An Empirical Study of Cognitive Linguistics-Based Instruction for Effective English Phrasal Verb Acquisition

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Abstract

The purpose of the present study concerning the acquisition of English phrasal verbs was to examine and demonstrate, through four empirical experiments, the effectiveness of cognitive linguistics inspired approaches with pictorial elucidations, their teachability, learnability, and adaptability to active learning-based instruction.

The reasons for focusing on phrasal verbs are threefold. First, difficult expressions can be articulated using a basic lexicon that language users are likely to have already acquired. Therefore, if learners have trouble communicating in English because they do not know how to express what they would like to communicate in English, phrasal verbs can bridge gaps in knowledge and assist speakers in expressing themselves. The second reason is that English phrasal verbs are economical. When combined with a limited number of basic verbs and particles, phrasal verbs function much better than verbs alone. The third reason is that phrasal verbs are frequently used in daily conversation by native speakers of English.

If the objective is to develop students' basic communication abilities in English, phrasal verb learning should be recognized as crucial for English language education in Japan. However, for learners of English as a foreign language, phrasal verbs can be challenging to master. The so-called Gestalt makes it difficult to understand why phrasal verbs mean what they do, and as a result, the learning process is laborious. As cognitive linguistics can reveal mysteries, such as those associated with phrasal verbs, from the perspective of linguistic motivation, a concept that conflicts with arbitrariness, instruction utilizing still or moving images based on its insights could be effective.

The advantages of phrasal verb learning via the cognitive linguistics-based approach are as follows: (1) a focus on linguistic motivation facilitates memory, (2) it clarifies differences from synonymous expressions, and (3) it deepens understanding of grammar and usage. The current research was an empirical study exploring the

usefulness of cognitive linguistics-based approaches to phrasal verb learning, as described above, in Japanese educational settings. This doctoral dissertation consists of seven chapters, as outlined below.

Chapter 1 presents an overview of this study. Then, key concepts of Subject Development Studies, in which the present study was grounded, are introduced.

In Chapter 2, previous research on phrasal verbs and their learning as well as the theoretical background of cognitive linguistics and applied cognitive linguistics are summarized and discussed. In addition, scientific evidence from a variety of fields, such as psychology and learning science, is reviewed to support the usefulness of the methodologies and materials employed in the present study.

Chapter 3 examines whether the application of materials based on the cognitive linguistics findings proposed in the present study was effective for phrasal verb learning or not. After dividing the participants into two groups, one of which learned phrasal verbs on the basis of cognitive linguistics and the other on the basis of conventional approaches, it was determined that participants in the former group scored significantly higher on the post-test, proving the efficacy of the phrasal verb materials derived from cognitive linguistics insights.

Chapters 4 and 5 verify the effectiveness of the cognitive linguistics approach for phrasal verb instruction in terms of teachability and learnability, respectively. When developing materials to put theory into practice in educational settings, it is imperative to consider whether they are both easy for teachers to teach and for learners to learn. In contributing research findings to the field of education, it is considered more appropriate to focus on the findings of theoretical linguistics to enhance teachers' instruction and cognitive abilities to enable learners to understand the explanations. The results of the verification confirmed that teachability and learnability were guaranteed elements when the method was applied. With respect to learnability, the gain scores (post-test minus pre-test) for phrasal verbs learned in the proposed cognitive linguistic approach were found to be high, regardless of English proficiency or the number of

phrasal verbs learned before the experiment. Furthermore, the cognitive linguistic approach to phrasal verb learning was observed to be beneficial in reducing the differences among academic groups.

In Chapter 6, a practical model for active learning-based instruction for phrasal verb acquisition utilizing the jigsaw method is proposed. In recent years, although active learning has been recommended in education in Japan, teacher-centered instruction remains the main method of vocabulary teaching. To enable the results of the present study to be incorporated into educational settings, one method of active learning-based instruction for phrasal verb learning and its effects is demonstrated.

This doctoral dissertation investigated the effectiveness of the proposed phrasal verb learning methods through four empirical studies, as previously described. In Chapter 7, a summary of the multitude of results obtained in the present study is presented, the limitations are enumerated, and recommended directions for future research on phrasal verb learning methods are indicated.

Chapter 1 Introduction

1.1 Outline of the Present Dissertation

Why does the phrasal verb “Watch out!” mean “pay attention”? Some English learners may ask themselves this type of question. This is one of the mysteries of English expression that cannot be understood by simply relying on Japanese translations, akin to combining “見る” for “watch” and “外” for “out” separately in vocabulary learning. In this regard, phrasal verbs often pose difficulties for learners of English as a foreign language owing to their Gestalt, or configuration nature, in which the meaning of the entire phrasal verb cannot be predicted based on the sum meanings of their verbs and particles. In this dissertation, prepositions and adverbs that are combined with verbs are collectively termed particles. Gestalt, or configuration is a concept based on the psychological notion that the meaning of the whole is more than the sum of the individual parts. The word “blackboard” is a compound of the words “black” and “board,” yet it does not literally mean a “black-colored board,” which, if looked for, would be commonplace. Rather, it represents a “blackboard” attached to a classroom wall that is utilized for writing letters and diagrams, etc. In this phenomenon, the whole simply does not add up to its partial meaning. It is for this reason that Japanese learners of English are sometimes ridiculed for using “phrasal verbs as painful verbs” (Aoki, 2007, p. 9). Reportedly, in addition to Japanese learners of English, Romanians, Spaniards, and others have difficulty learning phrasal verbs, given the lack of phrasal verb equivalents in their native languages (Neagu, 2007, p. 122). Furthermore, some studies have revealed that learners of English tend to avoid using English phrasal verbs because of this association with their mother tongue (Dagut & Laufer, 1985; Laufer & Eliasson, 1993). However,

phrasal verbs are, in fact, a useful vocabulary because they can express various and difficult things with simple and basic words. Moreover, as mentioned above, the major learning problem with phrasal verbs, which are often referred to as multi-word verbs or verb + particle constructions, is notoriously the semantic Gestalt (via metaphors in the conceptual system) that disables their overall meaning and, in turn, prevents predictions of their meaning from the constituent parts consisting of verbs and particles. However, the insights of cognitive linguistics can account for why phrasal verbs behave in such a manner. By using a theoretical rationale for the meaning of a phrasal verb, learners of English can formulate and grasp an image for it, which gives them a better understanding of its meaning. The purpose of the present study of phrasal verb acquisition was to examine and prove through experiments the effectiveness of pictorial elucidations based on the outcomes of cognitive linguistics for solving the above-mentioned problems.

This doctoral dissertation consists of seven chapters including this Introduction. Chapter 2 reviews the theoretical background of linguistics, cognitive linguistics, and applied cognitive linguistics. It also discusses previous studies in various fields in which the present study is grounded in terms of their methodology and materials as well as the importance and complexity of phrasal verb acquisition.

Chapter 3 illustrates through an experiment the validity of a cognitive linguistic approach to phrasal verb acquisition that emphasizes linguistic motivation, such as why an expression has a certain meaning.

As the purpose of the present study is to propose methods that can be put into practice in educational settings and to contribute the research results to English education in Japan, methods of phrasal verb learning, acquired based on cognitive linguistics, are examined within the frameworks of teachability in Chapter 4 and learnability in Chapter 5.

Linguistic motivation is a concept that conflicts with arbitrariness, in the sense that certain reasons exist for the way language is expressed, or certain relationships are present between the expressed language and the meaning embodied in its representation. According to Littlemore (2009), "in applied linguistics the term "motivated" is usually used to refer to keen and enthusiastic learners, whereas in cognitive linguistics, the term is applied to the language itself; it is used to refer to the fact that some aspects of language are not arbitrary and that there are sometimes reasons why we say things the way we do" (p. 148). Teachability and learnability are terms used in second language acquisition (SLA) theories, such as those of Pienemann (1998) and Gregg (2001). They refer to the ability of the learner's internal LAD (language acquisition device) to operate within a second language through a process of teaching and learning based on some predetermined acquisition order according to developmental stages (Pienemann, pp. 250–264). However, it should be noted that teachability and learnability in this dissertation obey the following definition by Tanaka (2007). Tanaka (pp. 558–559) lists three conditions for a sound pedagogical grammar: the possibility for the teacher to teach, the possibility for the learner to learn without stumbling, and the possibility for the grammar to be useful for communication. School English grammar in Japan teaches grammar comprehensively based on prescriptive grammar, but it does not clearly explain to learners why the grammar is the way it is. Theoretical linguistics can benefit school grammar by providing the reasons why language is or is not expressed in the way it is. However, due to a lack of theoretical linguistics knowledge and the difficulty of the field itself, teachers do not feel confident that they can actually teach learners by applying their knowledge of theoretical linguistics, and learners are uncertain whether they will understand the explanations given by teachers referring to theoretical linguistics. The concepts of teachability and learnability were used in the present study as indicators of whether the above concerns can be addressed and the problems solved. Tanaka is committed to

cognitive linguistics, which suggests that language acquisition reflects the interaction of intrinsic cognitive abilities, including perception, memory, thinking, and learning. On the other hand, Pienemann and Gregg differ from Tanaka in their definitions of teachability and learnability, as "the fundamental goal of a theory of second language acquisition (SLA) is to explain the acquisition of competence in a second language" (Gregg, 2001, p. 152). The research focuses on the implicit linguistic competence that constitutes linguistic knowledge. They are likely to have dissimilar definitions of teachability and learnability due to their different concerns to Tanaka. Gregg (2001) stated that "the connections between SLA theory and L2 instruction are indirect, complex, and tenuous at best, when they are not non-existent, and we may as well face that fact" (p. 153). The arrangement of grammatical items in textbooks used in educational settings does not necessarily follow the processability theory idealized by SLA findings. In contributing research findings to the field of education, it is considered more appropriate to focus on the findings of theoretical linguistics to enhance teachers' instruction and cognitive abilities to enable learners to understand the explanations. Therefore, this study used Tanaka's definition. Nakagawa's (2013a) study of phrasal verb learning showed that post-instruction retention was better when learners understood why phrasal verbs mean what they mean, based on a cognitive linguistic approach, rather than the conventional method of learning by rote. In the present study, experiments were conducted to determine whether the proposed cognitive linguistic approach could be taught even by teachers who had no knowledge of linguistics and whether learners could understand and acquire phrasal verbs in this manner.

In Chapter 6, an inductive phrasal verb learning method is proposed to correspond to the active learning-based instruction currently occurring in the educational sphere. In Japan, although the practice of active learning-based instruction in classrooms has been increasing, there remain few

research examples in vocabulary learning. Furthermore, very few studies have presented case studies that incorporate active learning-based instruction focused on phrasal verbs in vocabulary learning or examined its effectiveness. In this paper, phrasal verb learning through application of the jigsaw method is proposed to shift from rote vocabulary learning to vocabulary learning based on active learning-based instruction. Oshima and Maskawa (2016) criticized the emphasis still placed on learning "facts" in many subjects in Japan and argued the importance of "acquiring knowledge" through "learning with understanding" and "learning in such a way that transfer occurs."

This study investigated the effectiveness of the proposed phrasal verb learning methods through four experiments, as previously described. In Chapter 7, various results obtained in the study are summarized, and directions for further research on phrasal verb learning methods are suggested.

1.2 From the Perspective of Subject Development Studies

Before proceeding with a detailed discussion of the present research, I would like to share how it was conducted based on my own understanding of the concept of the new research field of "Subject Development Studies," as this dissertation seeks to contribute to it. According to Shirahata, Shimbo, and Kitayama (2015), Subject Development Studies integrate three different but related academic fields: (a) learning of student's major subject (e.g., learning scientific theory); (b) learning how to teach his or her major subject (e.g., how to teach science to students); and (c) learning of pedagogy and education in general (e.g., learning what education should be). In the present research, studies of specialized fields are regarded as research based on linguistics theory, while studies of how to teach subjects are referred to as research on English teaching methods. The research was

carried out in the field of linguistics theory applications, or more precisely, the theory of cognitive linguistics, to the field of language teaching as a bridge between the two. The main theme of the present study, which is inserted in the field of applied linguistics, is how to transform elaborate linguistic theories into practical applications in language education. In the past, there was a gap between studies of specialized fields and studies of subject teaching methods, but in recent years, with the development of this new research field, attempts are being made to construct new academic disciplines. The purpose of the present research was to discover effective teaching methods for the acquisition of phrasal verbs by transforming image schemas used in cognitive linguistics into familiar illustrations and developing materials that both teachers and learners can easily comprehend. To examine practical methods in the field of education, both qualitative and quantitative research was employed, and efforts were made to conduct the research as scientifically as possible from a variety of perspectives. In educational practice, vocabulary instruction, in particular, is mainly based on rote memorization, and little has been achieved with respect to the efficient learning of figurative idioms, including phrasal verbs. The current study, which presents explicit teaching methods that enable learners to acquire phrasal verbs in a meaningful and comprehensible way, is helpful in this regard.

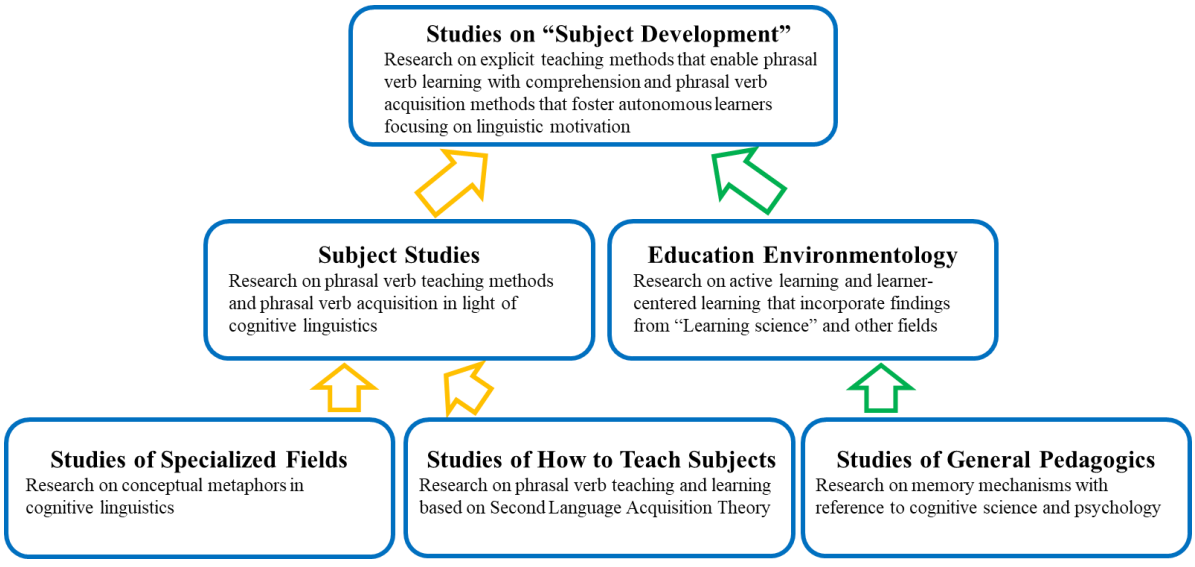
Above, I described Subject Studies as a field that integrates studies of specialized fields and studies of subject teaching methods in relation to the theme of this doctoral dissertation. What follows is a description of a method that integrates Education Environmentology and Subject Studies. Education Environmentology Studies include the recent spread of active learning-based instruction in schools. In Chapter 6, based on the learner-centered approach, a vocabulary learning method to assist learners, called problem-solving learning, is presented in this context of a changing learning environment within Education Environmentology studies, such as schools incorporating

active learning-based instruction, which has been spreading rapidly in recent years. Theoretical linguistics with a scientific basis is systematized to make it applicable to actual educational settings. In schools where the paradigm is shifting from teaching to learning, active learning-based instruction is taking place; therefore, in educational environments where educational equipment based on information and communications technology (ICT) is being introduced, the present study investigated how phrasal verb learning methods can be developed and exploited to contribute to the diversification of learning styles from an educational technology perspective. In the case of phrasal verb acquisition using video and still images, the construction of a learning environment and methods of visual memorization were pursued while referring to the findings of cognitive science on the mechanisms of memory.

Figure 1.1. outlines the concept of Subject Development Studies, as described above.

Figure 1.1.

Concept of Subject Development Studies Grounded in Nishimiya, Noji, Ito, Shirahata, Shimbo, & Kumakura (2015, p.5)



Chapter 2 Theoretical Background

2.1 Cognitive Linguistics

2.1.1 Overview of Cognitive Linguistics

Cognitive linguistics is a branch of theoretical linguistics that dates to the study of generative semantics, which emerged in the late 1960s, and has developed since the 1980s. Cognitive linguistics holds a view of language that regards linguistic competence as derivative and emergent from operational and general cognitive competence. Yamanashi (2000, p. 8) defined "cognition" in cognitive linguistics as "cognitive ability" in the broadest sense of the term. It is rooted in subjective interpretation, categorization, and expansion of the external world; meaning making; interaction with one's environment and society; and physical experiences, including the five senses, spatial cognition, and kinesthesia. Against the backdrop of this paradigm of "cognition" in cognitive linguistics, research has expanded to include Taylor's categorization, Lakoff and Johnson's metaphor, Langacker's cognitive grammar, Fillmore's frame semantics, Goldberg's construction grammar, Talmy's force dynamics, Sweetser's semantic change in Indo-European languages, and Fauconnier's mental space theory. Although they are not easily aligned because of the various positions held by these scholars, most emphasize the principle that Lakoff (1987, pp. 343–345) calls "experientialism." Experientialism is the view that language is based on our physical and psychological experiences in the environment in which we live. However, scholars do not completely deny that there are some innate factors involved in language acquisition (Langacker, 2008a, p. 8; Tomasello, 2003, p. 1; Tsuji, 1998, p. 33). Research on cognitive linguistics is being

conducted now in an interdisciplinary manner, extending the field of study to incorporate various adjacent fields, from artificial intelligence to literature.

2.1.2 Application of Cognitive Linguistics to Foreign Language Learning

Flashcards are often used as a classroom activity for teaching vocabulary in junior and senior high schools. New educational devices have emerged, yet the concept of flashcards remains, as exemplified by the adoption of flashcards as a function of digital textbooks. The process of showing flashcards, listening to English, and having students pronounce English words or say their meanings is based on the Audio-Lingual Approach, a teaching method developed by Fries (1945) and Lado (1964) at the University of Michigan. This approach refers to Skinner's theory of behaviorist psychology and American structural linguistics, which state that the connection between stimulus and response is strengthened by repetition. In the field of education, pattern practice has been performed as a way for students to acquire language patterns through practice. However, it has been criticized as an exercise that focuses on form, rather than on the semantic content of words, and is simply mechanically repeated sentences disconnected from actual scenes and contexts. The Audio-Lingual Approach (Lado & Fries, 1958), on which pattern practice is based, comes from the idea that language is acquired through repeated utterances, as shown below.

(1) Question: What is this? Answer: It is a pencil.

Question: What are these? Answer: They are pencils.

(Fries, 1945)

Although the Audio-Lingual Approach can promote memorization of English patterns through substitution of certain parts of the text, as in the English sentences above, it is also monotonous. Moreover, it is difficult to develop communicative competency because the focus is on form, rather than on semantic content. The fact that the Audio-Lingual Approach is no longer seen in the field of education in Japan today, where communicative competency is now required, can be attributed to this issue. Thus, we can see that foreign language teaching methods are related to theoretical linguistics. Later, Chomsky, who criticized American structural linguistics on the grounds that children can acquire language even in POS (poverty of the stimulus), changed the focus of theoretical linguistics to generative grammar. Chomsky was skeptical of the application of his theory to language teaching. When asked by an audience member at a lecture in Managua about possible applications of his linguistic theories in language teaching, Chomsky responded that linguistics has little to say about practical matters and that the capacity to carry out practical activities is usually far more advanced than scientific knowledge (Chomsky, 1988). Regarding language teaching, he stated, "The truth of the matter is that about 99 percent of teaching is making the students feel interested in the material. Then the other 1 percent has to do with your methods" (p. 181). As a teacher, I intuitively understand that no matter how good a teaching method is, a class will not be successful unless the students are intellectually curious.

Although Chomsky was not active in the application of generative grammar to language teaching, because of the focus of his research on grammar (strictly syntactic operation system), some early transformational grammar applications for language teaching were attempted (cf. Lester, 1973). Shirahata (2008) argued that school grammar can teach "this way of saying things" but lacks the ability to explain "not this way of saying things" and "why it is wrong to say things this way," while generative grammar can contribute to foreign language teaching by providing rational

answers to such questions. Certainly, generative grammar is useful as it allows us to explain syntactic rules explicitly. However, as generative grammar focuses on grammar and not as much on meaning, it has few implications for vocabulary learning in foreign languages. While generative grammar as a linguistic approach presupposes the autonomy of linguistic abilities, a linguistic approach postulating that linguistic abilities are motivated by general cognitive abilities that reflect human physicality later emerged and became known as cognitive linguistics. Regarding the application of cognitive linguistics in language education, Langacker stated the following.

> It remains to be seen whether language teaching will fare any better when guided by notions from cognitive linguistics. There are, however, grounds for being optimistic. Compared to other approaches, cognitive linguistics offers an account of language structure that—just from the linguistic standpoint—is arguably more comprehensive, revealing, and descriptively adequate. (Langacker, 2008b, p. 66)

According to Langacker, while there is some uncertainty about the effects of applying the findings of cognitive linguistics in language education, it is one of the only linguistic theories that focuses on linguistic motivation. Linguistic motivation opposes the notion of arbitrariness that is deemed to characterize linguistic signs, which suggests that linguistic motivation can be used effectively in language teaching. Cognitive linguistics emphasizes the human experientialism stance and posits that language reflects the experiences gained through interactions with physical activity, culture, and social environments. In other words, cognitive linguistics is based on the idea that how we perceive things differs, depending on our culture and environment, and that various ways of perceiving things results in a variety of linguistic expressions. This differs greatly from generative

grammar, which focuses on the autonomy of linguistic ability. Language acquisition research based on cognitive linguistics, including research fields such as applied linguistics, SLA, pedagogical grammar, and language teaching, was, to my knowledge, first conducted by Johnson (1985) in article form and Dirven (1989) in book form. More recently, there have been several language acquisition studies based on cognitive linguistics (Achard & Niemeier (Eds.), 2004; Robinson & Ellis (Eds.), 2008; Tyler, 2012; Tyler et al. (Eds.), 2018, etc.). Tyler (2008, p. 907) stated that "one of the central challenges in applied cognitive linguistics is to demonstrate the effectiveness of the cognitive linguistic approach to second language acquisition. As Figure 2.1. shows, Boers (2013) summarized previous research on its effectiveness in vocabulary retention, indicating the accumulation of empirical research.

Figure 2.1.

An Inventory of Quasi-Experimental Intervention Studies of the Effect of CL-Informed Treatments on Vocabulary Retention (Boers, 2013, p. 215）

Study	Targets for learning	CL group better retention of treated lexical items?
Kövecses & Szabó (1996)	Phrasal verbs with *up* and *down*	Yes, but no significance calculated
Boers (2000a)	Metaphoric word uses in economics (e.g. *hurdles; bail out; wean off*)	Yes
Boers (2000b, study 1)	Metaphors to talk about anger (e.g. *fuming; bite someone's head off*)	Yes
Boers (2000b, study 2)	Phrasal verbs with *in, out, up* and *down*	Yes
Boers (2000b, study 3)	Metaphoric word uses in economics (e.g. *plunge; peak; soar; slide*)	Yes
Boers (2001)	Figurative idioms (e.g. *a dummy run; get into gear; a chink in one's armour*)	Yes
Verspoor & Lowie (2003)	Metaphoric word uses (e.g. *bulge; grapple; smother*)	Yes
Csabi (2004)	Uses of *hold* and *keep* (incl. phrasal verbs and idioms)	Yes
Boers, Demecheleer & Eyckmans (2004)	Figurative idioms (e.g. *cut no ice with someone; waiting in the wings*)	Yes
Morimoto & Loewen (2007)	Uses of *break* and *over*	The same
Berendi, Csabi & Kövecses (2008)	Metaphors to talk about anger (e.g. *blow off steam; add fuel to the fire*)	Yes
Condon (2008)	Phrasal verbs with *in, out, up* and *down*	Yes, in 3 of 4 trials
Li (2009, study 1)[a]	Metaphoric word uses (e.g. *regurgitate; downhill; erupt*)	Yes
Li (2009, study 4)	Figurative idioms (e.g. *hit the ceiling; call the shots; blow the whistle*)	Yes
Li (2009, study 5)	Proverbs (e.g. *a rolling stone gathers no moss; look before you leap*)	Yes
Cho (2010)	Uses of the prepositions *at, in* and *on*	Yes
Gao & Meng (2010)	Metaphors to talk about anger	Yes in 1 of 3 trials
Tyler, Mueller & Ho (2010)	Modal verbs *could, would, should* and *must*	Yes
Yasuda (2010)	Phrasal verbs with *into, up, down, out* and *off*	The same[b]

Note. CL = Cognitive Linguistics

In Japan, beginning with Tanaka (Ed.) (1987), Ueno (Ed.) (2006), Arakawa and Moriyama (2009), Imai (2010), Onishi and McVey (2011), Nakagawa (2013c), and Cho (2016), there has been some research on the application of cognitive linguistics to SLA and foreign language teaching, just as in other countries. Recently, Nakagawa (2020a) discussed the affinity between English teaching methodology and cognitive linguistics. Niemeier (2017) proposed a method that combines task-based language teaching (TBLT) and cognitive grammar, which is mainly applied in the field of cognitive linguistics research on grammatical theories, and new cognitive linguistic approaches to teaching have been attracting attention. Langacker (1987) developed cognitive grammar and proposed UBM (usage-based model) based on a maximalist, non-reductive, bottom-up approach. UBM has also had a major influence on the development of research, such as Tomasello's (2003) native language acquisition and Ellis and Fernando's (2009) SLA. The maximalist position states that an enormous amount of learning is involved in gaining free command of a language, and it tries to minimize the assumption that there is an inborn structure specific to a language. A non-reductive approach posits that the concept of grammar includes not only reducible rules but also concrete examples of repeated patterns. The bottom-up approach refers to the idea that rules are acquired through exposure to the language used in daily life. The term usage-based model was coined by Langacker and empirically studied by Tomasello and others to describe the inductive acquisition of language through experience, such as the frequency of input (token frequency, type frequency). Langacker (2000a, p. 1) stated that "For better or for worse, I admit to having coined the term usage-based model". The idea is that language is acquired through repeated utterances, as in the Audio-Lingual Approach (Lado & Fries, 1958), the basis of pattern practice in education. The usage-based model is a theory of language acquisition that explains how children go from item-based construction to adult syntactic construction (Kodama & Nozawa, 2009, p. 31).

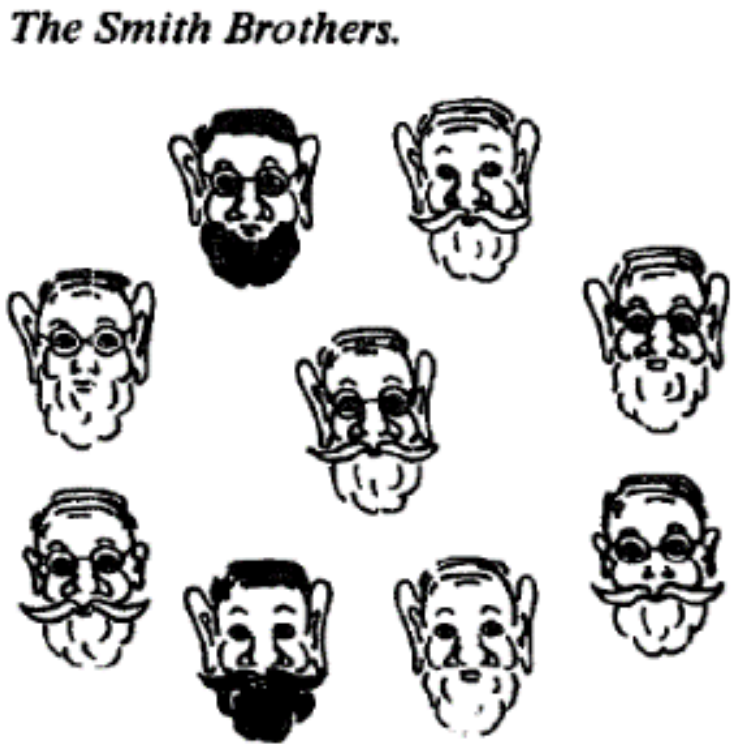
In fact, certain scholars used a similar approach to explain linguistic events, even before cognitive linguistics was established. Cognitive linguistics emphasizes the usage-based model and the empiricist position and assumes that linguistic expressions reflect experiences gained through physical movements using the five senses and interactions in cultural and social environments and that this view is based on the general cognitive abilities of ordinary people.

In the fields of English grammar and usage research, Konishi (1964, pp. 97–102) referred to the difference between the prepositions IN and AT by stating that although IN contains the notion of a wide place and AT a narrow place, it does not represent a difference in the original meaning but in the speaker's position and feeling in the moment, which is reflected in the preposition through psychological processes. Lee (2001, pp. 23–24), who relied on cognitive linguistics, offered the similar explanation of AT and IN to Konishi's above. In cognitive linguistics, there is active study of polysemantic words, with emphasis on their semantic extension, but the concept of the existence of a central meaning was also used by "meaning[*znachenie*]" Vygotsky (1962, p. 146) after Paulhan (1928). Additionally, Bolinger stated that one polysemous word comprises "a single overarching meaning" (1977, p. 19), which is not based on cognitive linguistic theory. From this point of view, the way cognitive linguistics perceive language can be said to be one of the natural cognitive activities, rather than a way of thinking unique to cognitive linguistics.

The theoretical background of central word meanings based on the findings of cognitive linguistics is based on prototypes and cores, which can be divided into two major categories. The former is an idea derived from Wittgenstein's family resemblance.

Figure 2.2.

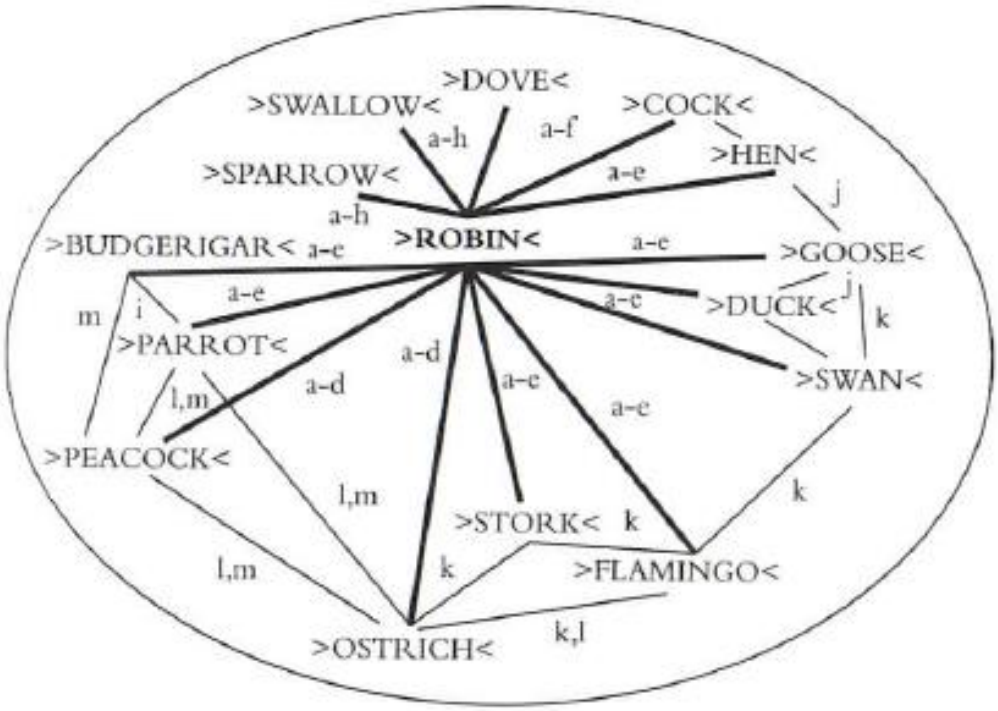
Family Resemblance (Armstrong et al., 1983)



Taking a family as an example, a prototype can be said to be a typical member of a family that does not all possess identical features but are related to one another and appear to be similar to the family as a whole in Figure 2.2. The same is true for the bird prototype, ROBIN, in Figure 2.3.

Figure 2.3.

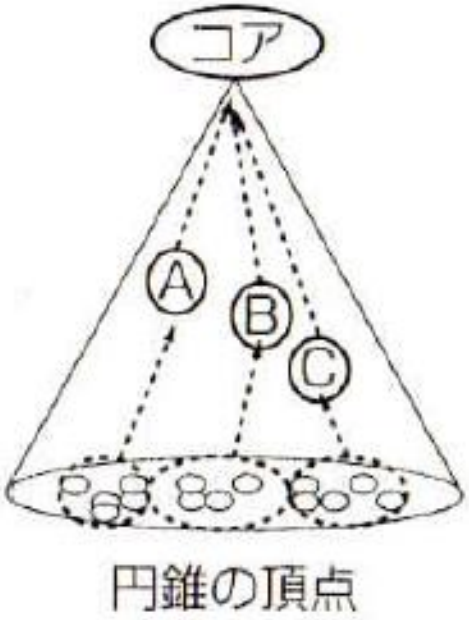
Prototype for the Concept of BIRD (Armstrong et al., 1983)



By contrast, according to Tanaka et al. (2006), core is a context-independent concept that captures the maximum common denominator of usage examples and the entire semantic range of a word.

Figure 2.4.

Core Image (Tanaka et al., 2006)



Prepositions with an expanding figurative meaning are also polysemous words. In a cognitive linguistics approach, the central meaning of a preposition is often illustrated with an image schema to facilitate understanding.

Figure 2.5.

