Applying Cognitive Linguistics to elucidate the meanings of the particles IN/OUT and UP/DOWN in L2 classrooms

Pedagogical experience vs. research findings

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Cognitive Linguistics offers valuable insights for second language instruction, particularly in enhancing motivated polysemy to facilitate vocabulary acquisition. This paper reports on a classroom-based study aimed at analysing the design, implementation, and assessment of activities inspired by Cognitive Linguistics, elucidating the polysemous meanings of the particles IN/OUT and UP/DOWN.

The study involved an experimental group comprising 81 Spanish secondary school students and a control group of 26 students. Participants completed two tests (a gap-fill particle test and a lexical depth test) designed to measure students' command of polysemous meanings. Despite positive teacher feedback and a perceived increase in awareness of polysemy, the experimental learners showed no statistically significant improvement in the test results. We conclude that a comprehensive approach is required to evaluate learning outcomes, encompassing pedagogical experience, classroom-based research factors, and effective assessment measures.

Keywords: Applied Cognitive Linguistics (ACL), polysemy, classroom-based research, L2 vocabulary.

1. Introduction

Applied Cognitive Linguistics (ACL), i.e., the application of the theoretical tenets of Cognitive Linguistics (CL) to second/foreign language (L2) instruction, has contributed insightful proposals to L2 teaching and learning (see Achard & Niemeier, 2004; Boers & Lindstromberg, 2008; De Knop et al., 2010; Littlemore, 2023; MacArthur, 2017; Piquer-

Píriz & Alejo-González, 2020; Tyler, 2012). Numerous studies have shown the benefits of CL-inspired pedagogies in enhancing L2 learners' understanding of metaphorical meanings related to different linguistic elements, including general vocabulary, prepositions, phrasal verbs, or idioms (see Boers, 2013; and Piquer-Píriz & Alejo-González, 2016, for some reviews).

The idea of linguistic motivation, as opposed to arbitrariness (Radden & Panther, 2004), entails a whole new approach to lexis that has given rise to the well-known construct of semantic networks (Lakoff, 1987; Langacker, 1990). The implications of this idea for L2 teaching offer an appealing alternative to other methods for fostering vocabulary acquisition. Specifically, the pedagogical potential of enhancing motivated polysemy in the L2 classroom to facilitate vocabulary acquisition has attracted considerable attention (Boers, 2013; Boers & Lindstromberg, 2008).

However, a significant gap remains between the application of metaphor research findings informed by ACL and their actual integration into L2 classroom instruction (Boers, 2011; MacArthur, 2010). In our view, two main types of causes related to both research and teaching practices explain this mismatch, as will be further explained in Section 2.3. We believe that integrating CL principles in mainstream L2 classrooms requires considering not only linguistic and pedagogical elements but also stakeholder-related perspectives and classroom dynamics.

We conducted a longitudinal, classroom-based study involving four English as a Foreign Language (EFL) teachers, focusing on designing, implementing, and assessing various CL-inspired activities for B1 level students. These activities aimed to elucidate and foster the underlying motivation for the polysemous senses of IN/OUT and UP/DOWN in English. We sought to avoid some of the methodological flaws identified in the literature

(Boers, 2013; see section 2.3 for further details), and we involved secondary school teachers and students in the process (MacArthur, 2021). Our study included both experimental and control participants and employed pre- and delayed post-testing measures.

The objective was to help Spanish EFL learners at secondary school level improve their understanding and recall of the different meanings of these frequently used particles, ranging from literal to highly figurative uses, such as those conveyed by phrasal verbs. This approach aimed to enhance the learners' awareness of figurative meanings in English and, thus, support their vocabulary building. Spanish-speaking learners often find phrasal verbs very challenging, largely due to their polysemous nature and the lack of equivalent constructions in Spanish (Alejo-González, 2010; Strong & Boers, 2019). Distributed learning was employed (see Section 2.3 for details), along with a dual approach to evaluating students' learning gains. This approach emphasised both qualitative and quantitative aspects of learning outcomes to assess the effectiveness of the CL-oriented instructional treatment.

The paper is structured as follows: Section 2 reviews key findings and challenges in ACL research, specifically regarding L2 vocabulary instruction. Section 3 details the study, covering objectives and research questions (3.1), participants (3.2), research methods (3.3), and pedagogical methods (3.4). Section 4 presents the results, including quantitative data (4.1) and teacher feedback on CL-oriented methods (4.2). Section 5 concludes with a discussion of the findings, limitations, and future research directions.

2. ACL Research: Findings and Challenges in L2 Vocabulary Instruction

In his seminal review article, Boers (2013) bridged a gap between general vocabulary studies and CL research, highlighting the importance of L2 learners' 'engagement' in acquiring new L2 words or expressions. Since the 1990s, ACL researchers have advocated using non-arbitrary aspects of vocabulary to boost this engagement, supported by several small-scale studies (see Boers, 2013, for a review). Despite some limitations, the studies reviewed collectively suggest that CL-informed instruction merits inclusion in L2 programmes.

Two contributions from ACL, emphasised by Piquer-Píriz and Boers (2019), are particularly relevant to L2 lexical development: the importance of figurative meanings in everyday communication (related to *what* content should be taught) and the concept of linguistic motivation (which informs *how* to teach certain content).

