

**【Articles】**

# A Systematic Review of Studies on the Cognitive Linguistic Approach to L2 Instruction: A Case of Japanese Learners of English

認知言語学的アプローチによる L2 指導研究に関する  
システマティックレビュー：  
日本人英語学習者の事例

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## Abstract

This study reports a systematic review of studies investigating the effectiveness of language teaching approaches based on insights from cognitive linguistics (CL). With a growing body of CL-inspired intervention research, the current study mainly targeted empirical studies with Japanese learners of English that compared CL with traditional teaching methods. The meta-analysis included 98 effect sizes from 40 sample studies involving 3,179 learners. Aggregated results revealed that CL-informed instruction led to greater learning gains with a medium effect size than traditional instruction overall ( $g = 0.719$ , 95% CI [0.565, 0.873]). The subsequent moderator analyses indicated that the CL approach was marginally better in the immediate and short-term delayed posttests. Although there was a possibility of a larger advantage of CL over traditional methods in the long term, the generalisation requires more data covering various linguistic features. The current study also confirmed that learners at A1 to B1 proficiency levels equally experienced moderately surplus effects of the CL approach. It suggests the magnitude of CL instruction on learners with higher proficiency to be explored in future research. Lastly, pedagogical implications related to instruction time will be discussed, as well as a future direction for the integration of the CL approach into language teaching.

## 1 Introduction

Theoretical insights from cognitive linguistics (CL) have been widely applied to language teaching and learning. The research field of applied cognitive linguistics has developed dramatically over the past two decades. A large number of studies attempt to make use of key concepts of CL (e.g., conceptual metaphors, image schemas, core meanings) in teaching different linguistic structures (e.g., prepositions, phrasal verbs, countability, modal verbs) of different target languages (e.g., English, Spanish). In Japan, this trend has also been seen in vocabulary and grammar learning, with many books published for English learners and reference books targeted at language instructors (Tanaka et al., 2003; Ueno, 2006). Now, there is a pool of studies that empirically investigated the efficacy of CL-based instruction in teaching English, especially to Japanese-speaking learners. This paper reports a systematic review of such studies to overview the areas of instructional application, target learner groups, and their outcomes in order to clarify the effectiveness of the CL approach

and its sustainability in comparison to conventional ways of teaching.

## 2 Literature Review

### 2.1 Application of Cognitive Linguistics to Language Teaching

CL began to be widely advocated in the 1980s, attempting to capture language ability through an approach different from traditional generative grammar (e.g., Lakoff, 1987; Langacker, 2008a; Talmy, 2000). While generative grammar views linguistic competence as separate and independent from other cognitive abilities, CL seeks to perceive it as a manifestation of advanced cognitive activities based on fundamental cognitive abilities inherent to humans. Sharing the assumptions that basic units of language representation are constructions, namely form-meaning mappings, and that language is learned from usage, work within this approach ranges over various research areas, such as cognitive semantics including conceptual metaphor theory (Lakoff & Johnson, 1980), usage-based models of language acquisition (Langacker, 2000; Tomasello, 2003), and so on (see Ellis & Robinson, 2008). In particular, Langacker, who established Cognitive Grammar, emphasises that “compared to other approaches, cognitive linguistics offers an account of language structure that ... is arguably more comprehensive, revealing, and descriptively adequate” (Langacker, 2008b, p. 66). He described the centrality of meaning, the meaningful characterisation of grammar, and the usage-based nature of Cognitive Grammar, all of which have extended implications for language learning and teaching.

Such proposals as insights from CL to benefit language instruction have been analysed and implemented since the emergence of applied cognitive linguistics as a research discipline, marked by influential publications such as *Applied Cognitive Linguistics I* and *II* (Pütz et al., 2001a, 2001b) and the launch of the book series *Applications of Cognitive Linguistics* (the first issue by Kristiansen et al., 2006). In the survey of CL-inspired teaching proposals, however, Boers and Lindstromberg (2006) found that some of them were “vague as to the exact implementation of the CL insights in terms of material design or precise classroom activities” and “lacking in the provision of empirical evidence of any surplus pedagogical effectiveness in comparison with already established teaching methods” (p. 335). They noted the necessity of fine-tuned implementations of research to evaluate the relative pedagogical effectiveness of CL-based language instruction. To fill this disciplinary demand, many studies have used more precise methodology to address language teaching efficiency through CL (De Knop et al., 2010; Tyler et al., 2018). With an expanding body of research regarding CL application to vocabulary teaching, Boers (2013) reported a review of intervention studies to assess whether CL-informed instruction was better for vocabulary retention than other kinds of instruction. This indicates that empirical research is accumulating in volume to make it possible to evaluate the effectiveness of the CL approach collectively.

## 2.2 CL and Traditional Approaches to L2 Instruction

This section overviews practical reports and empirical studies that incorporated CL-based methods into teaching Japanese learners of English (JLEs). According to Fujii (2017), there are two main streams in how insights from CL are applied to second language (L2) instruction. One is to teach the cognitive operation required for conceptual metaphors and metaphor/metonymy, which motivates the extension of meaning. The other relies on image schemas and/or core meanings to facilitate L2 learning. While the former is frequently observed in educational practice abroad, for example, for teaching how to link the central and peripheral meanings of polysemous words and fostering a better understanding of idioms, the latter is more common in Japan. Fujii summarised a literature survey on CL application to JLEs, noting that most studies targeted basic verbs, prepositions, and phrasal verbs. More importantly, he indicated that not all of the reported studies found the outcomes favouring the CL approach compared to traditional teaching methods using translation and English-Japanese dictionaries. This field of research is beginning to constitute a body of empirical evidence, but it still remains inconclusive how promising CL-based instruction is to JLEs.

For example, Yasuda (2010) investigated 115 university students on 21 phrasal verbs. The treatment group was given an explanation based on conceptual (orientational) metaphors embedded in the adverbial particles (up, down, into, out, off), such as MORE VISIBLE/ACCESSIBLE IS UP (e.g., open up, show up) and COMPLETION IS UP (e.g., dry up, use up). The instruction was followed by memorisation with reference to a checklist which categorised the phrasal verbs by each particle with subheadings of underlying conceptual metaphors and Japanese translations. On the other hand, the comparison group (i.e., the traditional approach) was taught each phrasal verb by simply translating it into Japanese and instructed to memorise them using a checklist which listed the phrasal verbs alphabetically with Japanese translations. The entire teaching session took 10 minutes for both groups. The outcome was measured by means of a fill-in-the-blank sentence completion task where a particle was missing in a sentence (e.g., “When she heard the news, she burst \_\_\_ tears.”). This study did not conduct a pretest to avoid a facilitating effect, in that giving a test may lead to giving knowledge. Instead, the outcome measure included exposed items (i.e., items that participants have seen or encountered before the task) and unexposed items (i.e., items that participants have not seen or been exposed to before the task), and the effectiveness was evaluated by comparing the accuracies of the two types of items in an immediate posttest (15 items per type, adding up to 30 test items). As a result, the treatment group outperformed the comparison group on the unexposed items, while they did not differ on the exposed items. This suggests that the knowledge of conceptual metaphors may facilitate understanding phrasal verbs that are not stored in the learner’s mental lexicon as a unit.

Incorporating image schemas into instruction, Strong (2013) compared three groups of

university students ( $N = 77$ ) in teaching 16 phrasal verbs: an English-Japanese translation group (paired-association group), a semantic analysis group, and a mixed instruction group (semantic analysis and image schema). The (traditional) translation group received a list of phrasal verbs presented with Japanese translations alphabetically and was asked to memorise them for 10 minutes. In contrast, the explanation given to the semantic analysis group included brief semantic instruction on the meaning of target particles (up, down, out, off) and how their prototypical meanings contributed to the meaning of the main verb, directing participants' attention to the semantic relationship between the verb-particle construction. The mixed instruction group received the same semantic instruction but supplemented with basic image schemas of the four particles. These two groups received the semantic instruction for 5 minutes and spent the remaining 5 minutes on independent review. Like Yasuda (2010), this study did not include a pretest, but the outcome measure consisted of exposed and unexposed items (32 items per type, adding up to 64 test items) in a fill-in-the-blank format<sup>1)</sup>. Results showed no difference among the three groups regarding the exposed items. With the unexposed items, however, the participants who received the semantic analysis and those who received the semantic analysis with image schemas performed better than those in the translation group. As no difference was found between the two outperforming groups, the inclusion of image schemas does not seem to have contributed to learning gain in this study. There is presumably room for improvement in terms of how to present and explain image schemas in instruction, and it is also necessary to investigate its potential impact on long-term retention.

