The effects of cognitive-based instruction on figurative constructions comprehension and production: a case study

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ABSTRACT: This study examines the effects of a cognitive-based instruction on L2 learners' metaphoric competence and comprehension and production of complex linguistic constructions in relation to emotion. Within the field of Cognitive Linguistics (CL) applied to the L2 classroom, our empirical study adds to the growing body of research exploring the role of explicitly teaching metaphor in an instructional setting. As a novelty, our study brings together insights from CL and conceptual metaphor theories for the design and implementation of a cognitive-based pedagogy along with a coherent assessment. It also addresses metaphorical constructions in Spanish that use vocabulary from physical perception that maps onto vocabulary of the self to express emotions (e.g., *tocar fondo*). The study follows a pretest/posttest/delayed posttest design for three research conditions (control, cognitive, and traditional). Data collection consists of four tasks measuring general metaphor comprehension and production, as well as target metaphorical constructions comprehension and production. Results of the statistical tests show that after instruction the cognitive group outperforms the traditional in all tasks. These findings reveal that a CL and metaphor-based instruction followed by a coherent assessment becomes a fruitful approach to teaching complex constructions in the L2.
Keywords: cognitive-based instruction and assessment, metaphor comprehension and production, emotion, Cognitive Linguistics

Los efectos de una enseñanza cognitiva en la comprensión y producción de construcciones figuradas: estudio de caso

RESUMEN: Este estudio examina el impacto de una instrucción cognitiva en la competencia metafórica y comprensión y producción de construcciones lingüísticas complejas de emoción en L2. Enmarcado en la Lingüística Cognitiva (LC) aplicada al aula de L2, nuestro estudio empírico se suma a investigaciones que exploran el papel de la enseñanza explícita de la metáfora. Como novedad, el estudio aúna ideas de la LC y teorías conceptuales de la metáfora para diseñar e implementar una pedagogía cognitiva y una evaluación coherente. Asimismo, aborda construcciones metafóricas en español sobre percepciones físicas para expresar emociones (p. ej., tocar fondo). El estudio sigue un diseño pretest/posttest1/postest2 para tres condiciones (control, cognitiva y tradicional). La recogida de datos se compila a través de cuatro tareas que miden la comprensión y la producción de metáforas generales, así como la comprensión y producción de las construcciones metafóricas objeto de estudio. Los resultados de las pruebas estadísticas muestran cómo, tras la instrucción, el grupo cognitivo supera al tradicional en todas las tareas. Estos resultados revelan que una instrucción basada

en la LC y la metáfora, seguida de una evaluación coherente, es un enfoque beneficioso para la enseñanza de construcciones complejas en L2.
Palabras clave: instrucción-evaluación de base cognitiva, producción-comprensión metafórica, emoción, Lingüística Cognitiva

1. Introduction

The last few decades have experienced a growth of theoretical and applied studies focusing on second language (L2) acquisition and teaching (e.g., Cook, 1985, 2016; Mitchel et al., 2019; VanPatten et al., 2020). Cognitive Linguistics (CL) has added to this field of research by examining how linguistic conceptualization and representation interact and affect the L2 teaching-learning process (to name but a few, Achard & Niemeier, 2004, 2008; Cadierno & Eskildsen, 2015; Ibarretxe-Antuñano et al., 2019; Llopis-García, 2010; Tyler, 2012).

CL, as an interdisciplinary approach to language, is based on the experientialist view of human capacities and postulates the interdependence between language, body, and the mind (Lakoff & Johnson, 1999; Ellis, 2019). The principle of cognition, as being grounded in physical experience and embodied metaphorical thought, was first posited by Lakoff & Johnson (1999, p. 3) and allows us to apprehend how we interact with the environment and absorb stimuli in different ways. Our bodily and perceptual experience eases our understanding of the surrounding, each sense being a door for specific physical perceptions. Based on said perceptual specificities, language applies them to our emotional sensations, which leads to metaphorical language.

Metaphorical language is ubiquitous in daily speech, especially when speakers talk about psychological experiences related to emotions which are harder to convey (Kövecses, 2000, 2010, 2020). In this regard, sense perception has for more than a century been related to the semantic field of emotions (Buck, 1949; Ibarretxe-Antuñano, 1999; Martín-Gascón, 2022; Kurath, 1921; Raffaelli & Kerovec, 2018). Linguistic expressions such as 'How touching!' or Me sentí tocada ('I felt touched') are pervasive in English and Spanish and are enriched by metaphors that involve the concept of 'touch'. In line with the pervasiveness of metaphorical language, metaphor and figurative thinking are crucial for developing one's communicative competence (e.g., Bachman, 1990; Littlemore, 2010; Littlemore & Low, 2006; O'Reilly & Marsden, 2021).

Previous research in the field of meaning extensions of lexemes related to perception from a CL perspective has focused efforts on examining their polysemous and motivated nature (Geeraerts & Cuyckens, 2007; Ibarretxe-Antuñano, 2002; Sweetser, 1990) as well as their metaphorical scope (Sweetser, 1990; Ibarretxe-Antuñano, 1999, 2002, 2005, 2008; Martín-Gascón, 2022). Yet, studies have primarily examined senses connected to the intellect, i.e., sight, or to interpersonal communication, i.e., hearing (e.g., Ibarretxe-Antuñano, 2002, 2008; MacArthur et al., 2015), and the analysis of other senses like smell, taste, and touch has been to some extent neglected (Ibarretxe-Antuñano, 1999). Furthermore, no study to date has, to the best of our knowledge, designed and implemented a CL-based material about metaphorical perception constructions in the L2 classroom.

