Cognitive individual differences in learning Spanish L2/FL emblematic gestures: multiple intelligences and learning styles

Diferencias individuales cognitivas en el aprendizaje de los gestos emblemáticos en español L2/FL: inteligencias múltiples y estilos de aprendizaje

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Abstract

The elements with which we communicate are verbal and non-verbal. For this reason, the inclusion of non-verbal communication is progressively gaining presence in L2/FL teaching to enhance intercultural communication. However, very few studies involve empirical approaches to understand the acquisition of L2/FL non-verbal signs in the classroom. This study analyzes the role of two cognitive individual differences (multiple intelligences and learning styles) on the learning of three types of emblematic gestures (common, different, and unique) are studied. To this end, an intervention comprising a pretest, an instruction period, and a post-test was carried out with a group of anglophone college students learning Spanish as L2/FL. The results show that kinesthetic intelligence facilitates learning the three types of emblematic gestures, while none of the learning styles analyzed facilitates learning these gestures.

Key words: emblems; non-verbal communication; language learning; kinesthetic intelligence; L2/FL Spanish

Resumen

Los elementos con los que nos comunicamos son tanto verbales como no verbales. Por este motivo, a fin de potenciar la comunicación intercultural, la inclusión de la comunicación no verbal está ganando progresivamente presencia en la enseñanza de L2/LE. Sin embargo, muy pocos estudios presentan enfoques empíricos para comprender la adquisición de signos no verbales L2/FL en el aula. Este estudio analiza el papel de dos diferencias cognitivas individuales (estilos de aprendizaje e inteligencias múltiples) en el aprendizaje de tres tipos diferentes de emblemas (comunes, diferentes y únicos). Para ello, se llevó a cabo una intervención formada por un pretest, un periodo de instrucción y un postest con un grupo de alumnos universitarios anglófonos que aprendían español como L2/LE. Los resultados muestran que la inteligencia cinestésica facilita el aprendizaje de los tres tipos de gestos emblemáticos, mientras que ninguno de los estilos de aprendizaje analizados lo promueve.

Palabras clave: emblemas; comunicación no verbal; aprendizaje de lengua; inteligencia kinestésica; español L2/LE

1. Introduction

Non-verbal signs are essential to performing and understanding messages in oral communication (Escandell Vidal, 2014; Cestero, 2017b). Moreover, non-verbal communication (NVC) varies markedly across cultures and languages (Watson & Graves, 1966; Watson, 1970; Hall, 1973; Hall & Hall, 1990; Poyatos, 1994b; Cestero & Gil, 1995; Capper, 2000; Matsumoto & Hwang, 2013; Schmidt, 2013; Cestero, 2017a), so it should be included in second- and foreign language (L2/FL) classrooms to ensure successful intercultural communication in the target language. However, while there is a considerable body of work addressing the role of non-verbal signs on L2 learning (Billot-Vasquez, Lian, Hirata & Kelly, 2020; Bedir & Daskan, 2023), studies on the learning of L2/FL non-verbal signs (i.e., non-verbal signs from the target language) are less frequent, particularly in Spanish as a Second Language. Consequently, the integration of NVC in teaching materials and curricular approaches is still under development (Cestero, 2017b).

NVC is traditionally classified into four main systems with different subgroups in each of them: paralanguage (phonics skills, physiological or emotional sound signs, pauses, and silence), kinesics (gestures, manners, and postures), proxemics (space and physical touch), and chronemics (conception and structure of time) (Cestero, 2004, 2017a; Poyatos, 1994a, 1994b, 2017). Since each of these systems and subgroups has its own linguistic complexities and pedagogical implications, they require different methodological approaches. This study focuses on kinesics and, more specifically, on *emblematic gestures* or *emblems*, which can be defined as autonomous signs that have a direct verbal equivalent, whose use is unambiguous within a speech community, and that play different communicative functions (Ekman & Friesen, 1969; Kendon, 1988; McNeill, 1992; Gullberg, 1998; Cienki, 2008; Teßendorf, 2013; Poyatos, 2017; Payrató & Clemente, 2020). For example, the gesture in which the tips of the index and middle fingers brush the thumb with a rapid and repeated movement, meaning ‘money’,

is an emblem in different Spanish- and English-speaking cultures. These gestures are significantly related to different students' competences: lexical and semantic competence, as they are associated with different lexical units of the verbal system; (inter)cultural competence, as each culture has its distinctive emblematic repertoire; and socio-linguistic and pragmatic competences, as their use in communication depends on a variety of discursive, diaphasic, diastratic, and social factors (Belío-Apaolaza, 2019).

The complexity of the dimensions involved in emblem learning requires considering not only the linguistic components typically analyzed in second language acquisition (SLA), but also the role of individual and contextual factors, that is, students' individual differences (IDs) and their importance in SLA. Although IDs are still being conceptualized and understood, it is undeniable that they are crucially involved in the L2/FL learning process (Perales & Cenoz, 2002; Dewaele, 2009; Zafar & Meenakshi, 2012; Griffiths & Soruç, 2020; Piechurska-Kuciel, 2020; Luque & Covey, 2023). In fact, the study of IDs and their pedagogical implications is expected "to lead to the kind of teaching practices that increase the success ratio at second-language acquisition" (Zafar & Meenakshi, 2012: 644–645).

This research will analyze two cognitive IDs (multiple intelligences and learning styles) in the learning of Spanish emblems, which will contribute to a reflection on the best teaching practices for these non-verbal signs. To this end, we designed a quasi-experimental intra-subject study, consisting of a pre-test composed of several measuring instruments, an instruction period, and a post-test identical to the pre-test. The pre- and post-tests and the instruction period included different types of emblems based on the similarities and differences between the target language (Spanish) and the participants' mother tongue (English). Thus, this research shall address the following questions: 1) Do multiple intelligences and learning styles as cognitive individual factors play a role in the learning of emblematic gestures in L2/FL Spanish? 2) What specific intelligences are related to the learning of emblematic gestures

in L2/FL Spanish? 3) What specific learning styles are related to the learning of emblematic gestures in L2/FL Spanish?