Nakagawa (2018) devised an inductive learning pedagogy for phrasal verbs using a jigsaw method (i.e., a cooperative learning strategy that asks groups of students to specialise in different aspects of a topic and share what they learn with other students). This method attempted to lead learners to notice by themselves that peripheral meanings of a word are derived from its central meaning through conceptual metaphors and to form the image schema of a word by themselves eventually. He employed a pre-immediate-delayed post design on 10 phrasal verbs with a particle “up”, comparing treatment with comparison groups consisting of 56 high school students collectively. The comparison group was given a list of phrasal verbs that appeared in the pretest of fill-in-the-blank sentence completion, where participants were asked to choose a verb out of 10 choices which matches the Japanese translation of the sentence. They looked up the phrasal verbs in a dictionary and wrote down the sentences with Japanese translations, followed by a read-aloud exercise with flashcards. On the other hand, the treatment group was given jigsaw activities comprising several steps (i.e., an individual activity, two expert group activities, a jigsaw group activity, and a teacher-directed wrap-up session). The participants in the treatment group were mainly asked to work out the peripheral meanings of the particle by themselves, individually and collaboratively, and they were only taught the central meaning in the last wrap-up session.

Both groups were instructed for 25 minutes. An immediate posttest took place on the same day, and a delayed posttest one week later. As a result, both groups improved after the instruction, showing a significant learning gain in the immediate test; however, only the treatment group continued to improve further in the delayed posttest. The findings of this study make an important call for examining the effects of the CL approach in the long term.

Lastly, teaching the same property, phrasal verbs, through conceptual metaphors and images, Hotei (2022) examined learners with low English proficiency. His participants ( $N = 69$ ) were assessed as Pre-A1 on CEFR-J and comparatively lower than the participants in Yasuda (2010) and Strong (2013), who were at low-intermediate levels probably equivalent to B1 on CEFR. The study compared three groups in a pre-immediate-delayed post design: a CL treatment group, a (traditional) memorisation group, and a mixed instruction group receiving both CL and memorisation methods<sup>2)</sup>. It also included exposed and unexposed items in the fill-in-the-blank sentence completion outcome measure. Although four particles (up, down, off, on) were taught, the results were only reported on the phrasal verbs with “up”. They revealed that learners at low proficiency levels benefited from any instruction to some extent; however, they all had difficulty inferring the meanings of unexposed phrasal verbs from the learned knowledge (i.e., CL explanation of particle “up” and/or memorisation of its dictionary definitions). Hotei’s study, together with Yasuda (2010) and Strong (2013), suggests that the learner’s proficiency level may be associated with the effectiveness of the CL approach in that the magnitude of the learning effect may vary depending on the learner’s English level.

## 2.3 Research Questions

Common beliefs so-called *cognitive instruction belief* and *cognitive superiority belief* (Wirag et al., 2022) exist among CL advocates, such that CL-based teaching models are typically assumed to bring about the desired L2 learning outcomes and outperform traditional methods, especially based on structuralist or generative language theories. As shown in the previous section reviewing only part of the research with CL-based methods on phrasal verbs, there are variations in their methodology, such as target learners, research design, and, more importantly, what kind of and how much CL-informed instruction is given to learners in what way, presumably resulting in different outcomes. Therefore, it is crucial to test such beliefs through scrutiny with empirical evidence.

This paper aims to conduct a systematic review with a meta-analysis on the effectiveness of CL-based L2 instruction. In particular, the search of the literature is limited to empirical studies with JLEs in foreign language settings. The rationale behind restricting the target L2 learners to a group of speakers with a specific L1 background is CL principles of language acquisition and learning. CL emphasises the symbolic function of language that associates meaning with structure to construct actually occurring linguistic expressions; therefore, the

grammar of a language can be viewed as a structured array of symbolic units. CL also holds usage-based models, in that linguistic knowledge (i.e., symbolic units) is shaped by the patterns of actual language use that a speaker is exposed to (Langacker, 2000; Tomasello, 2003). This suggests that a task for L2 learners is to construct a specific array of symbolic units from their exposure to the linguistic conventions of the target language. In this respect, foreign language settings, compared to immersive settings, offer “uniformity of exposure to the target language” (Ionin & Montrul, 2023, p. 33). Moreover, L2 acquisition fundamentally differs from L1 acquisition in that learners, particularly adult ones, already have an established inventory of symbolic units in their L1, which competes with the target units in L2. Hence, L2 learning can be described as “a gradual process by which the target system gains more and more differentiation and autonomy from the native one” (Achard & Niemeier, 2004, p. 6). This differentiation and autonomy from the L1 are indeed influenced by the relative language distance between the L1 and L2. Consequently, different degrees of instruction effects may be experienced by speakers with different L1s even through the same instruction. With these theoretical assumptions considered, it is essential to specify the characteristics of the target learner group.

Usage-based models also assume a bottom-up process of language learning. For example, the core meaning (schema) of “on” can be constructed through the learner’s exposure to actual usages of the word in context (e.g., on the table, on the wall, on the ceiling)<sup>3)</sup>. This bottom-up process of extracting a meaning that all the occurring expressions have in common may be accelerated as the exposure accumulates in the learner’s interlanguage. CL-informed instruction, especially the one relying on core meanings and image schemas, might be seen as teaching “the goal” which in a natural learning setting can be obtained through an adequate amount of experience with the language. Therefore, CL instruction may be readily accepted by learners who have already reached a certain level of proficiency in L2, helping them to integrate accumulated (and perhaps fragmented) knowledge. On the other hand, learners at an initial learning stage may take the CL explanation as somewhat abstract and unclear to use because they have not yet encountered a sufficient number of usages that they can link with the given CL explanation. In other words, some immediate learning outcomes might be expected of proficient learners, whereas learners at basic levels may not enjoy an immediate effect but may benefit in the long run. To sum up, this study surveys the studies that empirically examined the effects of the CL approach on JLEs to address the following research questions:

- (1) Is the CL approach to teaching JLEs more effective than the traditional approach?
- (2) How long does the effect of CL instruction last?
- (3) What proficiency level of students will benefit from CL instruction?



### 3 Method

#### 3.1 Literature Search

The data for this study were collected first through an online search of the following databases: CiNii Research, J-stage, Education Resources Information Center (ERIC), and Linguistics and Language Behavior Abstracts (LLBA). The studies published between 2000 and 2022 were included. The year 2000 was set as the start because the field of applied cognitive linguistics had its disciplinary roots in the 1990s and many CL-inspired pedagogical studies started to increase around this period. The combinations of the following keywords were utilised for the search: *cognitive linguistics*, *cognitive grammar*, *English*, *learning*, *instruction*, *teaching*, *Japanese learners of English*, *prototype*, *core meaning*, *image schema*, and *metaphor*. The retrieved studies included journal articles, published conference papers, book chapters, and dissertations. In addition, the references of the retrieved studies were consulted.

#### 3.2 Criteria for Inclusion

The retrieved study reports were examined to determine whether they satisfied the following criteria for inclusion in the meta-analysis.

1. The study employed either an experimental or quasi-experimental design, comparing treatment and comparison groups in a pre-post design. It was included when the study without a pretest assured the equal quality of the participants in both groups by alternative measures.
2. The study gave the treatment group the intervention that utilised explanations and descriptions based on CL (e.g., conceptual metaphor, image schema, prototype, cognitive grammar), while the comparison group was taught the same linguistic property with a conventional method based on Japanese translation, dictionary entries, and/or formal usage. When the study included more than one treatment group which received CL intervention against one comparison group, only one treatment group was chosen with the consideration of which method could be more commonly utilised<sup>4)</sup>. In addition, the study was not included when it compared different means and learning styles of CL instruction without a comparison group with conventional methods.
3. The study targeted Japanese learners of English in foreign language settings and provided the participants' details (e.g., proficiency levels, institutional status).
4. The study examined a statistically valid sample size for both treatment and comparison groups, namely at least five or more participants in a group. It also provided the



necessary information for the meta-analysis (i.e., sample sizes, means, and standard deviations). In particular, the study presenting mean difference scores rather than raw scores of each test was included only when it showed each group's mean difference scores between the pretest and posttest. A study reporting mean difference scores between treatment and comparison groups in a posttest was not included.