2.1. Figurative Meanings in Everyday Language and their Reflection in L2 Teaching Materials

One of the main contributions of CL is the recognition of metaphor as an integral part of everyday language rather than merely ornamental. This has generated wide interest in research into metaphor in English Language Teaching (ELT) because L2 learners need to understand and produce non-literal uses to communicate effectively. Figurative language appears in daily communication and educational contexts, in both the L1 (Cameron, 2003; Deignan et al., 2019) and the L2. For example, non-literal input is found in textbooks, high-stakes English for speakers of other languages (ESOL) exams (Martín-Gilete, 2022b), or Content and Language Integrated Learning (CLIL) contexts (Alejo-González & García-Bermejo, 2020) as well as in students' output, both oral (Martín-Gilete, 2024)

and written (Nacey, 2013). Therefore, learners must deal with this language, which can be both helpful and challenging (see Littlemore, 2023; MacArthur, 2016).

However, mainstream EFL textbooks often overlook figurative language and fail to encourage deeper semantic reflection. Littlemore and Low (2006) found that popular EFL textbooks only made initial efforts to introduce diverse figurative forms.

Amaya-Chávez (2010) concluded that EFL textbooks for Spanish primary and secondary school learners lacked systematic teaching of polysemous words, introducing non-literal senses sporadically without connecting them. Similarly, the treatment of phrasal verbs has been shown to be insufficient. Alejo et al. (2010) revealed inadequate treatment of phrasal verbs in Spanish EFL textbooks, with minimal practice and a lack of a coherent teaching framework. Recent studies show that similar issues persist: Lahlou and Abdul Rahim (2023) found limited use of polysemes in EFL textbooks. Regarding phrasal verbs, Strong and Boers (2019) noted that textbooks often present them without first providing relevant input. Millar (2023) highlighted that mainstream EFL textbooks often underexploited the potential of a CL-oriented approach (both teaching methods and metalinguistic discourse) to enhance L2 learners' awareness of the semantic motivations behind the polysemous meanings of the particles and, more broadly, to promote figurative thinking in the L2.

2.2. Linguistic Motivation and its Potential for Vocabulary Acquisition

Together with the reappraisal of figurative language, CL emphasises linguistic motivation. CL postulates that the different senses of a word are interconnected through metaphorical and metonymical relations derived from our bodily experiences and interactions with the world, rather than being arbitrary (Lakoff, 1987; Langacker, 1990).

For example, the semantic extensions of the adjectives *warm* and *cold*, when applied to people, are grounded in the positive physical sensation associated with warmth and the less positive sensation associated with coldness. Thus, a warm person is kind, while a cold person is unfriendly. This 'motivated polysemy' has led ACL to highlight the importance of making L2 learners aware of these connections at different educational stages (Piquer-Píriz, 2020). Proposed CL-oriented techniques include raising metaphor awareness in the L1 and the L2 (Deignan et al., 1997); identifying underlying conceptual metaphors (Kövecses & Szabó, 1996; Ponterotto, 1994); using images (Boers et al., 2009); Total Physical Response (TPR), i.e., physical enactment (Lindstromberg & Boers, 2005; Saaty, 2020) or etymological elaboration (Boers et al., 2004) to elucidate figurative meanings of highly frequent lexical items, e.g., prepositions and particles (Lindstromberg, 1996, 2010). These teaching techniques offer an appealing alternative to other L2 vocabulary approaches, which often treat word meanings as arbitrary and fail to explore the deeper, culturally, or experientially grounded meanings of polysemous words. The particles we selected for our study (IN/OUT and UP/DOWN) were previously analysed in quasi-experimental studies on the ACL instruction of phrasal verbs. Kövecses and Szabó (1996) explored phrasal verbs with UP/DOWN, finding that the experimental, CL-informed group performed better, although no significance was calculated. Boers (2000, Study 2) extended this research to phrasal verbs with IN/OUT and UP/DOWN, revealing that the experimental group achieved significantly better post-treatment test scores. Condon (2008) also investigated phrasal verbs with IN/OUT and UP/DOWN and reported that the experimental group had significantly better post-treatment test scores in three out of four trials. Yasuda (2010) examined phrasal verbs with INTO, UP, DOWN, OUT, and OFF, aiming to assess learners' ability to apply CL insights autonomously.

While CL groups did not outperform comparison groups on the 'taught' items, they did better on items new to the students, echoing a finding by Kövecses and Szabó (1996). Similarly, Boers (2011) evaluated the potential for learners to use CL techniques independently, outside the classroom setting.

These studies collectively highlight the benefits of ACL instruction for understanding phrasal verbs and provide promising insights into how learned concepts can be applied to new contexts.

2.3. Critical Gaps in ACL Research

Critical gaps in ACL research may account for the failure to achieve a more systematic integration in L2 classrooms. Although there are notable exceptions in the development of CL-oriented teaching materials, such as the work by Boers and Lindstromberg (2009), Lazar (2003), Lindstromberg and Boers (2008), Llopis-García (2024), and Rudzka-Ostyn (2003), CL insights have not sufficiently permeated mainstream textbooks, official descriptors such as the Common European Framework of Reference for Languages (CEFR; Council of Europe, 2020) and classroom environments (MacArthur, 2017). This limited impact, in our view, can be attributed to both research and teaching practices.