2. Literature review

2.1. *Emblematic gestures in* SLA

Emblems are highly symbolic gestures within a community whose meanings have different degrees of clarity for other speakers depending on their form, meaning, and resemblance to the emblematic gestures in their cultural code (Ekman & Friesen, 1969; McNeill, 1992; Gullberg, 1998; Cienki, 2008; Teßendorf, 2013; Poyatos, 2017; Payrató & Clemente, 2020). For L2/FL classrooms and studies on SLA, emblems can be classified based on the degree of similarity with those in the learners' culture of origin. Emblems can be classified into three major categories: 1) *common*: gestures with the same form and meaning in both cultures; 2) *different*: gestures that have a different form but share the same or very similar meaning; and 3) *unique*: gestures with no formal or semantic equivalent in the other culture (Belío-Apaolaza & Hernández Muñoz, 2024). It is reasonable to assume that the latter two categories can lead to miscommunication and cultural misunderstandings when interacting in the target language.

Despite the role of gestures in (mis)communication, research on this discipline in SLA is scarce.[1] Indeed, only two empirical studies about the learning process of emblems are available.[2] In the first

[1] There is, however, a substantial body of work addressing the role of other types of gestures in L2/FL learning and communication, especially on co-speech gestures. Refer the studies by Gullberg (1998) on communication strategies; McCafferty (2002) on word retrieval; Gullberg (2008) on grammar learning; Kelly, McDevitt and Esch (2009) on word learning; Macedonia and von Kriegstein (2012) on verbal memory; Hoetjes and van Maastricht (2020) on phoneme acquisition; and Stam (2018) on a literature review on this field.

[2] There are two additional types of research on emblematic gestures, but with no learning process involved: studies that attempted to create a valid instrument to

one, Jungheim (1991) conducted a quasi-experimental research study with college students from Japan who were learning English as an L2/FL. The experiment consisted of pre- and post-tests including one identification task with emblems that was performed in isolation. In between the pre- and post-tests, the students were given instruction based on two types of teaching methodologies: an inductive or, as the author describes, a 'natural' or 'more communicative' methodology, where the work was performed in small groups; and a deductive, 'more traditional' and 'teacher-centered' methodology, where the students and the teacher worked together with a presentation, practice, and production. The results showed that the group that received the 'teacher-centered' methodology understood more emblems than the 'more communicative' group, and that the 'teacher-centered' was the only group showing a statistically significant difference between the results in the post- and pre-tests, apparently confirming the advantages of learning based on this approach.

In the second empirical study, Belío-Apaolaza & Hernández Muñoz (2024) carried out an intra-subject quasi-experimental study (also consisting of a pre-test, an instruction period, and a post-test) in students of Spanish as L2/FL from the USA. They studied the learning based on the three gesture types mentioned above (*common, different*, and *unique*) using different types of tasks (controlled, semi-controlled, and free activities) and skills (comprehension and production). These authors found that learners improved their production and comprehension skills, as well as the three types of practice (free, semi-controlled, and controlled) after the instruction period. The participants also improved the three types of gestures (*common*, *different*, and *unique*). Belío-Apaolaza & Hernández Muñoz (2024: 20) state that instruction was based

measure non-verbal abilities to comprehend L2/FL gestures (Jungheim, 1994, 1995; O'Sullivan, 1996) and studies that measured the ability to identify L2/FL emblems by subjects with no previous instruction on the gestures included in the assessment (Mohan & Helmer, 1988; Jungheim, 2008; Salvato, 2011).

on "activities to promote students' active communication, in which the role of the teacher was as a facilitator who prepares and guides activities, provides feedback and encourages students towards the resolution of cultural problems." Their results differ from those by Jungheim (1991), as the latter showed that the 'teacher-centered' group was the only one with a statistically significant progress from the pre- to the post-test.

Belío-Apaolaza & Hernández Muñoz (2024) noted that this divergence could be explained by different factors, such as the particular learning contexts in which both studies were conducted, the time spent on instruction (five 20-minute sessions in Jungheim's study vs. six 1-hour sessions in Belío-Apaolaza & Hernández Muñoz (2024) study), or the activities included in the instruction: although Jungheim's article does not provide details on the teaching materials, this author explains that the 'more communicative' methodology involved an inductive or implicit approach while the 'teacher-centered' one was deductive or more explicit. In Belío-Apaolaza & Hernández Muñoz (2024), both deductive/explicit and inductive/implicit activities were incorporated, so the lack of explicit instruction could have been the cause for the lack of progress in the 'more communicative' approach in Jungheim (1991). These different findings show that explicit instruction on emblematic gestures, which is not incompatible with a communicative approach, is fundamental. Moreover, it is essential to use a variety of assessment tasks that allow observation of both the comprehension and production of emblems across different types of practices, considering the relationship between the gestures in the target-language and the learners' mother tongue (Belío-Apaolaza & Hernández Muñoz, 2024: 25).

2.2. *Individual differences in L2/FL*

One of the current and most recognized educational trends in the L2/FL classroom is to consider students' IDs, as they play a crucial role in SLA (Zafar & Meenakshi, 2012; Griffiths & Soruç, 2020;

Piechurska-Kuciel, 2020). At the same time, implementing the consideration of IDs into practice is a very complex task since, in most cases, students are a group of people with particular characteristics, aptitudes, cognitive, socio-affective, and metacognitive factors, identities, and others. Dewaele (2009) points out that this complexity requires an interdisciplinary approach in SLA research, demanding extensive theoretical and methodological knowledge. This author noted that no one had yet come up with the *Grand Unified Theory of Individual Differences*, possibly because "IDs are still conceptualized as largely learned-internal and that there cannot be one unified theory of something one-sided" (Dewaele, 2009: 625).

Traditionally, individual factors in L2/FL learning have been classified into biological (age and gender), cognitive (intelligence, aptitude, metalinguistic awareness, and learning strategies), and affective (attitudes, motivation, and anxiety) (Perales & Cenoz, 2002). Furthermore, it should be considered that internal characteristics are mediated by and interact with the context (Dewaele, 2009; Dörnyei & Ryan, 2015). In other words, individual (e.g., age, gender, ethnicity) and internal factors (e.g., motivation, attitudes, learning strategies) are formed, shaped, and reshaped by the learners' social context (Pavlenko, 2002). Therefore, a dynamic conceptualization including IDs interacting with situational parameters and with each other is attracting the attention of more researchers (Dörnyei, 2006; Dörnyei, MacIntyre & Henry, 2015; de Bot & Bátyi, 2017; Jung, DiBartolomeo, Melero-García, Giacomino, Gurzynski-Weiss, Henderson & Hidalgo, 2020; Gurzynski-Weiss, 2020; Luque & Covey, 2023).