5. The study focused on specific L2 features (e.g., prepositions, modal verbs, polysemy).
6. The study was written in either English or Japanese.

If an experimental study was published in several publications, only one report was selected for the statistical meta-analysis. Furthermore, when a single publication reported the results of multiple experiments investigating different linguistic features and/or learner groups, each experiment was treated as a separate study. As a result, 40 studies reported in 35 publications involving 3,179 learners were included in the analysis.

### 3.3 Coding Procedures

Coding criteria were set for four categories of characteristics related to publication, learners, research design, and statistical information, as shown in Table 1. First, publication and learner characteristics were coded. As for institutional status, technical colleges are equivalent to high schools and universities, usually offering five-year programmes after junior high school. Therefore, grades 1–3 were coded as high school and grades 4–5 as university. Regarding learner proficiency, four categories of proficiency assessment classification were adopted, following the definitions by Thomas (2006). Standardised tests include widely acknowledged English proficiency tests (e.g., TOEIC, TOEFL, GTEC). In-house assessments are locally developed instruments, such as programme placement tests. Institutional status is defined by learners' membership in an academic institution and used as a proxy for achieved proficiency. Impressionistic judgment is a spontaneous and unsupported characterisation of learners' competence, seen in statements like "The participants in this study were at the lower-intermediate level". The proficiency levels reported in each study were converted to CEFR, using Table 2. The conversion table was created based on the conversion rates officially provided by the organisation of each test<sup>5)</sup>. The proficiency assessed by institutional status or impressionistic judgment is distributed by its description accordingly.

Next, research design details were coded, such as target linguistic features and intervention time. Intervention effects were measured by various tasks (e.g., sentence completion, acceptability judgment, rating scale). Considering the purpose of this study to compare the effectiveness of two approaches, namely the CL approach and the conventional approach relying on Japanese translation, the involvement of Japanese translation was coded explicitly with the type of outcome measures. Then, the timing of posttests was coded

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**Table 1** *Coding*

Publication characteristics	Author	
	Year	
	Publication language	English, Japanese
	Publication type	articles (including published conference papers), book chapter, doctoral dissertation, etc.
Learner characteristics	Institutional status	high school, university, etc.
	Proficiency level (CEFR)	Pre-A1, A1, A2, B1, B2, C1, C2
	Proficiency assessment measures	standardised test, in-house assessment, institutional status, impressionistic judgment
Research design	Target feature	prepositions, countability, phrasal verbs, etc.
	Time per session	length of one intervention session in minute
	Session frequency	number of intervention sessions
	Total intervention duration	total duration of intervention in minute
	Outcome measures	fill-in-the-blank sentence completion, Japanese translation, acceptability judgment, etc.
	Timing of posttests	immediate, delayed
Statistical information	Sample size	number of participants
	Mean	
	Standard deviation	

**Table 2** *Proficiency Conversion Table*

CEFR	Eiken	GTEC for Students <sup>a</sup>	GTEC Basic	TOEIC L&R <sup>b</sup>	TOEFL ITP/PBT	Institutional status/ Impressionistic judgment
C2						upper-advanced
C1	Grade 1		1350 ~	945 (455) ~	620 ~	lower-advanced
B2	Grade Pre-1	980 (810) ~	1180 ~	785 (385) ~	543 ~	upper-intermediate
B1	Grade 2	815 ~ 979 (675 ~ 809)	930 ~	550 (275) ~	433 ~	lower-intermediate
A2	Grade Pre-2	565 ~ 814 (485 ~ 674)	680 ~	225(115) ~	343 ~	upper-basic
A1	Grade 3–5	~ 564 (484)	260 ~	120 (60) ~		lower-basic
Pre-A1 <sup>c</sup>			~ 259	~ 119 (59)		novice

<sup>a</sup> scores from four skills (scores from three skills of Listening, Reading, Writing)

<sup>b</sup> scores from Listening & Reading (scores from Reading)

<sup>c</sup> based on CEFR-J (<http://www.cefr-j.org>)

according to the interval between intervention and the test. When a test was conducted right after the intervention on the same day, it was coded as immediate. A test conducted on a different day was categorised as delayed and coded with how much time it took after a test took place. This distinction aimed to assess the learnability and sustainability of CL-based instruction separately<sup>6)</sup>.

Finally, statistical values necessary to calculate effect sizes were retrieved (i.e., sample size, mean, standard deviation). Effect sizes were computed for each outcome measure and posttest. For example, when a study used two outcome measures (e.g., sentence completion, picture description) in two posttests (e.g., an immediate posttest, a delayed posttest), four data sources were extracted from the study. In total, 98 data sources were submitted to the statistical meta-analysis<sup>7)</sup>. The categories in learner characteristics and research design were used for subsequent moderator analyses.

### 3.4 Data Analysis

The statistical software *SPSS* was used for data analyses. Effect sizes were calculated by comparing the treatment group with the comparison group according to Hedges's *g*, an index of standardised mean differences. Hedges's *g* provides more conservative calculations than Cohen's *d*, which tends to overestimate the absolute value of the effect size parameter in small samples (Cooper et al., 2009)<sup>8)</sup>. Since Hedges's *g* is a variation of Cohen's *d* that corrects for bias in small sample sizes, the interpretation is similar to Cohen's *d*. This study follows Plonsky and Oswald's (2014) suggestion to adopt the L2 field-specific benchmarks of small ( $d = .40$ ), medium ( $d = .70$ ), and large ( $d = 1.00$ ), in order to interpret the practical significance of intervention effects more precisely. The present meta-analysis employed the random-effect model to address the diverse research designs and learner characteristics of the included sample studies. The random-effect model posits that the variation between studies consists of factors shared within the studies and other factors that these shared factors cannot explain (Takeuchi & Mizumoto, 2023). Subsequent moderator analyses examined the heterogeneity found in the observed effects. For a moderator variable with three or more levels, a statistically significant *Q* statistic was followed by post hoc comparisons based on confidence intervals (CIs). In addition, research papers reporting non-significant results are, in general, unlikely to be published, and the inclusion of only published studies may overestimate the true effect of intervention. Such a phenomenon as publication bias was checked with a funnel plot and tested with the trill-and-fill methods (Duval & Tweedie, 2000).

## 4 Results and Discussion

A list of the sample studies is shown with coding in Appendix A. The characteristics of 40 sample studies reported in 35 publications are summarised in the following sections.

#### 4.1 Publication Characteristics

Table 3 shows that most of the publications were journal articles, divided into English ( $n = 17$ ) and Japanese ( $n = 13$ ). Although English is generally a more conventional language among academics, the frequent use of Japanese seems related to the potential readership of the articles, which presumably is a group of language instructors whose native language is Japanese rather than researchers.

**Table 3** *Results of Publication Characteristics*

Publication language	Publication type
English (20)	articles (30)
Japanese (15)	doctoral dissertation (4)
	book chapter (1)

*Note.* The number of publications is presented in parentheses.

#### 4.2 Learner Characteristics

As shown in Table 4, valid empirical studies were conducted on two types of populations: 28 studies on university students (70%) and 12 on high school students (30%). Some studies targeted elementary school (Kishimoto, 2015) and junior high school students (Kishimoto, 2007, 2014); however, they did not report necessary data for statistical meta-analyses and were not included in the current study.

**Table 4** *Results of Learner Characteristics*

Institutional status	Proficiency level (CEFR)	Proficiency assessment measures
university (28)	B1 (9)	standardised tests (20)
high school (12)	A2 (13)	institutional status (2)
	A1 (1)	impressionistic judgment (2)
	Pre-A1 (1)	unknown (16)
	unknown (16)	

*Note.* The number of studies is presented in parentheses.