In relation to research practices, we have witnessed a growing number of studies, but some exhibit methodological flaws in quasi-experimental designs, such as a lack of precise testing measures or the absence of control groups in short-term, one-off teaching interventions conducted beyond the usual range of instructional activities (Boers, 2013). Pedagogically-oriented metaphor research has predominantly focused on a specific participant profile: university undergraduate students who are learners of English with a B1 level of English proficiency. Boers (2013) advocates for more fine-tuned longitudinal

studies and the incorporation of distributed learning in CL-oriented instructional interventions.

Despite the apparent beneficial effects of CL-inspired pedagogical treatments, most studies have not yielded statistically significant differences in learning outcomes when comparing groups of learners who received this treatment with groups taught through mainstream methodologies. It is important to acknowledge the complexity and unpredictability of the classroom environment, which can make it difficult to control variables and obtain consistent results. Low (2017) points out the challenges inherent in conducting classroom-based research, especially with large, randomised samples committed to long-term studies. The lack of more robust findings may have contributed to the omission of crucial insights related to figurative language usage by L2 learners in instruction and assessment from major language descriptors, such as the CEFR (MacArthur, 2021; Nacey, 2013).

This brings us to the second type of causes, directly related to teaching practices. While CL-inspired pedagogical techniques may be appealing, they are time-consuming, not included in official syllabi, neglected in mainstream textbooks and materials, and their application requires extra teacher training. In our view, involving L2 instructors in the process is essential to effectively bringing CL-inspired proposals to classroom practice.

In instructed L2 settings, learners' understanding of figurative meanings is influenced by the variety of senses encountered in classroom input (Martín-Gilete, 2022b). Decisions about which meanings to introduce (*what* content?) and at what stage (*when*?) in the learning process are crucial considerations in designing L2 syllabi (MacArthur & Piquer-Píriz, 2007; Piquer-Píriz, 2011). MacArthur (2010) argues that metaphorical thinking can greatly expand L2 learners' vocabulary, as it is interesting, flexible, and not bound by

strict rules. Metaphor is particularly beneficial for learners with a limited word stock, helping derive meaning from familiar words and expanding their expressive abilities.

However, caution is advised. Boers (2013) and MacArthur (2010) emphasise the importance of 'distributed learning', promoting figurative awareness over generating L2 metaphors (Boers, 2000). The focus should be on understanding how metaphor permeates language rather than on specific pedagogical techniques (Martín-Gilete, 2024).

3. Study

3.1. Objective and Research Questions

This classroom-based study, coordinated by five metaphor researchers at the University of Extremadura (Spain) in collaboration with four secondary school EFL teachers, aimed to design, implement, and assess CL-inspired materials to raise metaphor awareness within a longitudinal project. The goal was to enhance L2 learners' knowledge of the different meanings of the particles IN/OUT and UP/DOWN and to measure the impact of a CL-inspired treatment on their potential lexical gains.

In this investigation, we address the following research questions (RQs):

RQ1: To what extent does a CL-informed approach to 'distributed learning of metaphor' enhance L2 learners' understanding of the polysemous meanings of the particles IN/OUT and UP/DOWN?

RQ2: To what extent does a CL-informed approach to 'distributed learning of metaphor' increase learners' awareness of polysemous meanings in general vocabulary?

3.2. Participants

A total of 107 students took part in the study. Among them, 81 Spanish learners of English at the B1 level, aged 14 to 16, participated in the CL-oriented instructional intervention. They were drawn from two local, state secondary schools and one private official exam preparation centre: 23 students in one classroom (CL group 1), 39 students in two classrooms at the same school (CL group 2), and 19 students in one classroom (CL group 3). These four CL-informed classrooms, forming the experimental group, were taught by four EFL teachers trained in CL-inspired instruction (see 3.4.1 for details). Additionally, a control group of 26 students from another local state secondary school was taught by an EFL teacher who was not informed about the CL approach.

Not all participants in both the control and experimental groups could complete the entire battery of tests due to classroom absences on data collection days. Only those who completed both pre- and post-tests are included in the results presented in Section 4. Prior to the study, parental or legal guardian authorisation was obtained.

3.3. Research Methods

3.3.1. Methodology

The study was conducted over a five-month period and comprised three distinct phases. Phase 1 (*Pre-test*): During the initial month, all participants completed three tests. *The Vocabulary Levels Test* (VLT; Schmitt et al., 2001) was employed to establish a baseline for the participants' vocabulary knowledge. Two tests were created ad hoc by the researchers to measure understanding of the polysemous meanings of the particles IN/OUT and UP/DOWN (RQ1) and the different senses of polysemous words (RQ2),

respectively. They consisted of a gap-fill particle test (see Appendix 1) and a lexical depth test (see Appendix 2), inspired by Aizawa (2018) and developed in Spanish. No time limit was set for completing the tests to reduce anxiety and stress, which could affect performance and accuracy. Concurrently, EFL teachers from the three CL classrooms underwent training in CL-inspired instruction (see 3.4.1 for further details).

Phase 2 (*Teaching Intervention*): For the next three months, CL-inspired activities were implemented across the three CL groups to enhance L2 learners' awareness of the underlying motivation for the polysemous senses of the particles IN/OUT and UP/DOWN. Facilitated by the trained teachers, these activities were integrated into the regular lessons over approximately 10 hours. Conversely, participants in the non-CL-informed classroom were instructed by an EFL teacher who lacked training in the applications of CL to L2 instruction. These students followed a standard communicative approach for learning phrasal verbs, adhering to the textbook guidelines.