Considering the CL assumption that metaphors are motivated by or grounded in our perceptual experience and given that efficient communication in the L2 entails the ability to use metaphors, our investigation aims to boost L2 learners' metaphoric competence through metaphors of perception to develop students' ability to understand conceptual met-

aphors and use their metaphorical linguistic representations. More specifically, the present study, building from results from a previous cognitive and contrastive analysis of frequent Spanish and English constructions with the tactile verb tocar 'touch' related to positive and negative emotions (Martín-Gascón, 2022), focuses on innovative pedagogical techniques to both teaching and assessing a list of metaphorical constructions eliciting emotions in the Spanish/L2 classroom.

Regarding the type of assessment, no empirical study has yet examined the benefits of the CL approach in the L2 teaching-learning process using CL-based assessment tests. The present paper therefore fills this gap by including multimodal (e.g., emojis, GIFs), meaning-based and focus-on-form evaluation items that raise L2 learners' reflection upon their experience –perceptual and emotional– and draw attention to similarities with students' first language (L1) –English.

The study is structured as follows. To begin with, we describe the theoretical background about perception metaphor (i.e., tactile) and emotion, as well as previous studies focusing on teaching metaphors in the L2 classroom to further on address an assessment typology gap in the field of applied CL. Secondly, we explain the main study conducted and its methodological aspects. Thirdly, we analyze the results to answer our research questions. Finally, we discuss the results in the light of previous theoretical and empirical findings and draw some concluding remarks.

2. Theoretical background

2.1. Metaphor: touch and emotion

Our perception and physical interaction with the world have a direct influence in how we express linguistically the inner world of emotions. Following the definition of emotion proposed by Mulligan and Scherer (2012), the linguistic representations under study designate deliberate mental episodes experienced by the subject through the senses and memory and lasting for a relatively short time. The object of these affective episodes can be "external or internal, real or fictional, concrete or abstract" (Mulligan and Scherer, 2012, p.348). Despite emotions being highly abstract, they are grounded in our sensory-motor experience, that is, they are conceptualized through the physiological effects experienced by the subject. According to Soriano (2016), "language is a powerful tool for the study of emotion" (p. 206). In line with this, CL allows to examine how different aspects of language replicate aspects of human cognition, and metaphor is one of the clearest examples of this relationship. From a CL perspective, metaphor is understood as a natural and cognitive mechanism that partially maps properties from one domain of experience (source or donor) onto another (target). Well-known examples of metaphorical mappings from the literature are UNDERSTANDING IS SEEING or AFFECTING IS TOUCHING, as instantiated in expressions such as 'I *see* what you mean' or 'We were *touched* by the news'.

The conceptual association between two domains has usually been considered universal and usage-based (Grady, 1997; Lakoff & Johnson, 1980, 1999). For instance, the target domain of emotions has been found to be conceptualized by means of the donor domain of physiological changes (Kövecses, 2000). The conceptualization of perception metaphors, e.g., UNDERSTANDING IS SEEING, has also been perceived as universal (Lakoff &

Johnson, 1980, 1999; Sweetser, 1990). Yet research conducted in minority languages (e.g., Australian languages, Sedang) has evinced that the choice of a specific source domain is culture-based, not restricted to one sense (vision), and drawing from other perceptual modalities (i.e., touch, hearing or smell) (Evans & Wilkins, 2000; Ibarretxe-Antuñano, 2018).

Metaphor is also a productive way of semantic extension or polysemy (e.g., Deignan, 1999, 2020), for it serves to economize on words based on the context, so that existing linguistic resources are exploited and not necessarily new ones. Due to their intricate polysemy, perception verbs have long been an important subject of study (e.g., Geeraerts & Cuyckens, 2007; Ibarretxe-Antuñano, 1999, 2002, 2008; Rojo & Valenzuela, 2005; Sweetser, 1990; Viberg, 2015). Sense perception has also been related to the semantic field of emotions. Kurath (1921) was among the first scholars to explain the association between sense perception and emotion based on the similarity of feeling that both domains share. According to this author, "the kinaesthetic, the visceral, and the tactual perceptions have a relatively stronger tone (for emotional terms) than those of hearing and especially of sight" (p. 31). This is in line with Buck (1949), who contended that the word for "feel" as "perceive by touch" in West-Germanic languages referred to physical perception and to emotions.

Sweetser (1990) likewise claimed that physical perception cannot be easily separated from emotion. This connection between mind and body is what she coined as the MIND-AS-BODY metaphor. In her taxonomy of perception metaphors with regard to verbs for touch ('feel' *tocar*) and taste ('taste' *degustar*), the author highlighted how the vocabulary of physical perception maps onto that of the internal self, which is subjective (and emotional) as compared to the other objective senses. Ibarretxe-Antuñano (1999, 2002, 2005, 2006, 2008) supported this mapping of tactile perception onto emotions and broadened the metaphorical scope of perception verbs. Furthermore, following Sweetser (1990), the author proposed a network of metaphorical mappings in the perceptual domain under the more general MIND-AS-BODY metaphor. In a detailed cross-linguistic (Basque, English, and Spanish) analysis of meaning extensions of basic/generic tactile verbs, the author highlighted new domains of experience onto which the domain of tactile perception can map, showing, among others, how the meaning extension 'to affect' is connected to not only the domain of 'emotion', but also to other domains such as 'change of location'. Based on findings in Ibarretxe-Antuñano (2006), Raffaelli & Kerovec (2018) examined differences and similarities in conceptual mappings based on the concept of 'touch' in the formation of the Croatian and Turkish lexicon and their results showed the necessity for a more comprehensive analytic approach to tactile verbs that allows for a fine-grained definition of conceptual domains and subdomains. According to these authors, differences between the two languages can be observed only if subdomains are closely studied (p. 139).

