the risk of losing learner engagement (Laufer & Hulstijn, 2001). There is a lack of cognitive processing involved in the activity, which may in turn negatively affect learners' motivation. To correct this, the activity could be personalized by asking learners to describe their own room or a room from an external source using counting expressions, which would increase the relevance of the material. The activity could be done with pairs, move to groups of four, and ultimately be turned into a presentation in which learners could use pictures from magazines and the Internet as props. This would provide listening and speaking fluency and allow learners to notice gaps in their interlanguage (Swain, 2005) through the use of guided production.

Activity Three

Third is an activity based on the popular Beatles song, *Hello, Goodbye*. The lyrics are written on the page, and learners are asked to read along as the song plays. Cognitively, the readers activate schemata through the focus of attention on the words of the song. This activation can often branch into other associated thoughts and concepts as demonstrated in schemata theory (Ortega, 2009). Lexically, the lyrics of this song constitute comprehensible input for low-proficiency learners, which allows them to

process it without overburdening their working memory. There is also repetition of the same lexical chunks, providing learners with multiple exposures.

In terms of criticism, there are many shortcomings to this activity. First, at an introductory level, it is likely that learners do not have the ability to understand the figurative meaning of the text, or as described by Grabe (2009), they do not possess the linguistic background knowledge to process a situational model of the text. This leaves learners with the literal meaning of the text, which largely consists of *goodbye* and *hello* exchanges. On another note, songs often incorporate the use of alliteration. Boers (2012) demonstrated that alliteration could be useful in improving retention. There are probably songs with more alliteration and interesting literal meaning than this one. Lastly, like the previous activities, this song activity does not push learners to engage in the material beyond listening and pronunciation. The addition of discussion, enactment, picture drawing, and elaboration activities might engage more cognitive processes (Boers, 2006). In the next section, a unit of the textbook will be analyzed wholistically.

Unit Analysis

The target unit begins with a schemata activation activity. Learners listen to a description of American school life and choose which picture is being described. Next, a three-page dialogue is given between two characters. Pictures supplement each page, and a brief form-focused instruction is given at the bottom of each page. The syntactic focus of the dialogue is the present progressive tense, appearing in the text eight times in total. Next, a series of three practice exercises are provided to reinforce the form and its usage (listening, speaking, speaking), followed by a brief conjugation exercise. This lesson structure follows the common present, practice, produce (PPP) approach to teaching. There are a number of aspects of it that adhere to CL research, and a number of aspects that could be changed to increase its effectiveness.

First, schemata activation presents visual stimulation about the topic. However, listening and choosing alone are not extremely cognitively engaging. Therefore, the activity should increase learner engagement. For example, the learners could look at the pictures and make a list of sentences in pairs. This would provide them with an opportunity for discussion and comparison, which would activate schemata and build confidence. In the process, direct discussion about phrasing and other linguistic features might occur in the L1 as well (Vygotsky, 1978), which can further deepen cognitive processing.

Next, the provided dialogue reflects processed input (VanPatten, 2004) in that every time the target form is used, a picture is provided. This provides learners with a source of positive evidence, which is reinforced by visual scaffolding. That is not to say it is

perfect, however. Some research indicates that pictures and text occurring together can be distracting and result in a failure to focus on the target form (Samuels, 1970). Instead, pictures and text could be separated onto different pages, so that learners could still use them as scaffolding, but would have to retain the linguistic form in their mind longer while they identified the correct pictures. Longer periods of processing and retention have been linked to overall reading proficiency (Grabe, 2009). Additionally, the third page of the dialogue should be removed because it changes the topic, introduces many new words (more than 2% of total text), and further burdens the working memory of the learners without introducing many occurrences of the target form.

In terms of chunking, the dialogue does introduce eight common forms of the target form (present progressive). Assuming there is a read-repeat activity, there are three opportunities for learners to listen, repeat, and produce the target form. These opportunities should be increased through pair work that pushes learners to create and present the target form. Examples should be provided, but choices about the content of the sentences should be left to the learners. In this way, learners can begin to develop beyond the materials, which has been shown to foster autonomy (Benson, 2011). The teacher may even choose to prepare school pictures, which can be turned into a drawing activity where one member of a group draws, while the others give hints using the target form.

Lastly, a pronunciation exercise is included. If pronunciation is a course goal, the text could be revisited to have learners mark super-segmental features and have learners inductively draw conclusions about what how they affect meaning. After the class reconvenes, a list could be made on the board for teacher affirmation.

Conclusion

With the aforementioned alterations to the unit, learners should be able to process content more quickly and retain it longer. In order to evaluate the new design's efficiency, achievement and vocabulary tests could be developed and administered in pre-test post-test experimental setting. Lastly, a survey could be used as a means of measuring learner confidence, self-efficacy, and overall enjoyment. A study of this nature could contribute to CL research by demonstrating that CL techniques have pedagogical value for all levels of proficiency, not just intermediate and advanced proficiency classrooms. Furthermore, a correlation could be established between the uses of CL as a means to increase learning efficiency and learner motivation.

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