This study focused on individual cognitive factors related to how learners handle, interpret, include, and process verbal and non-verbal information in communication. Specifically, two cognitive variables were analyzed: multiple intelligences and learning styles, which, according to Luengo-Cervera (2015), complement each other and share many characteristics: both refer to different learning preferences; are processed by all learners, though in

different proportions; are not innate and can be stretched; have neutral values, neither positive nor negative; and are stimulated within a specific environment or cultural setting. However, it must be clarified that they are not equivalent concepts: "A style is the manner in which a learner perceives, interacts and responds in the learning context, while an intelligence is the potential to solve problems or create products" (Luengo-Cervera, 2015: 85). Intelligences are understood closer to abilities, while learning styles are ways of learning more effectively (Lethaby & Mayne, 2020: 222).

Designing courses considering the multiple intelligences and learning styles of students has been supported by previous research on student engagement and motivation (Glomo-Narzoles, 2013; Ahmad Baaqeel, 2020) and academic performance (Yeow, Tan, Loh & Blitz, 2010; Baş, 2016; Borisova, Khabibullina, Seletskaia, Shpagonov & Molotnikov, 2021). However, some authors have questioned the influence of learning styles (Coffield, 2012; Newton, 2015; Lethaby & Mayne, 2020) and multiple intelligences[3] (Brand, 1996; Waterhouse, 2006) in SLA, as they see them only as theoretical constructs without sufficient empirical evidence, i.e., a *learning myth* (Newton, 2015: 1) or a *neuromyth* (Waterhouse, 2023). Therefore, one of the main objectives of this study was to partially fill this gap of empirical research on the influence of learning styles and multiple intelligences in SLA.

[3] Two of the main criticisms are the lack of evidence supporting the independence of intelligences functioning separately from one another (Visser, Ashton & Vernon, 2006; Almeida, Prieto, Ferreira, Bermejo, Ferrando & Ferrándiz, 2010; Castejon, Perez & Gilar, 2010) and the absence of a clear neural basis for distinct networks corresponding to individual intelligences (Waterhouse, 2006; Geake, 2008; Dekker, Lee, Howard-Jones & Jolles, 2012; Howard-Jones, 2014; Ruhaak & Cook, 2018; Blanchette Sarrasin, Riopel & Masson, 2019; Craig, Wilcox, Makarenko & Mac Master, 2021; Rousseau, 2021).

2.2.1. Multiple intelligences

According to Gardner (1999: 33), "intelligence is a bio-psychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture." Based on a diverse and holistic approach that (1) combined insights from psychology, education, neuroscience, and anthropology, (2) examined previous psychological theories to identify limitations and propose a broader perspective, (3) investigated how different cultures value and develop various forms of intelligence, (4) conducted case studies observing individuals with exceptional abilities in specific areas, and (5) conducted empirical research on student engagement, performance, and learning outcomes, this author established that, in addition to the two abilities traditionally considered intelligences — linguistic-verbal and logical-mathematical —, there are five additional intelligences, namely musical, kinesthetic, spatial, interpersonal, intrapersonal and spatial (Gardner, 1983). Later, he added an eighth type of intelligence to this list: naturalistic (Gardner, 1999).

Multiple intelligences (MIs) have been studied in various L2/FL learning contexts. For example, Rahimi and Qannadzadeh (2010) demonstrated a positive influence of logical-mathematical intelligence on the use of connectors in the writing of Iraqi students of English. Mohammadzadeh and Jafarigohar (2012) found a positive impact of linguistic, interpersonal, and musical intelligences on the willingness to communicate in the target language, also in Iraqi students of English. Saricaoğlu and Arikan (2009) proved a positive influence of musical intelligence on writing results in Turkish students of English. Tahriri and Divsar (2011) studied the relationship between MIs and the use of learning strategies in Iraqi students of English: cognitive strategies are used more frequently by students with verbal intelligence; metacognitive strategies are more common in those with verbal, kinesthetic, interpersonal, intrapersonal, and naturalistic intelligences than by those with logical-mathematical, visual-spatial, and musical intelligences, while

students with visual-spatial intelligence use fewer social strategies than the others. Moreover, regarding Iranian students of English, Moradi, Ghahari, and Abbas Nejad (2020) found that MIs can predict L2 text comprehension (those with higher verbal and spatial intelligences are more successful in taking systematic notes and creating outlines, while those with higher interpersonal and intrapersonal intelligences are more active and self-regulating in writing tasks); for their part, Sarani and Malmir (2020) found that logical, interpersonal, verbal, and intrapersonal intelligences significantly predict speech-act pragmatic performance, with verbal intelligence being the strongest predictor.

Finally, Gallego González (2009) compared the learning of Spanish in an experimental group of students who received a didactic methodology based on the Spectrum Project (Gardner, Feldman, & Krechevsky, 1998) where MIs are taken into account, versus a control group. The experimental group achieved a higher academic performance, differences in Spanish level between students were reduced, and motivation improved to a greater extent than in the control group (Gallego González, 2009: 348). All these studies have inspired educators to develop innovative and holistic teaching approaches such as the MI educational philosophy, which emphasizes "the use of learners' strengths to maximize academic achievement and success in life" (Shearer, 2024: 219).

2.2.2. Learning styles

Learning styles (LSs) are defined as the different cognitive, affective, and physiological behaviors and features that indicate how students perceive, interact with, and respond to their learning environments (Keefe, 1979; Alonso, Gallego & Honey, 1994; Meguro, 2020); they are useful in determining the preferences of students during the learning process (Esteban, Ruiz & Cerezo, 1996; Oxford, 2003; Griffiths, 2008; Purpura, 2014). There are different LS classifications and measurement instruments. We focused on the model by Honey and Mumford (1982, 1986), who distinguished

four learning styles: theoretical, pragmatic, reflective, and active. According to these authors, theorists seek to understand the theory behind the actions, preferring structured and logical thinking; pragmatists prefer to apply new ideas, theories, and techniques to assess if they work in practice; reflectors choose to learn by observing and thinking about what happens through data collection and analysis; and activists learn best by doing: they enjoy new experiences, challenges, and are open to trying different options (Pritchard, 2009).