ACROSS (Langacker, 2000b)

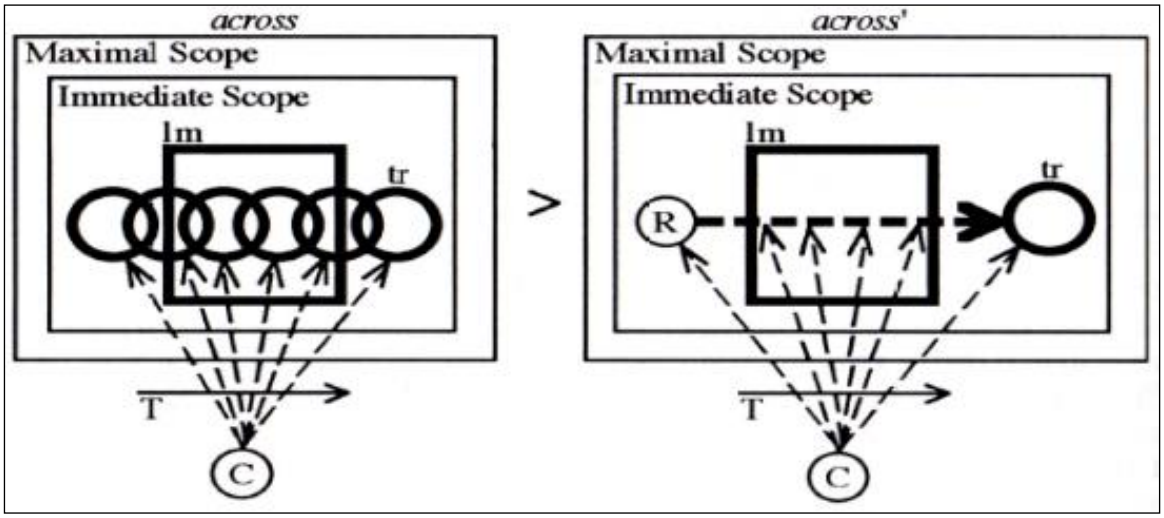
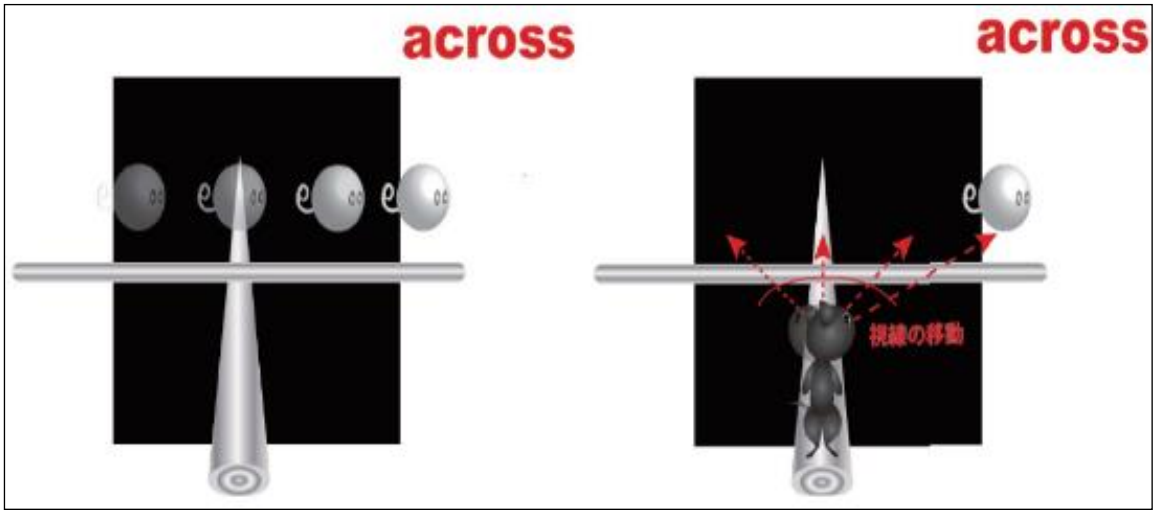


Figure 2.6.

ACROSS (Nakagawa, 2013b)



The diagrams in Figures 2.5. and 2.6. are images of ACROSS. The left image shows the movement of the object itself, as in "walk across the street," and the right image shows the movement of the gaze only, not the object itself, as in "live across the street." When theoretical linguistics is used in language teaching, it is necessary to present it in a simple way that learners can understand. In Figure 2.6., Langacker's (2000b) detailed representation of an ACROSS diagram has been modified by Nakagawa (2013b) using friendly illustrations. Although scholars have used similar images, there is no unified set, as there have been various iterations. This can be seen by comparing Tyler and Evans (2003) and Tanaka et al. (Eds.) (2003) to image figures.

Figure 2.7.

TO (Tyler & Evans, 2003)

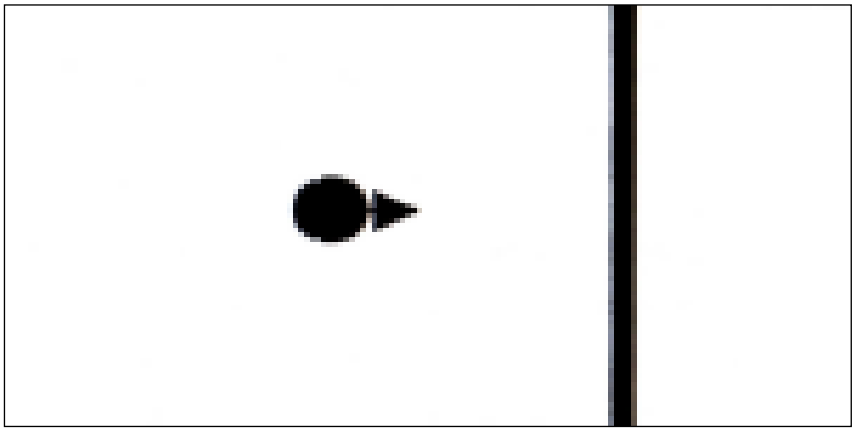
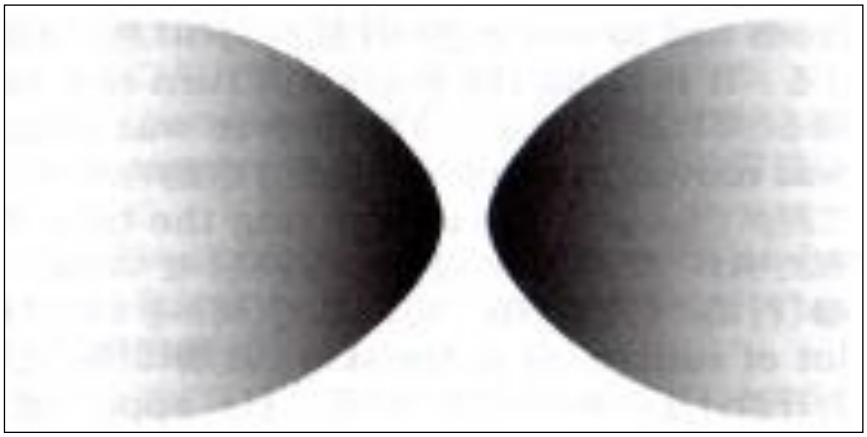


Figure 2.8.

TO (Tanaka et al. (Eds.), 2003)



Furthermore, image schemas themselves are theoretically based on the physical experiences in an individual's daily life, from which a certain abstract pattern is derived and emerges in the mind (Nakagawa, 2019a).

In recent years, some textbooks have been designed to enable students to learn English prepositions with accompanying imagery, but there is still room for improvement in the usage of prepositions such as AT, IN, and ON when they are used to represent time. While the physical positional relationships represented by prepositions are shown by images in some textbooks, the abstract time-representing uses of prepositions and the reasons the preposition represents that use are rarely explained through images. Time prepositions have figurative extended meanings, and although they are taught in junior high school, many high school students have not mastered them. Nakagawa (2019b) mentioned that the percentage of correct answers to basic questions about time prepositions was only 72%; exploring the pedagogical effects of "time prepositions" using imagery. In the study above, first-year high school students were divided into two groups: one based on rote

learning (control group: 31 students) and the other based on cognitive linguistics (experimental group: 31 students). Students were given a pre-test, a post-test immediately following the instruction, and a delayed test one week after the instruction.

In the control group, the following handout (Figure 2.9.) was used to promote retention by checking the usage of the prepositions on the test..

Figure 2.9.

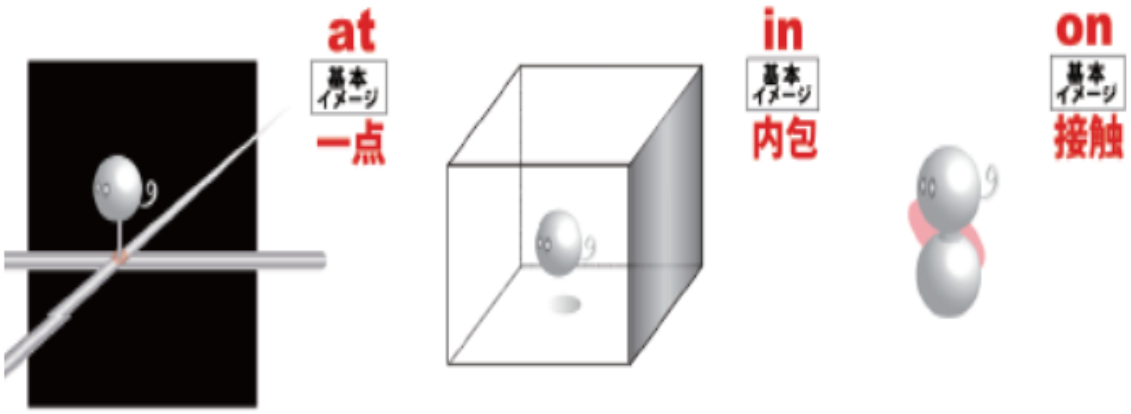
Handout Used for Explanation

時を表す前置詞
at：時刻・夜・正午
in：月・年・季節・午前・午後
on：日付・曜日・特定の日

In the experimental group, after a video was shown and the images of prepositions explained, the handout above was used to confirm each usage in English to promote understanding. Specifically, while showing the video (Figure 2.10.), the researcher explained to the learners that AT, with its image of a single point, is used to express a point in time and is used for the instantaneous moment; IN, with its image of inclusion in space, is used to express a relatively wide range of times; and ON, with its image of contact, is used to express a sense of contact at a specific time and is also used to mark a calendar with a sticker. As ON has the image of contact, the researcher explained to the participants that in the expression of time, it is used when there is a sense of perfect contact at a particular time and also when a sticker is attached to a calendar to mark it.

Figure 2.10.

Preposition Images Used for Explanation (Nakagawa, 2013b)



The results of the study showed that the experimental group scored significantly higher than the control group on the delayed test. The study reported that comments in the questionnaire indicated the participants in the experimental group learned more about the different meanings of prepositions through imagery, as opposed to the participants in the control group who only learned superficially through the test.

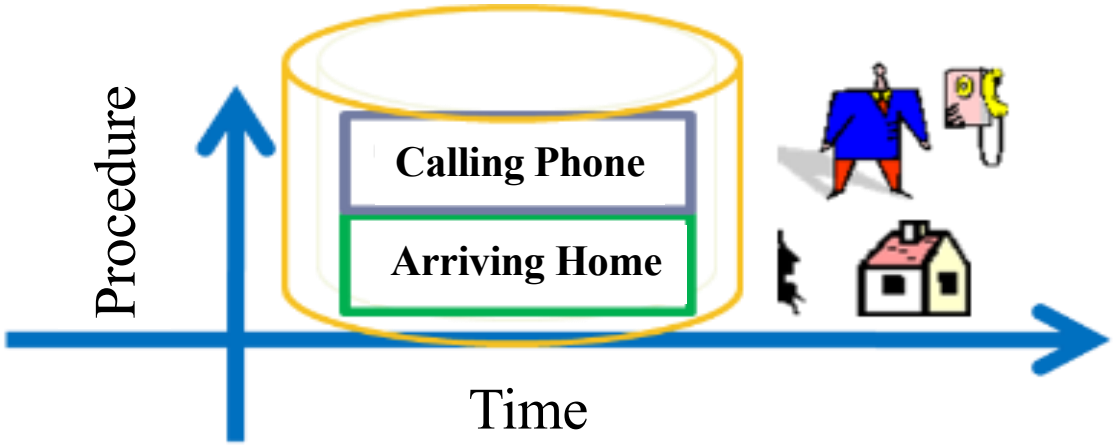
As there is no equivalent part of speech for prepositions in Japanese, and as the meaning of prepositions have figurative extensions, Japanese learners of English can have difficulty with them. English includes a wide variety of prepositions, but the nine most frequently used are AT, BY, FOR, FROM, IN, OF, ON, TO, and WITH, accounting for about 92.6% of all prepositional use (Fries, 1940). Prepositions that express physical positions, such as “The cat is on the chair,” are relatively easy to learn, but the following metaphorically extended usage of the preposition to express time (“on” for “as soon as”) seems to be difficult to learn.

(2) On getting home, I phoned Taro.

Many uses of figurative extension prepositions in English are taught at the high school level in Japan. For high school students, who have acquired the relative ability to think logically, it would be effective to teach them why "on" can mean "as soon as" by focusing on linguistic motivation. With the semantic concept of "contact," ON extends from its usage to indicate physical location to the abstract meaning of "as soon as," depending on the context. The reason for this is that people replace the abstract "event" with the concrete "thing" and think that the "event" of the phone call is placed right on top of the "event" of the arrival without any gap (free time), as shown in the following figure.

Figure 2.11.

The Image of ON Meaning AS SOON AS



Another example from Nakagawa (2019c), which is an expression frequently used by native English speakers, is "What's up?" Learners who rely on the translation of WHAT as "何 (what)"

and UP as "上 (up)" may take this expression to mean, "What is the meaning of UP?" Therefore, when asked by a native English speaker, "What's up?" they are sometimes unable to answer. The UP in this expression does not literally represent a spatial "top" but is a usage that reflects the sensory image that humans have of space on a daily basis, "What is the thing/event that appears/is happening?"; in other words, "What's going on?" Our minds are unconsciously dominated by these conceptual metaphors.

Figure 2.12.

Orientational Metaphors (Lakoff & Jonson, 1980, pp. 15–17)

HAPPY IS UP; SAD IS DOWN

CONSCIOUS IS UP; UNCONSCIOUS IS DOWN

HEALTH AND LIFE ARE UP; SICKNESS AND DEATH ARE DOWN

HAVING CONTROL OR FORCE IS UP; BEING SUBJECT TO CONTROL OR FORCE IS DOWN

MORE IS UP; LESS IS DOWN

FORESEEABLE FUTURE EVENTS ARE UP

HIGH STATUS IS UP; LOW STATUS IS DOWN

GOOD IS UP; BAD IS DOWN

VIRTUE IS UP; DEPRAVITY IS DOWN

RATIONAL IS UP; EMOTIONAL IS DOWN

When teaching learners that even a single word can have multiple meanings depending on how it is perceived, explicit explanations such as the orientational metaphors shown in Figure 2.12. can be effective in promoting intuitive understanding.

2.1.3 Phrasal Verb Learning Methods Based on Cognitive Linguistics

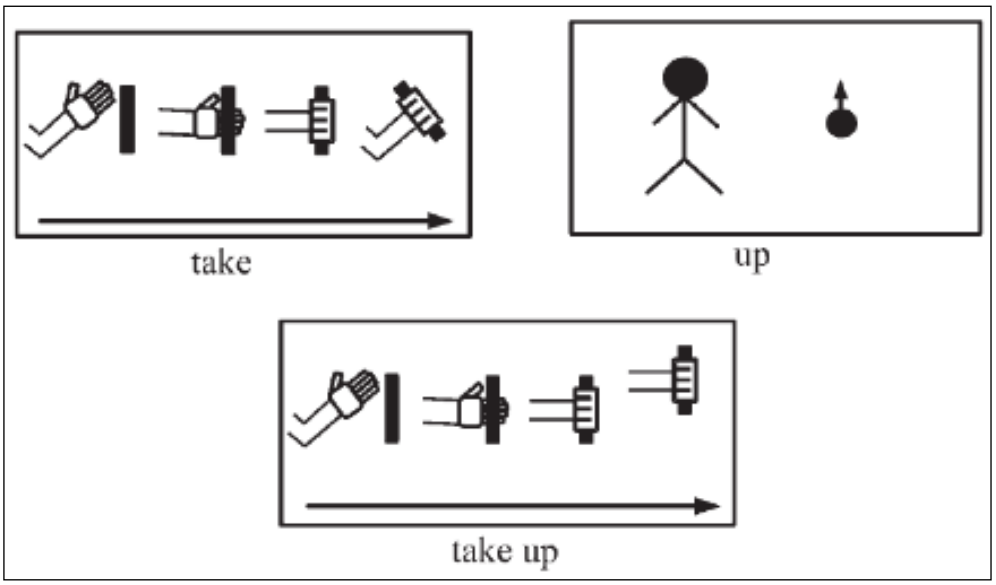
One of the advantages of the cognitive linguistic approach, as Morgan (1997) argued, is that it can give an explicit explanation of linguistic motivation based on phrasal verbs being semantically analyzable. When applying the findings of cognitive linguistics to phrasal verb acquisition, many studies have attempted to explain the effects of phrasal verbs by presenting imagery based on image schema. As described by Langacker (2008a, pp. 9–10), diagrams range from simple, cartoon-like sketches to elaborate technical displays of great complexity. Langacker calls them "diagrams," which are not the equivalent of image schema (which are patterns of mental activity) but are merely intended to evoke them and suggest their nature (Langacker, 2008a, p. 32). Kurtyka (2001) insisted that visualization, i.e., the ability to form mental representations of verbal and non-verbal input, seems to be indispensable in learning and that to enhance comprehension and retention, a teacher would be advised to combine the verbal and visual when presenting phrasal verbs (pp. 33–36). Here, mental representation is interpreted as imagery that facilitates people's understanding of things they picture in their minds, based on information obtained from their sensory and motor functions. Numerous examples of image schemas have been proposed in linguistics research (Mandler & Cánovas, 2014, p. 527). In particular, there has been much discussion about OVER. See Dewell (1994) for details. The term "schema" itself is an adaptation from psychology. Yoshimura (2013, p. 16) defined image schema as a cognitive ability related to mental representations that exist prior to the formation and conceptualization of words. Johnson (1987, p. 156) stated that the origins of the

concept can be traced back to the philosopher Kant. Lakoff (1987) mentioned that "Mental imagery, we pointed out above, is not merely visual. And that image schemas are kinesthetic in nature, that is, they have to do with the sense of spatial location, movement, shapes, etc., independent of any particular sensory modality" (p. 445). The imagery that underlies image schema, although similar, is not uniform, and there are many different types. For example, Tyler and Evans (2003) called imagery *proto-scene*, meaning that it represents abstract mental representations in the primary sense (p. 65). Tyler and Evans stated that "any senses not directly derivable from the primary sense itself should be traceable to a sense that was derived from the primary sense" (p. 49). On the other hand, Tanaka et al. (Eds.) (2003) referred to the images used in their research as "core." According to Tanaka (1990, pp. 21–26), the core image is a context-independent concept that captures the maximum common denominator of usage examples and the entire semantic range of a word. The image figure of Tanaka et al.'s (Eds.) (2003) core-based TO was provided for the peripheral use of "face-to-face", while the image figure of Tyler and Evans' (2003) primary sense-based TO was described for the central use of "to school". Tyler and Evans' may be more consistent with our intuition. For advanced-level learners, comprehensive image figures are useful for reconstructing the concept of a preposition like TO, which they would have mastered. However, considering that learners at the beginner level are not exposed to many examples of usage, it would be useful to have an image figure representing the most frequent usage. It is important to use them appropriately according to learners' proficiency levels and the depth of their learning. Different scholars have different ideas, as what is placed at the center of an image, even if the image figure is drawn based on image schema, so it is not surprising that there are various types of imagery. Theoretically, image schemas are based on the physical experiences of individuals in their daily lives, from which certain abstract patterns are derived and emerge in the mind, and thus individuality and universality may

be mixed. Cognitive linguistic approaches using imagery diagrams based on such image schemas were pioneered by Brugman (1981), Lindner (1981), and Yeagle (1983), who focused on specific particles such as OVER, OUT, UP, and OFF. In addition, there is a study book by Rudzka-Ostyn (2003) that focuses on phrasal verbs that co-occur with seven particles, and Holme (2004) provided not only a method for teaching phrasal verbs but also examples of worksheets. Furthermore, as shown in Figure 2.13., Mahpeykar and Tyler (2015) attempted a new approach by presenting not only images of particles and verbs, but also images of the phrasal verbs that combine them.

Figure 2.13.

Image Figure of TAKE, UP, and TAKE UP (Mahpeykar & Tyler, 2015, p. 24)



Many conventional cognitive linguistic approaches were proposed in studies that presented only image figures of particles that affect the meaning of phrasal verbs until Mahpeykar and Tyler (2015). Again, this view is not limited to the field of cognitive linguistics but, rather, it expresses the

fundamental idea that experiences gained through daily activities, including physical exercise, are reflected in linguistic expressions. Therefore, the effectiveness of the presentation of images in promoting the retention of words, especially those with multiple meanings, is not an idea that is unique to the field of cognitive linguistics, as evidenced by the fact that there used to be educational resources in Japan that took a similar approach, as shown in Figures 2.14. and 2.15. below.

Figure 2.14.

Semantic Network of FROM (Nagasaki, 1975, p. 84)

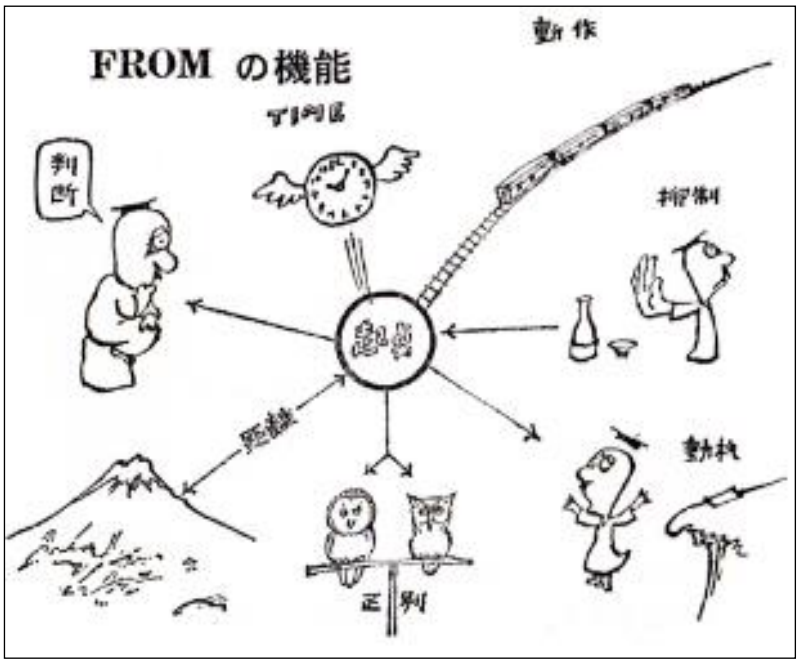
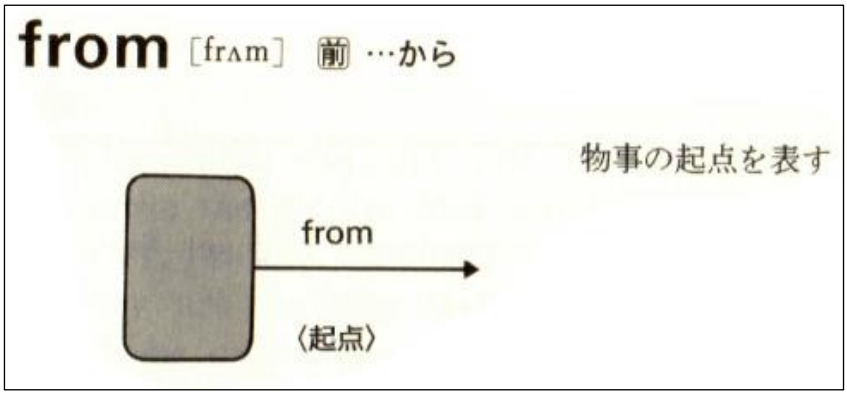


Figure 2.15.

Image Figure of FROM (Masamura, 1989, p. 206)



In another study aid book, Ando (1967) proposed the term “essential meaning” to describe combining the meanings of derived and subdivided prepositions into a single meaning as much as possible, though it did not provide image figures.

Empirical studies have analyzed English learners whose mother tongue was Hungarian (Kovecses & Szabco, 1996), French (Boers, 2000), or Iranian (Sadri, 2012; Ansari, 2016), and each found that phrasal verb acquisition was improved by the cognitive linguistic approach. In addition, Kartal and Uner (2017) investigated whether there was a difference in phrasal verb acquisition between different proficiency levels of English among native Turkish learners of English. The results showed significant differences between the elementary and beginner levels and between the pre-intermediate and introductory levels but not between the elementary and lower intermediate levels. Yasuda’s (2010) study of Japanese-speaking learners of English showed a significant difference between the control group who had memorized phrasal verbs along with their Japanese translations and the experimental group who received instruction using a cognitive linguistic approach about their phrasal verb tests not mentioned in the instruction. However, the tests on

phrasal verbs used in the instruction showed no significant differences, indicating that the usefulness of the cognitive linguistic approach cannot be demonstrated in part. Further, in Condon and Kelly's (2002) study of French-speaking Belgian learners of English, it was shown that teaching phrasal verbs based on cognitive linguistic findings resulted in lower test scores than teaching based on a dictionary. Therefore, while many previous studies have shown the cognitive linguistics approach to be useful in phrasal verb acquisition, opinions remain divided, and more practical studies and evidence are needed. As demonstrated by Kartal and Uner (2017), phrasal verb acquisition is expected to differ not only due to differences in English language proficiency but also due to differences in general academic ability, but the relationship between the two has not yet been clarified. In addition, Shirahata (2012, p. 188) suggested that intelligence or intellect may play a role in vocabulary learning.

It is natural to have difficulty retaining what cannot be understood. Learners who have already passed the critical period hope, to some extent, to learn English logically. The present study presents an effective method with illustrations for mastering phrasal verbs to provide a rationale for why phrasal verbs mean what they do. The hypothesis focuses on linguistic motivation, according to cognitive linguistics theory, which regards it as significant. Cognitive linguistics is grounded in the concept of "motivated meaning" (in the form of bodily and/or conceptual motivation). Kurtyka (2001) showed positive results when using cognitive semantic description as a basis for teaching phrasal verbs. Langacker, who is known as a founding father of the cognitive linguistics movement, pointed out that, "With proper instruction, the learning of a usage is thus a matter of grasping the semantic 'spin' it imposes, a far more natural and enjoyable process than sheer memorization" (Langacker, 2008b, pp. 72–73).

Illustrations are used because they are considered to be helpful for learners in memorizing phrasal verbs. Many kinds of mental images—visual, auditory, olfactory, tactile, kinesthetic, etc.—can be created in the human mind, but visual images are the most important, as they are said to constitute the majority: from 80% to 97% (Shone 1984, p. 15). Therefore, teaching phrasal verbs with illustrations is indispensable for effective instruction.

There are three main advantages of using illustrations based on cognitive linguistics to learn phrasal verbs: (1) the focus on linguistic motivation, (2) the clarification of synonymous expressions, and (3) a better understanding of grammar and word usage.

1) Examples of linguistic motivation are shown below in the figures. For example, Figure 2.16., which depicts the phrasal verb TURN OUT, helps learners understand "to turn" and "to know" because something that was contained and invisible pops "out" and becomes visible. Furthermore, if the word is associated with a rotating conveyor belt, the learner can understand from Figure 2.17. that going out from the conveyor belt represents "to ship" or "to produce."

Figure 2.16

Image Figure of TURN OUT for "Knowing" (Nakagawa & Tsuchiya, 2011)

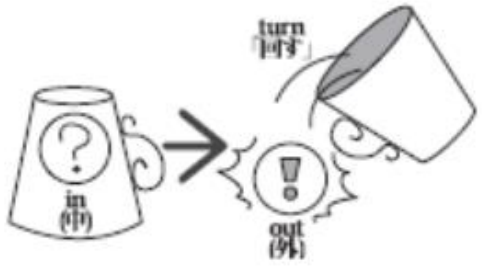
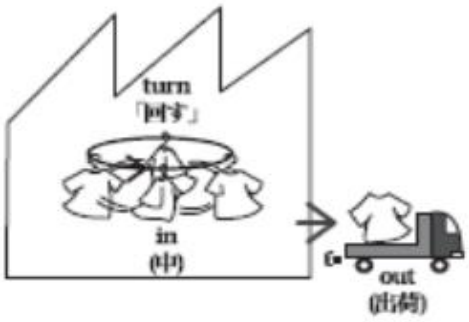


Figure 2.17.

Image Figure of TURN OUT for "Shipping" (Nakagawa & Tsuchiya, 2011)

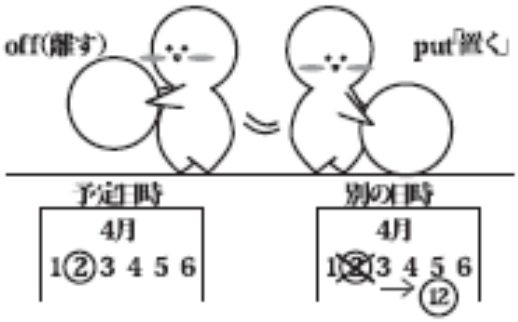


One factor that hinders learners' mastery of phrasal verbs is the difficulty in inferring the meaning of the whole phrase from the words that make up the phrasal verb. Although there is certainly an aspect of arbitrariness in language, not only in phrasal verbs, as language teachers, we should try to explore linguistic motivation as much as possible and provide reasonable explanations that will help learners retain vocabulary as they learn it.

For example, simply stating that the meaning of "put off" is "to postpone" is not an explanation of the vocabulary. Teaching methods that focus on linguistic motivation would be especially efficient in the case of phrasal verb learning. As Figure 2.18. shows, "put off" refers to the act of putting something off from its original schedule to a different date.

Figure 2.18.

Illustration of PUT OFF for "Postpone" (Nakagawa & Tsuchiya, 2011)



However, the term "put off" by itself does not show the nuance of "postponement," because it could also mean to move things ahead of schedule. The reason that "put off" means to postpone, rather than advance, the scheduled date and time can be explained by the fact that "put off" co-occurs with "until." In other words, PUT OFF, when co-occurring with "until," means to put something off from the scheduled date and time until another date and time, which means "to postpone." Note that while "until" does not always co-occur and may not be verbalized, it is implied.

(3) The meeting was put off until next week.

2) The cognitive linguistic approach to phrasal verb acquisition can also clarify synonymous expressions. Although a common sight in teaching for university entrance exams that may seem efficient in terms of encouraging memorization, the method of writing synonyms on the blackboard and connecting them can be harmful when the goal is to have students acquire true communicative competency.

For example, *depend on* and *turn to* are almost the same in the sense of "rely on," but the contexts in which they are used may be different. While DEPEND is associated with ON, which means "dependence," TURN is associated with TO, which means "direction." As is evident from the fact that the co-occurring particle is TO, the meaning of TURN is to "change" direction by turning, and TURN TO has a strong connotation of an action done to change the direction of a situation from a previous one. Therefore, "turn to" must be followed by "for," which means "to acquire (in search of)," to have the meaning of "to rely on." The following are definitions from phrasal verbs dictionaries:

turn to

(4) to go to someone for advice, sympathy, or help. (Summers (Ed.), 2000)

(5) to go to sb / sth for help or information. (McIntosh (Ed.), 2006)

In the following example, the use of TURN TO brings out the context for the change of direction.

(6) North Korea may have to turn to China for financial assistance.

Figure 2.19.

Illustration for TURN TO for the Above Sentence (Nakagawa & Tsuchiya, 2011)

By using TURN TO in Figure 2.19., we can infer a situation in which North Korea has changed its previous policies and started to ask China for economic support.

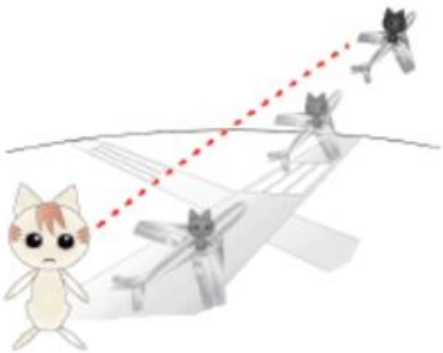
Furthermore, consider SEE OUT and SEE OFF as examples of a learning effect that can clarify synonymous expressions using figures based on cognitive linguistics. The phrasal verbs SEE OUT and SEE OFF are both translated as "見送る" in Japanese; therefore, it is difficult to conjugate them without an awareness of the context, but Figure 2.20. and Figure 2.21. can help learners of English notice the difference between SEE OUT and SEE OFF.

Figure 2.20.

Illustration for SEE OUT (Nakagawa, 2013b)

Figure 2.21.

Illustration for SEE OFF (Nakagawa, 2013b)



In the *Cambridge Phrasal Verbs Dictionary* (McCarthy & Walter (Eds.), 2011[5]), SEE OUT is defined as "to go with someone to the door of a room or building" and SEE OFF as "to go to the place that someone is leaving from."

(7) My secretary will see you out. (McCarthy & Walter (Eds.), 2011[5])

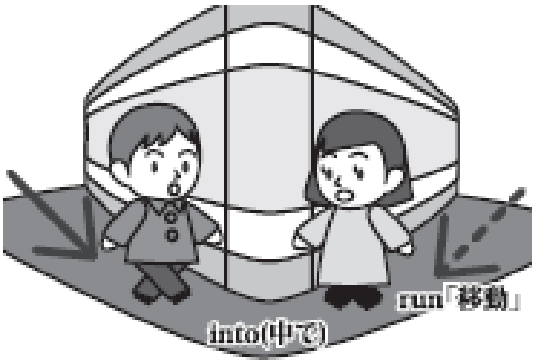
(8) My parents came to the airport to see me off. (McCarthy & Walter (Eds.), 2011[5])

What would an English language teacher answer if asked by a student, "The dictionary says that RUN INTO, COME ACROSS, and RUN ACROSS all mean 'to meet by chance,' but is there a difference?" It is difficult to understand the difference in meaning between some English expressions, particularly based on the Japanese translation. While asking a native speaker of English is one way to find out, few will mention linguistic motivation because, although they can explain differences in the nuances of phrasal verbs, it is only due to their unconsciously acquired linguistic sense. Thus, it is sometimes difficult even for native speakers of English to explain linguistic motivation. On the other hand, non-native speakers who learn the target language as a foreign language often acquire the language consciously and may be able to answer these kinds of questions, which is where the role of a Japanese teacher of English who is a non-native speaker of English comes in. Therefore, cognitive linguistics can be a powerful tool for Japanese teachers of English, as it provides clues to linguistic motivation. The following considers the differences in meaning between RUN INTO, COME ACROSS, and RUN ACROSS. The phrasal verb RUN INTO has the nuance of "bump into."

(9) I ran into Taro in a store.

Figure 2.22.