Phase 3 (*Delayed Post-test*): Five months after the start of the study and one month after the instructional intervention, a delayed post-test was administered to both the experimental and control groups. This assessment consisted of altered versions of the initial gap-fill particle test and lexical depth test (see Appendices 1 & 2) to measure the students' recall and improvement in understanding polysemous meanings, thereby controlling for test-retest effects.

3.3.2. Data Collection

3.3.2.1. Instruments Used for Quantitative Data Collection

Instrument 1 (*VLT 2K*) is a validated test that has been widely employed in vocabulary studies, particularly with a target population similar in age and background to ours. It was used in the pre-test phase to gauge whether the control group was comparable to the experimental group in terms of general vocabulary knowledge. Instruments 2 (*Particle test*) and 3 (*Lexical Depth test*) were designed to assess how much a CL-oriented teaching approach enhances understanding of polysemous meanings. The pre- and post-test versions of instruments 2 and 3 were piloted among learners of similar age and English proficiency levels to establish their effectiveness.

Instrument 1 – *VLT 2K*: This test assesses receptive vocabulary knowledge across different word frequency levels and the Academic Word List (AWL; Coxhead, 2000). It is a form-recognition matching test where test-takers match 30 target words, organised into 10 clusters, to their correct meanings or forms. We used the 2,000-word frequency band (2K), with scores out of 30.

Instrument 2 – *Particle test:* This ad hoc test examines knowledge of particles in phrasal verbs and awareness of polysemy through a multiple-choice format. It includes 15 items where test-takers select the correct particle to complete a sentence from six options (IN, DOWN, OUT, UP, OFF, ON), including two distractors. Each correct answer scores 1 point, with a maximum score of 15.

Instrument 3 – *Lexical Depth test*: This test assesses vocabulary depth by evaluating nuanced meanings. Test-takers identify the ‘odd one out’ from four possible meanings of a target word. The maximum score is 10.

3.3.2.2. Instruments Used for Qualitative Data Collection

The EFL teachers engaged in participant observation as part of the classroom-based research. They compiled field notes during teaching sessions that employed the CL-inspired materials by filling out an online form capturing data on the effectiveness and implementation of the activities, student attendance, reflections, and comments. This method provided qualitative data from the teachers' perspective on learner performance and potential gains.

The EFL teacher from CL group 1 was a supply teacher who, despite having completed the training and implemented the CL-inspired materials, could not fully submit the field notes. To address this absence in our qualitative analysis, we supplemented the missing data with observations from other CL-trained EFL teachers.

3.3.3. Data Analysis

Statistical analyses were conducted using the *R* software environment (2024) to measure L2 learners' understanding and recall of the particles IN/OUT and UP/DOWN (RQ1) and their awareness of the different senses of polysemous words (RQ2). Inferential analyses were performed to examine the potentially significant differences between the participants' results in the pre- and post-tests, as well as to observe their progress throughout the study. A Shapiro-Wilk test for normality was used to assess the distribution of the variables. Since the sample did not follow a Gaussian distribution, non-parametric tests were employed.

The independent Wilcoxon Rank Sum test for unpaired samples was used to compare the pre- and post-performance measures, as well as the differences in performance evolution, between the control and experimental groups. A Wilcoxon Signed Ranks test for paired

samples was used to examine variations or rates of change from the pre-assessment to the post-assessment within groups.

The Absolute Increase (AI) values were converted into relative increases (RI). AI refers to the difference between post-test and pre-test scores. RI, calculated as *(Post-test score – Pre-test score) / Pre-test score*, provides a proportionate measure of improvement relative to the initial performance. These measures help in understanding both the absolute and proportional progress made by the participants over the course of the study.

3.4. Pedagogical Methods

3.4.1. Teacher Training in the Applications of Cognitive Linguistics to L2 Instruction

The four EFL teachers from the CL-informed classrooms participated in a four-hour training on the applications of CL to L2 instruction, led by the metaphor researchers involved in the study. The training aimed to shift their perception of metaphors from mere rhetorical devices to essential cognitive and linguistic tools crucial for human communication and cognition. The goal was to enhance their understanding of thematic metaphor connections and help them recognise the metaphorical basis of everyday language expressions encountered by L2 learners.

The training incorporated materials based on established CL-inspired pedagogical approaches (see Section 2), including printed materials and online resources hosted on the university's online campus (adapted *Moodle* platform). The teachers were tasked with creating CL-inspired activities tailored to their specific EFL contexts in secondary education. This initiative served both to put their new insights into practice and prepare

them for their involvement in the development and implementation of the CL-inspired materials created for this study.

3.4.2. Materials Design and Implementation of CL-Oriented Activities

The CL-inspired teaching materials were developed in line with the key principles of CL discussed in Section 2, with a collaborative effort involving the metaphor researchers and the EFL teachers.

Semantic and/or etymological elaboration of source domains and TPR were employed alongside pictorial elucidation, i.e., using visuals to convey meanings. The latter was the central CL-oriented technique to enhance awareness of the meaning of the particles IN/OUT and UP/DOWN. The visual aids were created using *Canva for Education* and were designed to illustrate the different senses of each particle; see Martín-Gilete (2022a) for these visuals (licensed under CC BY-NC-ND 4.0).