Honey and Mumford (1982, 1986) created a questionnaire of 80 items, which was later expanded by Alonso, Gallego, and Honey (1994) for the Spanish context (CHAEA, Honey-Alonso Questionnaire of Learning Styles), adding 18 items on socio-academic variables. The CHAEA questionnaire has been mainly used in research with college students from different disciplines such as education (Espinoza & Serrano, 2019), nursing (López Fernández & Ballesteros Benjumeda, 2003), or medicine (Escanero-Marcén, Soria, Guerra-Sánchez & Silva, 2016), as well as to compare learning styles in different study areas (Díaz Díaz, 2017; Alonso-Martín, Cruz-Díaz, Granado-Alcón, Lago-Urbano & Martínez-García, 2021). Regarding Spanish as L2/FL, some research suggests that the dominant LSs in Japanese students are reflective and theoretical (Martínez, 2001), while Koreans prefer active and pragmatic styles (Mendoza Puertas, 2020). Feng (2019) and Feng, Iriarte, and Valencia (2020) point out that Chinese students prefer a combination of styles rather than a single one of them. Buyse and Morera Bañas (2016) compared LSs in Romanian students divided into two groups: those born before 1980 (and who received most of their education during the communist regime) and after 1980 (educated after the fall of this regime). These authors found significant changes "in educational culture and dominant learning styles between both periods, revealing, among others, a decrease in the number of theorists and reflectors in the language classroom and a correlation between reflection, oral participation, and periods" (Buyse & Morera Bañas, 2016: 4). This work illustrates the impor-

tance and transversality of contextual factors in IDs and the need to take them into account in SLA research.

From a humanistic approach to teaching, we understand students as complex individuals with different capabilities and skills. Moreover, this study was based on a holistic consideration of communication, where verbal and non-verbal components, as well as socio-affective and cultural factors, take place. Learning emblematic gestures involves various competences (lexical, semantic, non-verbal, (inter)cultural, socio-linguistic, pragmatic, and others), so the influence of LSs and MIs on the learning of non-verbal signs has productive pedagogical implications and innovative research approaches.

3. Research methodology

3.1. *Participants*

The participants in this study were freshman college students of Spanish as an L2/FL in the USA. Twenty subjects (14 women and 6 men) initially participated in this experiment; however, only 11 students were considered for the analysis of results, as those who missed instruction sessions were excluded. All subjects participated voluntarily outside the ordinary class time.

The homogenized constant variables of the group are the mother tongue (English), educational context (US college students), age (mean, 19.17 years; maximum 20, minimum 18), level of Spanish (B according to the CEFR and Intermediate High/Advanced Low-Mid according to ACTFL), time spent studying Spanish (mean, 5.75 years), type of students (voluntary attendants), intercultural exposure, and cultural sensitivity. Intercultural exposure was calculated based on de Santos Velasco (2004), which considers different cultural contextual factors (parents' nationality and mother tongue; whether the participant speaks a third language, whether he/she has lived or studied abroad, whether he/she has international friends, and others). All participants had intercultur-

al exposure. Cultural sensitivity was calculated using the Cultural Sensitivity Scale by Chen and Starosta (2000), which includes five dimensions: interaction engagement, respect for cultural differences, interaction enjoyment, interaction confidence and interaction attentiveness. All participants obtained high scores for intercultural sensitivity (maximum 105, minimum 84).

3.2. *Instruction*

Instruction was delivered entirely in Spanish through nine 60-minute sessions. The teaching methodology was based on an action-oriented-and-task-based approach where different competences are practiced: linguistic, socio-linguistic, pragmatic, strategic, and intercultural. Several oral interaction and audiovisual comprehension activities were designed to learn different non-verbal elements (kinesic, proxemic, chronemic, and paralinguistic), with major emphasis on emblematic gestures (6 of the 9 sessions were dedicated to these gestures). Emblems were taught along with their corresponding lexical units. Some sessions started with gestures; for example, watching a video in which some emblems were included in a conversation between Spanish speakers and then showing photos of these gestures so that the students could discuss their use and meaning in the observed conversation. Then, once they understood their meaning and use, lexical units for each gesture were presented and practiced. In other sessions, the meaning and use of the lexical units were taught before the emblems (in activities such as matching synonyms, filling-in blanks, multiple choice, writing text messages using lexical units, and others). After working with a given lexical component, the respective gestures were presented and practiced.

Didactic sequences were designed including comprehension and production activities. Different audiovisual resources, such as TV shows, music videos, comedy sketches, and videos created by the researcher to represent emblems in real-life situations, were used for comprehension activities. Moreover, photographs

of gestures in the previous videos were printed so that students could write the meaning, lexical component, and any additional information supporting the learning process. Production activities included both isolated and in-context production. First, students practiced the emblem form while the teacher assisted them and provided feedback about its production (e.g., recommendations on the speed, how the fingers should be placed, and orientation of the movement, among others). Second, the students individually practiced the form and meaning in games such as charades. Third, they produced the emblem in guided and short representations. Finally, emblems were performed in free in-context activities such as role-plays.

A total of 25 emblems were included in the instruction period, with 12 used in the pre- and post-tests, as explained below. These 12 emblems are described in Appendix 1.

3.3. *Pre- and post-tests*

A total of 12 Spanish emblems were selected and divided into three groups following contrasting categories between European Spanish and American English: four *common* emblems (same meaning and form), four *different* emblems (different form but same or almost identical meaning), and four *unique* emblems (without an equivalent in form or meaning).