Next, half of the 40 sample studies reported scores of standardised tests for learner proficiency assessment, followed by two studies relying on institutional status and two on impressionistic judgment, all of which helped to assign their participants to comparable CEFR levels. However, quite a few studies of 16 did not provide any proficiency assessment measures or proficiency levels, only reporting the learners' institutional status (nine studies with university, seven with high school). As a result, there were nine studies with B1 learners and 13 with A2, which comprised about half of the entire studies. While there was one study each targeting A1 and Pre-A1, no studies examined learners with upper proficiency

such as B2, C1, and C2. It was not surprising because the sample studies were typically conducted in intact classes at high schools and universities, where a majority of students are assumed to be at A-levels or even lower (Negishi et al., 2013). According to Negishi et al. (2013), less than 20% of JLEs are at B-levels, and proficient learners at C-levels are almost nil even after 10 years of English education, indicating the difficulty finding proficient participants who are practically accessible.

### 4.3 Research Design

Table 5 details the research design and shows a range of linguistic features addressed in the sample studies.

**Table 5** *Results of Research Design Characteristics*

Target feature	Time per session	Session frequency	Total intervention duration
prepositions (11)	5–10 (9)	1 (28)	5–10 (6)
phrasal verbs (7)	15–20 (6)	2 (3)	20–30 (7)
verbs (7)	25–30 (5)	3 (3)	40–60 (6)
modal verbs (3)	40–45 (4)	4 (2)	70–90 (9)
degree of certainty (3)	60–70 (3)	6 (3)	100–120 (3)
countability (2)	90 (5)	10 (1)	180–240 (2)
politeness (2)	120 (1)		unknown (7)
polysemy (2)	unknown (7)		
idioms (2)			
subjunctive (1)	Mean: 38.4 SD: 31.9 Range: 5–120	Mean: 2 SD: 2.0 Range: 1–10	Mean: 62.5 SD: 52.0 Range: 5–240
Outcome measures		Timing of posttests	
fill-in-the-blank sentence completion (24)		immediate only (13)	
fill-in-the-blank sentence completion with Japanese translation (8)		immediate and delayed (9)	
rating scale (9)		delayed only (16)	
Japanese translation (4)		unknown (2)	
writing (4)			
acceptability judgment (2)			
picture description (2)			
picture drawing (1)			
meta-explanation of sentence (1)			
multiple choice (details unknown) (1)			
unknown (1)			

*Note.* The number of studies is presented in parentheses.

The most frequent features were prepositions and phrasal verbs, and they shared similar approaches utilising core meanings and image schemas of prepositions (or particles in

phrasal verbs) in instruction. However, the actual items taught in the studies differed among them. For example, three prepositions (in, on, at) were commonly taught in eight of 11 studies on prepositions (Akamatsu, 2010b; Cho, 2010; Cho & Kawase, 2012; Mitsugi, 2013; Mitsugi, 2017; Mitsugi & Nagashima, 2015; Nakagawa, 2019; Yasuhara, 2011), whereas only one item “over” was taught in Takahashi and Kaneko (2011) and eight items (above, across, along, below, in, into, on, over) in two studies in Sato (2020). Looking at what was tested in outcome measures, furthermore, some studies examined one type of meaning (e.g., temporal use), while some covered a wider range of uses (e.g., special, temporal, metaphorical uses). These differences could influence the resulting effect of the instruction. Similarly, seven studies which focused on verb-related properties were categorised as verbs altogether. However, they varied in the features they addressed: verb telicity (Sato, 2010), verbs with gerund or to-infinitive (Fujii, 2009), causative verbs (Fujiwara et al., 2016; Mueller & Tsushima, 2019), and perceptual verbs (Sato, 2014, 2015). There were a few valid studies for features like countability, politeness, and subjunctive mood. Polysemy was a difficult category to define in terms of target feature because a preposition can, for example, be considered polysemous, having the core meaning with several peripheral ones. Therefore, when a study was set to address polysemy, then it was categorised as such: Morimoto and Loewen (2007) investigated the polysemy of the verb “break” and the preposition “over”.

Instruction time varied greatly among the studies. The mean instruction time per session was 38.4 minutes, but it ranged from 5 minutes to 2 hours. Most of the studies gave one session of instruction and evaluated its effectiveness. The total intervention duration was 62.5 minutes on average, and again, the range was quite diverse, from 5 minutes to 4 hours. This result suggests that instruction time should be considered an important variable in the analysis of instructional effectiveness.

Some studies employed multiple outcome measures, all of which were separately coded in this study. A fill-in-the-blank sentence completion, with or without Japanese translation provided, was used by many of the studies, presumably due to its high applicability to various linguistic structures. Some studies adopted highly productive measures, such as picture description and writing in English, whereas some used comprehension measures like rating scale, Japanese translation, acceptability judgment, picture drawing, and meta-explanation of English sentence. The current study did not distinguish the outcomes based on production and comprehension; however, it is interesting to examine in the future whether or not the CL approach leads to different outcomes on productive and receptive skills.

Finally, the timing of posttests is a crucial variable in the assessment of instruction. An immediate posttest allows evaluation of the learnability of instruction, while delayed posttests can measure the sustainability of the instruction. Of the 40 sample studies, 13 studies only conducted an immediate posttest, and nine studies conducted both an immediate and one delayed posttest (ranging from 1 to 6 weeks); therefore, 22 studies contributed to the evalua-

tion of the immediate effect of instruction. Sixteen studies only employed delayed posttests (ranging from 1–2 days to 4 months): once by seven studies, twice by five studies, and three times by four studies. A total of 25 studies contributed to the assessment of the durational effect of the instruction. Two studies did not report the timing of posttests.

## 4.4 Meta-Analysis

### 4.4.1 Overall, Immediate, and Delayed Effects of Instruction

Treatments with CL-based instruction, including all posttests, have resulted in positive effects over traditional methods, showing a medium effect size ( $g = 0.719$ )<sup>9)</sup>. No publication bias was confirmed with a funnel plot and a trim-and-fill analysis. Because this analysis included all the data sources from different criteria, such as target feature, the timing of posttests, and proficiency level, the effect varied considerably from one source to another, as expected ( $Q(97) = 626.40$ ,  $p < .001$ ,  $I^2 = 88.1$ ). Therefore, moderator analyses were conducted.

Table 6 Mean Effect Sizes by the Timing of Posttests

Timing of posttests	<i>n</i>	<i>k</i>	<i>g</i>	<i>SE</i>	<i>p</i>	95% CI	
						lower	upper
Overall	40	98	0.719	0.0789	<.001	0.565	0.873
Immediate	22	28	0.503	0.0990	<.001	0.309	0.697
Short-term							
1–2 days	2	5	0.335	0.2468	.174	–0.148	0.819
1 week	11	18	0.781	0.2201	<.001	0.350	1.213
2 weeks	8	11	0.278	0.1222	.023	0.038	0.517
3 weeks	2	2	–0.060	0.2442	.807	–0.538	0.419
4 weeks	3	5	0.287	0.1564	.066	–0.019	0.594
5 weeks	2	3	2.433	0.6027	<.001	1.252	3.614
6 weeks	5	12	0.819	0.1231	<.001	0.577	1.060
8 weeks	1	1	0.699	0.2351	.003	0.238	1.160
9 weeks	2	3	2.026	0.5786	<.001	0.893	3.160
4 months	2	6	1.733	0.2807	<.001	1.183	2.283
unknown	2	4	0.625	0.2557	.014	0.124	1.127

*n* = total number of studies

*k* = total number of data sources

*g* = Hedges's measure of effect size

*SE* = standard error

CI = confidence interval

First, Table 6 shows the effect sizes by the timing of posttests. Differences among the different timings were significant ( $Q_{between}(11) = 55.379$ ,  $p < .001$ ). The immediate effect of CL instruction was marginally more significant than that of traditional methods ( $g = 0.503$ : small effect size). A close examination of the sample studies revealed that they varied in tar-



get features (i.e., prepositions, idioms, verbs, phrasal verbs, modal verbs, subjunctive, and countability), suggesting that this immediate effect can be expected with a range of linguistic structures. Similarly, the studies which conducted a delayed posttest 1 day to 2 weeks after the intervention included several different linguistic properties (i.e., phrasal verbs, verbs, polysemy, modal verbs, degree of certainty, politeness, and prepositions). The aggregated effect sizes from the short-term delayed posttests up to 2 weeks after the intervention produced a small effect size altogether ( $g = 0.543$ ,  $SE = 0.1308$ ,  $CI[0.286, 0.799]$ )<sup>10)</sup>. This indicates that the slight superiority of the CL approach over the traditional one lasted about 2 weeks after instruction. However, the studies with delayed posttests after 3 weeks or over focused on different linguistic features respectively, which made the generalisation of the long-term effects inconclusive. For example, 3-week delayed posttests were given on verbs<sup>11)</sup>, 4-week on idioms and phrasal verbs, 5-week on politeness, 6-week on the degree of certainty and prepositions, 8-week on countability, 9-week on politeness, and 4-month on the degree of certainty. Although the results seem to show long-term effects in favour of CL intervention overall, the general long-term effectiveness of the CL approach over traditional methods cannot be concluded from this data<sup>12)</sup>.