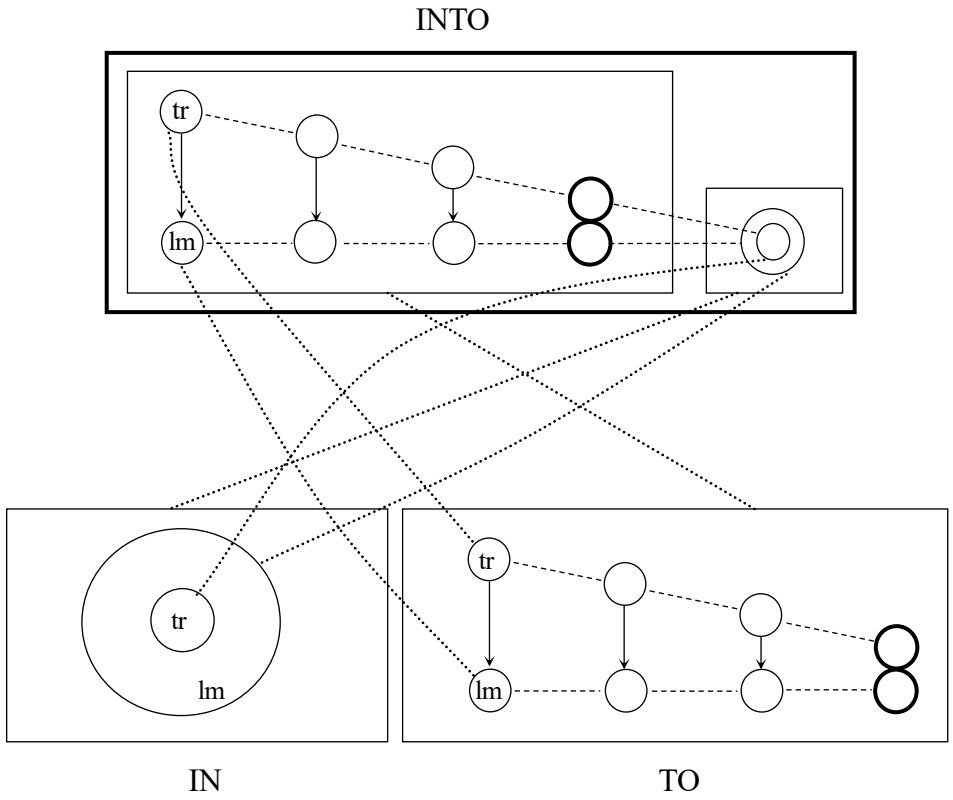
Illustration for RUN INTO (Nakagawa & Tsuchiya, 2011)



The collision-like nuance of “bump into” comes from the particle “into.” The particle “into” was used separately as “in” and “to” until the 16th century, and the two meanings of “in” and “to” coexist. The word “in” implies “inclusion” and “to” implies “direction,” or “reaching” an object. The word “into” denotes reaching inside, or “into the middle.” A nuance similar to a collision is created by TO. From the image of “reaching,” when we profile the point of destination, we expand to the image of “contact.” The simplified image schema for INTO is shown in Figure 2.23.

Figure 2.23.

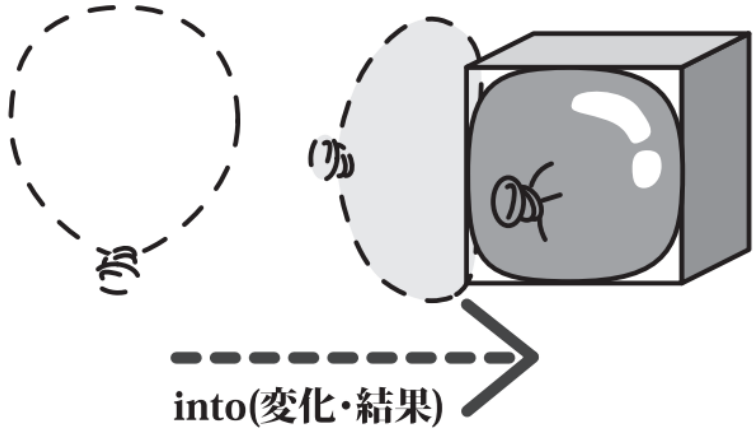
Image Schema for INTO



For learners, it may help to present the following illustration and mention that INTO is an image of making collision-like contact with an object before entering it and then entering.

Figure 2.24.

Illustration for INTO (Nakagawa & Tsuchiya, 2011)



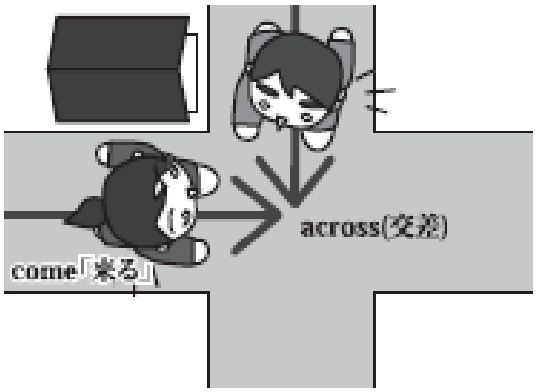
In the illustration above in Figure 2.24, *tr* is shown as a circle, *lm* as a rectangle, and the movement of *tr* as a gradation, for the convenience of learners. In addition to the meaning of "to meet by chance," RUN INTO has the meaning of "to collide," and the nuance of "collision" is created by the meaning inherent in the TO of INTO. Moreover, the reason that it is an instantaneous event, as suggested by the sound of the word "ばったり" in Japanese, is that RUN is a verb that describes relatively fast movement. The term RUN INTO means to collide with an object while moving at a relatively high speed, which means to "bump into" or "meet by chance."

The following looks at COME ACROSS and RUN ACROSS, which both co-occur with ACROSS.

(10) I came across my old friend Kenji by the shop.

Figure 2.25.

Illustration for COME ACROSS (Nakagawa & Tsuchiya, 2011)



(11) Sometimes, I run across someone who has never recovered from their bad experiences.

Figure 2.26.

Illustration for RUN ACROSS (Nakagawa & Tsuchiya, 2011)

The root of the word ACROSS is “cross,” which means “to cross” and has an image of “crossing.” It is from this image of “crossing” that the meaning of “coincidence” is created. It is inevitable that the word “cross” has the meaning of “coincidence,” considering that two objects cannot intersect at a certain point unless their directions and times coincide. As “come” and “run” are both verbs that refer to movement, they indicate that people happen to meet each other at a certain place during movement. However, there is no small difference in nuance between “come across” and “run across.” COME ACROSS means “to meet someone by chance you don’t usually see.” On the other hand, RUN ACROSS indicates only “to meet someone by chance.” The reason for this difference in meaning is obviously the difference between “come” and “run.” As “come” is originally an image of approaching from a distance, through the intervention of conceptual metaphor, the object is metaphorically something or someone that is usually perceived as distant, that is, someone that is not familiar. Based on Japanese translations, some of the differences in nuance can be incomprehensible, as in CALL IN （電話を入れる）and CALL UP（電話をかける）. Some learners do not understand why “you can call in and leave a message if I’m out” is an unnatural English sentence. However, by using the following illustrations, they can intuitively understand why the sentence is unnatural.

Figure 2.27.

Image Figure of CALL IN (Nakagawa, 2013b)

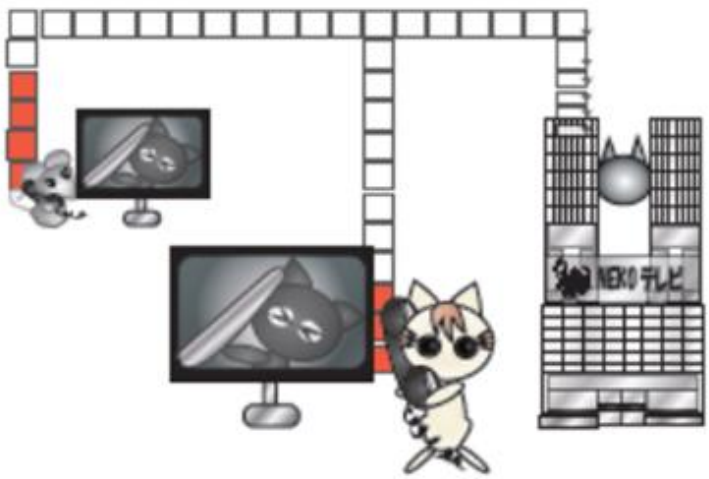


Figure 2.28.

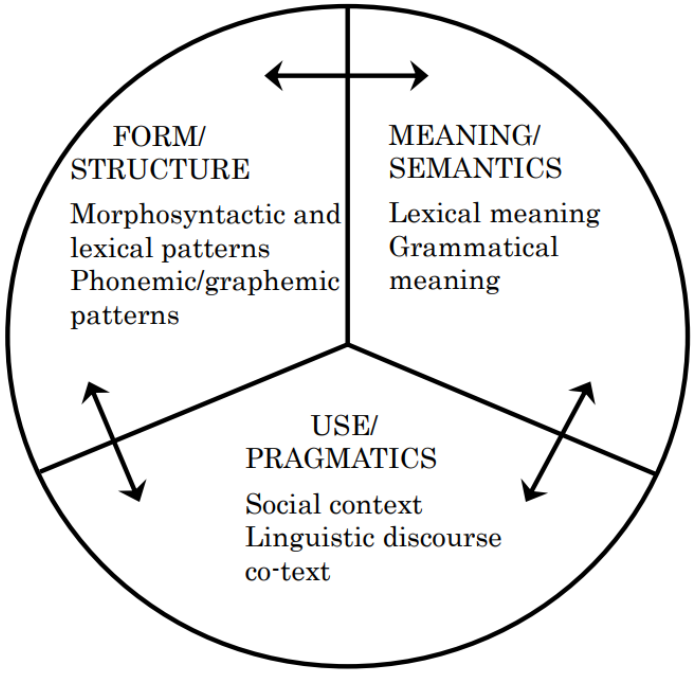
Image Figure of CALL UP (Nakagawa, 2013b)

The word “call in” implies that the caller can get through to the other party, while the word “call up” originally indicates the act of making a call, as it refers to the physical movement of lifting the telephone receiver upward.

Students cannot learn to use English simply by memorizing meaning and form. Rather, they need to be made aware of the situations in which they will be able to use it. Larsen-Freeman (2014) argued the importance of thinking about meaning, form, and situation when learning English, as shown in the following diagram.

Figure 2.29.

A Three-Dimensional Grammar Framework (Larsen-Freeman, 2014)



The illustrations used in the present study are useful as phrasal learning materials because they help make learners aware of context as well as meaning and form.

3) The third point pertains to the function of helping learners understand grammar and the grammar of phrasal verbs. According to Konishi's (1997) informant survey, HURRY UP is not used in negative imperative sentences.

(11)

○Hurry up, or you will be late for school.

○Don't hurry. There's plenty of time.

×Don't hurry up. There's plenty of time.

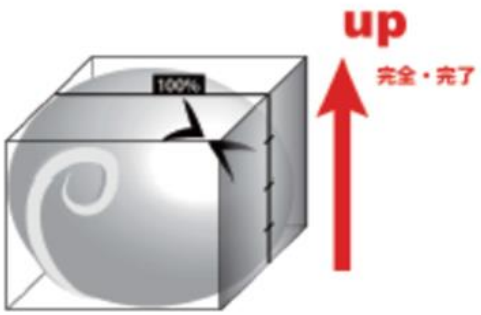
×Don't hurry me up.

Konishi (1997)

In conventional grammar and grammar instruction, it is difficult to provide explanations for such linguistic facts, and furthermore, the instruction is limited to verbal explanations. The following illustrations will help learners understand grammar and usage of phrasal verbs in a convincing way.

Figure 2.30.

Image of Peripheral Meaning for UP (Nakagawa, 2013b)



UP can also mean, in some contexts, to wrestle power to the end. The reason we say, “Hurry up” but not, “Don’t hurry up” is that there tend to be few situations that forbid us to do something with all our effort.

In some cases, the addition of a single particle to a transitive verb can change the meaning. If we add the particle IN to BELIEVE, it means “to believe that something or someone exists.”

(12) I don’t believe in gods in human form.

This is because BELIEVE IN means to believe in what is in an object. As shown by the following illustration (Figure 2.31.), believing in the invisible inner thing, as opposed to the visible outer thing, is connected to believing in the existence of something within it.

Figure 2.31.

Illustration for BELIEVE IN (Nakagawa & Tsuchiya, 2011)

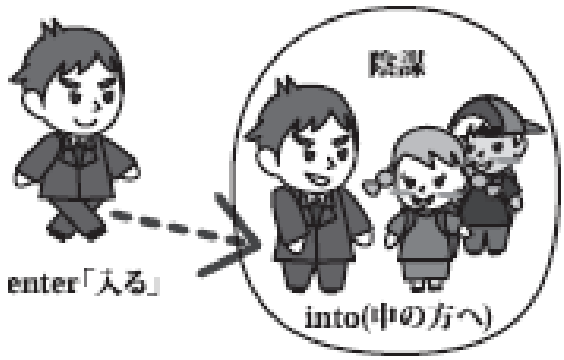
Another similar example follows. ENTER INTO is often explained as a transitive verb that can be easily mistaken for an intransitive verb, especially in English teaching spheres in Japan. Moreover, it is not uncommon for students to be taught to associate ENTER with GO INTO by teachers of English.

(13) He entered into a conspiracy with the children against the teacher.

As shown in the English sentence above, the expression “enter into” actually exists. When used as a phrasal verb, ENTER INTO means “to join (an activity, etc.)” or “to enter into (a relationship, agreement, etc.).” By adding the particle “into” to “enter,” the image of entering further into the object is created, and the conceptual metaphor is extended to not simply entering a place, but also entering into the activities taking place within the place, as shown by Figure 2.32. below.

Figure 2.32.

Illustration for ENTER INTO (Nakagawa & Tsuchiya, 2011)



Learners may not be able to understand words from only the descriptions in dictionaries. Therefore, they look for effective ways to acquire vocabulary. The teacher's role is to show the learner how to implement creative vocabulary acquisition and further promote vocabulary retention. In this sense, a cognitive linguistic approach to phrasal verb learning, which has the potential to be applied to English language teaching, deserves attention, as mentioned.

2.2 Phrasal Verbs

2.2.1 Definition of Phrasal Verbs

Scholars have various definitions for the term "phrasal verb." Some linguists define phrasal verbs based on syntactic features, referred to as the particle placement phenomenon, and others define them based on their semantic features. Dirven (2001) maintained that "the whole of the

phrasal verb has a meaning which is more than the sum of its parts." Quirk et al. (1985) defined phrasal verbs both at the syntactic level, where they can function as single transitive verbs, and at the semantic level, where they can have figurative meanings that are manifested in a wide range of idiomaticity. A close study of the definition of phrasal verbs is not the present concern and lies outside the scope of this paper. Therefore, in this paper, phrasal verbs are simply defined as phrases that combine verbs and particles commonly called prepositions or adverbs as well as phrases that are listed in dictionaries such as *Oxford Phrasal Verbs: Dictionary for Learners of English* (McIntosh (Ed.), 2006) and *Collins Cobuild Phrasal Verbs Dictionary* (Hands et al. (Eds.), 2020), as they are relatively recent materials available to learners of English.

2.2.2 Difficulties in Learning Phrasal Verbs

There are many different ways to learn vocabulary, from using prefixes, suffixes, and stems to guessing in context, writing and pronouncing words repeatedly, and making word books (Schmitt, 1997). A method based on self-determination theory (Deci & Ryan, 1985), in which learners are presented with a variety, rather than a uniform set, of learning strategies to choose from, would also be useful in promoting intrinsic motivation. In high school, because of the large amount of content required to be studied and the large amount of vocabulary to be acquired for university entrance exams, there are few opportunities to devote time to vocabulary study in the classroom, and home study using vocabulary books is often the main method of self- study. Folse (2004) admitted that there is a certain efficacy to vocabulary learning in making lists this way, commenting that it is an effective, albeit monotonous, activity. As Chickering and Gamson (1987) listed *respect for diversity of learning* as one of the seven principles of good practice, it seems important for teachers to present a variety of ways for learning to occur, while also allowing learners to choose from among these

options, instead of simply rejecting the notion of learning diversity. In junior high school, the number of vocabulary words to be learned is not as large as in senior high school; therefore, more time is available to spend on vocabulary study using flashcards in the classroom. However, the method of vocabulary learning in the classroom is the same in both junior high school and high school, in that the teacher often explains the meaning of the vocabulary in Japanese and makes use of flashcards for retention. Inaba (2016) stated that learners' and teachers' perceptions of classroom activities (preferred and disliked activities) tend to not always be the same, reporting that learners' (junior high school students) support for teacher explanations, in Japanese, concerning vocabulary meaning was 81.55%, while teachers' support stood at 59.00%. Phrasal verb learning as a learning strategy has not been very successful among Japanese learners of English compared to other types of vocabulary learning. Iio's (2013) corpus-based study found that Japanese learners of English also used phrasal verbs less frequently overall than native English speakers, while Morimoto (2010) reported that even among Japanese learners of English who had lived in English-speaking countries for more than 10 years (average TOEFL score of 598), the overall percentage of correct responses on a phrasal verb evaluation test was only in the 50% range. These issues are the result of the Gestalt nature of phrasal verbs (Gestalt/configuration), in which the meaning of the whole phrasal verb cannot be predicted from the sum of its verb or particle parts by those who are learning English as a foreign language. Allerton (1982, p. 92) stated that the particles have the strongest influence on the meaning of phrasal verbs. Tomasello (1992) observed that in one-word sentences that occur in the process of language acquisition, his child not only began to use DOWN to mean PUT DOWN after 17 months (p. 85), but also uttered phrasal verbs as one word, such as GET OUT (GEOUT) (p. 98). This observation confirms that phrasal verbs have a semantic focus on the particles and are acquired at a relatively early stage in the native language. The appearance of phrasal verbs in mother

tongue acquisition is reported to occur between the ages of 1 year, 7 months and 2 years, with 38 verbs and 10 particles co-occurring, of which PUT is the most frequent co-occurring verb, accounting for about half (Diessel & Tomasello, 2005, pp. 95–96). However, phrasal verbs, which seem easy to learn at first glance, are in a sense difficult, even for native English speakers, because of their economy of meaning, their polysemy, and their metaphorical nature. Metaphors are expressions that can be used symbolically. One example (quoted from Birch 2007: 68) including two interpretations in one sentence is offered below:

(14) The man turned on his friend. (Two meanings: One is bawdy)

Birch (2007, p. 68)

Phrasal verbs can change their meaning depending on the context, as in Birch's example (1), TURN ON. Thus, phrasal verbs present some difficult aspects without any context, even for native speakers of English; therefore, it is not easy for them to specify the meaning of phrasal verbs.

For the above linguistic aspects, cognitive linguistics considers the relationship between base and profile. The base serves as the background, while a profile is a focalized and distinctive part.

Figure 2.33.

Hypotenuse (Langacker, 1988, p. 59)

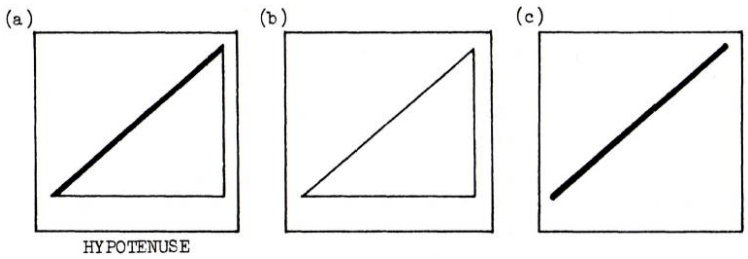
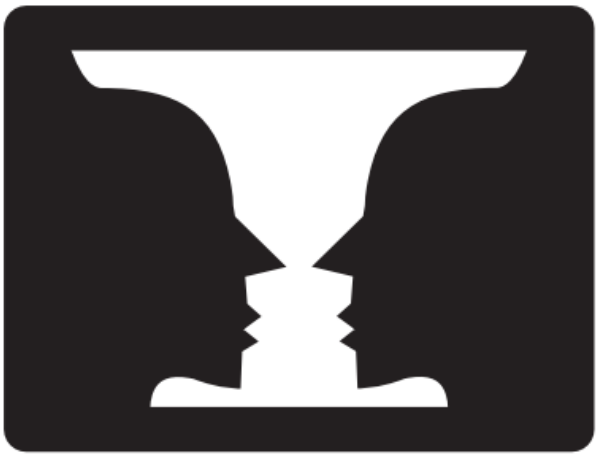


Figure 2.33.(c) is a “line segment,” but when the right-angle triangle in (b) is placed in the background, it is recognized as the “hypotenuse” side of the triangle. As for (a), it stands out and is foregrounded as the hypotenuse side of the right triangle. Similarly, if we use a rectangle as a base, we can easily recognize the line segments as “diagonals.”

The concept of base and profile is rooted in the notion of differentiation and inversion of figure and ground used in psychology, and in cognitive linguistics, it is adopted as a tool for language analysis to try to explain linguistic phenomena. The figure and the ground correspond to the profile and the base, respectively. The division of which parts are focused, and which parts are background is called differentiation, and the reversal of the relationship between the focused figure and the backgrounded ground is called inversion. The following image, called Rubin’s Vase, appears to be a vase when observers fix their eyes on the white part and persons facing each other when observers fix their eyes on the black part.

Figure 2.34.

Rubin’s Vase Adapted from Rubin (1915)

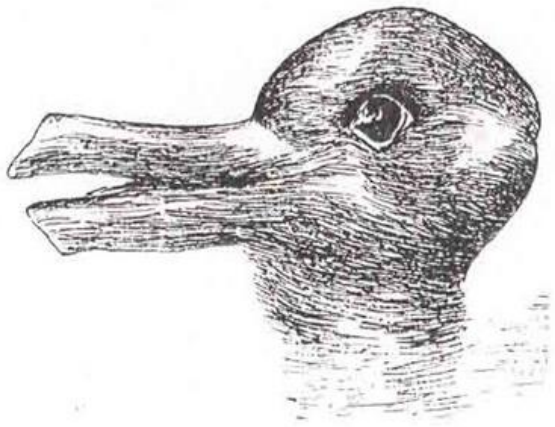


However, the vase and the persons facing each other are not visible at the same time. This phenomenon consists of the differentiation and reversal of the foreground image and the background ground.

The picture in Figure 2.35. can appear to be a rabbit or a duck.

Figure 2.35.

Duck-Rabbit Adapted from Jastrow (1899)

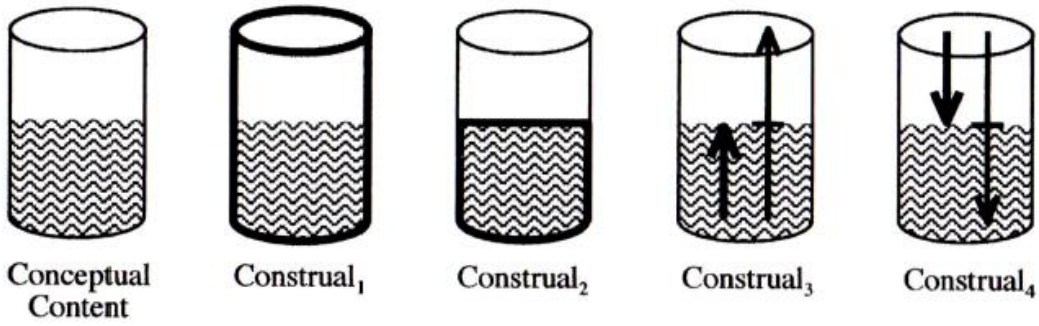


This famous picture of Duck-Rabbit teaches us the essence of the human cognitive process, that different ways of perception lead to different ways of expression. Wittgenstein, in his *Philosophical Investigations*, described this event as follows:

"The expression of a change of aspect is the expression of a new perception and at the same time of the perception's being unchanged" (Wittgenstein, 1953/1953, p. 196).

Figure 2.36.

Differentiation and Reversal of Figure and Ground (Langacker, 2008a, p. 44)



In Figure 2.36., all the glass containers are half full of water, but even in the same situation, the linguistic expressions differ depending on which part of the glass is profiled. Construal 1 is "the glass with water in it" and refers to the container, Construal 2 is "the water in the glass" and refers to the liquid, Construal 3 is "the glass is half full" and refers to the volume of liquid occupying the glass, and Construal 4 is "the glass is half empty," indicating the amount of empty space in the container. Thus, in cognitive linguistics, the emphasis is on how the conceptualizer perceives things.

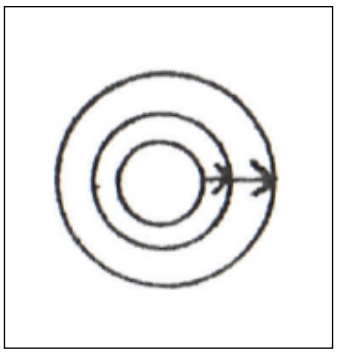
If we replace phrasal verbs with linguistic phenomena, the same expression can have its context evoked by background knowledge called a frame, which brings up and foregrounds the meaning embedded in the context and determines its meaning. In other words, the meaning that emerges depends on what the background is. The way we perceive things differs depending on our culture and environment, and if we perceive things differently, our linguistic expressions will also differ.

There are other examples of phrasal verbs that seem to be difficult, even for native English speakers. Lederer (1989, p. 23) pointed out the peculiarity of the English language by showing that "to fill out" can be expressed by both FILL OUT and FILL IN, even though the meanings of OUT

and IN are contradictory. This example can be understood if we think of it as a series of processes known as conceptualization that reflect differences in how we perceive and interpret things. Lee (2001, p. 34) explained that we use *fill in* when we think of the process of inserting something written into a blank space in a document and *fill out* when we think of the process of increasing the size of something written by adding to it.

Figure 2.37.

OUT (Lindner, 1982, p. 309)



Lindner's image in Figure 2.37. reminds us that as the initial circular boundary expands outward, the spatial area increases as well. When we FILL OUT a blank document, we are reminded of the process of completing the blanks by increasing the number of filled parts. In general, FILL IN and FILL OUT are explained as differences between British and American English, but if we think of them as differences in the way we perceive things, we can often provide an explanation for linguistic phenomena such as IN and OUT, whereby words that should be antonyms have similar meanings. See Lindner (1982) for details.

A similar example that cannot be explained even by native English speakers is "slow down" and "slow up," but the problem is different from the previous examples.

(15) Slow down, I can’t keep up with you.

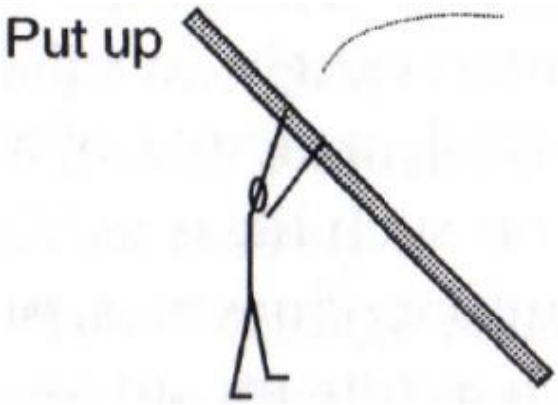
(16) The bus slowed up as it approached the junction.

McIntosh (2006)

The problem of FILL OUT and FILL IN is due to differences in conceptualization, while the problem of SLOW DOWN and SLOW UP is considered to be a misalignment caused by the manifestation of customary aspects of language through history. In cognitive linguistics, attempts to understand language diachronically, such as grammaticalization, have been actively studied; therefore, such issues will also be analyzed from a historical perspective. It seems natural that SLOW, which means deceleration, would be incompatible with UP. However, in the same way that “pull up” means “stop (a car, etc.),” it makes sense to think that in the old days, people used to pull the reins of their horses to slow down and stop the carriage and that this action was associated with “up” and motivated by their physical experience, or “embodiment,” and appeared in linguistic expressions. As Pinker (2008, p. 239) noted, when metaphors are fossilized in a language, even native English speakers do not possess the metaphorical imagination of their ancestors. As “support” can be seen as “endure,” the conceptual metaphor rooted in the body is related to the meaning of phrasal verbs, as shown in the following image by Holm (2004) in Figure 2.38.

Figure 2.38.

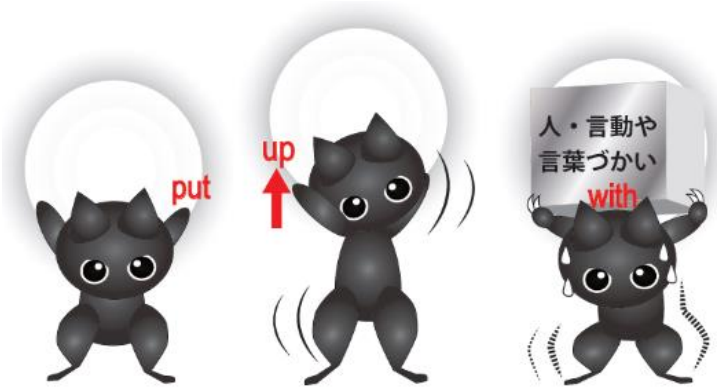
PUT UP (Holm, 2004, p. 162)



We can see that the person is lifting and supporting the stick to prevent it from falling. From this physical experience, it is not hard to imagine that PUT UP WITH can mean “to endure,” as the following illustration in Figure 2.39. shows.

Figure 2.39.

PUT UP WITH (Nakagawa, 2013b)



However, because we are unconsciously governed by the metaphors on which our concepts are based, not many native speakers of English can explicitly explain the meaningfulness of these notions. As this is a difficult aspect to notice in one's mother tongue, it is an area in which non-native English-speaking teachers can excel if they acquire the knowledge necessary for explicit explanation. Tanaka (2007, p. 552) stated that the greatest appeal of cognitive linguistics is the possibility to provide rational explanations for "why things are the way they are," as opposed to the conventional view of language as a set of arbitrary components. In other words, the greatest advantage of cognitive linguistics is that it provides clues to linguistic motivation and thus enables non-native English educators to have "lightbulb moments" and to teach English as a foreign language with confidence to their students.

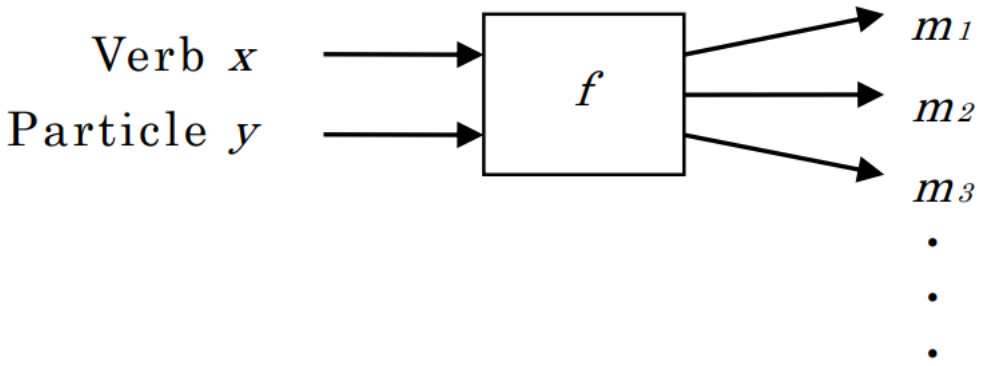
Phrasal verbs are complicated, even for native English speakers, but they are predictably much more difficult for learners of English as a foreign language. The main reason for this is the gestalt nature of phrasal verbs, which does not follow the principle of compositionality and does not allow us to predict the meaning of the whole phrasal verb from the sum of its verb and particles. The constitutive principle assumes that the meaning of the whole can be obtained by adding up the individual elements that make up the whole.

As previously mentioned, the meaning of a phrasal verb can be determined by its context. Without a context, it is challenging for many English native speakers to specify the meaning of a phrasal verb. Most Japanese English learners also find it challenging to define the meanings of phrasal verbs, but the reason for this difficulty is not the same as it is for English native speakers. The present study hypothesized that the lexical processing of phrasal verbs is different between English native speakers and Japanese English learners. In general, when we put a phrasal verb

consisting of a verb "x" and a particle "y" into a lexical processing function "f," several interpretations m1, m2, m3… can be made (See Figure 2.40.).

Figure 2.40.

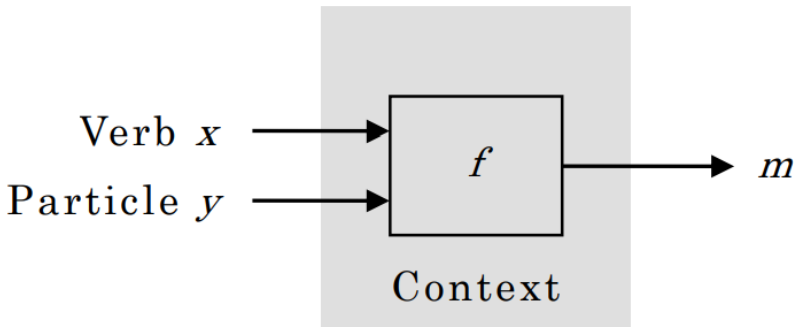
Basic Lexical Processing of Phrasal Verbs (Nakagawa, 2013a)



The shape of "f" used in the lexical processing function is diagramed differently because English native speakers and Japanese English learners don't go through the same lexical processes. Figure 2.41. represents the way English native speakers output one meaning through each context directly.

Figure 2.41.

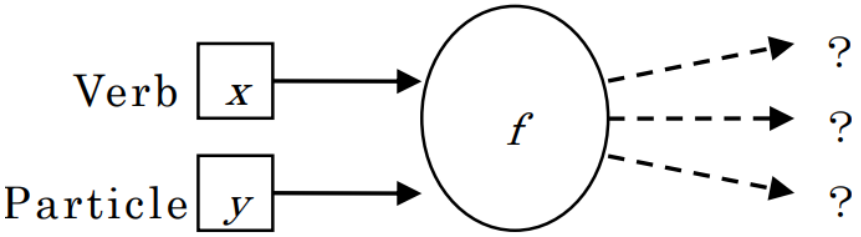
English Native Speakers' Lexical Processing of Phrasal Verbs (Nakagawa, 2013a)



For Japanese learners of English, they can list the following two types of lexical processing for phrasal verbs. The rectangles in Figure 2.42. surrounding Japanese English learners' verb "x" and particle "y" mean that they remember English paired with Japanese translation respectively.

Figure 2.42.

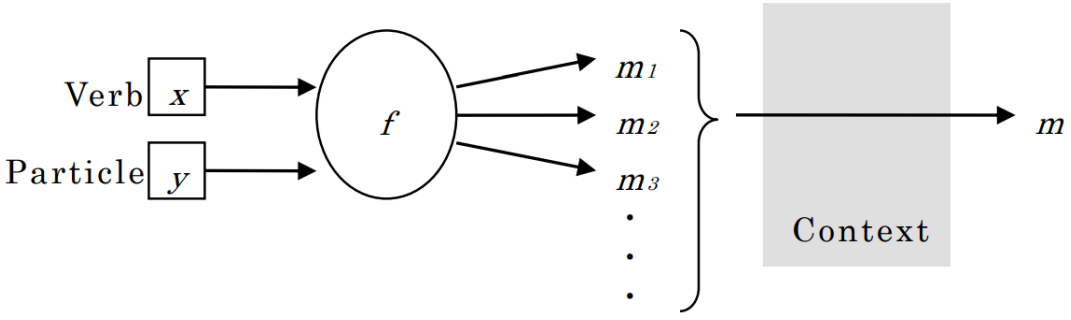
Japanese English Learners' Lexical Processing of Phrasal Verbs (1) (Nakagawa, 2013a)



First, Figure 2.42. maps the manner of lexical processing by Japanese English learners as they memorize separate meanings for verb "x" and particle "y." Thus, despite having input for the lexical processing function "f," their output could include inappropriate meanings, or nothing, as many phrasal verbs are completely different from the meanings of their individual words.