The pre- and post-tests included four assessment tasks: 1) a role-play exercise in pairs that evaluated the free production of the emblematic gestures; 2) a kinesic dubbing of a dialogue in pairs where students could only use gestures, including 12 emblems distributed between both participants; 3) an exercise in which students had to perform in-context identification of 6 of the 12 emblems tested (2 *different*, 2 *common*, and 2 *unique*); and 4) an individual multiple-choice task in which a video showed a woman producing the other 6 of the 12 emblems tested (2 *different*, 2 *common*, and 2 *unique*). Additional information about each task is available in Belío-Apaolaza & Hernández Muñoz (2024).

3.4. *Independent variables*

As explained in §2, two influence factors were considered: multiple intelligences and learning styles. The tests to assess these factors were presented in English to ensure a precise understanding of the questions.

3.4.1. Multiple intelligences

A test originally developed by Shelton, Conan, and Fulghum-Nutters (1992) and later adapted by Shelton, Heavenridge, and Beckerman (n.d.) was completed by participants to evaluate their MIs. The test provided the three predominant intelligences in each participant and the corresponding scores for each (e.g., intrapersonal 3.86, verbal 3.71, and spatial 3.43). We created a categorical and a nominal variable for each intelligence; for example, for spatial intelligence, *0 = spatial is not one of his/her three predominant intelligences*, and *1 = spatial is one of his/her three predominant intelligences*. That is, we analyzed whether the subjects' predominant intelligence types influenced the results obtained in the pre- and post-tests, as well as the progress achieved in between them.

3.4.2. Learning styles

Participants completed the CHAEA test (Alonso, Gallego & Honey, 1994), consisting of 80 items answered by expressing agreement or disagreement. The answers to the questionnaire showed that two learning styles could have the same score in the same subject. For example, the results for one subject were the following: *active*, 9 points; *reflective*, 14 points; *theoretical*, 14 points; and *pragmatic*, 13 points. The same procedure as for MI was followed: we created a nominal categorical variable for each LS, including two groups (e.g., for the theoretical style, *0 = theoretical is not his/her predominant style or one of his/her two predominant styles*, and *1 =*

theoretical is his/her predominant style or one of his/her two predominant styles).

3.5. *Data organization and processing*

We created four dependent variables from the pretest and four from post-test: first, we counted the overall number of emblems produced and identified through the four tasks (*overall pre-test* and *overall post-test*); then, we considered each type of gesture: *common, different,* and *unique* (e.g., *unique overall pre-test* and *unique overall post-test*). In addition, we created a dependent variable named *progress* based on the scores calculated by subtracting the post- minus the pre-test scores for the overall test results and for each type of gesture. The result of this subtraction can be considered the *rate of improvement.*

The statistical analysis was performed in SPSS version 27. Kurtosis and asymmetry were analyzed to determine whether the data were normally distributed; the Shapiro-Wilk test was subsequently performed. The analysis showed a non-normal distribution in all cases, based on which we performed a non-parametric test. The influence of the independent variables on the dependent variables was analyzed through the Mann-Whitney *U* test, which is the non-parametric alternative to the *t*-test (Larson-Hall, 2010: 376). This test provided both asymptotic and exact significances; this study focused on the exact significance because it is more accurate than the asymptotic significance for small samples (Field, 2005). In addition to the *p*-value, the effect size was also calculated (Cohen, 1988; Fritz, Morris & Richler, 2012: 12).

4. Results

Table 1 shows the means and mean ranks of the *total progress* from pre- to the post-test in the comparison of the independent variables between groups. The only statistically significant factor in the four dependent variables analyzed was kinesthetic intelligence regard-

ing *overall progress* (z = -2.653, p = 0.004, r = -0.799); *different overall progress* (z = -2.459, p = 0.017, r = -0.741); *common overall progress* (z = -2.560, p = 0.009, r = -0.772); and *unique overall progress* (z = -2.521, p = 0.017, r = -0.7601). The four comparisons returned a large effect size, confirming that the significance is important. The means and mean ranks of the group with kinesthetic intelligence are higher than the group lacking it, so the subjects with this type of intelligence showed a greater improvement from the pre- to the post-test.

Table 1. Descriptive attributes in the analysis of the influence of MIs and LSs on emblem improvement

Independent Variables		N	Overall progress from the pre-test to the post-test		*Different* overall progress from the pre-test to the post-test		*Common* overall progress from the pre-test to the post-test		*Unique* overall progress from the pre-test to the post-test	
			Mean (Std. Deviation)	Mean Rank	Mean (Std. Deviation)	Mean Rank	Mean (Std. Deviation)	Mean Rank	Mean (Std. Deviation)	Mean Rank
LS: Active	No	8	12.13 (4.121)	5.31	5.88 (1.959)	5.63	1.25 (1.035)	5.38	4.50 (0.926)	5.19
	Yes	3	14.67 (2.517)	7.83	6.67 (1.155)	7.00	2.00 (1.000)	7.67	5.33 (0.677)	8.17
LS: Reflexive	No	2	13.50 (2.121)	6.75	6.00 (0.000)	5.5	2.00 (1.414)	7.5	5.00 (0.000)	7.00
	Yes	9	12.67 (4.183)	5.83	6.11 (1.965)	6.11	1.33 (1.000)	5.67	4.67 (1.000)	5.78
LS: Theoretical	No	3	12.33 (5.686)	6.00	5.67 (3.215)	6.33	1.33 (1.155)	5.83	5.00 (1.000)	6.83
	Yes	8	13.00 (3.381)	6.00	6.25 (1.165)	5.88	1.50 (1.069)	6.06	4.63 (0.916)	5.69
LS: Pragmatic	No	9	13.44 (3.432)	6.44	6.44 (1.236)	6.33	1.56 (1.014)	6.28	4.78 (0.944)	6.22
	Yes	2	10.00 (5.657)	4.00	4.50 (3.536)	4.5	1.00 (1.414)	4.75	4.50 (0.707)	5.00
MI: Verbal	No	8	14.00 (3.464)	6.94	6.63 (1.302)	6.75	1.88 (0.835)	7.31*	4.88 (0.991)	6.63
	Yes	3	9.67 (3.215)	3.5	4.67 (2.309)	4.00	0.33 (0.577)	2.50*	4.33 (0.577)	4.33
MI: Logical-Mathematic	No	9	13.44 (3.941)	6.67	6.22 (1.922)	6.44	1.67 (1.00)	6.67	4.89 (0.782)	6.44
	Yes	2	10.00 (1.414)	3.00	5.50 (0.707)	4.00	0.50 (0.707)	3.00	4.00 (1.414)	4.00
MI: Spatial	No	8	12.88 (4.422)	6.06	6.13 (2.100)	6.19	1.50 (0.926)	6.19	4.75 (1.035)	6.13
	Yes	3	12.67 (2.082)	5.83	6.00 (0.000)	5.5	1.33 (1.528)	5.5	4.67 (0.577)	5.67
MI: Kinesthetic	No	5	9.60 (2.302)	3.10*	4.80 (1.643)	3.40*	0.60 (0.548)	3.30*	4.00 (0.707)	3.40*
	Yes	6	15.50 (2.429)	8.42*	7.17 (0.983)	8.17*	2.17 (0.753)	8.25*	5.33 (0.516)	8.17*
MI: Musical	No	1	13.20 (3.795)	6.4	6.20 (1.814)	6.35	1.50 (1.080)	6.15	4.90 (0.738)	6.5
	Yes	1	9.00	2.00	5.00	2.5	1.00	4.5	3.00	1.00