In addition, the most frequent outcome measures, fill-in-the-blank sentence completion tasks, were examined based on whether the target sentences were presented with Japanese translation or not. Since the current study focuses on comparing the CL approach and the conventional methods that rely on Japanese translation and dictionary entries, any information given in Japanese in outcome measures could potentially affect and inadvertently distort the effect of instruction. There were 17 data sources without Japanese and six with Japanese in the immediate posttests, and five without Japanese and seven with Japanese in the short-term delayed posttests. The comparisons of their effect sizes showed no difference between the two types of tasks in the immediate ( $Q_{between}(1) = 1.192$ ,  $p = .275$ ) and short-term delayed posttests ( $Q_{between}(1) = .415$ ,  $p = .519$ ). Therefore, supplying English sentence completion tasks with Japanese translation does not seem to have affected the participants' outcomes.

#### 4.4.2 Proficiency Level

The results by the proficiency level are shown in Table 7. The 16 studies with no reported proficiency assessment measures were labelled by the learners' institutional status and entered the analysis. Differences among the effect sizes by different proficiency levels were significant ( $Q_{between}(5) = 19.716$ ,  $p = .001$ ). This was due to the data of Pre-A1 learners, which resulted in no difference between the CL and traditional approaches. In contrast, the CL approach seemed to have a slightly better learning effect than the traditional approach on the learners at the B1 level ( $g = 0.519$ ), a larger effect on those at A2 ( $g = 1.025$ ), and a small effect on those at A1 ( $g = 0.537$ ), but there was no statistical difference among the three groups of learners. Comparing high school and university students in the unknown profi-

ciency group, CL-based instruction was likely to have worked better than traditional instruction with both types of students but had a medium-sized effect on university students ( $g = 0.635$ ) and a minimal effect on high school students ( $g = 0.324$ ).

**Table 7** *Mean Effect Sizes by Proficiency Level*

Proficiency level	<i>n</i>	<i>k</i>	<i>g</i>	<i>SE</i>	<i>p</i>	95% CI	
						lower	upper
B1	9	21	0.519	0.1270	<.001	0.270	0.768
A2	13	46	1.025	0.1358	<.001	0.759	1.291
A1	1	2	0.537	0.1735	.002	0.197	0.877
Pre-A1	1	2	0.104	0.2052	.612	-0.298	0.506
unknown							
high school	7	17	0.324	0.1474	.028	0.035	0.613
university	9	10	0.635	0.0993	<.001	0.440	0.830

For a more conservative examination of the effect sizes, another analysis was conducted by including only one outcome measure (i.e., productive measures, unexposed items) from the studies which used multiple outcome measures with the same participants. Notably, there were 15 data sources with B1 learners and 27 with A2 learners which entered the analysis, resulting in effect sizes slightly bigger with B1 ( $g = 0.634$ , CI[0.333, 0.935]) and smaller with A2 learners ( $g = 0.752$ , CI[0.443, 1.061]) than the ones calculated from all the data sources. By excluding such studies that may have multiplied impacts caused by several outcome measures, it was also suggestive that there were no differences in effect sizes among the different proficiency levels ( $Q_{\text{between}}(5) = 9.200$ ,  $p = .101$ ). The CL approach was equally more effective than the traditional approach among the learners at any of the proficiency levels reported.

Considering the previous results showing the immediate and short-term delayed effects of intervention, the effects of proficiency level on the immediate and short-term delayed posttests were separately examined. As a result, the differences among the proficiency levels were not significant in the immediate ( $Q_{\text{between}}(3) = 1.024$ ,  $p = .795$ ) and short-term delay posttests ( $Q_{\text{between}}(3) = 3.399$ ,  $p = .334$ )<sup>13)</sup>. This indicates that the immediate and short-term delayed learning gains were not substantially different among the learners at the different proficiency levels.

#### 4.4.3 Instruction Time

Lastly, the effect sizes associated with total intervention duration were summarised in Table 8. The different lengths of intervention resulted in different effect sizes ( $Q_{\text{between}}(6) = 31.783$ ,  $p < .001$ ). Overall, the CL-based instruction of up to 2 hours was more effective than the traditional methods of the same length; however, the effect sizes differed by the relative

amount of time. For instance, instruction of 5–30 minutes had small effects, 40–90 minutes medium effects, and 100–120 minutes a large effect. Although the results of instruction time longer than 3 hours showed no surplus effect of CL instruction, it was rather speculative as the data was only from two studies: Nagai (2001) on subjunctive and Spring (2018) on phrasal verbs<sup>14</sup>. With the confidence intervals not overlapping, a clear difference was found between 20–30 minutes (i.e., small effect size) and 40–60 minutes (i.e., medium effect size). Although this analysis did not consider the differences between immediate, short-term, and long-term effects, it is suggested that intervention of up to 30 minutes would bring a small effect and intervention of over 40 minutes a medium-sized effect of the CL over the traditional approach.

**Table 8** *Mean Effect Sizes by Total Instruction Time*

Instruction time	<i>n</i>	<i>k</i>	<i>g</i>	<i>SE</i>	<i>p</i>	95% CI	
						lower	upper
5–10 minutes	6	10	0.502	0.1430	<.001	0.221	0.782
20–30 minutes	7	22	0.365	0.0943	<.001	0.180	0.550
40–60 minutes	6	8	0.818	0.0798	.000	0.661	0.974
70–90 minutes	9	25	0.890	0.2152	<.001	0.468	1.312
100–120 minutes	3	20	1.226	0.1614	<.001	0.910	1.543
180–240 minutes	2	3	0.380	0.2951	.197	–0.198	0.959
unknown	7	10	0.285	0.2356	.226	–0.176	0.747

## 5 General Discussion

Based on 40 empirical studies and 98 effect sizes, the present study addressed the following research questions:

- (1) Is the CL approach to teaching JLEs more effective than the traditional approach?
- (2) How long does the effect of CL instruction last?
- (3) What proficiency level of students will benefit from CL instruction?

Overall, the findings of this study suggest that the CL approach generally results in more learning gains than the traditional approach with a medium effect size ( $g = .719$ ). The immediate learning advantage was small ( $g = .503$ ), and the effect of a similar size ( $g = .543$ ) was confirmed to continue up to 2 weeks after the instruction. The immediate learning effect on a range of linguistic features confirms the learnability of CL-based instruction. The present study did not conclude definitively on the long-term benefit of CL instruction due to the data sources available for limited areas of target linguistic features. However, speculated from the effect sizes of delayed posttests after 5 weeks or longer, learning gains may become more extensive as time goes by. For instance, a medium-sized learning advantage ( $g = .819$ ) was

observed 6 weeks after the intervention on the degree of certainty and prepositions, and the effect, although being confirmed only with the degree of certainty, was found to be even bigger after 4 months ( $g = 1.733$ ). This long-term learning gain is theoretically predicted by usage-based models of language learning. Learners who are given CL-based explanations of some linguistic expressions encounter and increase their exposure to such expressions in their experience with the target language, which can potentially facilitate the consolidation of the linguistic feature in the learner's interlanguage. Further studies are necessary to corroborate the general long-term advantage of the CL approach.