Figure 2.43.

Japanese English Learners' Lexical Processing of Phrasal Verbs (2) (Nakagawa, 2013a)



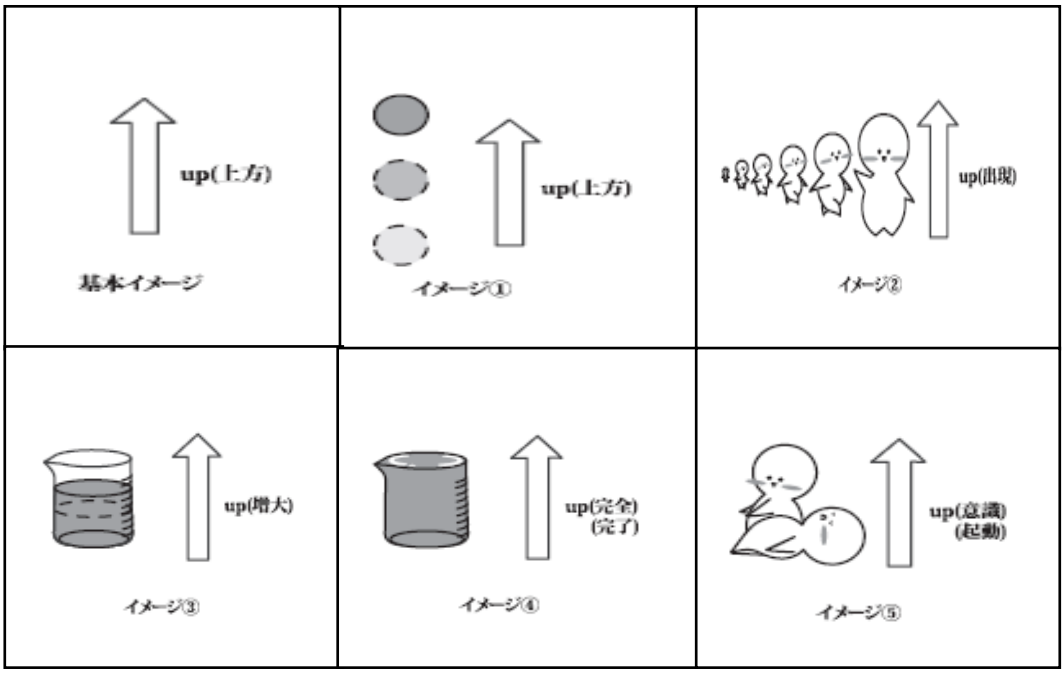
Second, from the lexical processing described in Figure 2.43, the following fact emerges: Japanese learners of English learn each meaning of a phrasal verb by heart. The characteristic of these learners is that they have the ability to interpret the meaning of a phrasal verb based on its context. That is, they filter many memorized meanings of phrasal verbs by taking their contexts into account. However, in countless cases, Japanese English learners might not intuitively understand the meaning of a phrasal verb. Moreover, there may be various meanings for each phrasal verb; therefore, it can be a formidable task to remember each meaning without reasoning.

When particles and verbs co-occur and become phrasal verbs with potentially numerous meanings, it is difficult for learners to guess the communicative implications, and they tend to regard them as complicated. For memorization tasks in educational settings, learners are often shown only the factual meanings that arise and are obtained from a combination of verbs and particles, without explanation of the reasons they have such connotations. Phrasal verbs can take various forms because the particles themselves are polysemous. The polysemy of particles is due to the fact that they represent "space" and "position" rooted in the body, and humans replace abstract matters with concrete positional relations. For example, the polysemy of the usage of UP includes not only the positional "upward" but also "appearance," "increase," "perfection," "completion," "consciousness," and "activation." The wide range of metaphors that humans associate with the positional relationship of "upward" makes it possible to express so many ideas, including the richness of human emotion and thought. This is not only true in English, but also in Japanese, as seen in expressions such as "気分は上々だ (I'm feeling good)," "問題が浮上した(a problem has come up)," and "立ち上げる(start up)." However, when studying a foreign language, it is quite laborious to learn polysemous words. The acquisition of polysemy in a foreign language can be aided by a consistent central word meaning that summarizes the polysemous senses. For example, it is useful

to present learners with the following illustration to show how polysemy extends from the central word meaning from the super-schema (basic image) to the local schema (extended word sense).

Figure 2.44.

UP (Nakagawa & Tsuchiya, 2011)



The acquisition of polysemous usage extended from the central meaning can be expected to have the effect of fostering a learner's ability to notice differences in nuance between similar expressions.

2.2.3 Importance of Learning Phrasal Verbs

Phrasal verbs diversify their meanings by enlarging their metaphors. Kövecses (2001) suggested and showed empirically, to some extent, that the learning of idioms is facilitated by the apprehension of their metaphorical motivation. Rudzka-Ostyn (1988) explained the differences in meaning between metaphoric expressions using phrasal verbs and those using only one verb, based on "vomit out" and "tell," as follows: "by using a metaphoric expression, he can both describe and judge, and since the description draws on another, more concrete, domain, the image created also gains in concreteness" (p. 525).

Phrasal verbs are rarely used in news and academic writing, but they are frequently used in conversation and fiction (Douglas et al., 2002, pp. 127–128). Aizawa (2007, p. 138) stated that the association of 16 basic verbs with 21 particles can substitute for the meaning of about 4,000 verbs, indicating that phrasal verbs are also useful from the aspect of language economy. For purposes of expression, this is convenient because learners do not necessarily have to learn tricky verbs to express what they want to say if phrasal verbs are economical and can have many meanings. The number of verbs and particles that make up phrasal verbs is relatively limited. Gardner and Davies (2007), in a study based on the British National Corpus (BNC), found that about half of phrasal verbs are composed of 20 verbs and eight particles.

Ogden (1931, p. 160), who is known as the inventor of Basic English, insisted on the necessity of basic words and mentioned that we can use "get better" instead of "convalesce." Therefore, it could be said that phrasal verbs are indispensable to English learners.

Kurtyka (2001) noted that "Since phrasal verbs are very common in everyday language, they are important to learn so that speakers might be able to use them and be understood, if not merely to understand others" (p. 29). In reality, however, most Japanese English learners cannot use phrasal

verbs properly. In addition, Nakagawa (2013b) used the Wordbanks Online corpus to extract verbs co-occurring with OUT from approximately 3,000,000 words of American English (National Public Radio) and approximately 2,500,000 words of British English (BBC World Service) and reported that each of the 10 most frequent verbs was at the level taught in government-authorized junior high school English textbooks.

Table 2.1.

Ranking of Verbs + Out (N) from Wordbanks Online (Nakagawa, 2013b)

Ranking	1	2	3	4	5	6	7	8	9	10
Word	carry	point	find	come	work	go	turn	break	rule	set
N	**580**	**410**	**330**	**325**	**324**	**270**	**266**	**196**	**151**	**141**

As the survey in Table 2.1. presents, each of the 10 most frequent words that co-occur with "out" are also included in junior high school English textbooks, which is to say, they are familiar words to Japanese English learners. It is generally believed that learning phrasal verbs is difficult mainly because learners cannot grasp their whole meaning owing to the combination of constituent parts.

As the main phrasal verbs are composed of basic words, phrasal verb learning is considered to have educational significance because it enables learners to express themselves in English using basic words. For example, "立候補する," "解散する(議会など.)," and "辞任する" are formal expressions in Japanese, but in English, they can be expressed with simple phrasal verbs such as "run for," "break up," and "step down," respectively. Ogden (1930, pp. 19–20) argued the necessity of Basic English, stating that even the difficult Latin-derived word DISEMBARK can be replaced

by “get off a ship.” Basic English is said to function with 20,000 words in 850 basic forms. See Ogden (1930) for details. Therefore, phrasal verb learning is important for both listening and speaking in communication, as it is frequently used in daily conversation by native speakers of English, has the utility to express a larger number of ideas, and even difficult expressions can be expressed using basic words. We often hear people say that individuals can communicate with the English they learned in junior high school, but I would argue that the ability to use basic phrasal verbs is a prerequisite. Moreover, only about 55 to 80 phrasal verbs can be learned from three years of junior high school textbook study in Japan. Based on a survey of government-authorized textbooks published by five publishing companies, many phrasal verbs are often accompanied by Japanese translations and treated as supplements, rather than as important words. We should note that phrasal verbs tend to be neglected, even though they play an important role in communication. According to Tanaka (2007, pp. 558–559), usability is a measure of what is useful for communication. The more phrasal verbs to which learners are exposed, the more familiar they will become to them. Learning their use will become easier as they gradually use them more through repeated listening and reading. As a result, phrasal verbs can be used in communication, and the conditions for usability can be established. If the goal is to improve communicative competence, phrasal verb learning should be recognized as crucial for English education in Japan.

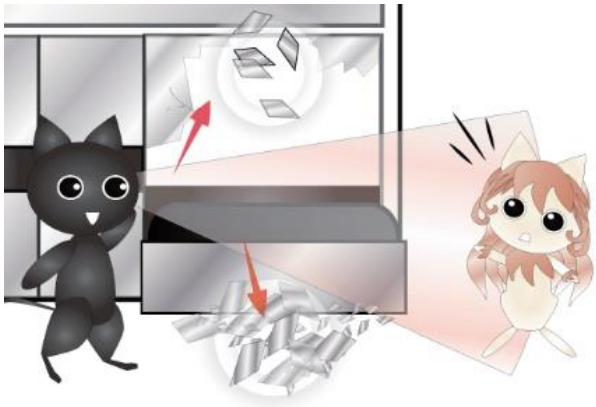
2.3 Methodology

2.3.1 Active Learning

Cognitive linguistics unravels linguistic motivation using image schemas formed on the basis of various bodily experiences as a tool to demonstrate extended cases by abstract and conceptual metaphors. In phrasal verb learning, presenting illustrations based on image schemas in concrete form to help students understand meaning has been recognized as a more effective learning method compared to rote learning (Nakagawa, 2013a). For example, consider the following image schema-based illustration for teaching WATCH OUT.

Figure 2.45.

WATCH OUT (Nakagawa, 2013b)



The basic image of "watch" is to see something in motion. We tend to be aware of what is in our field of vision but not necessarily of what is out of our field of vision. Therefore, WATCH OUT, as Figure 2.45 shows, also means to look beyond the normal range of our eyesight, and the conceptual metaphor of directing attention to a place that has not been attended to gives it the

meaning of “pay attention to” or WATCH OUT. The above explanation, based on the findings of cognitive linguistics, can help learners answer the question, “Why does it mean that?” In this respect, it can be more effective to use cognitive linguistics-based teaching methods in phrasal verb learning than other linguistic theories.

Kövecses and Szabcó (1996) stated that by teaching the valency of meaning, learners not only learn idioms faster than usual, but also remember them longer. Although there are phrasal verb learning studies of the usefulness of such cognitive linguistic findings (cf. Lindner, 1981; Yeagle, 1983), Akamatsu (2014) pointed out that deductive learning is the mainstream because it emphasizes the presentation of explicit knowledge based on cognitive linguistic findings, and there is not much research on inductive learning methods, such as inferring regularities and concepts from given examples. In particular, few studies have incorporated induction into phrasal verb learning. As the practice of active learning-based instruction advances in the field of education in Japan, there is an urgent need to explore the transition of phrasal verb instruction methods from teacher-centered teaching to learner-centered learning. In 2012, the Central Council for Education (Ministry of Education, Culture, Sports, Science and Technology) made active learning a policy in its “Report on Learning Qualitative Transformation” (2012), and since then it has been spreading in the field of education in Japan. As pedagogical theories are undergoing a major shift from positivism to constructivism, based on Kuhn’s (1970) view of paradigms, it can be said that this is a paradigm shift in the field of education. In fact, Barr and Tagg (1995) summarized this paradigm shift as going “from teaching to learning.” In terms of vocabulary learning, even at this time of a paradigm shift, many lessons are still teacher-centered, and the search for learner-centered vocabulary learning classes is ongoing.

The following section presents a specific method for active learning-based vocabulary learning, focused on phrasal verb learning, and explores the future of vocabulary learning based on learner-centered methods. In this thesis, although scholars have proposed various definitions of "active learning" (cf. Bonwell & Eison, 1991; Johnson et al., 1998), I adopt the following definition by Mizokami (2014) in light of the current situation in Japan:

> If we define passive learning as learning to listen to lectures that are designed to impart knowledge in a one-way direction, active learning refers to all in the sense of overcoming that (Mizokami, 2014, p. 7).

Furthermore, for Mizokami (2014), "active learning-based instruction" is a concept that combines teaching and learning, wherein lectures are also considered components of the lesson.

2.3.2 Active Learning-Based Instruction for Phrasal Verb Learning Using the Jigsaw Method

Based on Akamatsu's (2014) critique, learning methods based on cognitive linguistics tend to fall into the trap of explicit knowledge transfer teaching, or, in other words, deductive learning. In Chapter 6 of the present dissertation, I introduce a case study that used the jigsaw method to design an active learning-based instruction method that allows learners to engage in interactive and deep learning while benefiting from cognitive linguistic insights to break away from deductive learning. Nakagawa (2020b) proposed a method for teaching prepositions of time using the jigsaw method. This section presents the theoretical background of active learning-based instruction combined with phrasal verb learning using the jigsaw method, as mentioned in Chapter 6. The jigsaw method (Aronson et al., 1978) is a learning process developed by Elliot Aronson, a social

psychologist at the University of California, to help children in the United States learn from one another in the classroom against a backdrop of various social problems, such as competition and discrimination. In English language education, the jigsaw method has become popularized as jigsaw reading in Japan. The technique divides one material between separate learner groups, who work on the tasks assigned to them. Then, the learners come together to share their segments of information, and finally, they solve the problem, which can only occur if all the learners in the group have shared their information correctly. The name "jigsaw" refers to the fact that the learning format resembles the process of putting together the parts of a puzzle to make a whole. The learning method involves three elements: first, it is designed so that students do not have to compete with each other to achieve the task. If a task is to be accomplished according to individual ability differences, the number of learners who are willing to engage in the task from the beginning will be limited. Second, the task is set so that it can only be accomplished through the collaborative learning. This type of task fosters a positive attitude toward problem-solving by giving each member responsibilities. Third, each learner's information, although related to other information, is different and unique. In other words, the method contains an element of essential interdependence among learners. This kind of activity, when assigned to learners, promotes interaction among them and deepens understanding through dialogue, which is paramount during active learning-based instruction.

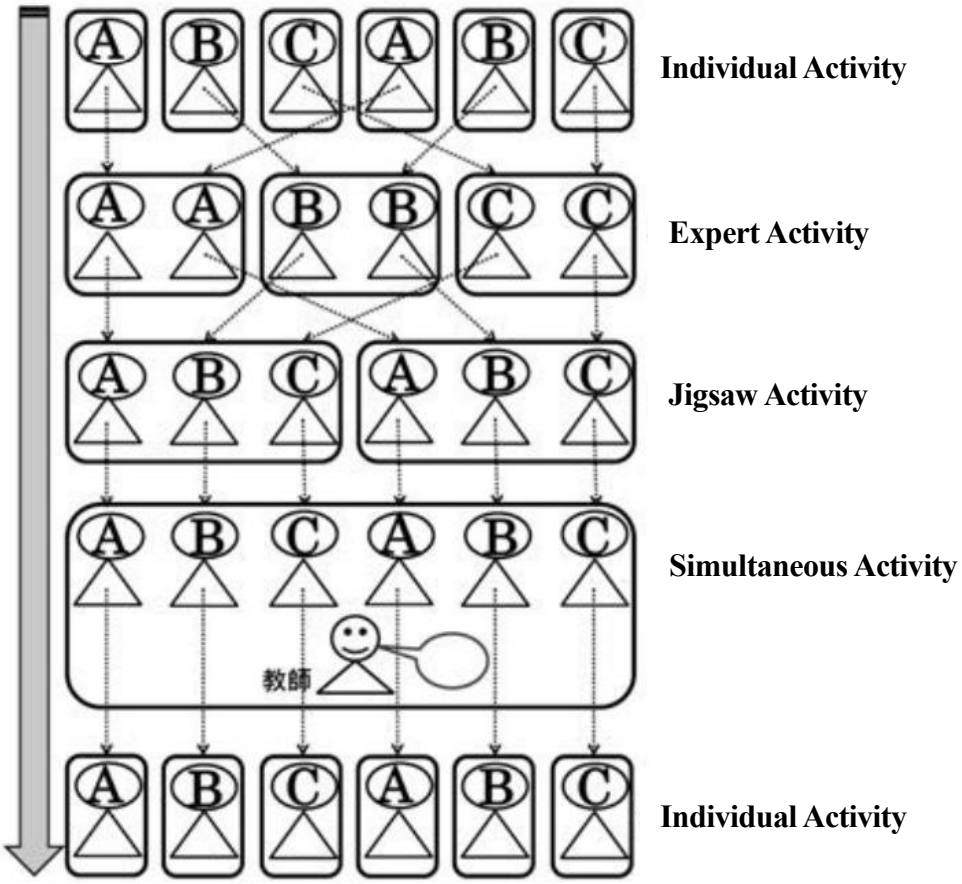
The main reason for choosing the jigsaw method to attempt to transform phrasal verb learning from deductive to inductive learning is the affinity between phrasal verb learning relying on cognitive linguistic insights and the jigsaw method. Particles constituting phrasal verbs are extended from the central to the peripheral senses through the intervention of metaphors. Accordingly, image schemas are also classified into super-schemas with a high level of abstraction and local schemas with a low level of abstraction. Each image schema can serve as information for the learners, as in

the previous explanation of the jigsaw method. In addition, when learners understand each local schema and construct concept, they can understand the more abstract super-schemas and reconstruct their knowledge. For instance, consider the meaning of the particle UP. The various Japanese translations of UP in the dictionary are peripheral word senses via conceptual metaphors, including "the higher position sense," "the existence sense," "the more sense," "the completion sense," and "the active condition sense." In the present study's jigsaw method, these are the roles of information given to the learners as materials.

Next, a concrete method for learning phrasal verbs using the jigsaw method is described. The following procedure assumes a 50-minute class, with 10 phrasal verbs to be learned, and high school students as the target learners. The main reason for choosing high school students as the learning target is that the cognitive linguistic approach uses highly abstract concepts, such as images and metaphors; therefore, learners with a certain level of general cognitive ability can be expected to benefit from the approach. Imai (2016) practiced teaching English expressions using a cognitive linguistic approach and obtained different results in terms of effectiveness for different items. He mentioned that instructions based on the findings of cognitive linguistics have different effects depending on learners' analytical abilities and English proficiency due to complicated explanations. Figure 2.46. illustrates the flow of an active learning-based instruction activity using the jigsaw method. The number of students in each group in Figure 2.46. is for illustrative purposes only.

Figure 2.46.

Flow of Active Learning-Based Instruction Activity



Teachers may give learners questions that lead them to immediately engage in group learning. However, some learners (known as “free riders”) may rely on their friends too much and end up doing nothing. The basis of active learning-based instruction is the process of individual activity ⇒ collaborative activity ⇒ individual activity. It is important that learners think individually first, then solve the problem by sharing their thoughts with classmates, and finally, work on a task that allows them to reflect on whether they have understood and retained the information. In the learning method proposed in the present study in Chapter 6, learners are first asked to answer questions in

which they have to put the appropriate phrasal verb in parentheses in an English sentence with Japanese translation. Once the learners finish answering the questions, the teacher shares the correct answers. Next, in the individual activity, learners A, B, and C are given the peripheral word sense they are responsible for as a task and are asked to draw an image of what the peripheral word sense represents. Then, the learners are asked to choose an English sentence in the phrasal verb questions they have just answered that matches the image they have drawn.

Next, they move on to the expert activity and form groups of learners with the same task. In the group, they share their thoughts about each other's answers to the question. The teacher then gives the answers to the questions to each expert activity group and encourages learners to work together to understand each other.

Next, the learners move on to the jigsaw activity, and learners with different tasks form groups. Each learner teaches the other learners the peripheral particle senses and images they have been assigned. After they have finished teaching each other, the teacher asks them to guess which images are common to each of the peripheral particle senses. In this simultaneous activity, the teacher explains the peripheral senses of the particles as a review, asks the learners what the common central meaning of the peripheral senses is, and shares the answers with them.

Finally, the teacher asks the learners to look up English sentences containing the phrasal verbs they have learned in the textbook or dictionary and asks them to present the phrasal verbs they have found.

We have looked at phrasal verb learning with the aid of the jigsaw method, and now a discussion around the usefulness of the learning method will be offered. Instruction and assessment are two sides of the same coin, but the educational goals as learning outcomes that provide the guidelines require a framework. Bloom et al. (1956) proposed a taxonomy to elaborate and classify

the framework of educational goals. The revised version (Anderson and Krathwohl, 2001), which improved on Bloom's taxonomy and made modifications mainly for the cognitive domain, presents a taxonomy table and divides the cognitive process dimensions into six categories: REMEMBER, UNDERSTAND, APPLY, ANALYZE, EVALUATE, and CREATE, among which ANALYZE, EVALUATE, and CREATE are classified as higher-order cognitive processes.

Figure 2.47.

Cognitive Process Dimension (Anderson & Krathwohl, 2001)

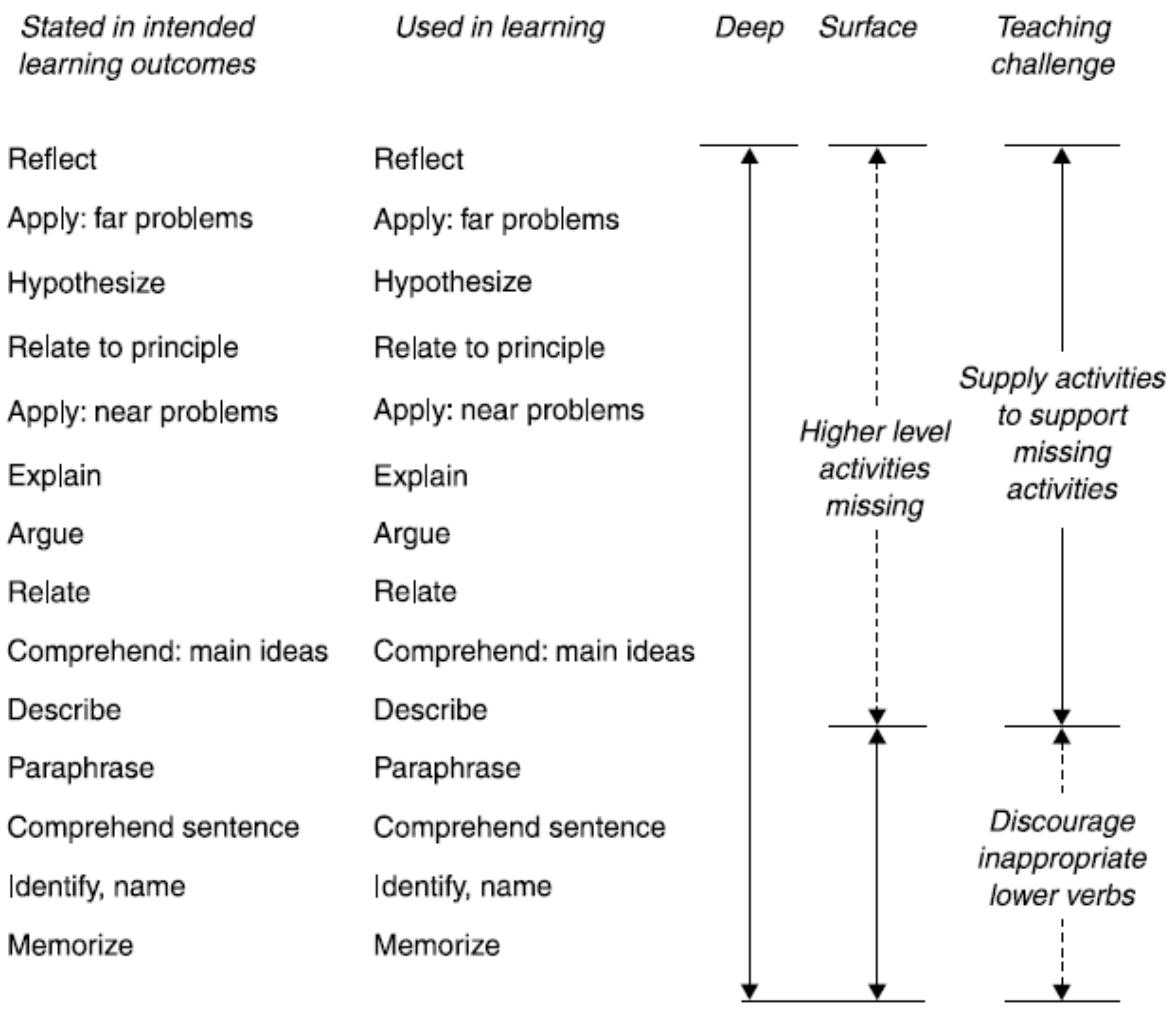
THE KNOWLEDGE DIMENSION	THE COGNITIVE PROCESS DIMENSION					
	1. REMEMBER	2. UNDERSTAND	3. APPLY	4. ANALYZE	5. EVALUATE	6. CREATE
A. FACTUAL KNOWLEDGE						
B. CONCEPTUAL KNOWLEDGE						
C. PROCEDURAL KNOWLEDGE						
D. META-COGNITIVE KNOWLEDGE						

While traditional teacher-centered classes are limited to REMEMBER, UNDERSTAND, and, at best, APPLY, the phrasal verb learning proposed in the present study using the jigsaw method is designed to include activities that require higher-order cognitive processes, including ANALYZE and CREATE. It incorporates activities that engage various cognitive functions, including not only thinking, but also perception and memory, and sometimes higher-order cognitive thinking, which is part of cognitive functioning. The following Figure 2.48. by Biggs and Tang (2011) shows that

phrasal verb learning using the jigsaw method includes activities that range from surface approaches to learning such as MEMORIZE, COMPREHEND SENTENCE, and PARAPHRASE to deeper approaches to learning such as REFLECT, APPLY: FAR PROBLEMS, HYPOTHESIZE, RELATE TO PRINCIPLE, EXPLAIN, RELATE, and COMPREHEND: MAIN IDEAS.

Figure 2.48.

Cognitive Level of Learning Activities (Biggs & Tang, 2011)



The following section explores the usefulness of the jigsaw method for phrasal verb learning by referring to the theoretical findings for each activity process.

First, we will consider individual activities. In the field of education, we see some classes in which questions are given, and learners are asked to immediately engage in group activities, but this

is not very effective. If learners are not given enough time to think and make decisions individually, they will be forced to participate in interactive activities before they can formulate their own ideas. As a result, it is possible that some may be led by others and end up being unable to formulate their own ideas, in addition to being distracted from the purpose of interaction by comparing their own and others' opinions. Even if after much thought, they are unable to come up with answers on their own, the exercise is not meaningless. This is because, as outcomes of learning, "I don't know" is beneficial, in that it allows for metacognitive self-analysis. Furthermore, knowledge is also necessary for identifying what is not understood, and there is a stage at which the learner begins to understand a little and then gradually realizes that there is much more that is not understood (Miyake & Norman, 1979; Miyake, 1986), and this can motivate further learning.

Expert Activity, which involves the externalization of cognitive processes, including deductive and hypothetical reasoning and explanation of one's ideas and the reasons for those ideas to others, is a basic model of active learning-based instruction. Some expert groups may not be able to reach the correct answers owing to the difficulty of the given task. However, it is important for teachers to be patient and support the learning process of learners, even if the expert groups do not arrive at the correct answers, because there is the possibility that problems can be solved through collaborative activities, even if they cannot be solved by one person, and the process of thinking itself is a very important element of learning. According to Masukawa (2016), if the teachers intervene too much in the learning activity, there is a risk that reaching the correct answers itself will become their goal. Although discussion activities have some limitations in terms of a "deep approach to learning," they are expected to promote understanding at the stage of expert group activities, after the answers are distributed. By stating their ideas to each other, comparing each other's ideas, and analyzing the similarities and differences between their own and others' ideas,

constructive interaction (Miyake, 1986) can occur to create new ideas, such as revising one's own ideas for the better or combining and integrating the ideas of both parties, giving learners the opportunity to deepen their thinking.

While the purpose of Expert Activity is for the teacher to give the answers to each expert group and to promote understanding among the learners, a critique of this method is that it is better for the teacher to provide direct explanations to avoid the possibility of learners forming false concepts in the first place. Vygotsky (1962) named the difference between learners' intellectual age and the level at which they can solve problems with assistance as the "zone of proximal development" and argued that it is necessary to consider this zone of development when assessing developmental status. The present study was based on the idea that the support or scaffolding does not have to be provided by the teacher and that enrichment materials given to learners can serve as substitutes for the teacher's oral explanations. Scaffolding is temporary and should be dismantled progressively over time for learners to achieve their goals (Lu et al., 2014). Therefore, as a step-by-step process to removing the scaffolding, it is more effective to have learners develop the habit of reading and understanding materials and then following the process of searching for them on their own in the future, rather than relying on the teacher's verbal explanations. Moreover, dialogue among learners promotes understanding (Ito & Kakihana, 2009), which can be expected based on the perspective of the zone of proximal development. The materials are designed to make learners aware of existing knowledge through explicit explanation, to structure their knowledge, and to allow for meaningful learning. Memory is promoted through the natural human process of understanding, which is to relate and combine new knowledge with existing knowledge. Existing knowledge here refers to latent conceptual metaphors that are acquired unconsciously.

In a jigsaw activity, the learner is the only one in their group who knows their own material; they must listen to others' explanations of their different materials, think about how they relate to their own material, and infer the central meaning of the particles. In addition, as with a jigsaw puzzle, each member of the group plays a role in revealing the whole picture of the central meaning of the particles by connecting the pieces of materials by means of each peripheral sense. The essential interdependence and responsibility of roles are designed to facilitate the jigsaw activities. Furthermore, unlike learning by memorizing Japanese translations, learning by explaining to others can lead to a deeper understanding at the conceptual level. It is desirable for learners to be able to explain ideas in their own words so that others can understand, but it is assumed there will be times when they get stuck or are unable to explain material well. Nevertheless, noticing that they cannot explain well may lead to self-reflective analysis of personal understanding.

In the next activity, the review is to be made by the teacher, so students will not be left without understanding due to any in-group inadequate explanations. A jigsaw activity involves not only giving explanations but also receiving explanations by others. As these explanations rely on cognitive linguistic findings, knowing the linguistic motivation can lead to deeper learning (Littlemore, 2009) and enable learners to understand why the meaning is what it is. Moreover, some studies have reported that analogizing the meaning of unknown words can help learners develop their abilities (cf. Nakagawa, 2013a). Miyake (2016) stated that what one expresses oneself with conviction tends to become "knowledge that can be used"; therefore, it is expected that learners will also develop the ability to use English through this method.

If learners only teach each other, there is a concern that they may form misconceptions and cause some group members to feel that they do not have sufficient understanding of the peripheral particle meanings they have not explained. In fact, Tomono (2016) conducted a questionnaire after

a jigsaw activity and found that participants reported their level of understanding of the part other than the section for which they were in charge to decrease. With inadequate explanation and communication, misunderstandings occurred. The main purpose of the teacher's review of the meaning of the peripheral particles following a jigsaw activity is to overcome these challenges. In the simultaneous activity, the central particle meaning inferred in the activity can also be summarized by having each group present their answers. Then, the teacher can present illustrations of the answers to promote the reconstruction of their knowledge and turn it into meaningful learning. Knowledge, by its very nature, can only be obtained when it is accompanied by the learner's independent activities of understanding, and it is not imparted via one-way teaching. Consequently, during the last Individual Activity, the questions should be brought back to the individuals so that they can work on them and come up with the answers themselves. The questions for individuals should not involve choosing the phrasal verb in a given English sentence this time but finding it in a textbook, dictionary, or other source. Based on the knowledge gained from the previous activities, participants will be able to search and relate to the knowledge by referring to it repeatedly, which will help to consolidate their learning and deepen their understanding. At the end of the class, they can be asked to present the English sentences they found, but it is better to have them raise their hands voluntarily. This is because they have already given each other answers in the previous step, and their psychological anxiety about wrong answers and resistance to public speaking are likely to be reduced. The number of presenters should increase.

2.4 Materials

2.4.1 Materials Development

Materials utilized in teaching and learning activities are generally referred to as teaching materials, but they can also be learning materials from the perspective of learners. Teaching and learning materials are taught by instructors and learned by students. In other words, as Bolitho (1990) showed, they are also the concept of the relationship between the instructor, the learner, and the materials/learning materials, and thus they are important elements for an instructor and the learners when teaching or learning something.

Figure 2.49.

Eternal Triangle (Bolitho, 1990)

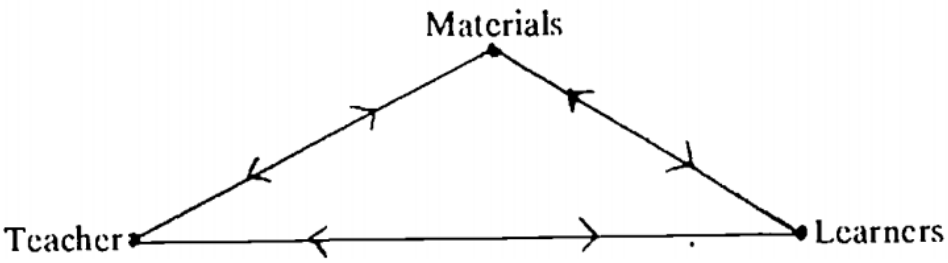
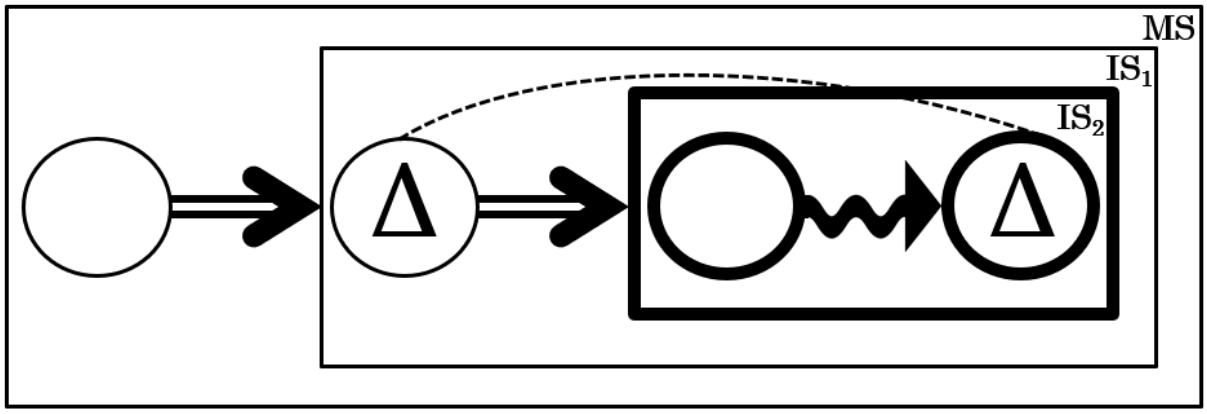


Figure 2.49. represents the relationship between learners, teachers, and materials by a symbolic diagram as well as the tendency for teachers to blame the materials (or learners) when things go wrong and a similar tendency displayed by learners to blame the teacher (or materials). Nakagawa (2021) reviewed how the findings of cognitive linguistics can be utilized in learning and teaching materials.