(*continued*)

Table 1. Descriptive attributes in the analysis of the influence of MIs and LSs on emblem improvement

Independent Variables		N	Overall progress from the pre-test to the post-test		*Different* overall progress from the pre-test to the post-test		*Common* overall progress from the pre-test to the post-test		*Unique* overall progress from the pre-test to the post-test	
			Mean (Std. Deviation)	Mean Rank	Mean (Std. Deviation)	Mean Rank	Mean (Std. Deviation)	Mean Rank	Mean (Std. Deviation)	Mean Rank
MI: Intrapersonal	No	1	11.00	4.00	6.00	5.5	0.00	1.5	5.00	7.00
	Yes	1	13.00 (3.975)	6.2	6.10 (1.853)	6.05	1.60 (0.966)	6.45	4.70 (0.949)	5.9
MI: Interpersonal	No	5	13.20 (3.899)	6.1	6.20 (1.095)	5.8	1.60 (1.342)	6.3	4.60 (1.140)	5.7
	Yes	6	12.50 (4.087)	5.92	6.00 (2.280)	6.17	1.33 (0.816)	5.75	4.83 (0.753)	6.25
MI: Naturalistic	No	9	12.44 (3.054)	5.78	6.00 (1.083)	5.94	1.33 (1.000)	5.67	4.67 (0.866)	5.83
	Yes	2	14.50 (6.364)	7.00	6.50 (2.121)	6.25	2.00 (1.414)	7.5	5.00 (1.414)	6.75

Note. An asterisk marks the mean ranks of the statistically significant comparisons (* = $p < 0.05$).

Table 2 and Figures 1, 2, 3, and 4 show the means and mean ranks of the pre- and post-tests for both groups (series 1, with kinesthetic intelligence; series 2, without kinesthetic intelligence). For the pre-test, the group lacking kinesthetic intelligence had higher means and mean ranks than the group with kinesthetic intelligence. In the post-test, that is, after the instruction period, the opposite was observed, i.e., the group with kinesthetic intelligence showed higher means and mean ranks.

Table 2. Descriptive attributes for kinesthetic intelligence in the pre-test and post-test

	Kinesthetic	N	Mean (Std. Deviation)	Mean Rank
Overall pre-test	No	5	8.40 (0.894)	9.00
	Yes	6	5.67 (1.366)	3.50
Overall post-test	No	5	18.00 (2.550)	4.40
	Yes	6	21.17 (2.927)	7.33
Different overall pre-test	No	5	0.60 (0.548)	7.80
	Yes	6	0.00 (0.000)	4.50

(*continued*)

TABLE 2. Descriptive attributes for kinesthetic intelligence in the pre-test and post-test

	Kinesthetic	N	Mean (Std. Deviation)	Mean Rank
Different overall post-test	No	5	5.40 (1.342)	3.80
	Yes	6	7.17 (0.983)	7.83
Common overall pre-test	No	5	6.40 (0.894)	8.00
	Yes	6	5.00 (1.265)	4.33
Common overall post-test	No	5	7.00 (1.225)	5.50
	Yes	6	7.17 (1.329)	6.42
Unique overall pre-test	No	5	1.40 (1.140)	7.20
	Yes	6	0.67 (0.816)	5.00
Unique overall post-test	No	5	5.40 (1.673)	5.00
	Yes	6	6.00 (0.894)	6.83

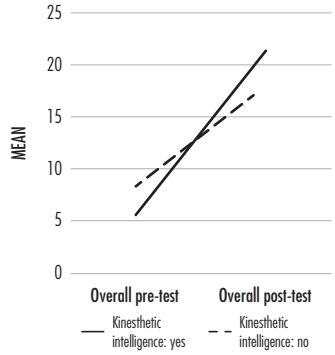

FIGURE 1. Means of overall emblems in the pre- and post-test for kinesthetic intelligence

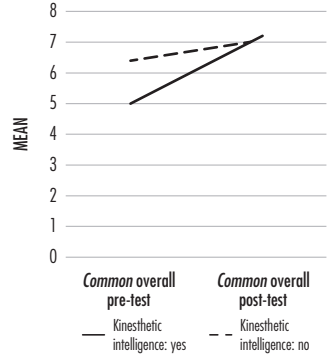

FIGURE 2. Means of *common* overall emblems in the pre-test and the post-test for kinesthetic intelligence

In addition to kinesthetic intelligence, Table 3 shows statistically significant results for verbal intelligence: students who do not have it showed greater improvement in *common* emblems than those who have this type of intelligence (z = -2.226, p = 0.024, r = -0.672). This table shows the means and mean ranks of the pre-

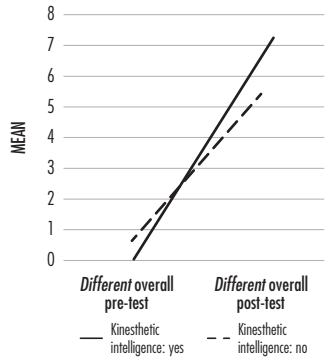

FIGURE 3. Means of *different* overall emblems in the pre-test and the post-test for kinesthetic intelligence

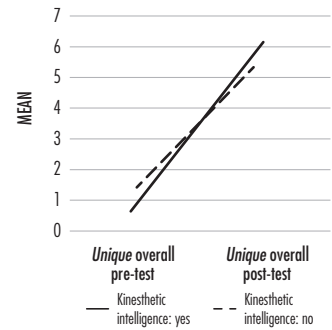

Figure 4. Means of *unique* overall emblems in the pre-test and the post-test for kinesthetic intelligence

and post-test results in both groups. The group with verbal intelligence started the pre-test with more *common* emblems than the group without this intelligence; the opposite was recorded in the post-test: the group lacking verbal intelligence obtained a higher average in *common* emblems.