Regarding the proficiency level, the current study has found that the CL and traditional methods did not differ in learning gains of novice learners (those lower than A1 on CEFR), while learners at A1, A2, and B1 experienced learning advantages of the CL approach to some extent. First, Pre-A1 learners appear to have not experienced a better effect of the CL approach over the traditional one. However, this result was only supported by one study on phrasal verbs (Hotei, 2022), and it needs to be interpreted carefully by excluding the possibility that the linguistic feature itself was challenging to learn. Taking the other six studies focusing on phrasal verbs into consideration, the effect sizes of these studies were examined additionally. There were three studies with high school students (Nakagawa, 2013, 2018; Nakagawa & Tsuchiya, 2013) and three with B1 learners (Spring, 2018; Strong, 2013; Yasuda, 2010). The data from high school students showed no immediate but short-term delayed effects<sup>15)</sup>. The studies with B1 learners differed in research design, but there was a tendency for them to enjoy some immediate as well as short-term delayed effects<sup>16)</sup>. On the other hand, Hotei (2022) tested the Pre-A1 learners 1 week and 4 weeks after the intervention and found no learning superiority of the CL approach. Although the proficiency levels of the high school students in the reported studies above were unknown, the assumption that they were at A-levels, which 46% of high school students in Japan fall into (Negishi et al., 2013), will probably lead to a better interpretation of the results here: no learning advantage of CL instruction with Pre-A1, no immediate but short-term delayed learning advantage with A-levels, and immediate as well as short-term surplus effects of CL instruction over traditional methods with B1 learners. Therefore, the reason for no surplus effect found with Pre-A1 learners seems unrelated to the difficulty of the linguistic feature per se but rather relevant to the learners' proficiency level, which presumably suggests that novice learners benefit from any instruction to some degree.

Secondly, unlike the prediction that some immediate effects are more likely seen with learners with higher proficiency, the present meta-analysis did not confirm different degrees of instructional effects among learners at three proficiency levels of A1, A2, and B1. Therefore, this study highlights that the CL approach can generally bring about slightly better learning gains than conventional methods for learners at A1, A2, and B1<sup>17)</sup>. However, the studies on phrasal verbs reviewed above indicated that B1 learners experienced some imme-

mediate learning gain, while no such effect was found with high school students, who were supposedly at A-levels. To validate this tendency, future research should examine learners at different proficiency levels, including B2 or above, on a variety of linguistic properties.

Next, the amount of instruction time and the degree of effectiveness achieved by the CL approach will be discussed further. The current findings have revealed that a 20–30 minute instruction yields a marginally better learning effect, while a 40–60 minute instruction leads to a moderate superiority of CL instruction. In an attempt to seek practical advice on how CL-based instruction can be incorporated into ordinary language classroom teaching, where one lesson is in general limited to 50 minutes for high schools and 90 minutes for universities, the current paper also examined the sample studies with 5–10 minutes of instruction in details (Fujii, 2009; Nakagawa, 2013, 2019; Nakagawa & Tsuchiya, 2013; Yasuda, 2010). The result showed that although no immediate advantage was probably expected, CL-informed methods of such a brief time were found to bring better learning gains on some linguistic features in a couple of weeks after teaching<sup>18)</sup>. Acknowledging that all teachers desire a teaching method that elicits the maximum effect in a short amount of time, the present article modestly adds that CL-based explanations of the target language may be worth teaching even in a small amount of time. They may be more effective than conventional instruction in a way that helps raise learners' awareness of the language, which can consequently lead to some learning gains.

Finally, the current search of the literature on CL instruction in teaching JLEs found a relatively large number of studies which were not qualified for the meta-analysis of the present study. They all employed some insights from CL but were not included for the following reasons:

- (a) they proposed some CL-informed teaching methods but did not empirically test their effectiveness (Hanazaki, 2012; Imai, 2013; Ishii, 2019; Kodama, 2012; Miyoshi, 2021; Nagatomo, 2014; Nakano, 2021; Nishihara & Nishihara, 2007; Taniguchi, K., 2011, 2012; Taniguchi, S., 2009, 2011a),
- (b) they investigated an experimental group which received CL instruction without a comparison group (Kameyama, 2001; Kashiwagi, 2010; Ochi, 2017; Oka, 2014; Shintani, 2018; Yamagata & Yoshida, 2015) or with a control group receiving no instruction (Akamatsu, 2010a),
- (c) they employed a pre-post design with experimental and comparison groups but did not provide sufficient data for the current meta-analysis (Akamatsu, 2018; Azuma & Littlemore, 2010; Birdsell, 2021; Fujimori & Yoshimura, 2013; Furusho, 2021; Goto, 2007; Imai, 2016; Kawaryu, 2011; Kishimoto, 2007, 2014, 2015; Kojima, Takehana, et al., 2007; Kojima, Komeda, et al., 2007; Kokubu, 2011; Kumada, 2015; Shintani et al., 2016; Taniguchi, 2007, 2008a, 2008b, 2011b),
- (d) they empirically tested the CL approach, but the outcomes were mainly analysed

qualitatively (Fukada, 2012; Mitsugi, 2018; Tahara, 2015),

- (e) they compared different materials (e.g., animated or static images) and learning/teaching styles (e.g., individual or collaborative, top-down or bottom-up) within the CL approach (Fujii, 2013, 2016b, 2016c; Kojima, 2007; Nakagawa & Kondo, 2022; Sato, 2016; Sato et al., 2022; Shintani, 2020; Tsuzuku, 2021a, 2021b).

In particular, those in (b) and (c) were excluded from the current analysis due to the author's lack of knowledge and techniques in adequate statistical procedures. Some of their effect sizes could have been calculated from the values of inferential statistics or by utilising mean differences of pre-post scores, which would add another body of effect sizes as empirical evidence. This is one of the limitations of the current study and should be addressed in future research. Moreover, a future direction of the CL approach is to develop its instructional applications within the disciplinary field of language teaching. As shown in (e), an increasing number of studies try to improve CL-based language teaching in various ways. Yet, a majority of the proposed teaching applications select the familiar Present-Practice-Produce (PPP) sequence of instruction, and Communicative Language Teaching (CLT) methods are rarely combined with CL instruction. As the CL approach becomes more established, it should also be embedded into the CLT frameworks, including task-based and content-based language teaching.

## 6 Conclusion

This study surveyed intervention research involving Japanese learners of English instructed through the CL approach and investigated its educational effectiveness. The results showed that it yielded moderately superior effects compared to traditional methods relying on translation and dictionary descriptions. The immediate and short-term delayed effects were marginally greater than those of traditional methods overall. The long-term advantage of CL instruction could not be concluded in this study; however, its potential was implied by some studies on limited areas of linguistic properties, which observed substantial learning effects even five weeks after instruction. The present article did not confirm differences in instructional effects based on proficiency levels, and it suggests the need for further investigation targeting proficient learners, such as those at the B2 level or above. Regarding instructional time, it was found that sessions of 40 minutes or longer resulted in superior effects to a certain extent compared to traditional methods. However, there was an implication that even with 5–10 minutes of instruction, CL-informed methods may lead to higher effectiveness than traditional methods in the long term. As the field of instructed SLA expands, it becomes more crucial to synthesise research studies to evaluate the effectiveness of different teaching interventions and grasp the roles of instruction in L2 development as a whole.

## Acknowledgements

This work was supported by a Joint Research Grant from Nihon University College of Commerce and JSPS KAKENHI Grant Number JP22K13167.