For the particles IN/OUT, the visual prompts depicted meanings related to (i) 'movement', with *in* conveying 'inward movement' (*put in*) and *out* indicating 'outward movement' (*take out*); (ii) 'static positions', where *in* refers to 'being inside' (*be in*) and *out* to 'being outside' (*be out*); and (iii) their figurative meanings (e.g., SOCIETY IS A CONTAINER, or THE BODY IS A CONTAINER), such as (a) *in* for 'inclusion' (*be in*) and *out* for 'exclusion' (*be out*), (b) *in* representing 'understanding' (*take in*) and *out* for 'expressing' (*speak out*), (c) *out* denoting 'visible', 'known' or 'available' (*come out*), and (d) *in* as 'seeking information or knowledge' (*look into*) and *out* as 'complete', 'solve' or 'understood' (*work*/*figure out*).

In a similar vein, the visuals for UP/DOWN illustrated (i) 'movement', with *up* entailing 'upward movement' (*climb up*) and *down* indicating 'downward movement' (*climb*

down); (ii) 'quantity', with *up* referring to 'increase' (*go up*) and *down* to 'decrease' (*come down*); and (iii) their figurative meanings (e.g., GOOD IS UP, or BAD IS DOWN): (a) *up* expressing 'approach' (*come up*), (b) *up* associated with 'better status' or 'importance' (*look up to someone*) and *down* with 'worse status' or 'unimportance' (*look down on someone*), (c) *up* denoting 'good mood' (*cheer up*) and *down* expressing 'bad mood' (*feel down*), and (d) *up* used for 'initiating an activity or undertaking' (*take up*).

The implementation of the CL-inspired materials was conducted across 10 one-hour sessions (five sessions per set of particles), following a presentation-practice-production (PPP) model. These sessions were spread over a period of three months. Each session was devoted to thoroughly exploring one of the three CL-oriented methods, ensuring a deep engagement with the material through the three teaching phases of the PPP approach. It was suggested that one session would include TPR activities, two sessions would employ pictorial elucidation, and two sessions would be devoted to semantic and/or etymological elaboration of source domains. However, it was the EFL teacher in each CL-informed classroom who determined the timing for the implementation of materials throughout the classroom-based study to ensure alignment with the general syllabus. A more detailed description of the overall implementation sequence for both sets of particles can be found in Martín-Gilete (2022a).

Only the presentation and practice phases of pictorial elucidation required the design of visuals. The same pictorial prompts were adapted and used as flashcards to reinforce the understanding of the particles IN/OUT and UP/DOWN by associating and matching the illustrations with the corresponding phrasal verbs. In contrast, the teaching phases for the semantic and/or etymological elaboration of source domains strategy consisted of worksheet tasks with exercises using methods such as verbal explanation, guessing

strategies, and conceptual grouping. Likewise, the teaching phases of the TPR method did not require visuals to elucidate the meaning of the particles explored in this study.

4. Results and Discussion

Results are reported in relation to the two different approaches used to measure students' learning gains: (i) quantitative formal assessment of EFL students' understanding of polysemous meanings; and (ii) qualitative teacher feedback.

4.1. Quantitative Results

The data were analysed quantitatively by comparing pre-test and post-test results between control and experimental groups (Section 4.1.1). Additionally, the focus shifts to the variations, or evolution rates, in pre-test and post-test results within each group over time (Section 4.1.2). Finally, the rates of change between the control and experimental groups are also compared to identify similarities and differences in their respective progress (Section 4.1.3), with particular attention given to the variations observed in students exposed to the CL-oriented instructional intervention.

As indicated in Section 3.3.1, the *VLT 2K* test was employed to measure participants' general vocabulary knowledge at the initial stage. Descriptive statistics show that the control group (N = 26; M = 21.38; SD = 4.79) outperformed the experimental group (N = 80; M = 20.11; SD = 6.05). However, the inferential statistics using the Wilcoxon Rank Sum indicated no significant differences between the two groups (W[1156.50] = 1.000, p = .391, d = 0.22, 95% CI = [-0.23, 0.67]).

4.1.1. Pre-Test and Post-Test Results (Experimental vs. Control Groups)

Tables 1 and 2 present the pre-test results for the *Particle test* (9.38 vs. 9.37) and the *Lexical Depth test* (6.15 vs. 6.05).

Table 1

Descriptive Analysis of the Participants' Scores in the Pre-Test

Test	Group	*N*	*M*	*Min.*	*Max.*	*SD*
Particle test	Control	26	9.38	3	13	2.45
	Experimental	78	9.37	3	15	2.75
Lexical Depth test	Control	26	6.15	3	9	1.91
	Experimental	81	6.05	0	9	1.82

Table 2

Inferential Analysis of the Participants' Performance in the Pre-Test

Test	Mean score		diff.	*W* score	*p* value	Cohen's *d*	95% CI
	Control	Experimental					
Particle test	9.38	9.37	<0.001	1020.50	.961	<0.01	[-0.44, 0.45]
Lexical Depth test	6.15	6.05	<0.001	1108.00	.685	0.06	[-0.39, 0.50]

As the results show, the differences in both tests were negligible and not statistically significant ($p > .05$) at the start of the study.

Tables 3 and 4 show the post-test results of L2 learners' understanding and recall of the particles IN/OUT and UP/DOWN, collected one month after the teaching intervention.