In a recent study on semantic extensions in the field of tactile perception in Spanish and English, Martín-Gascón (2022) followed a corpus-driven approach and a contrastive and cognitive analysis to identify the most frequent concepts co-occurring with the verb *tocar* 'touch' in relation to the expression of emotion to shed light into the underlying metaphorical and metonymic mappings. Her findings revealed for the most part shared metaphors and metonymies in both languages, but also language-specific ones. For instance, both AFFECTING IS TOUCHING, which is based on the primary or basic-level MIND-AS-BODY metaphor, and CAUSE FOR EFFECT metonymy, were observed cross-linguistically in most tactile verb constructions, whereas metaphors such as ANGERING SOMEONE IS AFFECTING HER/HIS NERVES or ANNOYING PEOPLE ARE DISEASE or the EFFECT FOR CAUSE metonymy were mostly evidenced only for English.

2.2. Metaphor in the L2 classroom

The past two decades have seen a proliferation of empirical studies focusing on teaching metaphors to L2 learners, based on the premise that understanding and producing metaphors enhances learners' communicative competence and proficiency (Achard & Niemeier, 2004; Acquarioni Muñoz & Suárez Campos, 2019; Boers, 2013; Boers & Lindstromberg, 2008; Lantolf & Bobrova 2014; Littlemore & Juchem-Grundmann 2010; Martín-Gascón, 2020, 2021; Niemeier, 2017; Suárez Campos & Hijazo-Gascón, 2019; Teymouri & Dowlatabadi, 2014). This research has succeeded in showing the relevance of explicitly teaching metaphor and raising L2 learners' metaphoric awareness (i.e., showing learners about the existence of conventionalized linguistic expressions used unconsciously and highlighting how metaphors structure those expressions) in terms of L2 engagement and learning.

In this regard, Boers (2000) argued that rather than encouraging L2 learners to generate metaphors, instilling a metaphor awareness might be more successful to "organize the steady stream of figurative language they are exposed to" (p. 564). In one of the few studies examining metaphorical production and comprehension, Charteris-Black (2002) concluded that practitioners should explicitly highlight the different source and target domains between the L1 and L2 in the L2/classroom. In MacArthur's (2010) approach to metaphor as a mechanism for semantic extension, the author affirmed that metaphor becomes the L2 learner's "best ally in the quest for greater expressive powers" (p. 159). Furthermore, the pedagogical techniques used in his method were less significant than both the general foregrounding of metaphor and the effects this might have had on the growing awareness of how metaphor permeates language.

In another study, MacArthur & Littlemore (2011) examined figurative language in spoken interaction (production and comprehension) in English L1 and L2 speakers. Results from their analysis led the authors to advocate the need for training in boosting the metaphorical potential of vocabulary in an L2. In this line, Littlemore & Juchem-Grundmann (2010) stressed how figurative or metaphoric thinking allows learners to comprehend linguistic metaphors that are novel to them and to use language in a creative manner. Lantolf & Bobrova (2014) also advocated the inclusion of figurative language realized as metaphor in any pedagogical program and offered didactic examples to teach emotion metaphors using colors, animals and sports as source domains. In line with this study, Niemeier's (2017) work on teaching color metaphors to German learners of English/L2 presented a practical example of the pedagogical potential of equipping students with experience-based and motivated tools in a classroom environment.

Acquaroni Muñoz & Suárez Campos' (2019) study evidenced the role of teaching metaphors explicitly in students' interlanguage characterization and enhanced metaphoric competence. In another study, Suárez Campos & Hijazo-Gascón (2019) highlighted the importance of reflecting on metaphors to elucidate the polysemous origin of words and to contribute to a more significant acquisition of the lexicon. Following this, Martín-Gascón (2020, 2021) offered pedagogical proposals that aim to enhance Spanish/L2 learners' metaphoric and communicative competence through emotion metaphors.

Developing the L2 learner's metaphoric competence (i.e., the ability to understand and use metaphors in a given language) is therefore necessary for a more native-like assimi-

lation of the target language. Only a small number of studies have so far developed tests that measure fluency of interpretation and original metaphor production. Littlemore (2001) is among the few having done so in her study with intermediate to upper-intermediate English/L2 learners. In this study, some of the dimensions explored in Littlemore's (2001) test are targeted.

2.3. CL based assessment: A gap

If the design of a cognitive-based (e.g., metaphor-based) pedagogical material is of utmost importance for empirical research within the field of applied CL, the elaboration of assessment tasks that are coherent with the type of instruction should also be paramount. Previous investigations targeting the productivity of CL approaches to L2 learning and teaching (Boers & Lindstromberg, 2008; De Knop et al., 2010; Tyler et al., 2011; among many others) have so far used traditional tests to assess cognitive-inspired instruction, and thus have disregarded this notion of adapting data collection practices. This methodological change has been defended by Llopis-García (2021), who claims that novel instruction requires novel data collection types. This author calls for a change in the type of assessment used in empirical studies, as she contends that the tests employed to evaluate students' learning gains favor traditional instruction over novel cognitive-based pedagogies that veer from typical traditional testing, such as grammaticality judgement, fill in the black, correct vs. incorrect, or multiple choice, among others.