## Notes

- 1) The task was given after the intervention, but the timing (i.e., immediate or delayed) was not reported.
- 2) An instruction session took about 15 minutes and was repeated twice a week over three weeks, resulting in 90 minutes of instruction in total. See Hotei (2022) for details of each treatment.
- 3) See Bybee (1985, 1995) for type frequency and token frequency.
- 4) For instance, some recent studies compared two types of materials (i.e., 2D/static or 3D/animated images) in teaching prepositions (Sato, 2020), present perfect tense (Nakagawa & Kondo, 2022), and politeness represented by request forms (Takimoto, 2021). They reported no significant difference between the two modes of materials. In this case, the group with static images was included in the study because of their higher applicability in actual educational settings than animated materials requiring specific equipment like monitors.
- 5) Eiken (<https://www.eiken.or.jp/eiken/en/grades/>)  
GTEC ([https://www.benesse.co.jp/gtec/fs/cuet/news/pdf/gtec20220823\\_01.pdf](https://www.benesse.co.jp/gtec/fs/cuet/news/pdf/gtec20220823_01.pdf))  
TOEIC ([https://www.iibc-global.org/toEIC/official\\_data/toEIC\\_cefr.html](https://www.iibc-global.org/toEIC/official_data/toEIC_cefr.html))  
TOEFL (<https://www.toefl-ibt.jp/toefl-ibt/testtaker/about.html>)
- 6) Keck et al. (2006) suggested two time points for the timing of posttests, based on the sustainability of the effects of task-based instruction (immediate: 0–7 days, short-term delayed: 8–29 days, and long-term delayed 30 days or later). They acknowledged that only six study effect sizes contributed to the observed long-term effects and that more studies with long-term delayed posttests needed to be evaluated. Similarly to their research, the current paper intends to show an indicator for the sustainability of CL intervention.
- 7) The current paper acknowledges that when multiple tests from the same participants in a study are included in a meta-analysis, the study's results can strongly influence the overall average effect size. However, it follows the suggestion by Norris and Ortega (2006) to “include all the effect sizes from each study, but avoid further inferential analyses of the accumulated effect sizes, focusing on cautious description rather than causal inference” (p. 30).
- 8) Hedges's  $g$  is a correction of  $d$  for the influence of sample size. Hedges's  $g$  is commonly used in inferential statistics, so some literature refers to Hedges's  $g$  as  $d$  (Watari et al., 2021).
- 9) Results of multiple outcome measures from the same participants were aggregated in this effect size ( $k = 98$ ). When only one outcome measure (i.e., productive measures, unexposed items) entered the analysis, in order to avoid a study from having a strong impact on the overall effect size, the effect size was  $g = 0.614$  ( $k = 66$ ).



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- 10) The effect size was calculated from 34 data sources in 18 published studies. Three studies conducted two posttests during this term: 2-day and 2-week delayed posttests by Morimoto and Loewen (2007), and 1-week and 2-week delayed posttests by Sato (2014, 2015).
- 11) The aggregated effect size of 3-week delayed posttests was  $-0.060$ , as shown in Table 6. This was due to the studies by Mueller and Tsushima (2019) on causative verbs, whose experiments failed to show a clear advantage of the CL over the traditional approach. Both approaches led to similar learning gains in their studies.
- 12) Quite large effect sizes were observed with delayed posttests after 5 weeks, 9 weeks, and 4 months. These effects were from some specific studies: Takimoto (2020b, 2021) on politeness represented in request forms, and Takimoto (2020a) on the degree of certainty. Takimoto (2022b, 2021) employed three delayed posttests (1 week, 5 weeks, and 9 weeks), using two outcome measures (2022b) and one (2021) respectively. Takimoto (2020a) also had three delayed posttests (1 week, 6 weeks, and 4 months), using three outcome measures. Despite the fact that they used multiple outcome measures on the same participants, re-analyses of their data with only one outcome measure (i.e., productive measure) also suggested large effect sizes. The interpretation of the data might be that CL-based explanations of politeness and the degree of certainty are, in particular, more effective than traditional methods in the long term.
- 13) The immediate posttests had four levels (B1, A2, high school, university), and the short-term delayed posttests also had four levels (B1, A2, Pre-A1, high school).
- 14) The exclusion of multiple outcome measures in a single study resulted in slightly changing the effect sizes of 100–120 minutes and 180–240 minutes. For instance, the effect size of 100–120 minute instruction changed from large ( $g = 1.226$ ) to medium ( $g = 0.884$ ,  $CI[0.572, 1.197]$ ) and that of 180–240 minutes from null to medium ( $g = 0.648$ ,  $p = .005$ ,  $CI[0.197, 1.099]$ ). Therefore, the data may be more conservatively interpreted as that instruction of 2 hours or longer would result in the superiority of CL to traditional instruction, probably with a medium effect size.
- 15) The immediate effect size was calculated from Nakagawa (2018):  $g = -0.35$ ,  $SE = 0.27$ ,  $p = .19$ ,  $CI[-0.87, 0.17]$ . The short-term delayed effect was aggregated from Nakagawa (2013, 2018) and Nakagawa and Tsuchiya (2013):  $g = 0.60$ ,  $SE = 0.09$ ,  $p < .001$ ,  $CI[0.42, 0.77]$ .
- 16) Yasuda (2010) showed an immediate learning gain with unexposed items ( $g = 0.68$ ,  $SE = 0.19$ ,  $p < .001$ ,  $CI[0.30, 1.05]$ ), and Spring (2018) showed a short-term delayed effect ( $g = 0.86$ ,  $SE = 0.24$ ,  $p < .001$ ,  $CI[0.39, 1.33]$ ). Although Strong (2013) did not specify the timing of posttests, he showed a learning advantage of CL instruction with unexposed items ( $g = 1.36$ ,  $SE = 0.30$ ,  $p < .001$ ,  $CI[0.77, 1.94]$ ).
- 17) Fujii (2016a) empirically explored the effects of proficiency level within the CL framework. Although his participants were all assumed to be at the A1 level, they were divided into upper and lower proficiency levels and given the same CL intervention based on image schemas of prepositions. As a result, the instruction worked more effectively for the upper-proficiency learners than the lower ones. The focus of his study was neither to compare CL with traditional methods nor to claim the superiority of CL over conventional methods. However, the implication is that even at the same CEFR level, learners'

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intake of the given knowledge was affected by their proficiency.

- 18) The studies only focused on prepositions, phrasal verbs, and verbs with gerund or to-infinitive. There was no difference between CL and traditional methods on the immediate posttests ( $g = 0.271$ ,  $SE = 0.2691$ ,  $k = 4$ ,  $p = .313$ ,  $CI[-0.256, 0.799]$ ), but in the short-term delayed posttests, the CL approach showed a greater learning effect to some degree ( $g = 0.603$ ,  $SE = 0.0814$ ,  $k = 4$ ,  $p < .001$ ,  $CI[0.444, 0.763]$ ).

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## 要旨

本研究では、認知言語学（CL）に基づく言語指導アプローチの効果を検証した研究の

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システマティックレビューを行う。CLに基づいた介入研究が増加している中で、この研究では特に、日本人英語学習者を対象に CL 法と従来の教授法を比較した実証研究に焦点を当てた。メタ分析には、3,179 人の学習者を対象とした 40 件のサンプル研究から得られた 98 つの効果サイズが含まれた。結果として、総合的に見ると、CL 法は中程度の効果サイズで従来法を上回る学習利益をもたらすことが明らかになった ( $g = 0.719$ , 95% CI [0.565, 0.873])。仲介変数による分析では、CL アプローチは即時事後及び短期遅延事後テストで従来法よりわずかに優れているという結果だった。長期的な効果については、本研究のデータから一般化できる傾向を得ることはできなかったが、特定の言語項目において従来法より大きな効果がある可能性が示唆された。そのため、より多くの言語項目において長期的な指導効果に関するデータを蓄積することが今後の課題として挙げられた。また本研究では、A1 から B1 レベルの学習者は CL アプローチの恩恵を同等に受けていることが確認できた。そして今後の研究にて、より習熟度の高い学習者に対する CL 指導法の効果の度合いを探る必要性が提言された。最後に、指導時間に関する教育的示唆に加えて、CL アプローチを言語教育に取り入れるための将来的な方向性についても議論する。

Appendix A Details of the Sample Studies

Prepositions		Note										
Study	Learner characteristics			Research design					Publication characteristics		Note	
	I <sup>a</sup>	Lv <sup>b</sup>	As <sup>c</sup>	Details of target feature	T <sup>d</sup>	Fq <sup>e</sup>	Total <sup>f</sup>	Outcome <sup>g</sup>	Posttest <sup>h</sup>	Lg <sup>i</sup>		Type <sup>j</sup>
Akamatsu (2010b)	U	B1	S	in, on, at	25	1	25	F	immediate	ENG	Art.	
Cho (2010)	U	B1	Im	in, on, at (topological, functional)	40	1	40	F	immediate 6 weeks	ENG	Book	
Cho & Kawase (2012)	U	A2	S	in, on, at (topological, temporal, functional, metaphorical)	60	1	60	F	6 weeks	ENG	Art.	
Mitsugi (2013)	U	- <sup>k</sup>	-	in, on, at, by	-	1	-	F w/ JP	immediate	ENG	Art.	a posttest with a hint-sheet as intervention
Mitsugi (2017)	U	-	-	in, on, at	30	1	30	F	immediate	ENG	Art.	
Mitsugi, Nagashima (2015)	U	-	-	in, on, at	30	1	30	F	immediate	JP	Art.	CBEI group included
Nakagawa (2019)	H	-	-	in, on, at (temporal)	5	1	5	F	immediate 1 week	JP	Art.	
Sato (2020) study 1	U	A2	S	above, across, along, below, in, into, on, over	20	1	20	F w/ JP	immediate	JP	Diss.	no pretest
study 2	U	-	-	above, across, along, below, in, into, on, over	-	1	-	RS PDrw	immediate	JP	Diss.	no pretest, 2D image group included
Takahashi & Kaneko (2011)	U	-	-	over	90	1	90	MC	immediate	JP	Art.	
Yasuhara (2011)	U	-	-	at, in, on	-	1	-	F	immediate	JP	Art.	