Table 3

Descriptive Analysis of the Participants' Scores in the Post-Test

Test	Group	*N*	*M*	*Min.*	*Max.*	*SD*
Particle test	Control	26	8.88	5	13	2.14
	Experimental	78	7.65	1	14	2.89
Lexical Depth test	Control	24	6.00	3	9	1.82
	Experimental	78	6.28	1	10	1.98

Table 4

Inferential Analysis of the Participants' Performance in the Post-Test

Test	Mean score		diff.	*W* score	*p* value	Cohen's *d*	95% CI
	Control	Experimental					
Particle test	8.88	7.65	1.000	1305.00	.028	0.45	[<0.01, 0.90]
Lexical Depth test	6.00	6.28	<0.001	833.50	.413	0.15	[-0.61, 0.32]

The experimental group performed slightly better than the control group in the *Lexical Depth test* (6.28 vs. 6.00), although the difference was not statistically significant ($p > .05$). Conversely, the control group outperformed the experimental group (8.88 vs. 7.65) in the *Particle test* (W[1305.00] = 1.000, $p = .028$, $d = 0.45$, 95% CI = [<0.01, 0.90]), supported by a small effect size.

4.1.2. Variations in the Pre-Test vs. Post-Test Scores

This section summarises the changes in outcomes for the control and experimental groups, comparing the pre-test and post-test results for participants' understanding of polysemous meanings.

The results for the experimental group are reported in Tables 5 and 6.

Table 5

Variation from the Pre-Test to the Post-Test Scores in the Experimental Group

Test	*N*	Pre-test mean scores	Post-test mean scores	Evolution rates		
				Absolute Increase (AI)	Relative Increase (RI)	Variation (%)
Particle test	76	9.37	7.65	-1.72	-0.18	-18
Lexical Depth test	78	6.05	6.28	0.23	0.04	4

Table 6

Pre-Test vs. Post-Test Scores in the Experimental Group

Tests	Mean score		diff.	*W* score	*p* value	Cohen's *d*	95% CI
	Pre-test	Post-test					
Particle test	9.37	7.65	2.000	1801.00	<.001	0.61	[0.29, 0.93]
Lexical Depth test	6.05	6.28	<0.001	945.00	.398	0.12	[-0.44, 0.19]

There was a 4% increase (see Table 5) in the *Lexical Depth test* results for the experimental group exposed to the CL-oriented treatment over the five-month study. However, this improvement in understanding polysemous meanings with CL-inspired instruction was not statistically significant ($p > .05$). Conversely, significant declines were found in the *Particle test* (W[1801.00] = 2.000, $p < .001$, $d = 0.61$, 95% CI = [0.29, 0.93]). Table 6 provides detailed information about the inferential statistics.

The results for the control group are reported in Tables 7 and 8.

Table 7

Variation from the Pre-Test to the Post-Test Scores in the Control Group

Test	*N*	Pre-test mean scores	Post-test mean scores	Evolution rates		
				Absolute Increase (AI)	Relative Increase (RI)	Variation (%)
Particle test	26	9.38	8.88	-0.50	-0.05	-5
Lexical Depth test	24	6.15	6.00	-0.15	-0.03	-3

Table 8

Pre-Test vs. Post-Test Scores in the Control Group

Tests	Mean score		diff.	*W* score	*p* value	Cohen's *d*	95% CI
	Pre-test	Post-test					
Particle test	9.38	8.88	1.000	137.00	.232	0.22	[-0.34, 0.78]
Lexical Depth test	6.15	6.00	0.500	130.50	.611	0.08	[-0.49, 0.65]

In contrast to the experimental group, the control group, which followed a standard communicative approach, showed a 3% decrease in the *Lexical Depth* test ($p > .05$), as shown in Tables 7 and 8. Additionally, there was no statistically significant change in the *Particle* test ($p > .05$) with a 5% decrease.

4.1.3. Comparison of Lexical Knowledge Variations (Control vs. Experimental Groups)

Table 9 compares the variations in lexical gains between the control and experimental groups.

Table 9

Comparison of Lexical Evolution in Participants: Control vs. Experimental Groups

Tests	Mean score variations (AI)		diff.	*W* score	*p* value	Cohen's *d*	95% CI
	Control	Experimental					
Particle test	-0.50	-1.72	1.000	1259.00	.035	0.49	[0.03, 0.95]
Lexical Depth test	-0.15	0.23	1.000	808.50	.309	0.21	[-0.68, 0.25]

The results show a significant decrease in the *Particle test* (W[1259.00] = 1.000, $p = .035$, $d = 0.49$, 95% CI = [0.03, 0.95]) within the experimental group in comparison to the control group. This lack of significant improvement and the observed declines in post-intervention scores suggest that the CL-inspired activities may not have been as effective as anticipated in enhancing the polysemous meanings of the particles IN/OUT and UP/DOWN in fixed linguistic expressions such as phrasal verbs (RQ1) in the context of our study that includes adolescent learners and the employment of a delayed post-test. Additionally, these findings may also point to potential limitations in the quantitative testing measures. The employed test may not have accurately measured the intended outcomes, a mismatch that will be further addressed in Section 5.

In contrast, the delayed post-test results of the *Lexical Depth test* ($p > .05$) suggest that CL-oriented activities could have positively impacted students' vocabulary depth. This indicates a nuanced benefit in fostering polysemous senses in general vocabulary (RQ2), despite challenges in improving overall recall and understanding of particles, as reflected in the *Particle test* results.