Considering this tradition and in an attempt to render the teaching, learning and assessment of Spanish/L2 metaphorical perception constructions more meaningful, the present study is novel in offering motivated and motivation tools at the three stages (teaching, learning, and assessing) to help English speakers become aware and establish connections between their L1 and Spanish, as well as to enhance their metaphoric and communicative competences.

3. The present study

This investigation builds from findings from a previous cognitive analysis of 23 frequent Spanish constructions with the tactile verb *tocar* conveying positive and negative emotions (Figure 1). The experiment reported thus lies within a CL-and metaphor-based pedagogical approach to both teach and assess metaphor, in general, and metaphorical tactile constructions in relation to emotion, in particular, at a Spanish/L2 instructional environment.

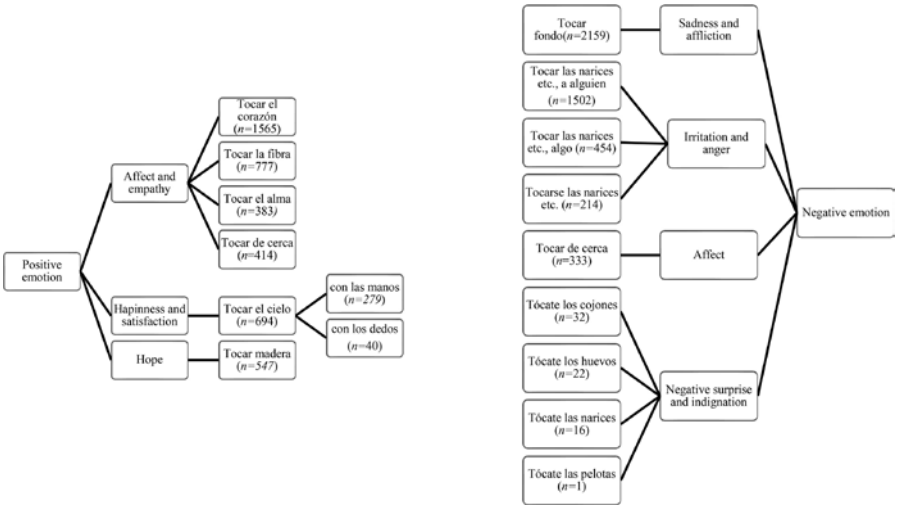

Figure 1. *Constructions and number of cases according to the Corpus del Español (Davies, 2018)* (Retrieved from Martín-Gascón, 2022, p. 51)

Hence, the purpose of this investigation is twofold. On the one hand, the study seeks to contribute to the existing literature as it aims to examine the potential benefits of explicitly teaching metaphor in the Spanish/L2 classroom, and more specifically, it targets metaphoric constructions related to tactile constructions of emotion for the first time. On the other hand, it aims to compare two pedagogical approaches, a cognitive-based one and a traditional one, using, as a novelty, CL-based assessment tests. Bearing this in mind, the study addressed two research questions:

RQ1: Are learners' metaphoric comprehension and production in the L2 enhanced after the intervention? Which approach is more effective?
RQ2: Are learners' comprehension and production of metaphorical tactile constructions in the L2 enhanced after the intervention? Which approach is more effective?

3.1. Methodology

3.1.1. Participants

For this investigation, a group of 33 A2+ learners who were taking a Spanish/L2 course at a North American university participated. The initial pool, consisting of 36 students from different course sections, was randomly assigned to one of the three research groups and was reduced to a final group of 33 participants (traditional-TRAD, *n*=10; cognitive-COG, *n*=13; control-CON, *n*=10). The criteria followed was: first, not being heritage speakers; second, having participated in all three sessions; and third, achieving scores of equal or less than 55% in the pretest.

3.1.2. Materials

Two instruction packages and data collection tools were designed and implemented.

3.1.2.1. Cognitive-based instruction package

The instruction package designed for the COG group (Appendix A) was elaborated based on findings in Martín-Gascón (2022), as it first included an explanation of the target constructions focusing on the underlying metaphorical mappings, and to similarities and differences in the L1 and L2 (Figure 2). The importance of highlighting the similar and differing source and target domains had been already emphasized by Charteris-Black (2002).

Figure 2. *Sample of activity in cognitive package. Images from Inside Out (Rivera, 2015)*

Hence, the didactic sequence considered, among others, metaphorical visual cues in motion (GIFs) that explicitly focused the attention on the bodily motivation of metaphors for emotion (e.g., happiness is up, anger is fire, sadness is down) and figurative constructions in both English and Spanish (e.g., 'went red', *se puso roja*, 'blowing off', *desfogando*). After presenting more general metaphorical expressions for anger, sadness, and happiness, and explicitly reflecting upon them, students were presented with the target constructions. The explanation included relatable and experiential metalanguage, colors (green for positive emotions, red for negative), as well as visual input that represented the target emotion and expression in an embodied manner (see Figure 3). For instance, when presenting *tocar fondo* and *tocar el cielo*, the instructor asked for the English equivalents ('touch the sky', 'hit rock bottom'), highlighted similarities and differences ('hit' versus *tocar*), put the emphasis on the verticality aspect, and accompanied the explanation with embodiment and gestures.

Figure 3. *Sample of activity in cognitive package*

3.1.2.2. Classic / traditional instruction package

The traditional package (Appendix B) was designed in line with most market-ready textbooks, that is, it followed a communicative approach and was elaborated according to the way this latter presents linguistic content in Spanish/L2 textbooks. Students were first introduced to a brainstorming task and were asked about the expression of different emotions with the aid of visual cues and context. When encountered with the target constructions, attention was given to the contrast between English and Spanish, yet the semantic motivation behind the constructions under study was not targeted (Figure 4).