In this section, the materials used in Chapters 3, 4, 5, and 6 of the present study will be outlined, specifically with respect to the theoretical background from which they were derived. As the materials were originally conceived for self-study, they are designed to be fully comprehensible to the learner as well as the teacher. The verification is done in Chapters 4 and 5. For an educational setting, teaching and learning materials must be developed with an awareness of teachability, learnability, and usability, as pointed out by Tanaka (2007). Equally, Ueno (2007) insisted that complex research must be modified with ingenuity, rather than being applied in its original form to junior high and high school English teaching and learning. In keeping with the indications of Tanaka (2007) and Ueno (2007), the teaching and learning materials used in the present experiment were developed with the highest priority given to ease of understanding for learners and teachers, although for some aspects, the theoretical elaboration was sacrificed. Furthermore, they were designed to foster proactive learning. Proactive learning is defined as learning to persevere with perspective, to reflect on one's own learning activities, and to connect them to the next activities (Ministry of Education, Culture, Sports, Science and Technology, 2016). It is closely related to metacognition and can be described as learning through a series of processes, such as reflecting on the past and present by objectively overviewing one's own behaviors and emotions and making one's own decisions about the direction of the future referring to it. As Mizokami (2018) pointed out, it does not simply mean active or spontaneous learning. A sense of "cultivating," rather than "expecting" learners' initiative, is important (Naka, 2016), which may require scaffolding (Wood et al., 1976).

Figure 2.50.

Model with Scaffolding

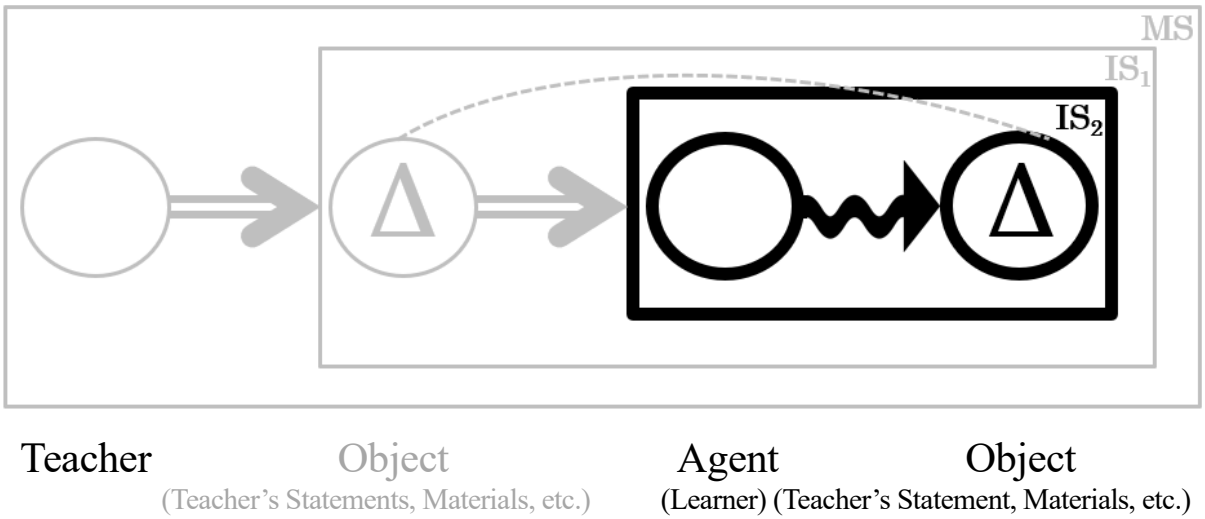


Note: MS: maximal scope IS: immediate scope

The teacher triggers the object, and the learner, as the agent, works on it. The wavy line in Figure 2.50. represents the learner's approach to the object and the resulting changes. Δ denotes a diversity of items, such as the teacher's statements and materials, as the object. Dashed lines indicate identical items. The double arrow is for the exerting force. In the figure, the agent's behavior changes depending on the object, and the teacher may be involved in some way, i.e., by scaffolding the object. However, as the object does not have to be provided by the teacher, Figure 2.51. shows that learning that does not require teacher assistance, that is, learning without scaffolding, is possible if the materials are well devised, for example.

Figure 2.51.

Model Without Scaffolding



Fundamentally, scaffolding temporarily helps achieve a goal and is removed after a certain period of time, as noted by Lu et al. (2014). By practicing the model of gradual release of responsibility (Pearson & Gallagher, 1983), which shifts instruction to enable students to learn from one another, autonomous learners can be developed. In the case of phrasal verb learning using illustrations applied in the present experiment, I consider that the materials imply effective ways of phrasal verb learning and that the learners' approach to the materials can be proactively transformed. The presentation of learning methods to students through materials, when viewed from the perspective of learning how to learn, can lead to the acquisition of higher-order cognitive skills.

2.4.2 Animation Materials Development

While many applications for learners have been developed, some studies have been conducted to examine the effects of preposition learning from the perspective of educational technology by

adapting the findings of cognitive linguistics to animation (cf. Kojima et al., 2007). Mayer (2008) proposed 10 principles that render narrated animation more efficient.

Figure 2.52.

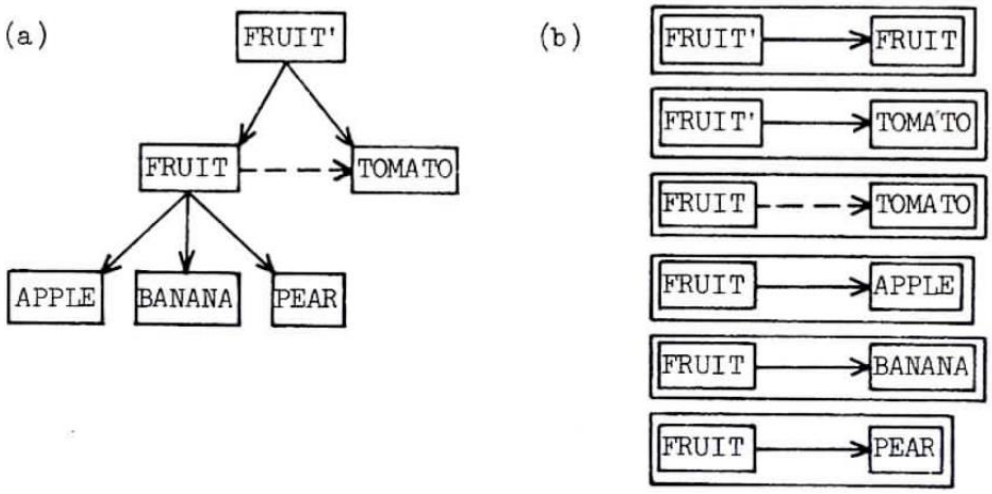
Ten Ways to Overcome Challenges to Learning with Animation (Mayer, 2008, p. 38)

Reducing Extraneous Processing
Coherence principle
Signaling principle
Redundancy principle
Spatial contiguity principle
Temporal contiguity principle
Managing Essential Processing
Segmenting principle
Pre-training principle
Modality principle
Fostering Generative Processing
Personalization principle
Voice principle

Nakagawa (2013b) followed Mayer's principles to develop an application by producing a narrated animation that enables students to learn phrasal verbs while focusing on the motivation of language. In the present study, I propose a cognitive linguistic approach to phrasal verb learning using illustrations. Given that Mayer (2001) stated that people learn better with illustrations than with words alone, learning methods using illustrations appear to be viable in the field of educational technology. The images used in the current study, whether still or animated, are designed to facilitate memorization by making it easier to grasp the extension to a conceptual metaphor through visualization.

Figure 2.53.

A Set of Semantic Units (Langacker, 1987, p. 74)

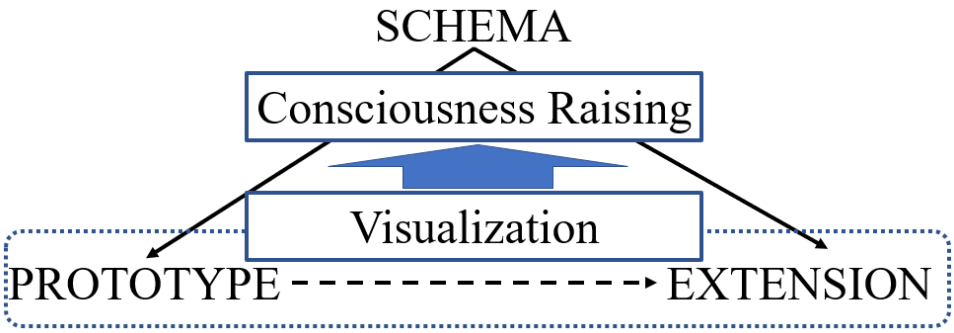


In Figure 2.53., full schematicity is represented by a solid arrow and partial schematicity, or extension, by a broken-line arrow. According to Langacker (1987), APPLE, BANANA, and PEAR, are unproblematic instantiations of the category defined by the schema FRUIT, while TOMATO is assimilated only through extension of the category, FRUIT'. Hence, FRUIT' is an elaboration of both FRUIT and TOMATO, as it is a higher level of abstraction, or a higher-order schema. Those shown in (b) are sets of individual categorizing relationships. APPLE, BANANA, and PEAR as well as TOMATO are existing knowledge and are concrete, but FRUIT and FRUIT' are abstract concepts. This indicates that both the prototype, FRUIT, and its elaborated schema, FRUIT', are abstract concepts, and they are structured on the basis of something concrete, that is, something instantiated. The illustrations employed in the present study were developed to enhance understanding by means of visualizing abstract concepts, including the conceptual metaphor, which is an extended case, but also by representing them by the movement of concrete objects. Illustrations that reflect the movement of visualized objects are accessible because they also convey existing

knowledge and can lead to an expanded understanding of abstract concepts. Moreover, unconsciously acquired conceptual metaphors derive from general cognitive abilities; therefore, although it is new information, it connects to existing knowledge and promotes understanding by raising awareness. Figure 2.54. showcases the process by which the applied materials make PROTOTYPE and EXTENSION—both abstract concepts—conscious through visualization and schematization.

Figure 2.54.

The Process of Schematization



As Piaget (1947/1950) noted that every new acquisition modifies previous ideas, the aforementioned cognitive processes are also natural from the perspective of memory mechanisms. According to Ausubel and Robinson (1969, p. 53), meaningful learning occurs if learners have the intention to relate the material in a nonarbitrary and substantive fashion to relevant items in their cognitive structure. Hatano and Kuhara (1969) insisted that even if the same materials are used, there is no effect unless the students engage in meaningful learning; therefore, in the current study, attempts were made to develop teaching and learning materials that would foster meaningful

learning. The materials utilized in the current study allow for meaningful learning because they are intended to be related to existing knowledge, as previously mentioned.

In Chapter 5, the effectiveness of the cognitive linguistic approach to phrasal verb learning is examined in an experiment using animation videos. In the 1990s, with the technological innovation of personal computers (PCs) in the education field, the use of multimedia teaching materials became popular, and research on the development of teaching materials using animation as well as still images, such as illustrations, increased (Rieber, 1991). For example, Mayer (2002) proposed the dual coding theory and the cognitive load theory. The dual coding theory asserts that narrated videos are processed through audio processing circuits, while images are processed in visual information processing circuits, and that the two types of information are integrated in the learner's mind to facilitate comprehension, resulting in new information being unified with information in long-term memory and storage. In summary, the idea is that when designing materials, one should take advantage of these two channels, the audio processing circuitry and the visual information processing circuitry, as they are important for promoting learning effectiveness. The cognitive load theory arises from the fact that learners' cognitive resources are limited, and if the video exceeds these limits, understanding will not be promoted. The video material utilized in the experiment in Chapter 6 attempts to reduce cognitive load. The video is streamed along with audio descriptions so that the effect of dual coding can be accomplished.

In the present experiment, I explored the effectiveness of a learning method that provides explicit explanations that focus on linguistic motivation materials that can clarify the differences of grammar and usage and the nuances of synonyms by aiding image schemas (illustrations and animation videos) used in cognitive linguistics. I examined whether teachability, learnability, and

usability were maintained in terms of educational soundness with respect to materials and also discuss their effectiveness.

Chapter 3 The Effectiveness of Using Visual Images in Teaching Phrasal Verbs[1]

3.1 Research Question

Cognitive linguistics is increasingly being applied within language teaching fields in Japan. This chapter focuses on the question of whether illustrations can modify image schemas based on cognitive linguistics theory and whether they can contribute to the learning of English phrasal verbs.

English native speakers tend to use phrasal verbs frequently in conversation. On the other hand, Japanese learners of English tend to use one-word synonyms instead of phrasal verbs because figurative meanings of phrasal verbs can be quite confusing. In addition, the main reason Japanese learners have trouble with phrasal verbs is that they often attempt to learn all the individual words by heart.

Some Japanese learners who have difficulty speaking English are apt to fall into the trap of believing that they must build up their vocabulary and learn additional English grammar points to speak English. That may be true, but learning phrasal verbs is important as well, because they are useful for expressing what learners want to say through basic verbs and particles they have already acquired.

This chapter presents a method of more effectively learning phrasal verbs, discusses some of the findings, and offers several suggestions. I hypothesize that teaching phrasal verbs using visual images is significant. I report the comparative results of two post-tests derived from two groups:

[1] This chapter has been revised slightly from the previously published version in Nakagawa (2013a).

group A conducted by conventional methods and group B by a cognitive linguistics-based approach. I then examine whether its teaching method, with the tentative theory, is useful or not.

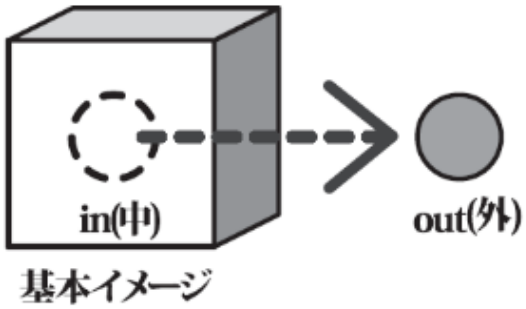
3.2 Method

The teaching method presented in this chapter is an example of a cognitive approach to teaching phrasal verbs that is centered on prepositions and adverbs, not basic verbs. If we focus on basic verbs and consider their combinations with prepositions or adverbs, the number of phrasal verbs is limited. As a result, we can learn no more than a few dozen phrasal verbs. By contrast, prepositions and adverbs are fewer in number than verbs, but the number of verbs that can be combined with them is almost infinite. Therefore, the advantage of the method is simply that. If learners can understand an image of a preposition or adverb, which exhibits the motivation for the extension from the prototypical center to the different senses, they can easily infer the meaning of unfamiliar phrasal verbs when they first encounter them.

Here, we will consider phrasal verbs with “out.” The basic image for out is “outside,” which represents motion from inside to outside. From this basic image, various meanings emerge.

Figure 3.1.

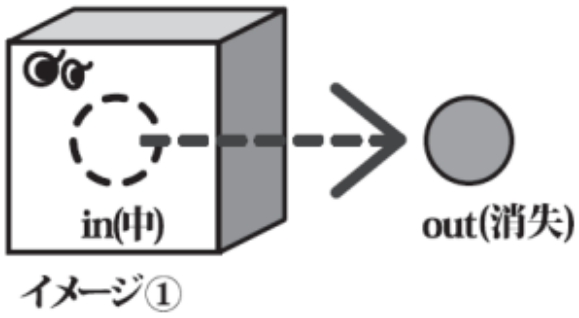
Basic Image for "OUT" (Nakagawa & Tsuchiya, 2011, p. 26)



For instance, in terms of expressions that can change meaning according to the viewpoint of the observer, we can list "go out" and "come out." When an observer's viewpoint is from within, the observer can use "go out," which means an object has "disappeared" or "vanished."

Figure 3.2.

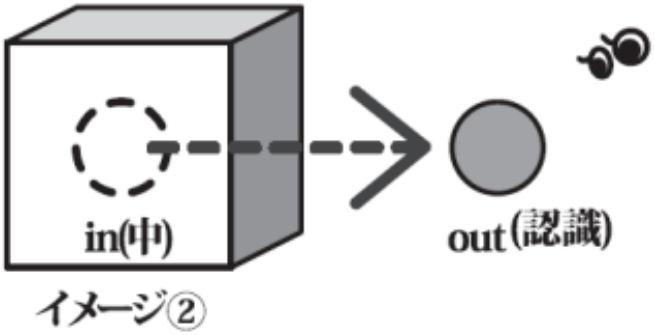
Extended Image 1 for "OUT" (Nakagawa & Tsuchiya, 2011, p. 26)



Conversely, when the object is seen from the outside, the observer can say "come out," which means that an object has come into one's view and can be recognized.

Figure 3.3.

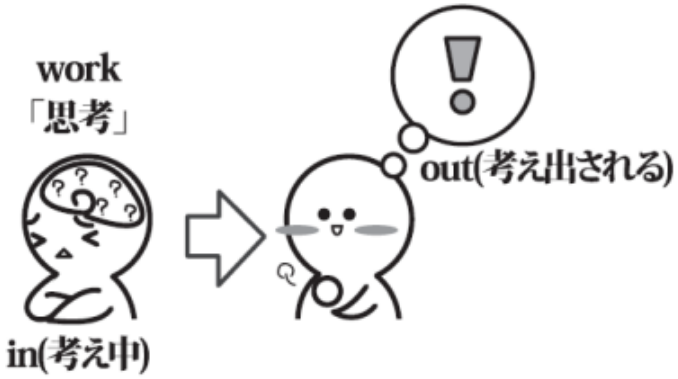
Extended Image 2 for "OUT" (Nakagawa & Tsuchiya, 2011, p.27)



These different meanings illustrate the relevance of an observer's viewpoint to the process of conceptualization. One piece of evidence supporting this claim is the fact that we say "they worked out a compromise between ideals and reality." The basic meaning of "work" is to do something by exerting the given functions and abilities. This basic meaning extends according to the person, place, and circumstances. For example, when we think about something, "what one carries out in one's brain" is essentially equal to "thought." When "work" is used with "out," "thoughts" go "out" of our brain. In other words, it means a result of a "thought" such as "coming up with something" or "solving something," or the means to bear fruit from them such as "doing well."

Figure 3.4.

Image for "WORK OUT" (Nakagawa & Tsuchiya, 2011, p. 31)



The test materials were prepared as follows. First, the 10 most frequent phrasal verbs (carry out, point out, find out, come out, work out, go out, turn out, break out, rule out, set out) were selected from the corpus.[2] Second, two different sentences were made using each phrasal verb, one for the pretest (Appendix 1) and the other for the posttest (Appendix 2). Lastly, an extra sentence including the phrasal verb "run out" was added to the posttest to examine whether the learners could improve their ability to guess the meaning of the unfamiliar phrasal verb. Thus, 10 question items were made for the pretest and 11 for the posttest.

As for the procedure, first, to grasp the extent to which the learners understood phrasal verbs, we conducted a five-minute pretest on the phrasal verbs listed above. The learners were asked to write the Japanese translations of these phrasal verbs in the sentences. Based on the results of the pretest, the learners were divided into two groups, A and B, while ensuring the levels of the two groups were equivalent. Second, the learners in Group A were given 10 minutes to memorize the phrasal verbs any way they preferred. Conversely, the learners in Group B spent 10 minutes

[2] This corpus includes the data of about 300,000 American English words (National Public Radio) and about 250,000 British English words (BBC World Service).

receiving an explanation of the phrasal verbs, based on our hypothesis. Two weeks later, learners in both groups were given a five-minute posttest, which was similar to the pretest in that they were asked to give Japanese translations of the phrasal verbs. They were not notified of the test in advance. Both the pretest and posttest had a total possible score of 10, with one point for each question. To examine whether the means of the two groups' test results were significantly different, a *t*-test was conducted at a significance level of 5%.

3.3 Participants

The participants were 226 Japanese students (aged 15–16 years) at three different high schools (a total of six classes).

3.4 Results and Discussion

As for the pretest, the results of the *t*-test revealed that the two groups were equivalent in their knowledge of the target phrasal verbs (t = .19, df = 224, p = .84, ES: d = 0.84) prior to the experimental instruction.

The descriptive statistical results of group A and group B on the pre and post-tests are summarized in Table 3.1.

Table 3.1.

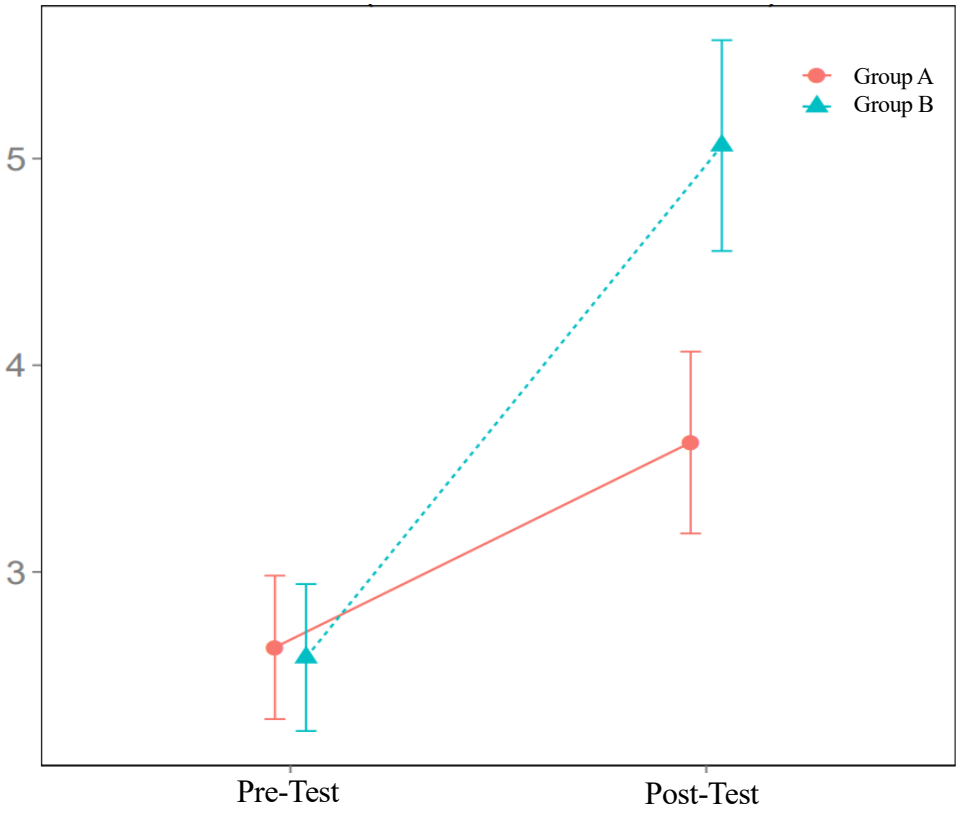
Descriptive Statistics of Group A and Group B on Pre-Test and Post-test

		M	*SD*	Minimum	Maximum	Skewness	Kurtosis
Group A	Pre-test	2.63	1.88	0.00	7.00	0.49	-0.55
(*n* = 115)	Post-test	3.63	2.38	0.00	9.00	0.20	-0.81
Group B	Pre-test	2.59	1.89	0.00	10.00	0.63	0.66
(*n* = 111)	Post-test	5.06	2.71	0.00	10.00	-0.40	-0.85

A two-way repeated measures analysis of variance (ANOVA) was performed with time as the within-participants factor and group as the between-participants factor. A significant main effect was found for time ($F(1, 451) = 154.60$, $p < .001$, $\eta_p^2 = 0.41$), group ($F(1, 451) = 6.92$, $p < .01$, $\eta_p^2 = 0.03$), and time by group interaction ($F(1, 451) = 28.38$, $p < .001$, $\eta_p^2 = 0.11$). A significant simple main effect was found for group at the posttest ($F(1, 224) = 17.94$, $p < .001$, $\eta_p^2 = 0.07$).

Figure 3.5.

Mean Scores of Group A and Group B at Pre-Test and Post-Test



Note. The error bars attached to each item show 95% CI.

As shown in Figure 3.5., Group B made significantly greater score gains than Group A, which suggests that the cognitive approach was effective.

Figure 3.6.

Percentage of Students who Answered Correctly [%]

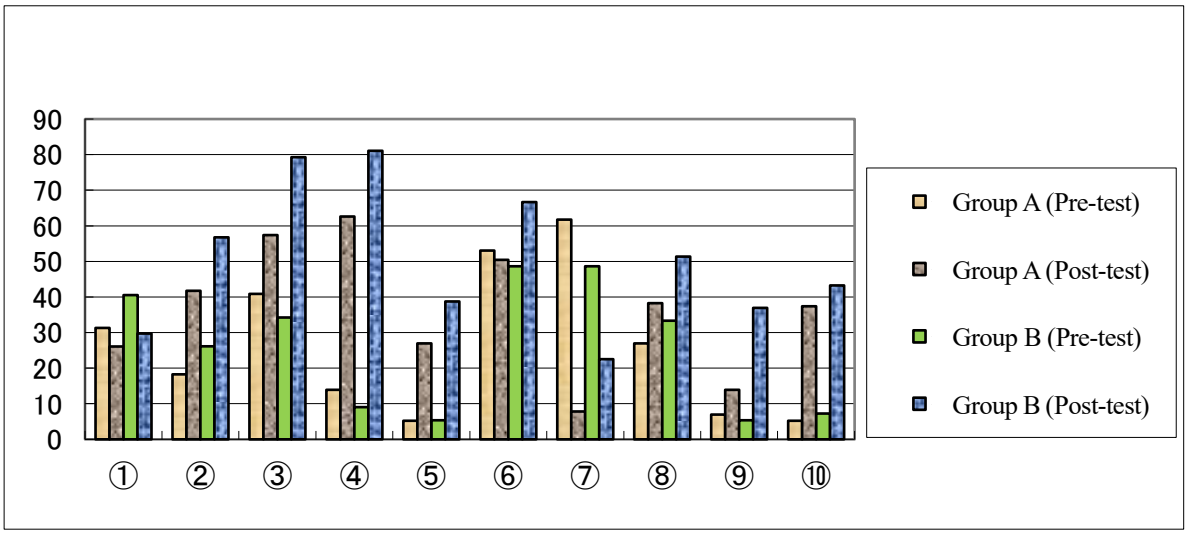


Table 3.2.

Details of the Percentage of Students who Answered Correctly [%]

		① carry out	② point out	③ find out	④ come out	⑤ work out
Group A	Pre-test	31.30	18.26	40.87	13.91	5.22
	Post-test	26.09	41.74	57.39	62.61	26.96
Group B	Pre-test	40.54	26.13	34.23	9.01	5.41
	Post-test	29.73	56.76	79.28	81.08	38.74
		⑥ go out	⑦ turn out	⑧ break out	⑨ rule out	⑩ set out
Group A	Pre-test	53.04	61.74	26.96	6.96	5.22
	Post-test	50.43	7.83	38.26	13.91	37.39
Group B	Pre-test	48.65	48.65	33.33	5.41	7.21
	Post-test	66.67	22.52	51.35	36.94	43.24

From even a cursory examination of Figure 3.6. and Table 3.2., the following facts emerge: the percentage of those who gave the correct answer to the question concerning "carry out" and "turn out" decreased in both Group A and Group B. As for "go out," only the Group A percentage became smaller. Higher percentages in Group A were associated with "come out" (+48.7%), "set out" (+32.2%) in the post-test compared to the pre-test. In Group B, they were "point out" (+30.6%), "find out" (+45%), "come out" (+72.1%), "work out" (+33.3%), and "rule out" (+31.5%), and "set out" (+36%). These figures yielded the following observation: overall, the learners in Group B, to whom explanations were given based on our hypothesis, retained more phrasal verbs than those in Group A for a certain period.

I first hypothesized that in using a cognitive approach, learners would improve their ability to guess the meaning of unfamiliar phrasal verbs they encountered. To examine this, one extra question unknown to the learners on "run out" was added in the post-test. It is possible that many Japanese English learners think "run" has only one meaning: to move very quickly, by moving your legs more quickly than when you walk. Hence, it would be difficult for them to suppose that "run out" has an alternative meaning of to "be exhausted" or to "dry up." The results of the test concerning the inferred meaning of the unknown phrasal verb, "run out," showed that 50.5% of the learners in Group A and 64.9% in Group B answered the question correctly. Even in Group A, around half of the learners grasped the correct interpretation by learning a certain number of phrasal verbs, based on generalizing how the phrasal verb meanings were formed. However, the result indicated that more learners in Group B tended to write the correct translation than those in Group A.

Not only has little attention been paid to phrasal verbs in Japanese EFL (English as a Foreign Language) education, but little instruction has been given to help learners memorize/acquire phrasal verbs and transfer/apply it to unknown phrasal verbs. Our analysis has implications for ways

of more effective phrasal verb learning. Based on this research comparing two groups, it can be concluded that the cognitive approach hypothesis was more effective. However, the percentage of improvement of some phrasal verbs such as “carry out” and “turn out” were low in the post-test because the figurative meanings of phrasal verbs can be quite confusing. It is often claimed that the cognitive approach is not applicable to all learners for learning phrasal verbs with absolute certainty. One reason might be that teaching methods based on cognitive linguistics often rely on somewhat abstract explanations; therefore, this method may not be suitable for all learners. Further phrasal verb study is therefore imperative to give learners more concrete and more concise explanations.

Chapter 4 The Teachability of a Cognitive Linguistics Approach to Phrasal Verbs[3]

4.1 Research Question

The purpose of this chapter is to examine the differences in English learners' acquisition of phrasal verbs depending on the presence or absence of cognitive linguistic knowledge on the part of instructors, which has not been discussed in previous studies from the viewpoint of teachability. To measure the usefulness of teaching materials and methods from the viewpoint of teachability, experimental designs should include a group of English learners who are taught by instructors who do not have expert knowledge. However, no studies have ever attempted to examine teachability in cognitive linguistic approaches to phrasal verb acquisition, and as a result, high versatility may not be expected. Langacker (2008b) indicated that unless they are themselves experienced language teachers, the advice of linguists on language pedagogy is likely to be of no more practical value than the advice of theoretical physicists on how to teach pole vaulting (p. 66). It is obvious that teaching methods and materials must be sufficiently understandable and usable, even by instructors who do not specialize in cognitive linguistics if they are to be used in the field of education. Therefore, I believe that this study can contribute to the accumulation of empirical research from the perspective of exploring higher versatility.

[3] Some parts of this chapter (written in Japanese) appeared in Nakagawa (2019a).

4.2 Method

This chapter focuses on teachability, one of the three conditions for sound educational grammar proposed by Tanaka (2007, pp. 558–559), and examines approaches to phrasal verb acquisition from a cognitive linguistic perspective. I hypothesize that even if teachers do not have cognitive linguistic knowledge, if they use materials that are designed in some way to facilitate comprehension, the effect on English learners will be similar to that of teachers with cognitive linguistic knowledge.

To ensure the teachability of a method for teaching phrasal verbs with the aid of cognitive linguistics, I examined whether the presence or absence of cognitive linguistics knowledge on the part of an instructor makes a difference to a learners' retention of phrasal verbs among students. In School A, students were taught by a teacher who majored in Russian at university, studied English teaching in graduate school, and did not have knowledge of cognitive linguistics. On the other hand, students in School B were taught by a teacher who specialized in cognitive linguistics.

With respect to the teaching materials in the present study, I utilized the 10 most frequent phrasal verbs (carry out, point out, find out, come out, work out, go out, turn out, break out, rule out, and set out) with a high frequency of co-occurrence with "out," adapted from Nakagawa and Tsuchiya (2011), a book on phrasal verb learning that supports the findings of cognitive linguistics. The images and explanatory methods used in this book are undeniably at the expense of theoretical sophistication; however, in accordance with Cho and Kawase's (2011) suggestion, there is a need to eliminate the jargon used in cognitive linguistics in order to apply cognitive linguistics to educational settings. Ueno (2007) also argued that it is necessary to "modify" cognitive linguistical

insights to apply them to educational settings, so that the materials are as simple and accessible as possible. Shown below is the example of “presence,” which is used in “find out.”

Figure 4.1.

Presence Image for “OUT” (Lee, 2001)

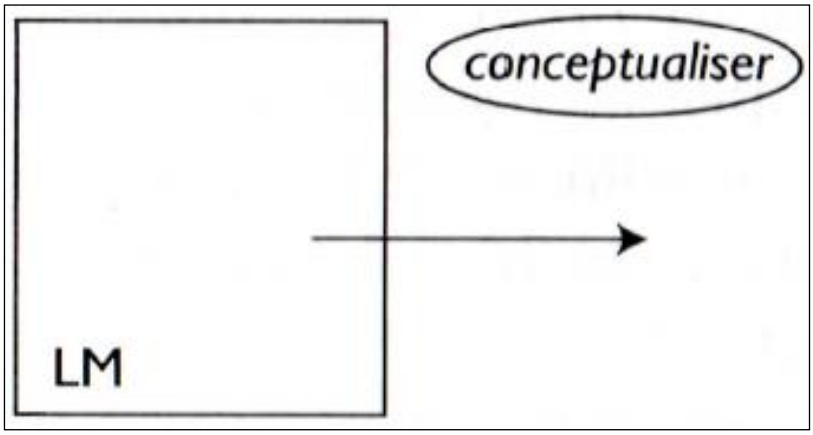
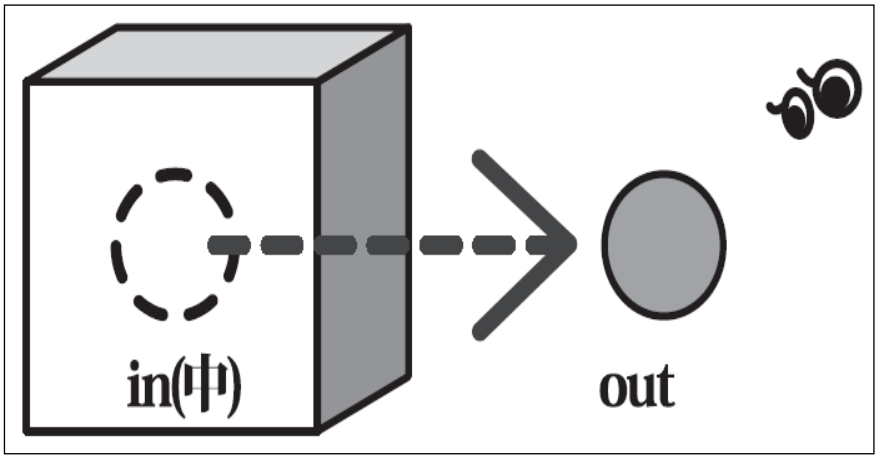


Figure 4.2.