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Phrasal verbs											Note	
Study	Learner characteristics			Research design					Publication characteristics			
	I <sup>a</sup>	Lv <sup>b</sup>	As <sup>c</sup>	Details of target feature	T <sup>d</sup>	Fq <sup>e</sup>	Total <sup>f</sup>	Outcome <sup>g</sup>	Posttest <sup>h</sup>	Lg <sup>i</sup>		Type <sup>j</sup>
Hotei (2022)	H	Pre-A1	S	up (+down, on, off)	15	6	90	F	1 week 4 weeks	JP	Art.	CL group included
Nakagawa (2013)	H	-	-	out (10 verbs)	10	1	10	JP tr.	2 weeks	JP	Art.	
Nakagawa (2018)	H	-	-	up (10 verbs)	25	1	25	F w/ JP	immediate 1 week	JP	Art.	
Nakagawa & Tsuchiya (2013)	H	-	-	out (10 verbs)	10	1	10	JP tr.	2 weeks	JP	Art.	
Spring (2018)	U	B1	S	up, down, in, out, on, off, back, away, after, under(below), over(above), across, along, apart, together, around(about), through	90	2	180	F	1 day	ENG	Art.	
Strong (2013)	U	B1	S	up, down, out, off (4 verbs each)	10	1	10	F	-	ENG	Art.	semantic analysis+image schema group included, no pretest, exposed/unexposed items tested
Yasuda (2010)	U	B1	S	up, down, into, out, off (21 phrasal verbs in total)	10	1	10	F	immediate	ENG	Art.	no pretest, exposed/unexposed items tested



Verbs		Note									
Study	Learner characteristics			Research design				Publication characteristics			Note
	I <sup>a</sup>	Lv <sup>b</sup>	As <sup>c</sup>	Details of target feature	T <sup>d</sup>	Fq <sup>e</sup>	Total <sup>f</sup>	Outcome <sup>g</sup>	Posttest <sup>h</sup>	Lg <sup>i</sup>	Type <sup>j</sup>
Fujii (2009)	H	A2	S	enjoy, promise, decide, finish, quit, manage, imagine, mind, admit, refuse, forget, remember	7	1	7	F	immediate 2 weeks	JP	Art.
Fujiwara et al. (2016)	H	-	-	have (causative)	-	1	-	-	immediate	JP	Art.
Mueller & Tsushima (2019)	U	A2	S	force, get, have, help, let, make, prevent	70	1	70	F	immediate 3 weeks	ENG	Art.
study 2	U	B1	Im	force, get, have, let, make	90	1	90	F	3 weeks	ENG	Art.
Sato (2010)	U	-	-	telicity	45	1	45	F	immediate	JP	Art.
Sato (2014)	U	B1	In	listen, hear	90	1	90	F w/ JP	1 week 2 weeks	JP	Diss.
Sato (2015)	U	B1	In	look, see	90	1	90	F w/ JP	1 week 2 weeks	JP	Diss.
Modal verbs											
Fujii (2011a)	H	A2	S	will must, can, may, should, shall	-	1	-	F w/ JP	immediate 2 weeks	JP	Art.
Fujii (2011b)	H	A2	S	will, must, can, may, should	-	1	-	F w/ JP	immediate 2 weeks	JP	Art.
Ochi (2018)	U	A2	S	will, must, may, should, could, would	-	2	-	F	1 week	ENG	Diss.
											self-review took place before posttest

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Degree of certainty												Note
Study	Learner characteristics			Research design					Publication characteristics			
	I <sup>a</sup>	Lv <sup>b</sup>	As <sup>c</sup>	Details of target feature	T <sup>d</sup>	Fq <sup>e</sup>	Total <sup>f</sup>	Outcome <sup>g</sup>	Posttest <sup>h</sup>	Lg <sup>i</sup>	Type <sup>j</sup>	
Takimoto (2016)	U	B1	S	“certain, probable, possible” items (9 adjectives, 9 adverbs)	30	3	90	Writing RS	1 week 6 weeks	ENG	Art.	self-directed learning
Takimoto (2020a) study 1	U	A2	S	“certain, probable, possible” items (9 adjectives, 9 adverbs)	20	6	120	Writing RS	1 week 6 weeks 4 months	ENG	Art.	
study 2	U	A2	S	“certain, probable, possible” items (9 adjectives, 9 adverbs)	20	6	120	Writing RS	1 week 6 weeks 4 months	ENG	Art.	
Countability												
Cho & Kawase (2011)	U	-	-	countable/uncountable nouns	60	1	60	F	8 weeks	ENG	Art.	
Sato (2010) study 1	U	-	-	countable/uncountable nouns	90	1	90	F	immediate	JP	Art.	
Politeness												
Takimoto (2020b)	U	A2	S	request forms	20	4	80	Writing RS	1 week 5 weeks 9 weeks	ENG	Art.	
Takimoto (2021)	U	A2	S	request forms	20	4	80	Writing RS	1 week 5 weeks 9 weeks	ENG	Art.	static group included

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Polysemy		Note									
Study	Learner characteristics		Research design				Publication characteristics		Note		
	I <sup>a</sup>	Lv <sup>b</sup>	As <sup>c</sup>	Details of target feature	T <sup>d</sup>	Fq <sup>e</sup>	Total <sup>f</sup>	Outcome <sup>g</sup>	Posttest <sup>h</sup>	Lg <sup>i</sup>	Type <sup>j</sup>
Morimoto, Loewen (2007)	H	-	-	break, over	40	1	40	AJ PDes	2 days 2 weeks	ENG	Art.
Nakahara (2005)	H	A1	S	40 words	10	10	100	JP tr.	-	ENG	Diss.
4 words taught per session, exposed/unexposed items tested											
Subjunctive											
Nagai (2001)	H	-	-	subjunctive, indicative	120	2	240	F w/ JP Meta	immediate	ENG	Art.
Idiom											
Vasiljevic (2011)	study 1	U	A2	S	18 idioms from 3 source domains	10	3	30	F F	ENG	Art.
									immediate 4 weeks		instruction examples in English
	study 2	U	A2	S	18 idioms from 3 source domains	10	3	30	F F	ENG	Art.
									immediate 4 weeks		instruction examples in English with JP tr.

<sup>a</sup> I, institutional status; U, university; H, high school; <sup>b</sup> Lv, proficiency level; <sup>c</sup> As, Proficiency assessment measures; S, standardised tests; In, institutional status; Im, impressionistic judgment; <sup>d</sup> T, time per session (min); <sup>e</sup> Fq, session frequency; <sup>f</sup> Total, total intervention duration (min); <sup>g</sup> Outcome, outcome measures; F, fill-in-the-blank sentence completion; F w/JP, fill-in-the-blank sentence completion with Japanese translation; RS, rating scale; PDrw, picture drawing; MC, multiple choice; JP tr, Japanese translation; AJ, acceptability judgment; PDes, picture description; Meta, meta-explanation; <sup>h</sup> Posttest, timing of posttests; <sup>i</sup> Lg, publication language; ENG, English; JP, Japanese; <sup>j</sup> Type, publication type; Art. article; Book, book chapter; Diss, doctoral dissertation; <sup>k</sup> -, unknown.