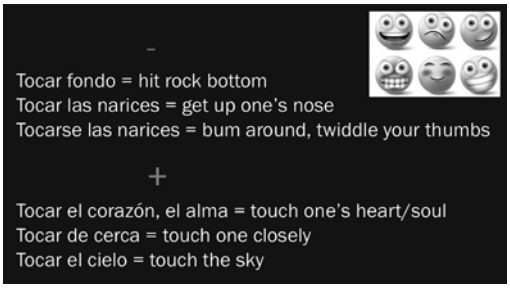

Figure 4. *Sample of activity in traditional package*

3.1.2.3. Data collection and assessment instruments

A pretest (Appendix C), posttest (Appendix D) and delayed posttest (Appendix E) were designed to assess participants' metaphoric comprehension and production as well as performance of the target metaphorical constructions (comprehension and production of constructions with *tocar* that express positive and negative emotions). As a novelty, all tests were meaning-based and required students to reflect upon their embodiment (i.e., perceptual and bodily) and ponder over similarities and differences with their L1. The items were designed departing from a right or wrong dichotomy and a focus on metalanguage, and instead encouraged learners to derive meaning from context, visual cues, and physical and perceptual experience. Each test included four types of tasks with the same number of items.

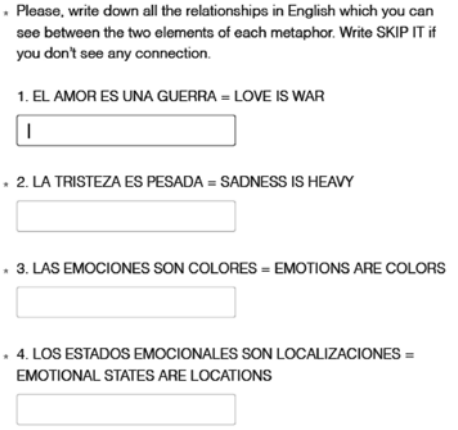

Figure 5. *Sample of items in Task 1*

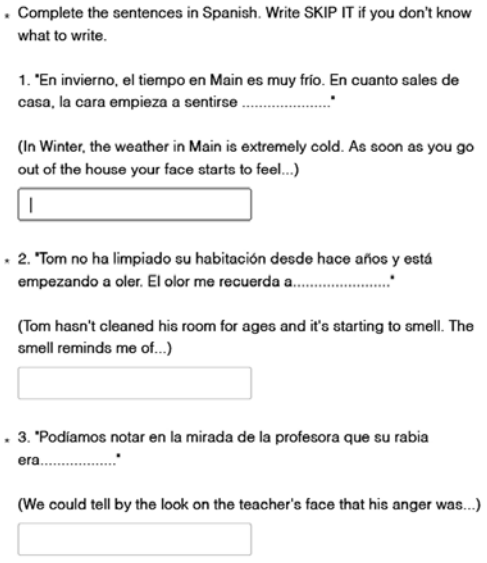

Figure 6. *Sample of items in Task 2*

Task 1 and Task 2 measured general metaphor interpretation and original metaphor production, respectively, and were adapted from Littlemore's (2001) study (Figure 5 and 6). Task 3 assessed learners' interpretation of the target metaphorical constructions with *tocar* (Figure 7) and Task 4 examined learner' production of said constructions (Figure 8).

* Choose the sentence that best describes this image and explain why:

- ( ) Entiendo que estés nervioso por la operación, ese tema me toca en casa
- ( ) Entiendo que estés nervioso por la operación, ese tema me toca de cerca
- ( ) SKIP IT

* Explain why in English (or write SKIP IT)

Figure 7. *Sample of items in Task 3*

Is there in Spanish a similar expression to the English expressions "to bum around" or "to twiddle your thumbs"?

"Ana has spent the whole day bumming around"

"Ana se ha pasado el día entero _____"

Please write here what you think might be the Spanish equivalent of "TO BUM AROUND" or "TO TWIDDLE YOUR THUMBS". Write SKIP IT if you don't know the answer.

Figure 8. *Sample of items in Task 4*

3.1.3. Procedure

The teaching sessions and the three tests were delivered during normal class sessions for each participating group. Tests were administered online via Wufoo. Over a week and a half, the researcher met each group a total of three times. On the first session, participants received general information about the study in a short presentation and were asked to fill in a consent form and complete the pretest. On another session, the two experimental groups received an hour of instruction and completed the posttests. The control group received instruction that was independent from the target form. The last session took place after a few days and all three groups filled in the delayed posttests.

4. Results and Discussion

4.1. RQ1: Are learners' metaphoric comprehension and production in the L2 enhanced after the intervention? Which approach is more effective?

The first RQ examined the change in students' general metaphoric competence when being exposed to a CL-inspired approach and a traditional one to teaching metaphorical tactile constructions. More specifically, it looked at L2 learners' general metaphoric interpretation (Task 1) and general metaphoric original production (Task 2) development. Results by each group in the three time periods (pretest, posttest and delayed) were compared. Table 1 displays the means, median, standard deviations (*SD*), and confidence intervals (CI) for the two tasks in all three conditions.