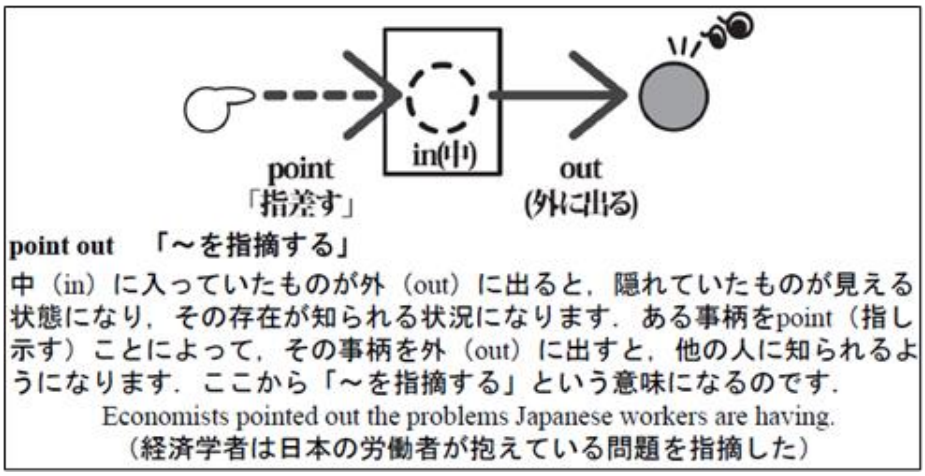
Presence Image for “OUT” (Nakagawa & Tsuchiya, 2011)



Comparing the two images in Figures 4.1. and 4.2. shows that the image material in Figure 4.2. is designed to promote intuitive visual understanding without the use of cognitive linguistic terms, such as a landmark or conceptualiser. The following is an example of an explanation.

Figure 4.3.

Example of Phrasal Verb Explanation (Nakagawa & Tsuchiya, 2011)



The explanation is based on the concept of cognitive linguistics, and it explains the meaning of the phrasal verb in a simple and concise manner. To be able to teach phrasal verbs based on the findings of cognitive linguistics, the teacher at School A did so after reading and understanding Nakagawa and Tsuchiya's explanation (pp. 26–42) of the phrasal verbs used in the present experiment.

Regarding the procedure, first, to grasp the learners' knowledge of phrasal verbs prior to the present experiment, a pre-test was conducted for 10 phrasal verbs from the material with a test time of 5 minutes. One week later, in both schools A and B, each teacher presented the imagery sketched in Nakagawa and Tsuchiya (2011) and gave an explicit explanation based on the insights of

cognitive linguistics for 10 minutes to encourage learners to retain the meanings of each phrasal verb. After another week, both sets of students were given a post-test. The pre-test and post-test were scored out of 10 and were written questions in which students were asked to write a suitable Japanese translation for the meanings of each phrasal verb according to the context in the English sentences, as shown in Figure 4.4.

Figure 4.4.

Example of Phrasal Verb Test

問題　以下の英文を訳した日本文の（　　）を補いなさい。
Fire suddenly broke out in the kitchen.　　突然，台所で火が（　　）。

4.3 Participants

A total of 79 students (15–16 years), 37 from School A (Group A) and 42 from School B (Group B), whose native language was Japanese, were participants in this study. Considering that only a limited number of phrasal verbs, such as “talk about,” were learned in junior high school and that the experiment was conducted in September of the first year, the number of phrasal verbs known before the experiment was thought to be relatively small.

4.4 Results and Discussion

The results of the descriptive statistics of School A and School B on the pre- and post-tests are shown in Table 4.1.

Table 4.1.

Descriptive Statistics of Group A and Group B on Pre-Test and Post-test

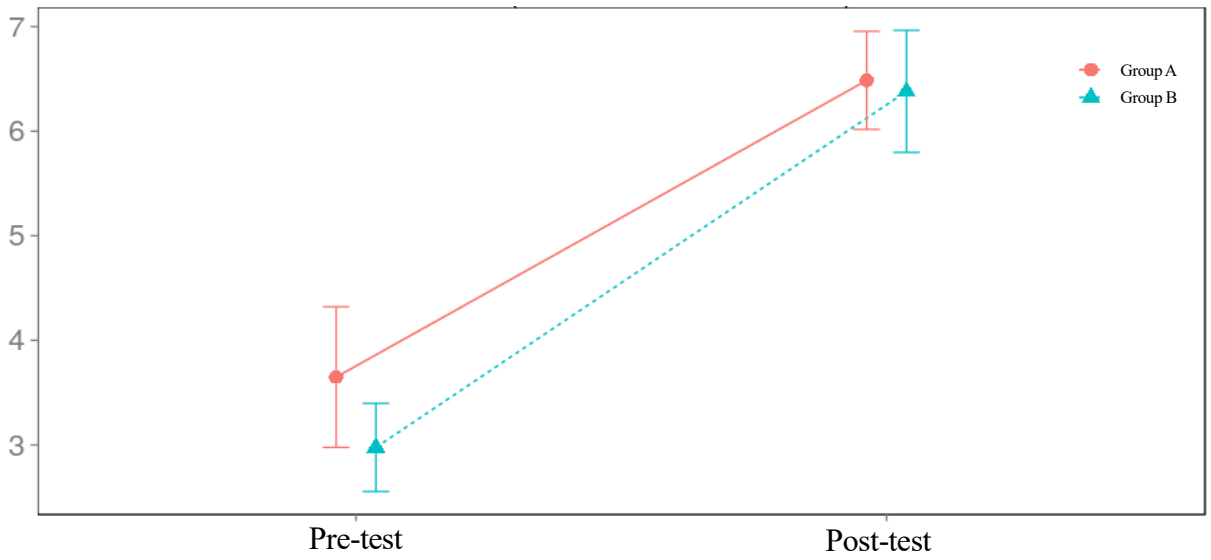
		M	*SD*	Minimum	Maximum	Skewness	Kurtosis
Group A	Pre-test	3.65	2.02	0.00	10.00	0.51	0.84
(n = 37)	Post-test	6.49	1.41	4.00	10.00	0.29	-0.25
Group B	Pre-test	2.98	1.35	0.00	6.00	-0.67	0.21
(n = 42)	Post-test	6.38	1.87	3.00	10.00	-0.18	-0.98

To examine whether the presence or absence of cognitive linguistic knowledge by the teacher made a difference in the retention of learners' knowledge of phrasal verbs, a two-way ANOVA with a mixed design was performed. As Mauchly's sphericity test showed that the assumption of sphericity was not satisfied, the degrees of freedom were adjusted by Greenhouse-Geisser's method. The results of the ANOVA indicated that the main effect of the presence of cognitive linguistic knowledge by the teacher was not statistically significant ($F(1, 77) = 1.85$, $p = .18$, $\eta_p^2 = 0.02$). However, the main effects of the test times were statistically significant ($F(1, 77) = 156.51$, $p < .01$, $\eta_p^2 = 0.67$). Furthermore, the interaction of the presence of teachers' cognitive linguistic knowledge × test times was not significant ($F(1, 77) = 1.29$, $p = .26$, $\eta_p^2 = 0.02$). In other words, the only significant effect was the test times, and the interaction effect was not significant. Therefore, it can

be concluded that if the theory of cognitive linguistics is modified well for teaching materials so that it can be applied in the field of education, the retention of learner's knowledge of phrasal verbs will significantly improve with instruction, regardless of a teachers' knowledge of cognitive linguistics; therefore, the teachability of the teaching method based on cognitive linguistics in the present study is guaranteed.

Figure 4.5.

Mean Scores of Group A and Group B at Pre-Test and Post-Test



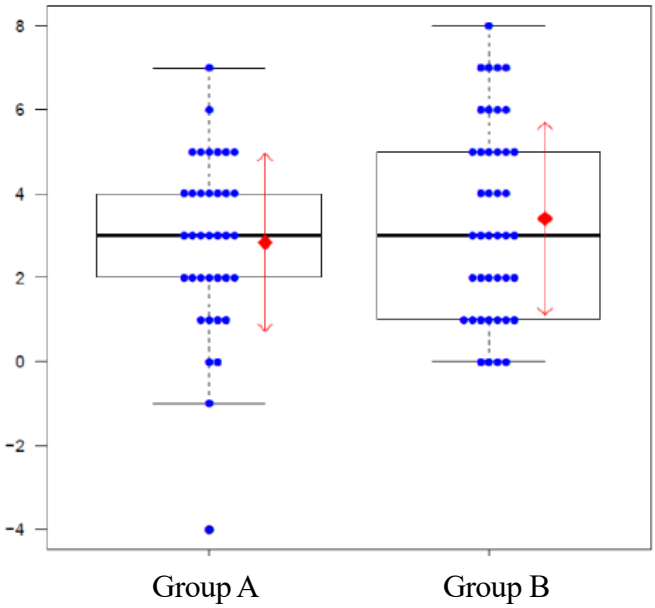
Note. The error bars attached to each item show 95% CI.

In both School A and School B, the mean score of the post-test was higher than that of the pre-test, which confirmed the effectiveness of teaching methods based on cognitive linguistics for the teaching/learning of phrasal verbs. In addition, this study's findings reaffirm those of many previous studies. However, the standard deviation of the post-test was lower than that of the pre-test in School A, although it was within the margin of error, and the variability was converged, while

the standard deviation of School B was larger, and the variability seemed to be a little wider than that of the pre-test. Although it is difficult to make a general statement owing to various factors such as individual differences in learner characteristics, the teacher at School B, who had knowledge of cognitive linguistics, mentioned a few peripheral cases, which may have caused a slight gap to appear between learners who found this learning method difficult and those who did not because, as established, they had not experienced it much until junior high school. On the other hand, the teacher at School A did not have any knowledge of cognitive linguistics; therefore, his simple and concise explanations, which consisted of only the images of the teaching materials and their explanations, may have made it easier for learners who were not familiar with this learning method to understand overall. Figure 4.6. shows the mean difference in scores between the post-test and pre-test (post-test minus pretest), which is the amount of change in schools A and B, respectively.

Figure 4.6.

Gain Scores of Individuals in Group A and Group B



Note. The red center point of the up and down arrows shows the average gain scores.

The learners in School B were observed to have a slightly larger score increase between the pre-test and post-test than those in School A. One reason for the slightly greater increase may be that although the scatter of scores was smaller for learners in School A than in School B, there were learners whose score difference was negative or retained no difference, while there were learners in School B whose score difference was zero, but there was also a relatively large number of students whose score difference appeared large, ranging from 6 to 7 points. The reason for this was hypothesized to be the fact that the teacher of School B, who had knowledge of cognitive linguistics, was able to promote understanding of abstract phrasal verbs with similar examples, which can be expected to be difficult for some learners to understand.

With respect to teachability, it was found that when teachers without knowledge of cognitive linguistics taught, the effect was the same as that of teachers with knowledge of cognitive linguistics, as long as the materials and teaching methods were sufficiently well designed for the teachers to understand them.

Chapter 5 The Learnability of a Cognitive Linguistics Approach to Phrasal Verbs[4]

5.1 Research Question

This chapter investigates whether there is a relationship between general cognitive abilities and the acquisition of phrasal verbs using cognitive linguistics-based teaching methods from the perspective of learnability to examine the cognitive linguistic approach to phrasal verb acquisition. The current research aims to bridge theory and practice. The cognitive linguistic approach to language acquisition research maintains that general cognitive abilities are deeply related to language acquisition, in part of the theoretical framework attempting to clarify language acquisition processes from the perspective of cognitive faculty and language performance. However, previous studies, such as Kartal and Uner (2017), which explored the relationship between English proficiency level and phrasal verb completion test scores, have not clarified—in a fairly broader sense—the relationship between general cognitive ability and academic achievement as one of the general cognitive abilities. In the present research, I operationally defined the score of a nationwide trial examination as a measure of general academic ability and conducted an experiment to determine whether there was a relationship between phrasal verb acquisition through a cognitive linguistic approach and general academic ability. Based on the theoretical background that linguistic competency is motivated by cognitive ability, I hypothesized that both English language proficiency and the general academic ability of English learners is related to differences in phrasal verb acquisition, even if the same cognitive linguistic approach is used for phrasal verb instruction. One study that investigated the correlation between SLA and intelligence was conducted by Genesee

[4] Some parts of this chapter (written in Japanese) appeared in Nakagawa (2019a).

(1976) and found that both reading and language usage tests were related to IQ tests because many IQ tests aim to predict how accurately students will perform on important criteria such as school grades and achievement-tests. Conversely, no correlation was found between IQ tests and listening and communication skills, which implies the skills being acquired, despite the absence of rigorous teaching of formal language structures and rules in native language acquisition. The current study examined whether phrasal verb acquisition was correlated with English proficiency level and academic achievement, and if so, whether a cognitive linguistic approach has the potential to eliminate or reduce the difference.

5.2 Method

To verify the learnability of the teaching method of phrasal verbs with the aid of cognitive linguistics, the correlation between the general academic ability and the retention of phrasal verbs was confirmed using the nationwide Benesse Corporation's trial examination. Benesse Corporation's trial examination was utilized to denote general academic ability because of a useful index of academic achievement used most widely in Japan. To accurately measure the effects of the teaching method using the findings of cognitive linguistics, phrasal verbs were combined with each of the 15 different types of particles, which are not often taught in junior high schools: bring about, call at, come by, care for, turn down, hear from, cut in, put off, hit on, stand out, get over, belong to, pull up, go with, and look into. These were selected as the material for verification. The procedure was as follows: first, a pre-test of the 15 phrasal verbs was conducted, with a time of 10 minutes, followed immediately by a 15-minute explanation using a cognitive linguistic approach. Two weeks later, a post-test was given without notice and without explanation, with a test duration of 10 minutes.

The pre-test and post-test consisted of questions in which students were asked to choose appropriate phrasal verbs that expressed the meaning of Japanese words from the verbs and particles, and each question was scored out of 15 points. We adopted a full-answer format, in which both verb and particle had to be correct. In addition, the students were given two minutes after instruction to answer an open-ended survey questionnaire that asked them to write how they felt about the learning methods used during the class.

Figure 5.1.

Example of Pre and Post-test Questions

問題　日本語の意味を表す句動詞を下の語群 A と B からそれぞれ選び答えなさい。それぞれの語は 1 回しか使えません。なお，句動詞が使われる英文も参照しなさい。

①「断る」　＿＿＿　＿＿＿

She（　）（　）my request.　彼女は私の頼みを断った。

②「調査する」　＿＿＿　＿＿＿

The police are（　）（　）the matter.　警察がその件を調査している。

⑮「望む」　＿＿＿　＿＿＿

Would you（　）（　）a glass of wine?　ワインを 1 杯いかがですか。

A

belong, bring, call, care, come, cut, get, go, hear, hit, look, pull, put, stand, turn

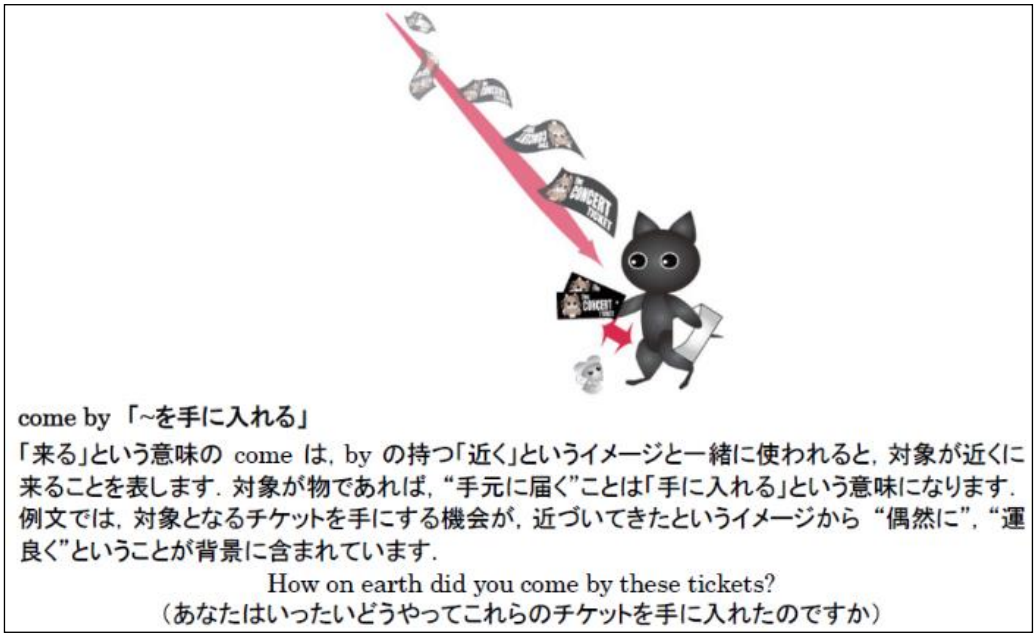
B

about, at, by, for, down, from, in, into, off, on, out, over, to, up, with

With respect to the teaching method, an animation video of phrasal verbs by Nakagawa (2013b) was presented, and the students were encouraged to attempt to understand the meaning of the phrasal verbs by explicitly explaining why they had such a meaning, based on the findings of cognitive linguistics.

Figure 5.2.

Example of Animation Video Used in Teaching Phrasal Verbs (Nakagawa, 2013b)



5.3 Participants

A total of 60 second-year high school students (16–17 years), whose mother tongue was Japanese, were involved in the experiment. Their average GTEC Advanced score (upper limit 810 points: reading 320, listening 320, writing 170) in June was 435.92, and their average score on the nationwide Benesse Corporation’s trial examination (upper limit 300 points: English 100, Japanese 100, mathematics 100) in July was 99.22. Their average score on the GTEC (Global Test of English Communication) Advanced was equivalent to the A1 level of the CEFR (Common European Framework of Reference for Languages). The national average for second-year high school students on the GTEC Advanced at the time of the research was approximately 445 points, and the national average for second-year high school students on the nationwide Benesse Corporation’s trial

examination was 110.60 points, which indicated that the participants in the experiment had English and general academic abilities that were slightly below national averages.

5.4 Results and Discussion

The results of the descriptive statistics for each test are shown in Table 5.1.

Table 5.1.

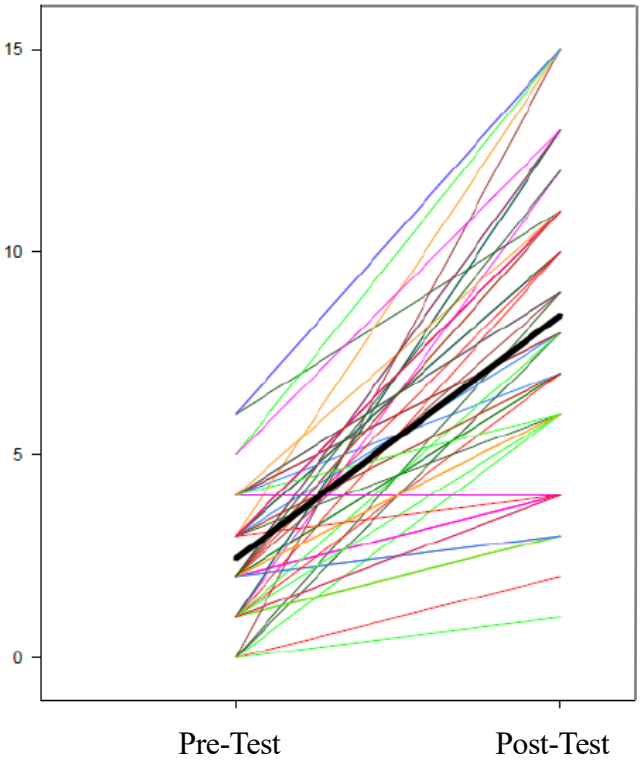
Descriptive Statistics of Pre-Post-tests, Gain Scores, GTEC, and Benesse Corporation's Trial Examination

	M	95%CI	*SD*	*Minimum*	*Maximum*
Pre-Test	2.43	2.02–2.85	1.60	0.00	6.00
Post-test	8.43	7.44–9.43	3.86	1.00	15.00
Gain Scores	6.00	5.10–6.90	3.49	0.00	15.00
GTEC	435.91	424.22–447.61	45.27	330.00	554.00
Benesse Corporation's Trial Examination	99.22	90.79–107.64	32.62	33.00	173.00

A paired *t*-test was performed to assess the difference between the means of the pre-test and the post-test on phrasal verbs, and a statistically significant difference was confirmed at the 0.1% level (t (59) = -13.30, $p < .01$, d = 1.84, 95% CI [-6.90, -5.10]).

Figure 5.3.

Individual Scores of Pre-Test and Post-Test



Note. The bold line indicates the average point.

The changes in the mean scores of the individual data points in Figure 5.3. show that not only did the scores increase significantly in the post-test compared to the pre-test, but also that the learners who scored low in the pre-test increased as much as the learners who scored high. The results indicate that the cognitive linguistic approach proposed in the present study was effective for phrasal verb learning.

The research question intended to explore whether the difference in scores between the post-test and pre-test were related to English language proficiency verified in previous studies and/or to the general academic ability hypothesized in this study. I examine whether the difference in scores

between the post-test and pre-test were related to the aforementioned proficiency that has been verified and/or to the wider academic abilities found among English learners in Japanese schools. To verify the effects of a cognitive linguistic approach from the viewpoint of learnability, I measured the strength of the linear relationship among the gain scores (post-test minus pretest), English language proficiency, and general academic ability by correlation analysis.

Table 5.2.

Correlations Among GTEC, Benesse Corporation's Trial Examination, Pre-Tests and Gain Scores

	1	2	3	4
1. GTEC	—			
2. Benesse Corporation's Trial Examination	.53**	—		
3. Pre-Test	.54**	.57**	—	
4. Gain Scores	.17	.31*	.01	—

Note. $^{**}p < .01$, $^{*}p < .05$

As the correlation matrix in Table 5.2. shows, the correlation coefficient between the pre-test and Benesse Corporation's trial examination as a criterion for general academic ability was $r = .57$, which is a moderate correlation. Although general academic ability cannot be equated with intelligence, the present study can confirm that intelligence was also correlated with vocabulary learning, just as Shirahata (2012, p. 188) stated.

Figure 5.4.

Scatterplot Depicting the Correlation Between Benesse Corporation's Trial Examination and Pre-Test

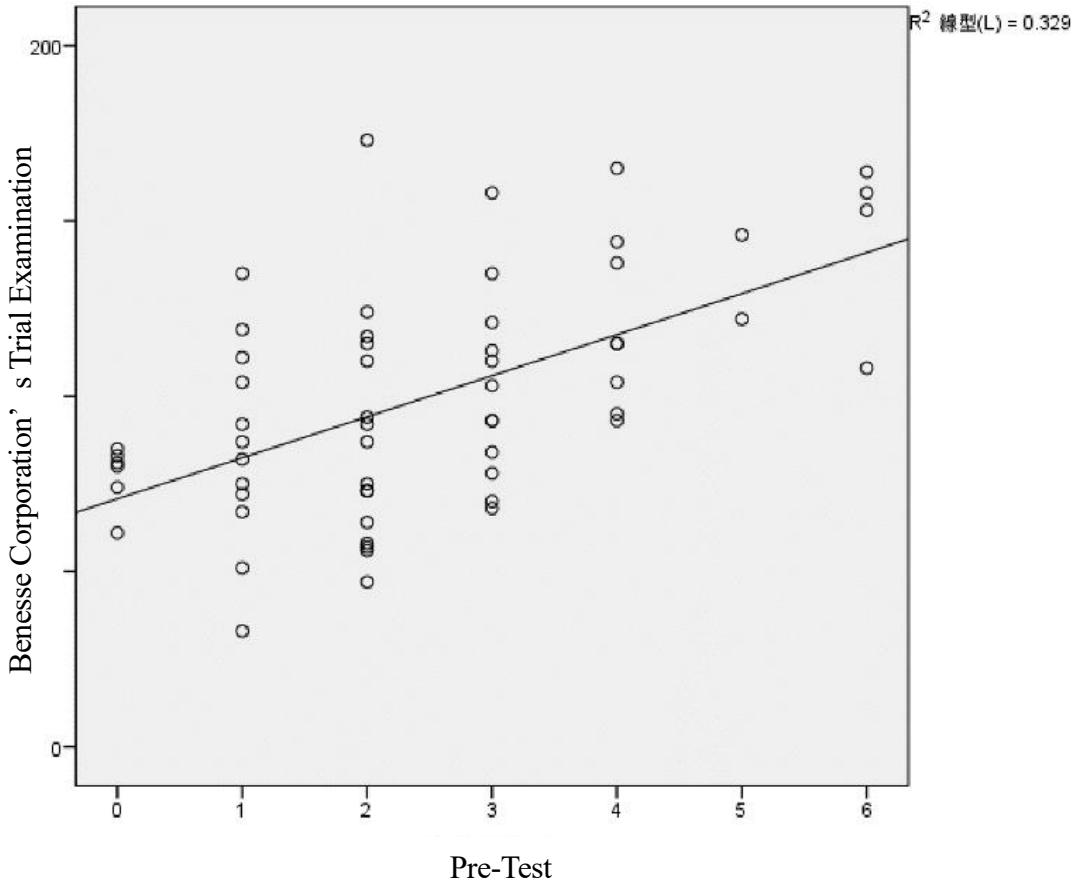
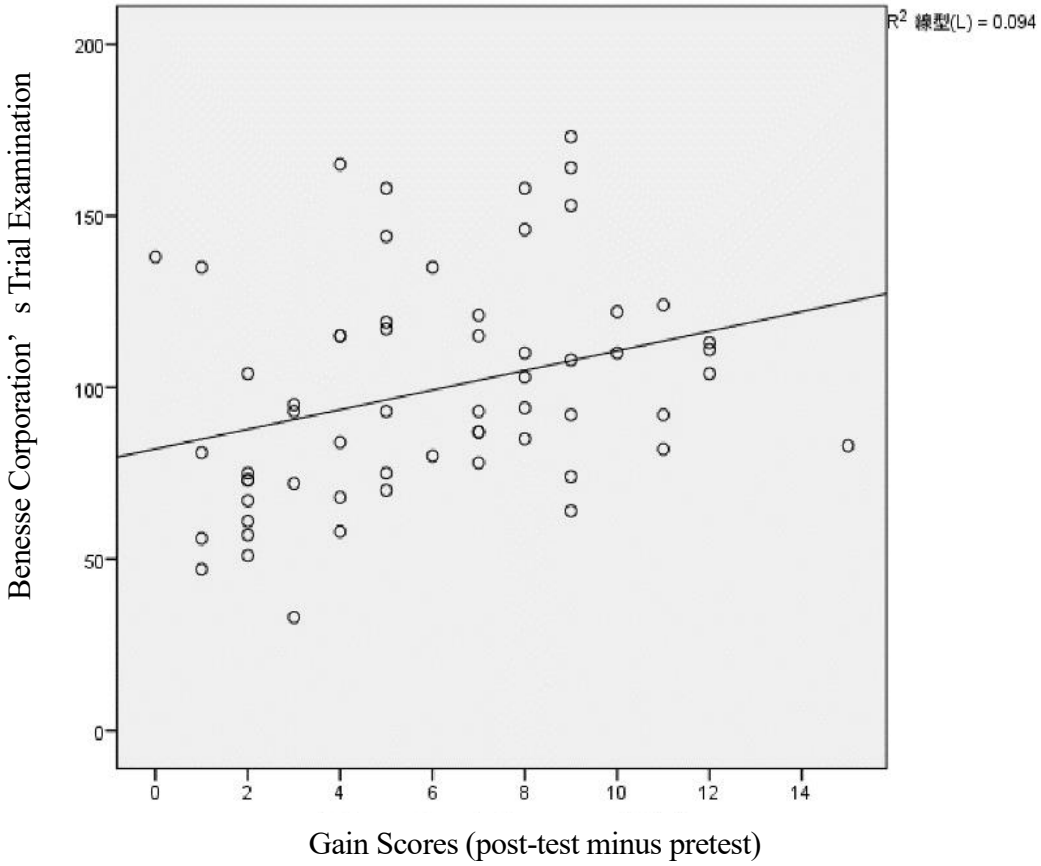


Figure 5.5.

Scatterplot Depicting the Correlation Between Benesse Corporation's Trial Examination and Gain Scores



In general, a prediction can be made that a learner whose English is good knows more phrasal verbs than one who is less proficient in English. This is also confirmed by the fact that the correlation coefficient between the GTEC and the pre-test was moderate in current study (r = .54). Interestingly, the results of the correlation between the gain scores (post-test minus pretest) and Benesse Corporation's trial examination and GTEC were different from the results of the correlation with the pre-test. The correlation coefficient between Benesse Corporation's trial examination and the gain scores was r = .31, which appears to be a weak correlation (Table 5.2.).

In light of the above results, it is possible to stimulate well-designed conditions for learnability by processing the findings of cognitive linguistics to create teaching materials and provide adequate instruction. However, it cannot be denied that general academic ability has some influence on the level of comprehension, regardless of the teaching method, akin to applying the cognitive linguistic approach, as seen by the weak correlation between Benesse Corporation's trial examination and gain scores in this instance. The factors could be explored by investigating learners' perceptions of the instructional methods. Therefore, I conducted an exploratory analysis of learners' perceptions of the instructional methods by means of a qualitative dataset in the form of an open-ended questionnaire administered after instruction. In the case of open-ended questionnaires as qualitative data, there is the possibility of differences in individual expressive ability. Participants' differing abilities, perhaps unrelated to their understanding of phrasal verbs, could have affected the results. Nevertheless, I consider the results to be meaningful inasmuch as they suggest a tendency, though partial. Therefore, I attempted to verify the results without interpreting them subjectively, as explained below.

Preprocessing by KH Coder 3 produced the following statistics: the total number of extracted words was 2,683 (1,086), the number of different words was 395 (280), the number of sentences was 117, and the number of paragraphs was 60. The 10 most frequently used words in the list were as follows (Table 5.3.).

Table 5.3.

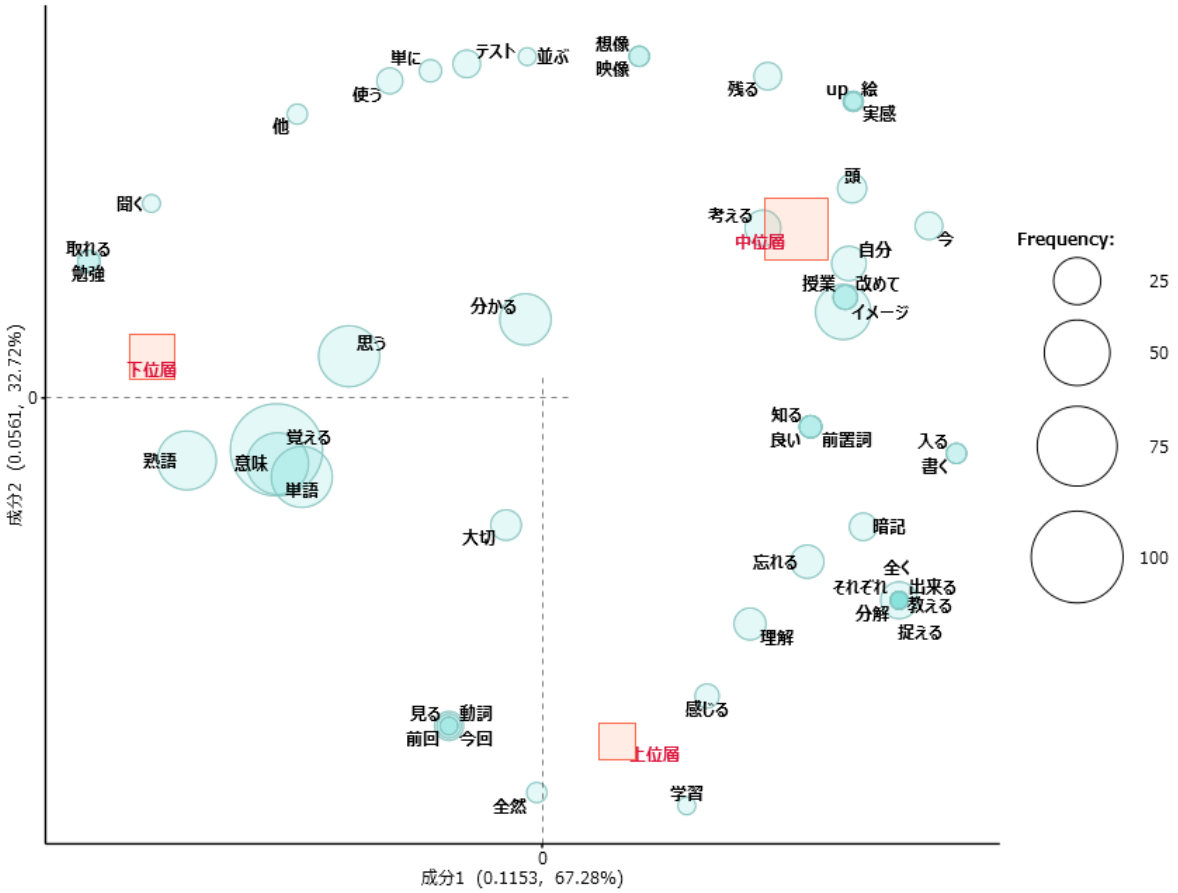
Ten Most Frequently Used Terms List

Extracted Word	Frequency	Extracted Word	Frequency
覚える (learn)	101	イメージ (image)	35
意味 (meaning)	44	わかる (understand)	30
思う (think)	43	できる (can)	15
単語 (word)	43	考える (consider)	14
熟語 (idiom)	40	自分 (I)	13

Next, I conducted a correspondence analysis using extracted words, dividing the scores from 33 to 80 into the lower stratum (n = 19), 81 to 130 into the middle stratum (n = 3), and 131 to 173 into the upper stratum (n = 10) (Figure 5.6.). The minimum number of occurrences was set to 3. The depicted circles represent extracted words, and the squares represent external variables. The sizes of the circles and squares correspond to the number of occurrences of each item, and the more strongly related items are placed closer to each other on the plane distance, while the weaker items are placed farther away. In addition, in correspondence analysis, items are placed away from the origin if the tendency is characteristic and near the origin if the tendency is general.

Figure 5.6.