TABLE 3. Descriptive attributes for verbal intelligence in the pre-test and the post-test.

	Verbal	N	Mean (Std. Deviation)	Mean Rank
Common overall pre-test	No	8	5.38 (1.302)	5.31
	Yes	3	6.33 (1.155)	7.83
Common overall post-test	No	8	7.25 (1.165)	6.44
	Yes	3	6.67 (1.528)	4.83

5. Discussion and interpretation

This study analyzed the role of two cognitive IDs in the learning of L2/FL emblems to guide and develop the best teaching practices for these gestures. We found that participants with kinesthetic intelligence showed a greater improvement from the pre- to the

post-test than those lacking it among their main three types of intelligence. This was observed in the overall results and in the three types of emblems (*common, different*, and *unique*). The only information on the relationship between kinesthetic skills and language learning was expressed by Brown (1984: 94): "Bodily-kinesthetic modes have already been discussed in connection with the learning of phonology of a language." However, we are unaware of any previous empirical study reporting results similar to our findings or establishing a direct relationship between kinesthetic intelligence and the learning of emblematic gestures. However, Arnold and Fonseca (2004: 123) suggested that emblems, which they call 'speech-independent gestures', should be included in L2/FL language classes to develop the kinesthetic intelligence of students.

Kinesthetic intelligence is defined by Nolen (2003) as the ability to understand the world through the body and movement. According to this author, people with this intelligence have motor skills that give them the "ability to manipulate objects, and to carry out delicate movements using precise control" (Nolen, 2003: 117). In this regard, it is important to remember that learning a L2/FL is not only learning a new linguistic code but also a non-verbal code from a new culture, a new way of seeing the world (Miquel López, 2004: 515). Therefore, the participants with kinesthetic intelligence can enjoy the opportunities created throughout the instruction taking advantage of their ability to face this new linguistic-cultural reality. In addition, the fact of having great motor skills, as well as control to carry out delicate movements, is crucial to producing emblems: these gestures are precise movements resulting from the combination of multiple elements: vehicle (the part of the body used: arm(s), face, hand(s), and others), direction, number of repetitions, duration, speed, orientation, and direction (horizontal, vertical, sagittal, or frontal) (Calbris, 1990: 124–125). All of them are involved in emblem production, and altering any of these elements may cause the loss of gesture meaning.

Therefore, the results obtained in the present study support the methodology used, since they show that our instruction is co-

rrectly designed to achieve the learning of emblematic gestures in Spanish as L2/FL, enhancing the kinesthetic skills of students. Likewise, these findings reinforce the MI theory developed by Gardner (1983). Strong kinesthetic intelligence facilitates the learning of content that involves movement, control, and body perception. It should be highlighted that significant results have been observed in the progress from pre- to post-tests, that is, students with kinesthetic skills achieved a greater improvement than students lacking them. However, in the pre-test, students with kinesthetic intelligence did not correctly answer more questions than students lacking it. This shows that kinesthetic skills must be learned and developed through different activities, as we have done throughout the instruction period. Then, a linear relationship should not be assumed between having non-verbal skills, as an individual cognitive factor, and the implicit learning of non-verbal content. The lack of empirical evidence on this relationship has been noted by different authors (Lethaby & Mayne, 2020: 228–229). Our results show that the relationship between content and skills can be observed only after specific and well-designed training. Therefore, non-verbal content must be practiced (understood and produced) through a training methodology in which non-verbal signs are taught through complete (explicit and implicit) training to develop effective non-verbal skills in students.

At this point, we should recall the results obtained by Gallego González (2009): the group of students who received training through an MI-based methodology obtained higher performance scores in different competences, the differences in the levels of Spanish language of participants were reduced, and they were more motivated to learn the target language. Arnold and Fonseca (2004) explained that practicing students' intelligences enhances their motivation and, therefore, contributes to learning. In the training of their study, kinesthetic intelligence was enhanced through learning emblems and the types included to practice the different Spanish non-verbal signs, such as multiple role-plays, movement, and physical games. In fact, these authors mentioned that "the use

of role plays, drama, games, project work, shadow puppets, and many activities related to group dynamic directly address the bodily-kinesthetic intelligence in the language classroom" (Arnold & Fonseca, 2004: 128). According to Schewe (2002: 75–76), pedagogy for L2/FL classes should consider the distinctive characteristics of learners by including activities to enhance their different MIs. For kinesthetic intelligence, in addition to role plays, this author suggests incorporating learning opportunities by using body movements.

Schewe's pedagogical orientations can be related to Differentiated Instruction, a methodology extensively developed by Tomlinson (1999, 2001, 2003) where the distinctive characteristics of each student are considered to design flexible learning modalities. One of the factors considered in this methodology is MI (Tomlinson, 1999: 19). Caine and Caine (1991) argued that the development of our potential is affected by the connection between what we learn and how we learn it with our particular intelligences, so learning experiences to enhance students' MIs should be offered. These authors explain that neurons grow and develop if they are actively used, while they can atrophy if they are not (Caine & Caine, 1991). This relates to the results obtained in our study and the importance of enhancing the various abilities and skills of learners to obtain favorable results: having a specific ability may not be sufficient to be proficient in related tasks, but they should be trained. Therefore, it is crucial to understand that knowing that all learners are different is not enough: "the teacher should also be skilled and willing enough to help the students *use* these differences to their advantage in the process of second language acquisition" (Zafar & Meenakshi, 2012: 644–645). Thus, differentiated instruction and the training of MIs should be progressively incorporated in L2/FL classrooms by developing activities in which students can explore and learn to use their different abilities to promote and find the best way to learn L2/FL in general, and emblematic gestures in particular. Specific activities can be created for each intelligence, but common activities in which all intelligences have an active role

in achieving a common goal may also contribute to promoting the enrichment of having IDs within the group.