Table 1. *Descriptive statistics for tasks 1 and 2*

Time	Group	Task 1 Mean	Median	*SD*	95% CI	Task 2 Mean	Median	*SD*	95% CI
Pre	CON (n = 10)	1.60	2.00	1.26	[0.70, 2.50]	1.40	1.50	1.17	[0.56, 2.24]
	COG (n = 13)	1.69	3.00	1.65	[0.69, 2.69]	1.23	1.00	0.59	[0.87, 1.59]
	TRAD (n = 10)	1.10	0.00	1.59	[-0.04, 2.24]	1.40	1.00	0.84	[0.80, 2.00]
Post	CON (n = 10)	1.30	1.00	1.41	[0.29, 2.31]	0.50	0.50	0.52	[0.12, 0.88]
	COG (n = 13)	3.08	4.00	1.49	[2.17, 3.98]	2.46	2.00	0.51	[2.15, 2.78]
	TRAD (n = 10)	1.50	1.00	1.65	[0.32, 2.68]	1.40	1.00	0.84	[0.80, 2.00]
Del	CON (n = 10)	1.60	1.00	1.77	[0.33, 2.87]	1.50	2.00	0.70	[0.99, 2.01]
	COG (n = 13)	2.62	4.00	1.85	[1.50, 3.73]	2.69	3.00	0.63	[2.31, 3.07]
	TRAD (n = 10)	1.80	1.50	1.81	[0.50, 3.10]	1.60	2.00	0.96	[0.91, 2.29]

To assess within-group differences across pretest, posttest, and delayed posttest scores, Friedman tests were used. Results showed that there was no significant difference in scores across the three test situations for neither task in neither the CON nor the TRAD groups. Results revealed a statistically significant increase in test scores across the three situations ($x^2(2) = 12{,}500$, $p = .002$) for Task 1 in the COG group, as observed in Table 2.

Table 2. *Friedman test statistics*

		N	Chi-Square	df	Sig.
CON	Task 1	10	0,437	2	0,804
	Task 2	10	5,353	2	0,069
COG	Task 1	13	12,500	2	0,002
	Task 2	13	19,077	2	0,000
TRAD	Task 1	10	1,625	2	0,444
	Task 2	10	1,771	2	0,412

As Table 3 displays, post-hoc analyses with Wilcoxon signed-rank tests revealed a statistically significant increase in test scores ($Z = -2{,}565$, $p = .010$), with large effect size ($r = .50$) for Task 1. Results of the Friedman test for Task 2 indicated that there was a significant difference in test scores across the three tests ($x^2(2) = 19{,}077$, $p = .000$) (see Table 2 above).

After running post-hoc analyses, results from Wilcoxon signed-rank tests showed a statistically significant increase in test scores ($Z = -3{,}025$, $p = .002$), with large effect size ($r = .59$). The median score also increased from pretest (1,00) to posttest (2,00), and further increased in the delayed test (3,00). Negative influence of time was not recorded since scores on delayed tests remained the same (sometimes higher) as scores on the posttests.

Findings revealed that students in the cognitive condition were the only ones who improved and performed significantly better in interpreting metaphors and producing original metaphors. This suggests that teaching metaphor explicitly yields statistically significant positive outcomes in learners' metaphoric competence. These results are in line with previous studies aiming at testing the relevance of metaphor inclusion as a means of raising L2 learners' metaphor awareness and production (e.g., Acquaroni Muñoz & Suárez Campos, 2019; Boers, 2000; Charteris-Black, 2002; Lantolf & Bobrova, 2014; Littlemore & Juchem-Grundmann, 2010; MacArthur, 2010; MacArthur & Littlemore, 2011; Martín-Gascón, 2020, 2021; Niemeier, 2017; Suárez Campos & Hijazo-Gascón, 2019).

Table 3. *Wilcoxon signed-rank test statistics*

COG		Z	Sig.	Effect size
Task 1	posttest_Interpretation pretest_Interpretation	-2.565[b]	0,010	0,503
	delayed_Interpretation posttest_Interpretation	-1.289[c]	0,197	
Task 2	posttest_Production pretest_Production	-3.025[b]	0,002	0,593
	delayed_Production posttest_Production	-1.342[b]	0,180	

Kruskal-Wallis tests were run to observe whether there was a difference in the general metaphoric competence test scores between groups. Results showed a statistically significant difference in test scores between CON, TRAD and COG in posttest in Task 1 and in posttest and delayed test in Task 2 (Table 4). To further determine which two groups evinced this difference, Mann-Whitney U tests were run in the three testing situations (Table 5). Results revealed significant difference between test scores in posttest situation for Task 1 between the TRAD and the COG groups (Z = -2,383, p = .017); scores from this latter were significantly higher. Posttest results for Task 2 were also significantly higher in the COG group than in the TRAD group (Z = -2,931, p = .003). Mann-Whitney U tests showed significant difference between test scores in delayed test situation (Task 2) between the two experimental groups (Z = -2,995, p = .003), being those by the COG group significantly higher. Results of the previous tests suggest that students in the COG approach group have better chances to obtain higher test scores on Task 1 and Task 2 than students from the TRAD group.

Table 4. *Kruskal-Wallis test statistics*

	Chi-Square	df	Sig.
pretest_Interpretation	0,808	2	0,668
posttest_Interpretation	8,363	2	0,015
delayed_Interpretation	1,577	2	0,455
pretest_Production	0,224	2	0,894
posttest_Production	19,501	2	0,000
delayed_Production	14,361	2	0,001

Table 5. *Man-Whitney test statistics*

	Mann-Whitney U	Wilcoxon W	Z	Sig. (2-tailed)
posttest_Interpretation	28,5	83,5	-2,383	0,017
posttest_Production	20,5	75,5	-2,931	0,003
delayed_Interpretation	49,5	104,5	-1,028	0,304
delayed_Production	20,5	75,5	-2,995	0,003