Correspondence Analysis of Words and Variables (Extracted Words × Academic Abilities)

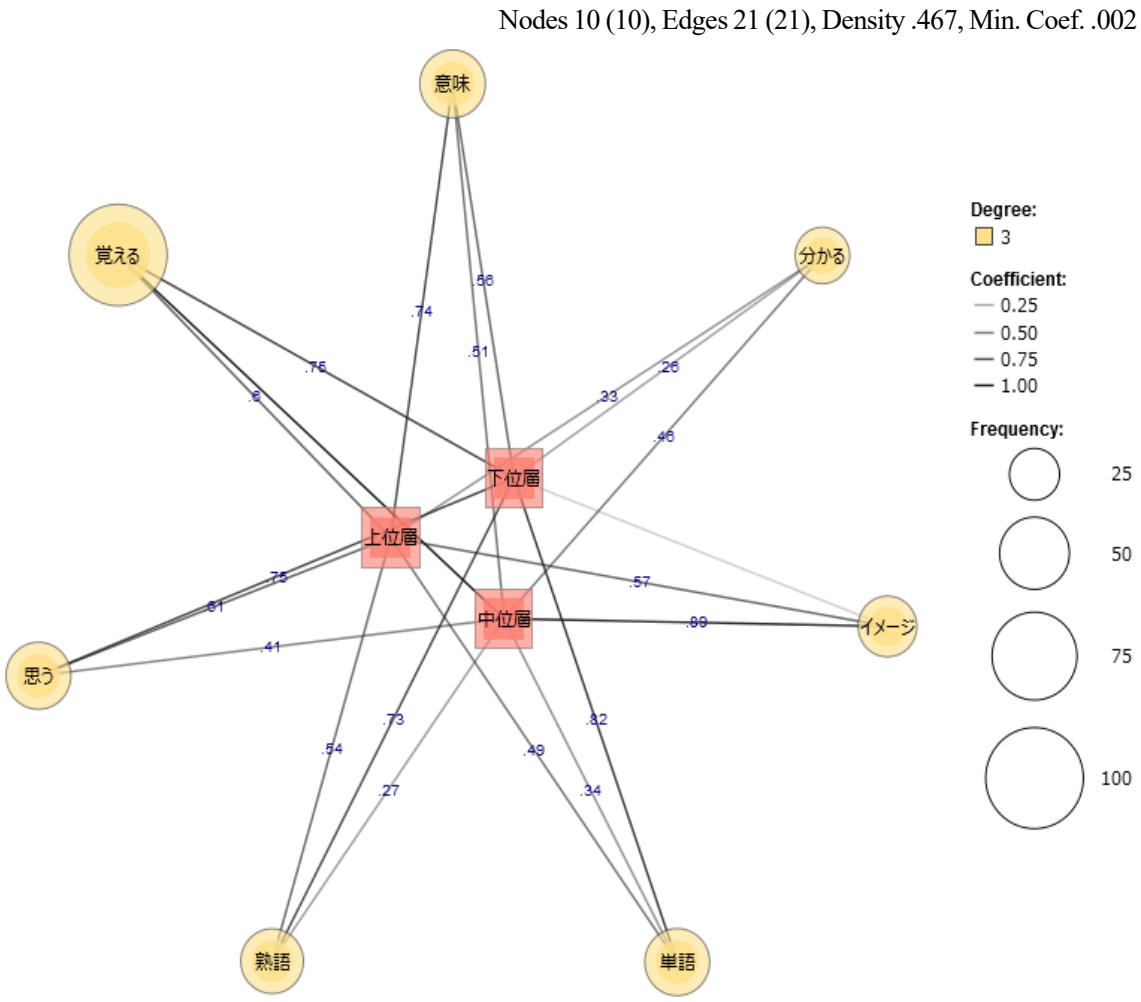


While multiple extracts were concentrated and similar among the upper and middle learners, only a few extracts such as “取れる(can get),” “勉強(study),” and “思う(think)” were distributed nearby for the lower learners, indicating that they perceived learning superficially, which is called a surface approach to learning, evidenced by the following opinion, “勉強すれば（点数が）取れると思う(I think I can get good scores if I study).” This is a rather typical reasoning of a learner characterized by lower academic attainment levels.

Then, a co-occurrence network analysis result was produced, which visualized the co-occurrence between the extracted words and the external variables of the academic achievement levels, as shown in Figure 5.7.

Figure 5.7.

Co-Occurrence Network of Words and Variables



The minimum number of occurrences was set to 20, and the number of edges representing co-occurrence relations was set to 60, which was the top number (in terms of the strength of co-occurrence relations). The stronger the co-occurrence relationship, the thicker the line. Words (nodes) in the same group are connected by solid lines, and words in different groups are connected by dashed lines. The numbers on the lines are the Jaccard similarity coefficients, which emphasize whether the words co-occur or not. Note that the co-occurrence network depicted indicates the strength of the co-occurrence relation by the Jaccard similarity coefficient; it is not represented by the distance between each word.

The co-occurrence relationship suggests that learners in the upper- and middle-level groups felt that "the meanings of words and phrases can be understood and remembered based on images," while the output co-occurrence network showed that learners in the lower-level groups had weaker co-occurrences with the "image." It can be concluded that the lower-level learners were less stimulated by the cognitive linguistic approach to learning phrasal verbs through images, and it can be inferred that their failure to consciously utilize the imagery learning method may have led to the differences in scores between them and the other academic level groups.

(17) Free comment from a learner (1) (upper level)

I realized once again that even though I know the general meaning of each word, I do not have detailed knowledge. I thought it was important to memorize the image and etymology of the word, because I don't understand it when it becomes an idiom.

(18) Free comment from a learner (2) (middle level)

I always just read and wrote, and I couldn't remember anything before the instruction. However, I was able to memorize them by visualizing them as taught in the class, which made it much easier for me to remember them.

(19) Free comment from a learner (3) (lower level)

I was surprised that I got more points in the post-test when I memorized the words in combination. I learned that it is better to memorize the words separately instead of memorizing the whole idiom.

As for learnability, I hypothesized that the difference in general academic ability was related to the difference in phrasal verb acquisition, which verified the hypothesis. The results showed that before the cognitive-linguistic approach intervention concerning teaching phrasal verbs, there was a moderate correlation between phrasal verb acquisition test scores at the pre-test, but after the intervention, the correlation coefficient difference between the post-test and pre-test scores became weaker. Moreover, based on the qualitative data collected, I explored how learners perceived the learning method utilized by means of their academic ability group and found that learners in the lower academic ability group tended to regard it as a superficial learning method whereby they could get good scores on the test by simply studying and memorizing. On the other hand, learners in the middle and upper levels of academic attainment realized that they were able to learn with conviction using the images, and they viewed the study's learning method more as an image-based learning method. It can be inferred that learners in the middle and upper levels were relatively accustomed to thinking with logic and that their perception of learning methods might be different

from that of learners in the lower academic achievement levels. As there are differences in the characteristics of learners at different ability levels, further research is needed to examine the factors that contribute to the correlation between general academic ability and phrasal verb acquisition from the perspective of learning strategies in vocabulary acquisition. Additionally, as the number of participants in this experiment was not very large, a follow-up study with more numerous participants is a logical future endeavor.

Chapter 6 Applying Active Learning-Based Instruction to Phrasal Verbs[5]

6.1 Research Question

To demonstrate the effectiveness of active learning-based instruction using the jigsaw method proposed in this paper, quantitative data from test scores and qualitative data from open-ended questionnaires were selected. My aim was also to explore the differences in the degree of knowledge retention and the learners' perception of each learning method. This chapter focuses on the significance of applying active learning-based instruction to the learning of phrasal verbs combinable with "up." The hypotheses of the present study are as follows:

(1) The jigsaw method has a higher retention rate than the teacher-centered method.

(2) The jigsaw method enables a deep approach to learning by externalizing cognitive processes and thus enhances the educational effect in learning phrasal verbs co-occurring with "up."

6.2 Method

To assess the learners' mastery of phrasal verbs, a pre-test was conducted with a test duration of 3 minutes. The test questions were multiple-choice questions in which the participants were asked to choose the appropriate verb among break, come, get, give, go, grow, pick, put, set, and show, according to their context in each English sentence.

[5] Some parts written in Japanese of this chapter appeared in Nakagawa (2018).

Figure 6.1.

Test Questions with Multiple Choice

小テスト

クラス　　番号　　名前＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

○例文を参考にして、日本語訳に合うよう、下から適切な動詞を選び、（　　）に書きなさい。

1. 「～を拾い上げる」:（　　）up
   例　He＿＿＿＿up the pieces of marbles.
   （彼は大理石の破片を拾い上げた）
2. 「～を上げる」:（　　）up
   例　Four out of twenty students＿＿＿＿up their hands.
   （20 人中 4 人の学生が手を上げた）
3. 「（話題などが）上がる」:（　　）up
   例　Will that topic＿＿＿＿up at the meeting?
   （あの話題は会議であがるだろうか）
4. 「現れる」:（　　）up
   例　She＿＿＿＿up twenty minutes late for class.
   （彼女は授業に 20 分遅れて現れた）
5. 「起動させる」:（　　）up
   例　The new bank＿＿＿＿up a central computer system to monitor the amount of money.
   （その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた）
6. 「起きる」:（　　）up
   例　I usually＿＿＿＿up at seven.
   （私はたいてい、7 時に起きる）
7. 「あきらめる」:（　　）up
   例　We didn't＿＿＿＿up all hope.
   （私達はあらゆる希望をあきらめなかった）
8. 「恋人同士が別れる」:（　　）up
   例　Last year I was in love with a woman but we ＿＿＿＿ up in February.
   （昨年私はある女性に恋をしたが、２月に私たちは別れた）
9. 「（数値などが）上がる」:（　　）up
   例　Energy prices and transport fares＿＿＿＿up last month.
   （先月エネルギー価格や公共運賃が上がった）
10. 「育つ」:（　　）up
    例　I＿＿＿＿up in this small town.
    （私はこの小さな町で育った）

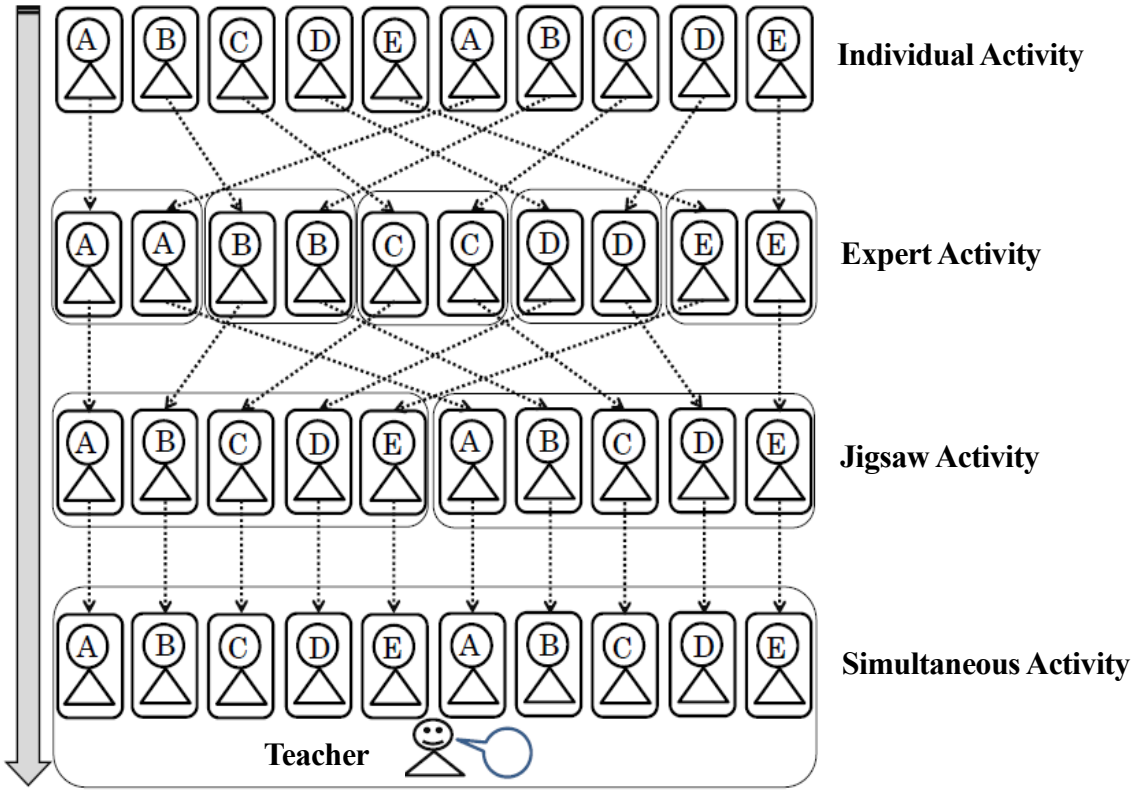
break, come, get, give, go, grow, pick, put, set, show

In terms of scoring, one point per question was available, for a total score of 10 points. The participants in the survey were divided into two groups: a comparison group of 28 students (teacher-centered deductive learning) and the experiment group of 28 students (learner-centered inductive learning). Immediately after the pre-test, the participants in the comparison group were asked to look up the same phrasal verbs in a dictionary and then write English and Japanese translations (15 minutes), followed by a read-aloud activity using flashcards (10 minutes). Conversely, in the experiment group, five activities were conducted based on the design of the proposed jigsaw-based inductive learning method (Chapter 2). There were, as follows: an "individual activity" (3 minutes), "expert activity" 1 (2 minutes), "expert activity" 2 (3 minutes), "jigsaw activity" (10 minutes), and a "simultaneous activity" (7 minutes). Both groups spent the same amount of time on the activities: 25 minutes in total.

A more detailed instructional description of the teaching processes and materials (handouts and teacher's materials) used for the experimental group (Appendix 3) is outlined. Figure 6.2. shows the flow of group formation for each stage of each activity.

Figure 6.2.

Flow of Group Formation for Each Activity



(1) Individual activity: The learners are given a list of the peripheral meanings of particles as materials and asked to draw an image of the infinitive while thinking about why it has that meaning. Then, they must select an English sentence that matches the image.

(2) Expert Activity 1: Expert groups of learners who have the same materials (A, B, C, D, and E in Fig. 6.2. represent types of materials) are formed, who should then share their thoughts with one another. The number of people in each group in Figure 6.2. is for illustrative purposes only, and group sizes can vary.

(3) Expert Activity 2: The teacher gives the answers to each expert group and encourages the learners to work together to understand one another (Appendix 4).

(4) Jigsaw Activity: Jigsaw groups of learners who have brought different materials from each expert group (groups consisting of A, B, C, D, and E in Figure 6.2.) are formed, who teach one another the information (images of peripheral senses, reasons they mean what they mean, and any English sentences that match the senses). Then, they are told to find the similarities among their peripheral senses, infer the image/gist of the central sense, and discuss it.

(5) Simultaneous Activity: The teacher explains the image of the peripheral meaning of each inflectional verb for review, then asks the learners to find the image of the central meaning and summarize their answers. Finally, the learners are asked to find English sentences containing phrasal verbs that match the peripheral senses they have learned about, this time from a textbook or dictionary, and then present them.

Take UP as an example. As there are five peripheral senses, "the higher position sense," "the existence sense," "the more sense," "the completion sense," and "the active condition sense" for the word "up," the meaning of which depends on the context, the expert group consists of five members. As previously mentioned, A, B, C, D, and E represent the type of material. To reiterate, the number of participants in an expert group is not necessarily only two.

The handouts for the participants instruct them to illustrate an image of the given peripheral meaning. They are also asked to describe the reasons they think that the peripheral meaning has such an image and to select an English sentence containing a phrasal verb that matches the peripheral vocabulary. The following figure shows one of the actual examples of participants' writing on the material (Figure 6.3.).

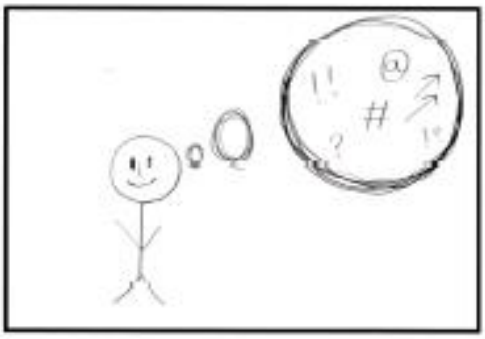
Figure 6.3.

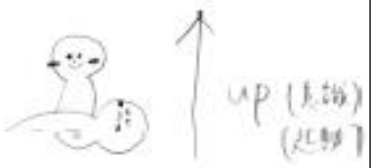
Example of the Material Filled out by a Participant

イメージ５

up には、「意識」・「起動のイメージがあります。

問題①「意識」・「起動をあらわすイラストを下に描いてみましょう。





問題②なぜそのようなイメージを持つのか理由を考えてみましょう。

意識とは常に考えていることだと思うから。

問題③下から「意識」・「起動をあらわす英文を２つ選んでみましょう。

上方 ア He picked up the pieces of marbles.
「彼は大理石の破片を拾い上げた」

出現 イ Will that topic come up at the meeting?
「あの話題は会議であがるだろうか」

意識起動 ウ The new bank set up a central computer system to monitor the amount of money.
「その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた」

完了終了 エ We didn't give up all hope.
「私達はあらゆる希望をあきらめなかった」

増大 オ Energy prices and transport fares went up last month.
「先月エネルギー価格や公共運賃が上がった」

増大 カ I grew up in this small town.
「私はこの小さな町で育った」

完了終了 キ Last year I was in love with a woman but we broke up in February.
「昨年私はある女性に恋をしたが、２月に私たちは別れた」

意識起動 ク I usually get up at seven.
「私はたいてい、７時に起きる」

出現 ケ She showed up twenty minutes late for class.
「彼女は授業に 20 分遅れて現れた」

上方 コ Four out of twenty students put up their hands.
「20 人中 4 人の学生が手を上げた」

眠っていたものを起こすと、そのものの位置が高くなり、「意識」「起動」のイメージになります。日本語の"コンピュータをたちあげる"という表現もこのイメージによるものです。

After the individual activities, the participants who are in charge of the same materials gather together to form expert groups and move on to Expert Activity 1. The main purpose of the expert activity is for participants to recognize the similarities and differences between their own and others' ideas by describing their own ideas to one another and comparing them.

Then, the participants move on to Expert Activity 2. At this stage, the teacher distributes the answers for the materials to each expert group and encourages them to promote understanding among themselves (Appendix 4).

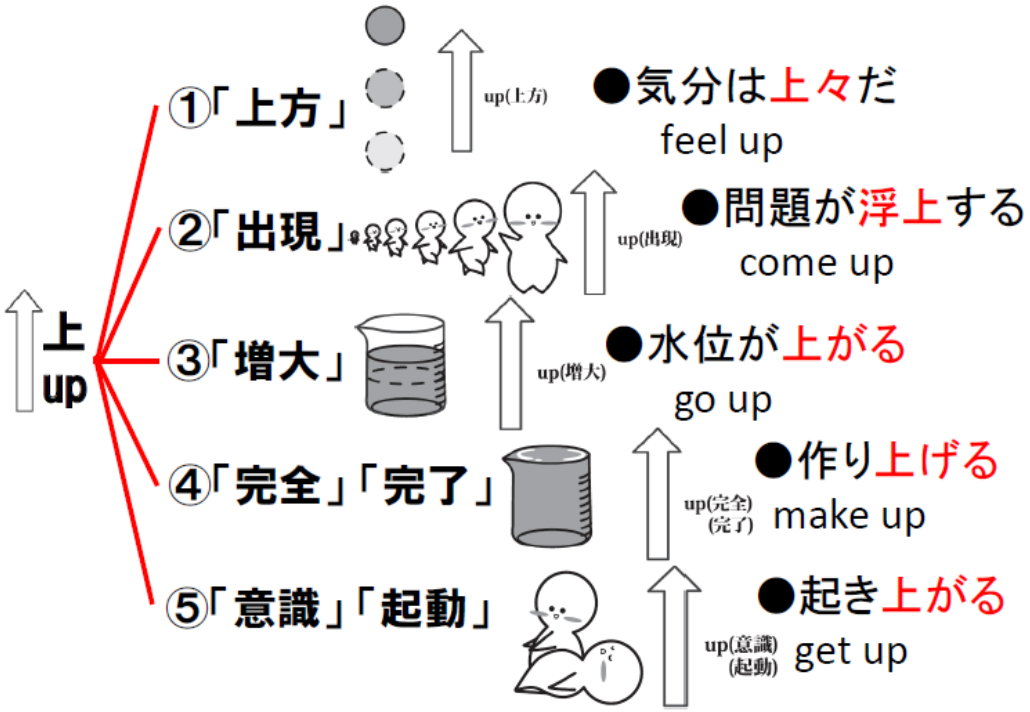
Then, the participants change their group formations from expert group to jigsaw group and teach one another what they have learned in their expert activities. After that, through explanation and listening, all members of the group are asked to infer the central meaning from the construction of knowledge of the peripheral meaning. The participants act as linguists. The activity is graded, as it is rather difficult, but they may get to the correct answer. In any case, it is the process by which learners maximize their thinking and work together to arrive at varied theories that is meaningful for better learning.

At the end of the whole process, an element of teacher-led plenary is vital. When participants teach one another, there is a strong possibility that they will form false concepts. To correct them, the teacher reviews the peripheral word meanings in the form of teacher-led simultaneous activities. After completing the review, the teacher asks the participants to think about the relationships between each of the peripheral word senses to reconstruct their knowledge and prompts them to offer answers for the main objective concerning central word senses.

Then, using Figure 6.4., the teacher visually shows the network of word meanings by conceptual metaphors, which have been acquired unconsciously, and then the participants reconstruct their conceptual knowledge of peripheral word senses and central word meanings.

Figure 6.4.

Semantic Network for "up" (Nakagawa & Tsuchiya, 2011)



One week after each of the above-mentioned activities were completed by the comparison group and experiment group, both groups were given a post-test in the same format as the pre-test. After the post-test, to understand the learners' perceptions of the learning method, both the comparison group and the experiment group participants were given an open-ended questionnaire (2 minutes) that asked, "How do you feel about phrasal verb learning?"

6.3 Participants

There were 56 first-year high school students (15–16 years) in two classes of a private high school, taking their required subject "Communicative English I." Most of the participants wanted to go on to vocational schools or universities, but their academic ability was not yet high enough, and their English attainment was poor.

6.4 Results and Discussion

To examine the differences in the effects of different learning methods on test scores, a 2 × 3 ANOVA was conducted with learning method (the comparison group and the experiment group) as the independent variable and the test time (pre, post, and delayed) scores as the dependent variables. KH Coder 3 was used for the exploratory analysis of the free text from the questionnaire evaluating the teaching method. The analysis of the free text with KH Coder can be considered an efficient and objective analysis technique without the influence of the analyst (Higuchi, 2004), particularly when presenting a summary of an entire dataset by multivariate analysis. Morphological analysis and detection of compound words were performed using Chasen.

Initially, based on the assumption of equal variances (verified by the Levene test), the difference in means between the comparison group and the experiment group on the pre-test was verified by an independent *t*-test (two-tailed), and no difference was found between the two groups (t (54) = .80, p = .427, r = .11). The *t-test* confirmed that the two groups were equivalent in the pre-learning phase.

The following table represents the results of the descriptive statistics for the tests of the comparison group and the experiment group.

Table 6.1.

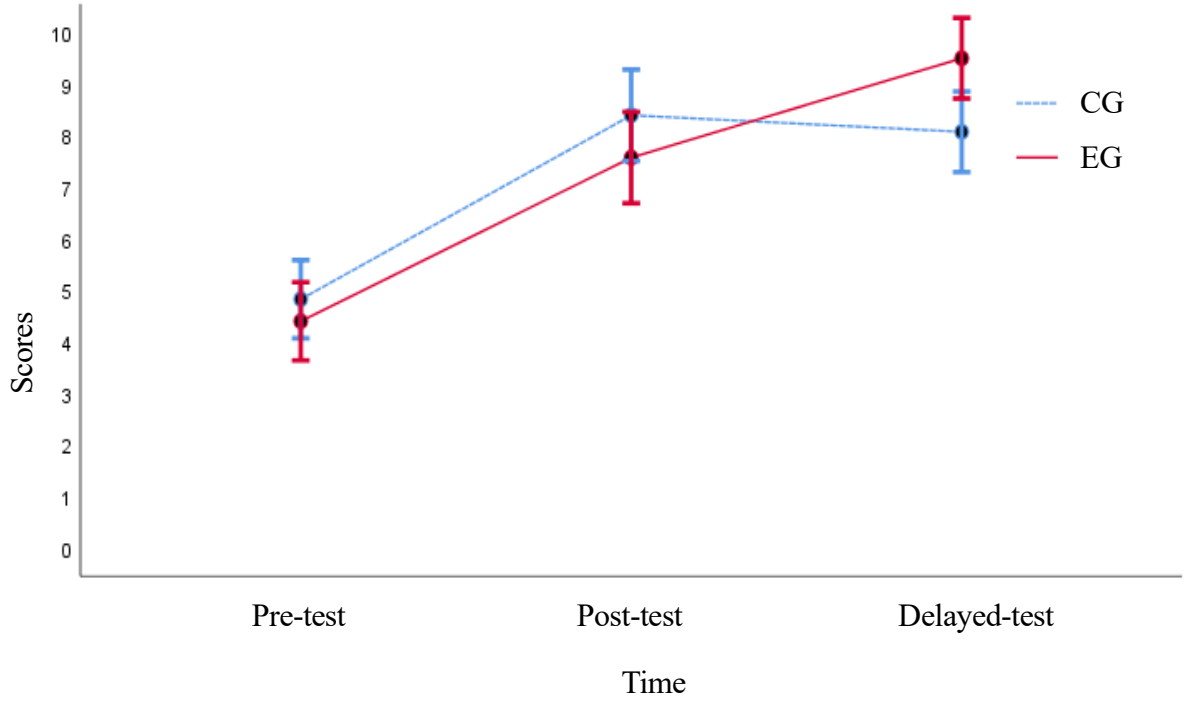
Descriptive Statistics of Comparison Group and Experiment Group on Pre-Test, Post-Test and Delayed-Test

		M	*SD*	Minimum	Maximum	Skewness	Kurtosis
Comparison Group (n = 28)	Pre-test	4.82	1.89	1.00	10.00	0.28	0.47
	Post-test	8.39	1.93	4.00	10.00	-0.75	-0.85
	Delayed test	8.07	2.26	2.00	10.00	-0.92	-0.12
Experiment Group (n = 28)	Pre-test	4.39	2.11	0.00	8.00	-0.23	-1.00
	Post-test	7.57	2.69	0.00	10.00	-0.88	0.05
	Delayed test	9.50	1.86	2.00	10.00	-3.27	9.28

As shown in Figure 6.5., the difference in scores between the comparison group (CG) and the experiment group (EG) in the delayed test was greater than in the other test times (error bars in Figure 6.5. show 95% confidence intervals: CI).

Figure 6.5.

Mean Scores of CG and EG at Pre-Test, Post-Test, and Delayed Test



Note. CG = Comparison Group EG = Experiment Group

The scores of the comparison group on the delayed test were observed to be lower than those on the post-test, while those of the experiment group were higher. The scores of the experiment group tended to increase with each test session.

Subsequently, the results of the two-way ANOVA for the two-factor mixed design are shared. As a result of Mauchly's sphericity test, sphericity was assumed.

The main effect of group, a factor with no correspondence as a between-participants test, was F (1, 54) = .01, p = .90, Mse = 9.80, η_p^2 = 0.0003. As a test of within-participants factors, the main effect of the corresponding factor of test time was F (2, 108) = 139.18, p < .001, Mse = 1.98, η_p^2 = .7205, and the main effect of test time was significant at the 0.1% level.

Furthermore, the main effect of group × test time was F (2, 108) = 10.22, $p < .001$, $\eta_p^2 = .1592$, indicating an interaction. As the main effect and interaction were found to be significant, a simple main effect test was conducted.

Table 6.2.

Simple Effects for Group × Test Time Interaction

Source	*SS*	*df*	*MS*	*F*	*p*	η_p^2
Group at Pre-test	2.57	1.00	2.57	0.64	.42	0.0117
Group at Post-test	9.44	1.00	9.44	1.72	.19	0.0310
Group at Delayed test	28.57	1.00	28.57	6.68	$p < .05$	0.1101
Test time at CG	218.59	2.00	109.29	57.07	$p < .001$	0.6789
Test time at EG	372.45	2.00	186.22	81.24	$p < .001$	0.7717

Note. CG = Comparison Group EG = Experiment Group

As shown in Table 6.2., the results of the test of the simple main effect of the group at each level of the test time factor (pretest, posttest, and delayed test) were significant at the 5% level for the delayed test (F (1, 54) = 6.68, $p < .05$, Mse = 4.28, $\eta_p^2 = 0.1101$). There were no differences between the two groups in the pretest (F (1, 54) = 0.64, p = .42, Mse = 4.01, $\eta_p^2 = 0.0117$) and posttest (F (1, 54) = 1.72, $p = .19$, Mse = 5.47, $\eta_p^2 = 0.0310$).

The simple main effects of test time at each level of the group factor (comparison group and experiment group) were significant at the 0.1% level for the comparison group (F (2, 108) = 57.07, $p < .001$, Mse = 1.91, $\eta_p^2 = .6789$) and the experiment group (F (2, 108) = 81.24, $p < .001$, Mse = 2.04, $\eta_p^2 = 0.7717$. Both groups were found to be significant at the 0.1% level.

Multiple comparisons using the Holm's method (SRB) adjusted for Bonferroni's method showed that both groups improved significantly from test to test, except for the difference between the post-test and delayed test in the comparison group (Tables 6.3. and 6.4.).

Table 6.3.

Multiple Comparison for Test Time at Comparison Group

Pair	*Diff*	*t*	*df*	*p*	*adj. p*	
Pre-test-Post-test	-3.57	8.58	27.00	$p < .001$	$p < .001$	Pre-test < Post-test
Pre-test-Delayed-test	-3.25	8.39	27.00	$p < .001$	$p < .001$	Pre-test < Delayed-test
Post-test-Delayed-test	0.32	1.08	27.00	.28	.28	Post-test = Delayed-test

Table 6.4.

Multiple Comparison for Test Time at Experiment Group

Pair	*Diff*	*t*	*df*	*p*	*adj. p*	
Pre-test-Post-test	-3.17	8.56	27.00	$p < .001$	$p < .001$	Pre-test < Post-test
Pre-test-Delayed-test	-5.10	13.85	27.00	$p < .001$	$p < .001$	Pre-test < Delayed-test
Post-test-Delayed-test	-1.92	4.76	27.00	$p < .001$	$p < .001$	Post-test < Delayed-test

In the comparison group, the retention rate immediately after learning was no different from that of the experiment group, and it improved significantly compared to the pretest. However, the experiment group improved significantly more on the delayed test than on the post-test, while the comparison group showed no such tendency. From the results, it can be suggested that the experiment group reconstructed their knowledge by continuing to learn independently after learning,

or by looking back to review their mistakes, and as a result, they scored higher than the comparison group on the delayed test. In fact, in the experiment group, even at the end of class and during recess, students were observed discussing the content of the test, for example, “I didn’t understand the difference between go up and come up, but should I remember that ‘appear’ means ‘come up’?”

The following are the results of the preprocessing by KH Coder 3 of the questionnaire data obtained from 28 participants in the comparison and experiment groups, respectively. In the comparison group, the total number of extracted words was 1,297 (481), the number of different words was 238 (156), the number of sentences was 75, and the number of paragraphs was 28. In the experiment group, the total number of extracted words was 1,316 (508), the number of different words was 253 (162), the number of sentences was 63, and the number of paragraphs was 28. In KH Coder analysis, words such as particles and auxiliaries are excluded; therefore, the number of words that is actually analyzed is smaller (the numbers in parentheses indicate the number of words actually analyzed, respectively). The 10 most frequent words in the list are as follows.

Table 6.5.

Ten Most Frequently Used Terms List

Experiment Group		Comparison Group	
Extracted Word	Frequency	Extracted Word	Frequency
思う (think)	28	思う (think)	25
覚える (learn)	23	意味 (meaning)	23
分かる (understand)	15	覚える (learn)	18
熟語 (idiom)	13	分かる (understand)	16
難しい (difficult)	12	up	14
単語 (word)	11	単語 (word)	14
勉強 (study)	11	理解 (comprehension)	11
知る (know)	9	取れる (can take)	10
up	8	勉強 (study)	10
意味 (meaning)	8	熟語 (idiom)	9

In the comparison group, there were words such as “difficult” and “know,” which were not among the 10 most frequent words listed in the experiment group. The results show that even though the students were able to familiarize themselves with the idioms through deductive learning, they found it difficult to learn them.

(20) Free comment from a participant (1) in the comparison group

I can easily do the idioms I know, but most of the questions I didn't know, so they were very difficult. I'm glad that I was able to learn idioms that I didn't know. I would like to be able to remember more idioms. I was glad to know how many idioms I did not know by taking this test.

On the other hand, in the experiment group, the words "comprehension" and "can take" were not among the 10 most frequently used words in the comparison group. This indicates that the participants in the experiment group had the impression that they were able to obtain a good score through activities that were accompanied by understanding through inductive learning.

(21) Free comment from a participant (2) in the experiment group

Once I understood the proper meaning, I could apply it. It is important to understand the meaning of the words.

Furthermore, although "meaning" and "up" were among the 10 most frequently occurring words in both groups, the number of occurrences differed greatly from the other words, resulting in more occurrences in the experiment group. As these words represent the content that was learned, it seems the participants in the experiment group were able to reflect on the content that was learned with more focus. The following statement from a participant suggests that this was the case.

(22) Free comment from a participant (3) in the experiment group

The word "up" alone has five meanings, and today's lesson helped us understand the meaning of English sentences by holding on to our own images of phrasal verbs and visualizing them well.

To visualize the connections between words, a network analysis was conducted, and a co-occurrence network was drawn (Figures 6.6. and 6.7.). The co-occurrence networks of the comparison and experiment groups were output after setting the minimum number of occurrences of words to 3 and the number of edges representing co-occurrence relationships to 60. The stronger the co-occurrence relationship, the thicker the line. Words (nodes) in the same group are connected by solid lines, and words in different groups are connected by dashed lines. The numbers on the lines are the Jaccard coefficients, which emphasize whether words are co-occurring or not. Note that the drawn co-occurrence network shows the strength of the co-occurrence relation by this Jaccard coefficient, not by the distance between words. As for the size of the circle, it varies according to the number of occurrences. Clusters (communities) are color-coded according to the degree to which each word plays a central role in the network structure, and the results of automatic detection and grouping of words that are relatively strongly connected to each other are shown. The density is the number of co-occurrences that are drawn minus the number of possible co-occurrences. The numbers in parentheses indicate the number of words and co-occurrences that were included in the input data.

Figure 6.6.