4.2. Qualitative Insights into Teacher Feedback on CL-Inspired Pedagogy

EFL teachers provided nuanced feedback on student progress from CL-inspired activities, highlighting strengths and aspects requiring attention while considering stakeholders' perspectives and classroom dynamics. Both students and teachers found this approach to teaching L2 lexis appealing (Niemeier, 2017). Positive comments included:

(1) [TCH01] Students enjoyed the class very much and they understood the difference between these two prepositions [IN/OUT] working in an innovative way.

(2) [TCH02] Students enjoyed the class a lot and they showed interest and motivation toward learning PVs [phrasal verbs].

(3) [TCH03] Students were engaged during the whole classroom. They were excited and happy about being learning differently.

From the teachers' perspective, the CL-oriented activities effectively advanced students' lexical gains over the three-month intervention. Comprehensive evaluations, including both formative assessments throughout the study and summative assessments in end-of-unit tests, consistently revealed an increase in students' understanding and recall, especially of the polysemous meanings of the particles.

However, several important factors from classroom dynamics impacted their implementation in the mainstream L2 classroom, as identified by teacher feedback:

Timing and schedule: Activities scheduled early in the morning or late in the school year were less effective (Condon, 2008), affecting students' attention spans and attendance levels. Teachers reported that such scheduling constraints hindered the optimal implementation and effectiveness of the teaching activities.

Class size and lesson duration: Smaller groups, such as the private language centre (CL group 3), fostered better engagement and participation. The smaller student-to-teacher ratio allowed for more active and cognitively engaging participation from students. However, extended one-hour lessons often led to student fatigue and a decrease in sustained attention, placing additional strain on teachers (Pan, 2019). The intensive nature of these activities also required significant effort and guidance from instructors, suggesting that both teaching and learning in this context can be quite demanding. Distributed learning of metaphorical language (Boers, 2013) might be better approached in short-term slots to prevent fatigue and maintain attention for both teachers and students (see Martín-Gilete, 2024).

Teaching techniques: Using distinct techniques like pictorial elucidation, semantic and/or etymological elaboration of source domains, and TPR in isolation was less effective. Some teenagers were hesitant or self-conscious about engaging in physical activities associated with TPR, which shifted students' focus from content to methodology. Instructors observed that this division often led students to concentrate more on *how* to learn rather than *what* was being learned (MacArthur, 2010), impacting learning efficacy.

Contextual relevance: According to teacher observations, students occasionally felt lost when engaging in CL-oriented activities, not because the content was complex but because the materials were decontextualised. Although these activities aligned with the official syllabus, they were not seamlessly integrated into topic-based lesson plans within

the mainstream textbook used in class, posing a challenge to student engagement and comprehension (see, however, Martín-Gilete, 2024). Better integration is needed to maximise their pedagogical impact.

5. Conclusions, Implications, and Further Directions

This study, conducted in authentic L2 classroom environments by EFL teachers with their own students, offers a distinctive perspective on the complexities of bringing CL-oriented pedagogical practices to mainstream L2 classrooms with secondary school learners. In our view, a strong point, unprecedented in previous research, is the collaboration between researchers and teachers in designing and adapting materials to fit specific educational contexts. This partnership ensured that the interventions were both relevant and practical for real-world teaching scenarios. Additionally, qualitative data from teachers' feedback provided valuable insights that complemented the quantitative results, contributing to a more comprehensive understanding of the pedagogical outcomes.

However, the quantitative results did not align with the positive feedback from EFL teachers, suggesting issues with the classroom-based context and the testing methods. The complex and dynamic nature of this environment, including variables such as teaching schedules, student-to-teacher ratios, activity duration, and learner attitudes, influenced outcomes. Furthermore, the CL-oriented activities were supplemental, spanning only three months, and were not fully integrated into the textbook's topic-based lesson plans.

These findings highlight the need for a revised methodology in designing, implementing, and assessing classroom-based studies. Comprehensive and extended teacher training in CL applications to L2 instruction, with clear guidelines and well-developed lesson plans,

is recommended. CL-oriented practices should become part of the L2 teacher's toolkit, as Boers (2022) suggests, aligned with official syllabi.

While addressing some caveats in previous research (Boers, 2013), new issues emerged, particularly with quantitative testing measures. The tests designed, especially the *Particle* test, may not have measured expected outcomes. This study underscores the need for more ecologically valid research that reflects real-world language use in L2 assessment contexts (Boers, 2011). Adapted tests aligning with CL approaches are necessary, as traditional measures may not capture nuanced learning gains (e.g., see Llopis-García, 2024; Martín-Gascón et al., 2023).

Specific instruments to measure command of polysemous meanings are needed, particularly for both teenage and younger learners in lower-level L2 contexts. In this sense, analysing naturalistic data, from written compositions (Nacey, 2013) and oral interactions (Martín-Gilete, 2024), to explore their lexical depth and metaphor accuracy is promising. Future research should aim to create pre-tests and post-tests that align with the teaching methods, possibly through analysing learner discourse that matches the tasks performed in the instructed L2 setting (e.g., see Martín-Gilete, 2024).

Preliminary insights from the *Lexical Depth test* indicate that while distributed learning might not significantly improve recall of specific figurative meanings, it enhances a broader understanding of figurative language. This supports the potential of long-term exposure to distributed learning for raising figurative awareness. Further research should extend over longer periods to establish distributed teaching routines that foster cognitive engagement through short-term slots, considering one-hour sessions were observed to be quite time-consuming for teachers and students in this study. Future studies should also aim to collect more qualitative data, particularly from L2 learners' oral production, to

inform a student-centred design of materials and a more fine-tuned design of teaching interventions.