Results derived from the comparisons between groups during each test across time lead us to conclude that all three groups had similar scores in both tasks in the pretest. However, although learners in the COG group obtained a slightly lower score than those in the CON and TRAD conditions for the pretest in the production task, COG group's scores improved significantly in the immediate posttest and delayed posttest, while the CON performed poorly on the posttest and the TRAD showed no improvement. This latter showed progress over time in metaphor comprehension, yet the increase in scores was not statistically significant. To better understand our results, it is important to bear in mind that metaphoric competence has been claimed to be part of general cognition (see early experimental work by Billow, 1975; or Kogan, 1983). The ability to interpret and produce metaphors involves other cognitive skills (Evan & Green, 2006) and this could be related to the same tendency or skill

in the L2, as suggested by Littlemore (2010). This reasoning could explain why participants in this study showed relatively good results in the pretest and why students in the CON and TRAD conditions maintained to some extent their scores, even if they did not receive explicit instruction on metaphors. Results from the analysis looking at type of instruction and its effects on the two experimental conditions (COG and TRAD) revealed that after the pedagogical intervention, the learners in the cognitive-based group performed significantly better than those in the traditional one in metaphor comprehension in the posttest and in metaphor production in both the posttest and delayed posttest. This finding is consistent with the idea defended by scholars in the field of L2 pedagogy and applied cognitive linguistics that students perform more effectively in interpreting and producing metaphors after a cognitive and metaphor-based teaching session than those who are exposed to the pervading communicative and formalist method.

4.2. RQ1: Are learners' comprehension and production of metaphorical tactile constructions in the L2 enhanced after the intervention? Which approach is more effective?

The second RQ focused on learners' interpretation (Task 3) and production (Task 4) of metaphorical tactile constructions. Table 6 shows the means, median, *SD* and CI of Task 3 and Task 4 for each condition. Results from pretest and delayed in the production task for the CON group were not taken into consideration, since all test scores were equal to zero.

Table 6. *Descriptive statistics for tasks 3 and 4*

Time	Group	Task 3 Mean	Median	*SD*	95% CI	Task 4 Mean	Median	*SD*	95% CI
Pre	CON ($n = 10$)	1.80	1.00	1.47	[0.74, 2.86]	0			
	COG ($n = 13$)	3.77	4.00	1.83	[2.66, 4.88]	0.15	0.00	0.37	[-0.07, 0,38]
	TRAD ($n = 10$)	3.60	3.00	1.43	[2.58, 4.62]	0.20	0.00	0.42	[-0.10, 0.50]
Post	CON ($n = 10$)	1.40	1.00	1.07	[0.63, 2.17]	0.20	0.00	0.42	[-0.10, 0,50]
	COG ($n = 13$)	6.77	8.00	1.87	[5.63, 7.90]	1.62	2.00	0.50	[1.31, 1.92]
	TRAD ($n = 10$)	3.30	3.00	1.82	[1.99, 4.61]	1.20	1.00	0.78	[0.64, 1.76]
Del	CON ($n = 10$)	1.40	1.00	0.84	[0.80, 2.00]	0			
	COG (n = 13)	6.85	8.00	1.67	[5.83, 7.86]	1.54	2.00	0.51	[1.22, 1.85]
	TRAD ($n = 10$)	5.00	5.00	2.10	[3.49, 6.51]	1.00	1.00	0.94	[0.33, 1.67]

In line with findings from general metaphoric competence, the Friedman test (Table 7) indicated that there was no significant difference in test scores across the three test situations

for Task 3 and Task 4 in the CON group. Concerning the TRAD group, no significant difference in test scores was found for Task 3, yet a significant difference was shown for Task 4 ($x^2(2) = 11{,}143$, $p = .004$). Post-hoc analyses with Wilcoxon signed-rank tests (Table 8) were then conducted and showed a statistically significant increase in test scores ($Z = 2{,}428$, $p = .015$), with large effect size ($r = .54$). Indeed, the median score increased from pretest (0,00) to posttest (1,00) and remained the same in the delayed test. Furthermore, results of the Friedman test for the COG group showed that there was a significant difference in test scores across the three test situations ($x^2(2) = 14{,}683$, $p = .001$) for Task 3 (see Table 7).

These results reveal that students' comprehension and production of metaphorical tactile constructions in the COG group were significantly enhanced across time. The TRAD group also performed significantly better in producing the target metaphorical constructions; however, the improvement was not superior to the COG group, and this was not the case for comprehension. It is worth remembering that empirical studies conducted to date (e.g., Boers & Lindstromberg, 2008; De Knop et al., 2010; Tyler et al., 2011) have so far applied a traditional assessment for data elicitation in which the cognitive condition, without having received traditional instruction, still performed as well as the traditional.

If we look at Table 6, which summarizes the comparisons between groups during each test, we can conclude that even though students in the TRAD condition obtained in the pretest a slightly higher score in producing the target form than those in the COG condition, this latter showed a greater improvement after the pedagogical intervention than the TRAD group. Furthermore, scores from the delayed test dropped slightly for both groups, being this decrease larger in the TRAD group. This dropping of scores might be due to time and memory effects. Leaners' production of metaphorical tactile constructions in the posttest can be interpreted as the result of recently acquired knowledge put into practice; yet, that same active practice carried out a few days after the intervention becomes cognitively more challenging, for it involves more long-term memory, and thus performance is negatively affected.