Co-Occurrence Network of Frequently Occurring Words in the Comparison Group

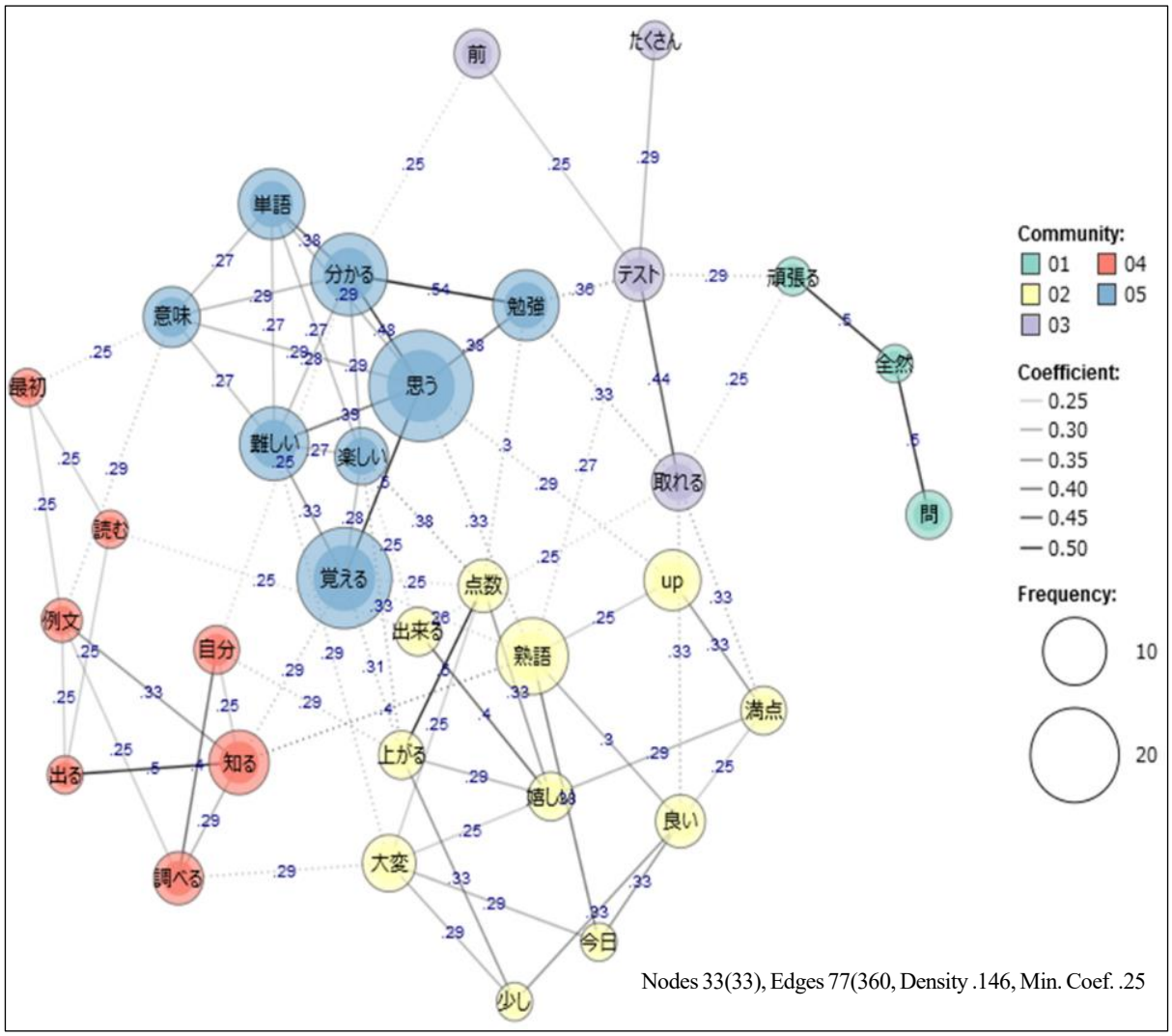
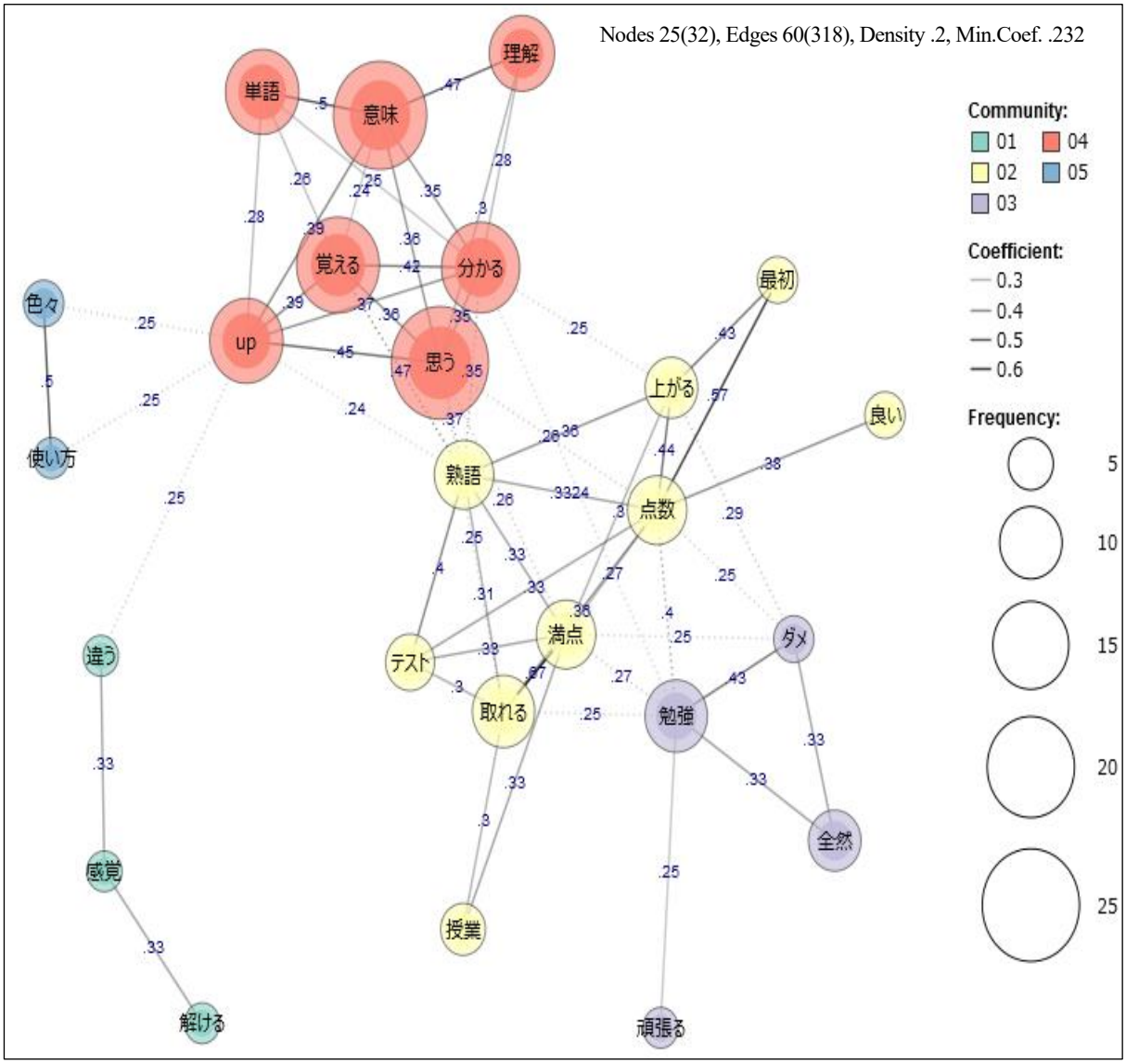


Figure 6.7.

Co-Occurrence Network of Frequently Occurring Words in the Experiment Group



First, a focus on the common word “remember” may allow for a comparison of the differences in cognitive processes between the two groups. In the comparison group, the word “remember” formed a network with words such as “study（勉強）,” “difficult（難しい）,” “word（単語）,” “meaning（意味）,” “understand（分かる）,” “interesting（楽しい）,” and “think（思う）,” suggesting that participants thought that it was interesting because they studied and learned the meaning of a difficult word and came to understand it in the learning process.

(23) Free comment from a participant (4) in the comparison group

It was difficult, and I’m glad I did a little better than the first time. It was hard to remember.

Alternatively, in the experiment group, the word “remember” was connected with words such as “up,” “word（単語）,” “meaning（意味）,” “comprehension（理解）,” “understand（分かる）,” and “think（思う）,” indicating that the participants understood the meaning of the word UP and thought that they understood it.

(24) Free comments from a participant (5) in the experiment group

Once I understood the meaning of the senses, such as “the more sense” and “the completion sense,” I knew which words to put on the answer sheet. If we can remember the meanings of the words in this way, we can get full marks for the idioms.

The participants in the comparison group felt that the learning process was difficult and that it was interesting to remember. On the other hand, the participants in the experiment group did not

co-occur with adjective words that express emotion and subjectivity, indicating that they were able to learn with understanding and were able to objectively reflect and analyze the learning process.

Next, I focus on the word "idiom（熟語）." Both the comparison group and the experiment group had something in common, in that the participants thought it was good that their scores improved. In the comparison group, however, as in the previous cluster, the word "hard（大変）," which has a negative meaning, was included, indicating that a burden was felt by participants in phrasal verb learning, as shown in the following free comment.

(25) Free comment from a participant (6) in the comparison group

It was hard to remember just one phrasal verb. I will study and memorize the meanings of the idioms we learned today so that I don't forget them.

On the other hand, the participants in the experiment group reflected objectively on their own learning process and wrote descriptions that showed that they had learned how to learn.

(26) Free comment from a participant (7) in the experiment group

At first, my score was only 3, but when I took the group activities seriously, my score went up to 9, which was good. I found out that it is easy to remember idioms using images.

Next, clusters that represent learning methods are explored. The participants in the comparison group looked up the phrasal verbs in the dictionary, wrote down their example sentences and their Japanese translations, and then read the sentences aloud using flashcards,

forming a network with the words “example sentence（例文）,” “first（最初）,” “self（自分）,” “look up（調べる）,” “assignment（出る）,” “know（知る）,” and “read（読む）.”

(27) Free comment from a participant (8) in the comparison group

I knew some of them before. I thought it would be good to remember all of them. By searching for not only the meanings of phrasal verbs, but also example sentences for them, I think I can understand how to use them.

In the experiment group, the network was drawn with the words “different（違う）,” “sense（感覚）,” “solve（解ける）,” “various（色々）,” and “usage（使い方）” because they learned various usages using illustrations based on the image schema.

(28) Free comment from a participant (9) in the experiment group

I thought it was important to remember the various senses of idioms. There were senses that were different from the Japanese, and I thought it was important to remember things like “put up your hand.”

When comparing the aforementioned comments of participants in the experiment group with those of the comparison group, insights into participants in the experiment group were gained. In short, they tended to adopt a “deep approach to learning” strategy not seen in the descriptions of the comparison group. An example was that students noticed the difference in the way Japanese and English are expressed in relation to their mother tongue, Japanese. In addition, the following

statement infers that they realized learning various usages through illustrations based on image schemas helped phrasal verb learning.

(29) Free comment from a participant (10) in the experiment group

I didn't know that there were so many usages of "up." Even if the Japanese translations are similar, they are all different when translated into English. Using pictures and diagrams, I can get some of them into my head.

Phrasal verb learning using the jigsaw method has broader educational implications that go beyond simply transferring knowledge or assisting in passing entrance examinations. In educational settings, it is difficult to devote a lot of time and attention to phrasal verb learning owing to time constraints. However, I believe that even a few sessions of similar activities will make a difference. Presenting such a learning method to learners as an option for phrasal verb learning will help them acquire higher-order cognitive skills when viewed from the perspective of learning how to learn. In the future, I would like to examine the differences in retention rates when the period of the delayed test is longer as well as the effect of combining the inductive phrasal verb learning method with other learning methods, to develop this research into a more sophisticated study.

Chapter 7 Conclusion and Future Directions

This doctoral dissertation has suggested effective methods of learning phrasal verbs for English language education in Japan to contribute to the advancement of the field of Subject Development Study. The basis of the proposed phrasal verb learning method mainly drew on the findings of cognitive linguistics and utilized both video and still images. Among the various concerns in English language teaching, such as speaking, writing, reading, listening, and grammar learning, the present study focused on phrasal verb learning for the reasons explained in this dissertation. One of the most frequently discussed issues in English education in Japan that most interests Japanese learners of English are methods of learning to speak English. As a solution, the present study aimed to develop participants' ability to use the vocabulary they had learned in Japanese junior high school to express themselves if they had not yet acquired more advanced vocabulary. I consider that phrasal verb learning is an essential component of the ability to speak English, which can be accomplished using words learned up to and including junior high school, as most phrasal verbs are composed of basic verbs, particles, prepositions, and adverbs. Phrasal verbs allow learners to express what they intend to say using basic vocabulary, instead of a difficult lexicon. Nevertheless, despite being composed of simple vocabulary, they are challenging to learn because it is difficult for learners to understand why phrasal verbs have certain meanings. This is a negative aspect that inhibits their acquisition. The methods proposed in this doctoral dissertation were coherent in that they offer ways for learners to acquire a satisfactory understanding of why phrasal verbs have these meanings. The underlying theory supporting this method is cognitive linguistics, which can guide students in overcoming the challenges associated with phrasal verb learning, as it provides clues to linguistic motivation.

Following Chapter 1, which was devoted to the outline of this doctoral dissertation, Chapter 2 addressed the various background theories that served as the basis for implementing the experiments in the present study. This dissertation reviewed previous research on cognitive linguistics applied to learning, phrasal verbs, the methodology, and materials as well as cognitive linguistics, which belongs to theoretical linguistics, helping describe how the methods of phrasal verb learning were designed within the theories of these various scientifically supported disciplines. These were presented as background to demonstrate the effectiveness of phrasal verb learning.

Chapter 3 covered the effectiveness of the cognitive linguistic approach to phrasal verb learning, which is the foundation of this dissertation. The results of the experiment showed that learning based on cognitive linguistic findings was more effective than rote learning as practiced in Japan. Although the effectiveness of the cognitive linguistic approach to phrasal verb learning was shown, concerns remained about whether teachers could actually use such a method in an educational setting and whether the effectiveness of the approach might vary among learners. Hence, to solve these problems, in chapters 4 and 5, the methods for learning phrasal verbs were examined by applying a cognitive linguistic approach from the perspective of teachability and learnability.

In the investigation of the teachability of methods that employ cognitive linguistics, which was the research question established in Chapter 4, I examined whether the effectiveness of phrasal verb learning differed between teachers with no knowledge of cognitive linguistics and those who specialized in cognitive linguistics. One group of learners was taught by a teacher who majored in Russian at university, had studied English teaching in graduate school, and had no knowledge of cognitive linguistics, while the other group was taught by a teacher who had researched cognitive linguistics. The results showed no significant difference in the effectiveness of the phrasal verb learning method based on the findings of cognitive linguistics. One possible rationale for this was

that the materials developed in accordance with the materials development theories detailed in Chapter 2 enabled the teacher with no knowledge of cognitive linguistics to teach effectively. The developed materials explained phrasal verbs to learners based on plain, concise expressions without jargon. This revealed that teachability can be ensured if learning materials are well organized and cater to easier understandability based on the findings of cognitive linguistics.

In Chapter 5, phrasal verb learning methods based on the findings of cognitive linguistics were explored to ascertain whether they were easy to learn for participants. Several previous studies of learner factors and phrasal verb retention have indicated their relation to English language proficiency and general cognitive ability. The present study also replicated the results of previous studies, finding moderate correlations between pre-testing and English language proficiency (Golkar & Yamini, 2007; Laufer & Goldstein, 2004) and between pre-testing and academic performance operationally defined as general cognitive ability (Szabo et al., 2020). In contrast, almost no correlation was detected between gain scores as a measure of phrasal verb learning effectiveness based on the findings of cognitive linguistics, English language proficiency, and the pre-test score. Furthermore, the correlation coefficient between the gain scores and academic achievement was lower than that between the pre-test score and academic achievement. In this regard, the cognitive linguistic approach to phrasal verb learning guaranteed learnability because its effects were less influenced by the differences in academic ability and English proficiency that existed prior to instruction.

In Chapter 6, one effect of integrating the active learning-based instruction method was highlighted. The study aimed to propose an inductive phrasal verb learning pedagogy in response to recent educational policy, in which teachers must engage in dynamic exploration of active learning instruction. In the field of vocabulary learning research, there have been relatively few

reports focusing on inductive approaches to phrasal verb learning. This study produced a design for enhancing phrasal verb learning by applying the jigsaw method to shift from a deductive approach, such as teacher-centered instruction, to an inductive approach. Thereafter, a discussion was conducted concerning the benefits of inductive phrasal verb learning, based on previous studies and the significantly positive effects shown in the survey. Additionally, the research attempted to contribute to the establishment of studies on "Subject Development" by integrating "Subject Studies" from the SLA and cognitive linguistics theory perspectives with "Education Environmentology" from the point of view of cognitive science.

This doctoral dissertation did not eliminate all the challenges of learning phrasal verbs by means of a cognitive linguistic approach, and the findings can be further developed by increasing the number of participants and conducting experiments with a variety of learners. Tanaka (2007) proposed the following three conditions for a sound educational grammar: teachability, learnability, and usability. Usability is a measure of whether learners are able to utilize what they have learned in actual communication and is related not only to teachability and learnability, but also to the complex issue of the extent to which learners' internalize the expressions they use.

In addition, many cognitive linguistic approaches utilize imagery, as shown in the present study; however, it is necessary to elucidate the characteristics of each type of imagery, such as still images and animations. Fukada (2012) noted that still images have the advantage of focusing on the parts that are closely related to the learning objectives and the disadvantage of requiring learners to use their own imaginations to fill in the parts that are not fully depicted. However, moving images have the strength of being able to appropriately represent the world of words and the weakness of not being able to easily highlight only what needs to be learned. While keeping these points in mind, it is necessary to continue to develop materials for phrasal verb acquisition. Then, exploring and

empirically verifying more appropriate methods should follow. In particular, phrasal verb learning, as pointed out in the current study, is an area critical for the improvement of communicative competency in English. Therefore, I have high expectations that future research will aim to solve this issue to contribute to education, including the further studies mentioned earlier.

In Chapter 5, I examined the cognitive linguistic approach to learnability, which is required to describe general academic skills in more detail and to specify learner characteristics and their effects. Especially, it should be explicated how the effects of phrasal verb learning using a cognitive linguistic approach relate to the academic skills generally taught in Japanese schools, such as mathematics, Japanese, and social studies because more accurate learning methods adapted to various learner characteristics may be found. Furthermore, Norris and Ortega (2000) suggested that explicit grammatical instruction in tandem with communicative activities is more effective than an inductive approach without explicit instruction; therefore, it is essential to investigate the effects of combinations with communicative activities in the future. The challenges raised above will be the subject of ongoing research.

It is hoped that the results of this doctoral dissertation will assist learners and teachers in some way and contribute to the further development of English education in Japan.

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Appendices

Appendix 1. Chapter 3 Pre-test

小テスト

クラス　　番号　　名前＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

○以下の英文を訳した日本文の（　　）を補って書きなさい。
（※動詞は時制 <～する, ～した など> に気をつけて書きなさい。）

1. The police are carrying out an investigation.
   警察は取り調べを（　　）。

2. Economists pointed out the problems Japanese workers are having.
   経済学者は日本の労働者が抱えている問題を（　　）。

3. I found out the book I had been looking for.
   ずっと探していた本を（　　）。

4. Thousands of people came out on the streets.
   何千人という人々が通りに（　　）。

5. Finally, they worked out a compromise between ideals and reality.
   最終的に彼らは理想と現実との間の妥協案を（　　）。

6. He went out with his friends.
   彼は友人たちと（　　）。

7. He turned out to be a real good man.
   彼はいい人だということが（　　）。

8. Outside, street fights broke out.
   外で路上喧嘩が（　　）。

9. They have ruled out the possibility of such cooperation between each other.
   彼らはお互いそのような協力の可能性は（　　）。

10. They set out on another bus tour today.
    彼らは今日，別のバスツアーに（　　）。

Appendix 2. Chapter 3 Post-test

小テスト

クラス　　番号　　名前＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

○以下の英文を訳した日本文の（　　）を補って書きなさい。
（※動詞は時制 <～する，～した など> に気をつけて書きなさい。）

1. They are carrying out an experiment.
   彼らはある実験を（　　）。

2. I pointed out to him the weaknesses in the plan.
   私はその計画の弱点を彼に（　　）。

3. She found out the CD she had been looking for.
   彼女はずっと探していた CD を（　　）。

4. The boss came out of his office.
   部長が部長室から（　　）。

5. We worked out a plan to save the company 20 percent of production costs.
   私たちは，会社が生産コストを 20%節減できるようなプランを（　　）。

6. Mother went out to the store to do some shopping.
   母は買い物をしに店へ（　　）。

7. He turned out to be a friend of my brother's.
   彼は，弟の友達だと（　　）。

8. Fire suddenly broke out in the kitchen.
   突然，台所で火が（　　）。

9. He has ruled out the possibility of his retirement.
   彼は引退の可能性は（　　）。

10. In 1492 Christopher Columbus set out on his first voyage to America.
    1492 年，クリストファー・コロンブスはアメリカへの最初の航海に（　　）した。

☆Batteries are running out.
バッテリーが（　　）かけている。

Appendix 3. Chapter 6 Materials Given to Participants in Each Part

Participant's Material of A Part

イメージ 1
up には、”上の方へ”という気持ちの「上方」のイメージがあります。

問題①「上方」をあらわすイラストを下に描いてみましょう。

問題②なぜそのようなイメージを持つのか理由を考えてみましょう。

問題③下から「上方」をあらわす英文を 2 つ選んでみましょう。

ア　He picked up the pieces of marbles.
「彼は大理石の破片を拾い上げた」

イ　Will that topic come up at the meeting?
「あの話題は会議であがるだろうか」

ウ　The new bank set up a central computer system to monitor the amount of money.
「その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた」

エ　We didn't give up all hope.
「私達はあらゆる希望をあきらめなかった」

オ　Energy prices and transport fares went up last month.
「先月エネルギー価格や公共運賃が上がった」

カ　I grew up in this small town.
「私はこの小さな町で育った」

キ　Last year I was in love with a woman but we broke up in February.
「昨年私はある女性に恋をしたが，２月に私たちは別れた」

ク　I usually get up at seven.
「私はたいてい，7 時に起きる」

ケ　She showed up twenty minutes late for class.
「彼女は授業に 20 分遅れて現れた」

コ　Four out of twenty students put up their hands.
「20 人中 4 人の学生が手を上げた」

Participant’s Material of B Part

イメージ 2
up には、「出現」のイメージがあります。

問題①「出現」をあらわすイラストを下に描いてみましょう。

問題②なぜそのようなイメージを持つのか理由を考えてみましょう。

問題③下から「出現」をあらわす英文を 2 つ選んでみましょう。

ア　He picked up the pieces of marbles.
「彼は大理石の破片を拾い上げた」

イ　Will that topic come up at the meeting?
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ウ　The new bank set up a central computer system to monitor the amount of money.
「その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた」

エ　We didn’t give up all hope.
「私達はあらゆる希望をあきらめなかった」

オ　Energy prices and transport fares went up last month.
「先月エネルギー価格や公共運賃が上がった」

カ　I grew up in this small town.
「私はこの小さな町で育った」

キ　Last year I was in love with a woman but we broke up in February.
「昨年私はある女性に恋をしたが，２月に私たちは別れた」

ク　I usually get up at seven.
「私はたいてい，7 時に起きる」

ケ　She showed up twenty minutes late for class.
「彼女は授業に 20 分遅れて現れた」

コ　Four out of twenty students put up their hands.
「20 人中 4 人の学生が手を上げた」

Participant's Material of C Part

イメージ 3
up には、「増大」のイメージがあります。

問題①「増大」をあらわすイラストを下に描いてみましょう。

問題②なぜそのようなイメージを持つのか理由を考えてみましょう。

問題③下から「増大」をあらわす英文を 2 つ選んでみましょう。

ア　He picked up the pieces of marbles.
「彼は大理石の破片を拾い上げた」

イ　Will that topic come up at the meeting?
「あの話題は会議であがるだろうか」

ウ　The new bank set up a central computer system to monitor the amount of money.
「その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた」

エ　We didn't give up all hope.
「私達はあらゆる希望をあきらめなかった」

オ　Energy prices and transport fares went up last month.
「先月エネルギー価格や公共運賃が上がった」

カ　I grew up in this small town.
「私はこの小さな町で育った」

キ　Last year I was in love with a woman but we broke up in February.
「昨年私はある女性に恋をしたが，２月に私たちは別れた」

ク　I usually get up at seven.
「私はたいてい，7 時に起きる」

ケ　She showed up twenty minutes late for class.
「彼女は授業に 20 分遅れて現れた」

コ　Four out of twenty students put up their hands.
「20 人中 4 人の学生が手を上げた」

Participant’s Material of D Part

イメージ 4
up には、「完全」・「完了」のイメージがあります。

問題①「完全」・「完了」をあらわすイラストを下に描いてみましょう。

問題②なぜそのようなイメージを持つのか理由を考えてみましょう。

問題③下から「完全」・「完了」をあらわす英文を 2 つ選んでみましょう。

ア　He picked up the pieces of marbles.
「彼は大理石の破片を拾い上げた」

イ　Will that topic come up at the meeting?
「あの話題は会議であがるだろうか」

ウ　The new bank set up a central computer system to monitor the amount of money.
「その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた」

エ　We didn’t give up all hope.
「私達はあらゆる希望をあきらめなかった」

オ　Energy prices and transport fares went up last month.
「先月エネルギー価格や公共運賃が上がった」

カ　I grew up in this small town.
「私はこの小さな町で育った」

キ　Last year I was in love with a woman but we broke up in February.
「昨年私はある女性に恋をしたが，２月に私たちは別れた」

ク　I usually get up at seven.
「私はたいてい，7 時に起きる」

ケ　She showed up twenty minutes late for class.
「彼女は授業に 20 分遅れて現れた」

コ　Four out of twenty students put up their hands.
「20 人中 4 人の学生が手を上げた」

Participant’s Material of E Part

イメージ 5
up には、「意識」・「起動」のイメージがあります。

問題①「意識」・「起動」をあらわすイラストを下に描いてみましょう。

問題②なぜそのようなイメージを持つのか理由を考えてみましょう。

問題③下から「意識」・「起動」をあらわす英文を 2 つ選んでみましょう。

ア　He picked up the pieces of marbles.
「彼は大理石の破片を拾い上げた」

イ　Will that topic come up at the meeting?
「あの話題は会議であがるだろうか」

ウ　The new bank set up a central computer system to monitor the amount of money.
「その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた」

エ　We didn’t give up all hope.
「私達はあらゆる希望をあきらめなかった」

オ　Energy prices and transport fares went up last month.
「先月エネルギー価格や公共運賃が上がった」

カ　I grew up in this small town.
「私はこの小さな町で育った」

キ　Last year I was in love with a woman but we broke up in February.
「昨年私はある女性に恋をしたが，２月に私たちは別れた」

ク　I usually get up at seven.
「私はたいてい，7 時に起きる」

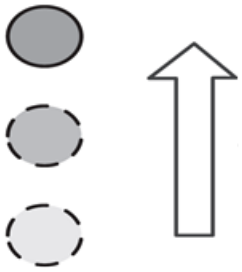
ケ　She showed up twenty minutes late for class.
「彼女は授業に 20 分遅れて現れた」

コ　Four out of twenty students put up their hands.
「20 人中 4 人の学生が手を上げた」

Appendix 4. Chapter 6 Answers Materials Given to Participants in Each Part

Participant's Answer Material of A Part

イメージ 1
up には，”上の方へ”という気持ちの「上方」のイメージがあります。
問題①「上方」をあらわすイラストを下に描いてみましょう。



問題②なぜそのようなイメージを持つのか理由を考えてみましょう。
ANS：物が「上」へ移動するや，「上」にあるといった，物理的な移動や位置を意味するから。

問題③下から「上方」をあらわす英文を 2 つ選んでみましょう。

ア　He picked up the pieces of marbles.
「彼は大理石の破片を拾い上げた」
pick up は，物をつまみ（pick）上げる（up）動作をあらわし，物を「拾い上げる」を意味します。

コ　Four out of twenty students put up their hands.
「20 人中 4 人の学生が手を上げた」
put up はあるものの位置を上（up）の方に置く（put），つまり「～を上げる」という動作をあらわします。

Participant's Answer Material of B Part

イメージ 2
up には,「出現」のイメージがあります。
問題①「出現」をあらわすイラストを下に描いてみましょう。

問題②なぜそのようなイメージを持つのか理由を考えてみましょう。
ANS : 遠近法に基づく人間の視覚が反映された場合には，人間の目には，遠くにあるものは小さく，近くにあるものは大きく見えます。そして，遠くにあるものが近づいてくるとき，初めは小さな点だったものが，だんだん上に伸びていき，大きくなってその存在が見えるようになるから。

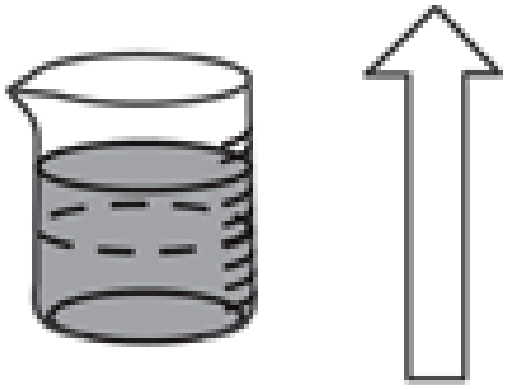
問題③下から「出現」をあらわす英文を 2 つ選んでみましょう。

イ　Will that topic come up at the meeting?
「あの話題は会議であがるだろうか」
出て（up）くる（come），というイメージを持っています。人々の議論の場などに，話題が姿を現す，登場してくる，ということなのです。

ケ　She showed up twenty minutes late for class.
「彼女は授業に 20 分遅れて現れた」
「見せる」という意味の show は，up の持つ「出現」というイメージと一緒に使われると，姿を見せて人前に出ることをあらわし，「現れる」という意味になります。

Participant's Answer Material of C Part

イメージ 3
up には，「増大」のイメージがあります。
問題①「増大」をあらわすイラストを下に描いてみましょう。



問題②なぜそのようなイメージを持つのか理由を考えてみましょう。
ANS : 容器の中の水が増えて目盛りが上がるというイメージから，目盛が上がることは量が増え，ものであれば大きく見えることから「増大」のイメージを持つ。

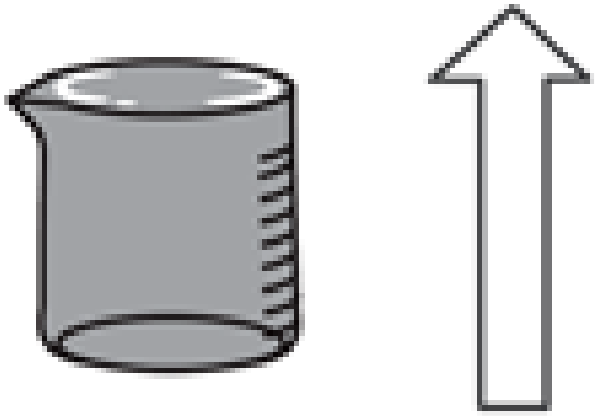
問題③下から「増大」をあらわす英文を 2 つ選んでみましょう。

オ　Energy prices and transport fares went up last month.
「先月エネルギー価格や公共運賃が上がった」
go up は数値などが上がって（up）いく（go），つまり「上がる・上昇する」という意味です。

カ　I grew up in this small town.
「私はこの小さな町で育った」
「成長する」という意味の grow は，up の持つ「増大」というイメージと一緒に使われると，大きく成長すること，つまり人が「育つ」という意味になります。

Participant's Answer Material of D Part

イメージ4
up には,「完全」・「完了」のイメージがあります。
問題①「完全」・「完了」をあらわすイラストを下に描いてみましょう。



問題②なぜそのようなイメージを持つのか理由を考えてみましょう。
ANS : 容器の中の水が増えて完全に目盛りが限界点まで到達し，容器の容量が天井まで完全に使われて，頭打ちになり，それ以上進まない様子から,「完全」や「完了」をあらわします。

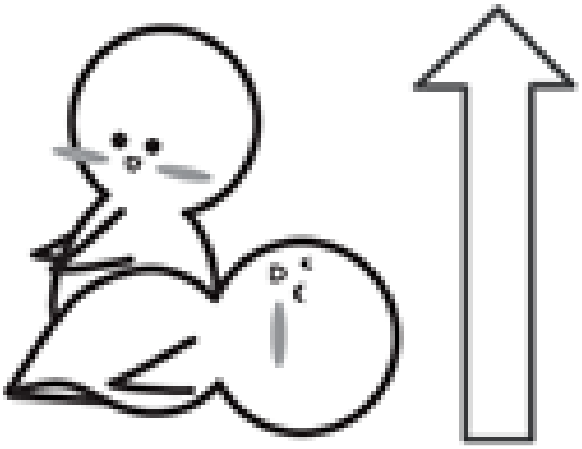
問題③下から「完全」・「完了」をあらわす英文を 2 つ選んでみましょう。

エ　We didn't give up all hope.
「私達はあらゆる希望をあきらめなかった」
give は「与える」という意味がありますが，自分の手元にあるものを相手に「与える」という行為は「手放す」ことも意味します。夢や希望などを完全（up）に手放す（give）ことは,「あきらめる」ということを意味します。

キ　Last year I was in love with a woman but we broke up in February.
「昨年私はある女性に恋をしたが，２月に私たちは別れた」
break up は物や関係などを完全（up）に壊す（break）ことをあらわします。壊されるものが恋愛関係ならば，break up は「別れる」ことを意味します。

Participant's Answer Material of E Part

イメージ 5
up には，「意識」・「起動のイメージがあります。
問題①「意識」・「起動」をあらわすイラストを下に描いてみましょう。



問題②なぜそのようなイメージを持つのか理由を考えてみましょう。
ANS：眠っていたものを起こすと，そのものの位置が高くなり，「意識」・「起動」のイメージになります。日本語の"コンピュータをたちあげる"という表現もこのイメージによるものです。

問題③下から「意識」・「起動」をあらわす英文を 2 つ選んでみましょう。
ウ　The new bank set up a central computer system to monitor the amount of money.
「その新しい銀行はお金の総額を監視するためセントラル・コンピュータ・システムを起動させた」
コンピュータを起動（up）できる状態にセット（set）するという意味です。コンピュータを「セットアップする」は，日本語の中にもすっかり定着している表現です。

ク　I usually get up at seven.
「私はたいてい，7 時に起きる」
「得る」という意味の get は，up の持つ「起動」というイメージと一緒に使われると，起き上がった状態を得ることを表し，「起きる」という意味になります。