Besides kinesthetic intelligence, another type of intelligence obtained statistically significant results in our study: students with no verbal intelligence achieved greater progress in the *common* emblems than the group with this skill. This finding may be because the students lacking verbal intelligence relied more on non-verbal resources; in other words, the more verbally predisposed group paid more attention to the verbal elements during the instruction for information already known. Verbal skills include the use of different linguistic, phonological, semantic, and morphosyntactic dimensions, so the fact that *common* emblems share a coincident semantic dimension in the mother and target languages could have a played a part in the use of this type of intelligence. Further research on the relationship between verbal skills and the learning of emblems, as well as the lexical units associated with gestures, would be very interesting.

Finally, we did not find any significant results on the influence of learning styles in the learning of emblematic gestures. It is important to mention that the instruction was not designed based on the various LSs of students, but different activities and working preferences typically associated with each style were included: role-plays, riddles, creation of videos, and problem-solving for *active*; reading, listening, journal writing, preparation and observation activities, and watching videos for *reflective*; summarizing, reading, comparing, analyzing, and looking for patterns and connections for *theoretical*; and role-plays, videos about facts, applying new content, and planning practical tasks for *pragmatic* (Luengo-Cervera, 2015: 89). Moreover, cognitive individual factors are diverse in nature, and LSs are a complex construct with different classifications and instruments to measure these factors. Further research about the relationship between the type of activities according to LSs of learners, including other LS classification systems, and the development of L2/FL non-verbal skills would be needed to delve into the results obtained in this study.

6. Conclusions

Emblematic gestures comprise the combination of (socio)linguistic, pragmatic, and cultural elements determined by internal and contextual factors involved in communication. This study aimed to better understand the complex learning process of these gestures in Spanish as L2/FL addressing cognitive individual factors. To this end, we analyzed the influence of multiple intelligences and learning styles through a pre-test, an instruction period, and a post-test.

While we did not find any significant influence of our participants' learning styles, a key finding emerged from the multiple intelligences analysis: learners with kinesthetic intelligence achieved a greater progress from the pre- to the post-test than those lacking that type of intelligence, in both the overall results and the three types of gestures: *common, different*, and *unique*. In the pre-test, i.e., before participants were trained on the comprehension and production of Spanish emblems, there were no significant differences between both groups. This suggests that having kinesthetic skills does not necessarily lead to a greater performance, but rather that they need to be progressively enhanced through activities that promote them, implicitly and explicitly, such as those developed through our instruction period. However, our results do not solve one of the theoretical limitations pointed out in the literature review about cognitive individual differences, namely the existence of a relationship between learning styles and specific intelligences in non-verbal sign acquisition in the context of holistic communication skills.

The main pedagogical implication from the results of the present study is that IDs and learning preferences must be considered when designing class activities and learning modules to enhance students' potential. Furthermore, the development of L2/FL non-verbal competence entails three elements: (1) non-verbal content, which must be introduced and practiced through a (2) teaching methodology consisting of explicit and implicit activities to enhance non-verbal awareness, and (3) train the non-verbal

abilities and skills of students. Further intercultural research on IDs and the acquisition of non-verbal signs will facilitate the task of offering students different learning experiences based on empirical evidence.

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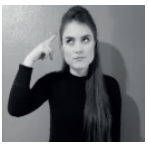
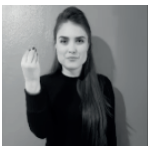
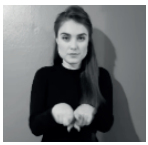
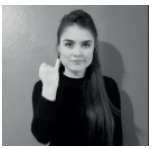
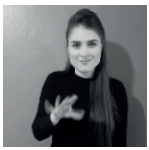
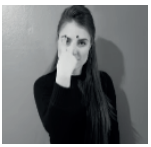
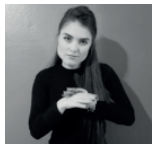
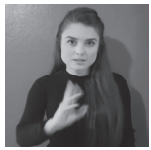
Appendix 1: Emblems included in the pre-test and the post-test

COMMON	DIFFERENT	UNIQUE
/loco/ *crazy*	/darle vueltas/ *to think*	/mucho/ *a lot*
		
Fast, intermediate, or slow circling motion of the index finger at the temple and a closed fist.	Fast, intermediate, or slow circling motion of the index finger at the temple and a closed fist.	Fingers are pressed vertically with the tips up and separated in rapid and repeated opening and closing motion.
/dinero/ *money*	/juntos/ *together*	/delgado/ *thin*
		
The tips of the index and middle fingers brush the thumb with a rapid and repeated movement.	The index fingers of both hands (nails facing up and the rest of the fist closed) join in quick repeated movements.	The little finger of one hand is raised vertically on one occasion while the rest of the fist is closed.
/más o menos/ *more or less*	/a dos velas/ *no money*	/agarrado/ *stingy*
		
The palm (facing down with the fingers spread) performs a medium or rapid left-to-right rocking motion repeatedly.	The index and middle fingers (placed in V-shape) are moved fast downward from the eyelids to the lips (the nose is in between the fingers). This movement can be repeated or done just once.	A closed fist is raised at medium speed.

(*continued*)

COMMON	DIFFERENT	UNIQUE
/blablablá/ *bla-bla-bla*	/irse/ *to leave*	/robar/ *to steal*
		
The fingers of one hand are kept straight and together and then separated in rapid and repeated full opening-and-closing movements ranging 5 to 8 cm until the fingers and thumb snap together.	One hand is extended (with the fingers together, the back facing up) while the other hand extends and gives one or two quick blows with the edge to the palm (or to the wrist) of the opposite hand.	The palm of one hand is slanted upwards with separate fingers, making a semi-circular movement, while the fingers, starting with the little finger, progressively close into a fist at medium or fast speed.