Post-hoc analyses with Wilcoxon signed-rank tests (Table 8) were then run and revealed a statistically significant increase in test scores ($Z = -2{,}809$, $p = .005$), with large effect size ($r = .55$). The median score increased from 4,00 in the pretest to 8,00 in the posttest and remained the same in the delayed test. Results also showed that there was a significant difference in test scores across the three-time situations for Task 4 ($x^2(2) = 19{,}682$, $p = .000$). Wilcoxon signed-rank tests revealed a statistically significant increase in test scores ($Z = -3{,}153$, $p = .002$), with large effect size ($r = .61$) for Task 4 (see Table 8). The median score increased from pretest (0,00) to posttest (2,00) and remained the same in the delayed test.

Table 7. *Friedman test statistics*

		N	Chi-Square	df	Asymp. Sig.
CON	Task 3	10	0,923	2	0,630
	Task 4	10	4,000	2	0,135
COG	Task 3	13	14,683	2	0,001
	Task 4	13	19,682	2	0,000
TRAD	Task 3	10	4,800	2	0,091
	Task 4	10	11,143	2	0,004

Table 8. *Wilcoxon signed-rank test statistics*

		COG			TRAD		
		Z	Asymp. Sig. (2 tailed)	Effect size	Z	Asymp. Sig. (2 tailed)	Effect size
Task 1	posttest_Interpretation pretest_Interpretation	-2.809[b]	0,005	0,550			
	delayed_Interpretation posttest_Interpretation	-.171[b]	0,864				
Task 2	posttest_Production pretest_Production	-3.153[b]	0,002	0,618	-2.428[b]	0.015	0.54
	delayed_Production posttest_Production	-.378[c]	0,705		-1.414[c]	0.157	

Previous analyses have evinced that a cognitive approach has a stronger impact on tests scores in the interpretation task than a traditional one. Like in general metaphoric competence, negative influence of time was not recorded for the target tactile constructions, since the scores on delayed tests remained the same as the scores on posttests.

Kruskal-Wallis tests were used to assess between-group differences in the three testing moments. Results revealed a statistically significant difference in test scores between the three group conditions in posttest and delayed test situations for both tasks (Table 9). To determine which two groups showed this difference, a Mann-Whitney U test was run. Results indicated that there was no significant difference between test scores in Task 3 and Task 4 in the pretest situation between TRAD and COG. A Mann-Whitney U test (see Table 10) revealed significant difference between test scores in posttest situation for Task 3 between TRAD and COG groups (Z = -3,346, p = .001). Posttest results were significantly higher in the COG group. Likewise, a Mann-Whitney U test revealed significant difference in the delayed test situation (Task 3) between TRAD and COG groups (Z = -2,120, p = .034), being significantly higher in the COG condition. Results of the previous tests suggest that students in the cognitive approach group have better chances to get higher test scores on Task 3 and Task 4 than students from the traditional approach group. The findings presented here confirm that a cognitive-based pedagogy, if followed by a coherent assessment based on CL-based principles (in agreement with Llopis-García, 2021), could become a fruitful approach to teaching and learning complex linguistic constructions in relation to emotions.

Table 9. *Kruskal-Wallis test statistics*

	Chi-Square	df	Asymp. Sig.
pretest_Interpretation	8,585	2	0,014
posttest_Interpretation	21,616	2	0,000
delayed_Interpretation	21,433	2	0,000
pretest_Production	2,029	2	0,363
posttest_Production	16,698	2	0,000
delayed_Production	18,122	2	0,000

Table 10. *Man-Whitney test statistics*

	Mann-Whitney U	Wilcoxon W	Z	Sig. (2-tailed)
posttest_Interpretation	12,000	67	-3,346	0,001
delayed_Interpretation	32,000	87	-2,120	0,034

5. Discussion

The empirical study presented here, lying within a CL approach to teaching and assessing metaphorical tactile constructions in relation to emotion, renders firm evidence in support of a continued exploration of applied CL and metaphor-based methods to L2 teaching and learning. The findings reported are in line with previous research aiming at showing the importance of incorporating metaphor in the language curriculum to raise L2 metaphoric awareness, understanding and production. Students in the cognitive group not only outperformed significantly in interpreting metaphors and producing original metaphors than those in the traditional condition, but they were also superior at both production and comprehension tasks for the target metaphorical constructions– in this latter they were significantly better. Considering the positive results and in agreement with research on L2 metaphor teaching, we can conclude that instilling metaphoric awareness and encouraging learners to generate metaphors enhance not only students' metaphoric competence but also their communicative competence, i.e., comprehension and production of figurative constructions.

Furthermore, this study adds the design and implementation of cognitive-based assessment tests as a novelty, an aspect that had been neglected in applied CL. This, along with motivated and embodied linguistic descriptions, proves to be a successful method for teaching, learning, and assessing complex constructions in the L2. So far, CL research has focused on evaluating students via traditional tasks, regardless of the novel approach to which students were exposed to during the intervention. Traditional tasks are the unremitting companions of learners in regular classroom testing and what students are used to in their everyday instruction. Systemic, motivated, and embodied explanations focusing on image-based form and meaning pairings, however, veer deeply from the more mechanized answer options of traditional tasks. Hence, when assessing the effects of a novel instruction with traditional methods, the cognitive groups never have a fair chance. Further empirical studies providing a larger sample, extended intervention periods, and examining other linguistic constructions could help corroborate our promising findings. To the best of our knowledge, this is the first case study that examines the effects of a CL-inspired methodology for both teaching and assessing metaphoric competence and metaphorical tactile constructions, which opens new horizons for research in CL applied to the L2 classroom.

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7. Appendices

Appendices have been uploaded to the following Open Science Framework URL: *https://osf.io/gywbr/?view_only=baa010e05ddd4378958311ca3773a09e*