Finally, future research should explore the natural use of metaphor, extending beyond the metaphors presented in the materials used in CL-oriented interventions. Such studies could shed light on L2 learners' flexibility in using figurative language in real-life communication contexts.

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Appendix 1. Particle Test

Pre-test version

Código:

Elige la palabra que creas que es la más adecuada para cada frase de entre las seis que aparecen en la siguiente lista. Puedes usar una misma palabra más de una vez y **NO TODAS** son necesarias.

off in down out up on

1. At my friend's school in England, when the teacher arrives, all the students have to stand ……. .
2. "Where's Patricia?". "I don't know. I think she's gone ……. ."
3. I can't wait for the next *Fortnite Battle Pass* to come ……. .
4. Speak …….! I can't hear you!
5. In a dictation, the students have to write ……. what the teacher says.
6. The only thing Juan wanted was to be ……. the school football team
7. For their homework, the students had to find ……. the answer to 10 Maths problems.
8. The boy fell ……. the stairs and hurt his arm.
9. José always gets a 10 in exams. He's the best student ……. the class.
10. "Please take ……. your books and we'll do exercise 6", said the teacher.
11. It's going to be 40º today. Temperatures have really gone ……. .
12. Even though the water was cold, the children jumped ……. the swimming pool.
13. My friend came ……. to me and gave me his book.
14. In the game "Musical chairs" if you don't find a chair to sit on before the music stops, you're ……. .
15. All FC Barcelona supporters really look ……. to Messi. He's a great football player!

Post-test version

Código:

Elige la palabra que creas que es la más adecuada para cada frase de entre las seis que aparecen en la siguiente lista. Puedes usar una misma palabra más de una vez y **NO TODAS** son necesarias.

off in down out up on

1. Don't sit there all afternoon in the armchair. Stand ……. and move around!
2. I went round to Maya's house to talk to her, but her mother told me she'd gone ……. .
3. In spring, all the flowers come ……. and the countryside looks really beautiful.
4. If you don't speak ……. your grandmother won't be able to hear you. She's rather deaf.
5. Listen carefully to what I say and write ……. what you hear.
6. There are eleven players ……. a football team.
7. I'm not going to give you the answer to the problem. Try and work it ……. yourself.
8. The children ran ……. to the bottom of the hill.
9. Ana is really nice. I'm not surprised she's the most popular girl ……. the class.
10. I asked Juan if he'd seen my pen, and, to my surprise, he took it ……. of his pocket.
11. My mother said I couldn't have a new pair of jeans because prices had really gone ……. and we couldn't afford them.
12. I waited ……. the car while my mother went into the shop.
13. When he saw that my friend was hurt, a policeman came ……. and asked what had happened.
14. In many card games, if you don't play the right card, you're ……. .
15. Immigrants feel that some people look ……. on them when they leave their home countries.

Appendix 2. Lexical Depth Test

Pre-test version

Test sobre la profundidad del vocabulario

El objetivo de este cuestionario es comprobar tu nivel de vocabulario. Para ello, tienes 10 palabras en inglés y cuatro posibles significados en castellano para cada palabra inglesa. De todos los significados, tres de ellos son correctos y uno es incorrecto. Por favor, tacha aquel que consideres que es incorrecto.

Ejemplo:

1. ***be*** ser estar parecer ~~cantar~~

	Palabra	Significado 1	Significado 2	Significado 3	Significado 4
1	**check**	averiguar	revisar	billete	cheque
2	**break**	salto	estropearse	hacer una pausa	descanso
3	**ring**	sonar	estadio	cuadrilátero	llamar por teléfono
4	**close**	cerrar	cercano	parecido	íntimo
5	**look**	mirar	traje	parecer	ojeada
6	**right**	correcto	dentro	derecha	precisamente (ahora)
7	**set**	fijo	ponerse (el sol)	enfadado	ajustar
8	**strong**	fuerte	resistente	sólida (relación)	irrompible
9	**tie**	atar	corbata	empatar	cuerda
10	**end**	esquina	muerte	objetivo	resto

Recuerda que es totalmente anónimo.
Muchas gracias por tu colaboración

Post-test version

Test sobre la profundidad del vocabulario

El objetivo de este cuestionario es comprobar tu nivel de vocabulario. Para ello, tienes 10 palabras en inglés y cuatro posibles significados en castellano para cada palabra inglesa. De todos los significados, tres de ellos son correctos y uno es incorrecto. Por favor, tacha aquel que consideres que es incorrecto.

Ejemplo:

2. ***be*** ser estar parecer ~~cantar~~

	Palabra	Significado 1	Significado 2	Significado 3	Significado 4
1	**hand**	mano	guante	dar	distribuir (exámenes)
2	**board**	barco	tablón	tablero	embarcar
3	**paper**	papel	periódico	trabajo escrito	libro
4	**show**	enseñar	recitar	espectáculo	exposición
5	**study**	estudiar	examinar	tema	despacho
6	**tie**	atar	corbata	empatar	cuerda
7	**top**	peonza	cumbre de una montaña	tapón	camiseta corta
8	**rule**	regla, norma	jefe	decidir	gobernar
9	**match**	golpear	cerilla	relacionar	partido
10	**glasses**	gafas	pantallas	vidrios	vasos

Recuerda que es totalmente anónimo.
Muchas gracias por tu colaboración