Mastering a New Modality: the influence of phonological knowledge on the acquisition of sign parameters by hearing adults

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Abstract

While spoken and signed languages express linguistic meaning through distinct modalities—the former makes use of the audio-oral modality, whereas the second operates through the visual-gestural modality—both build meaningful structures through phonological systems composed of meaningless substructure units. When the process of second language acquisition involves learning to communicate in the other modality, one must acquire a new phonological system. Some research has been conducted on the subject, but it has not yet been asked what role phonological knowledge might play in the acquisition process that takes place when hearing adults attempt to acquire a sign language. The present paper considers this issue, and through a pilot study attempts to examine the effects of the activation of phonological knowledge on perception and production accuracy of sign parameters. Additionally, a proposal for a future study is made, with the added goal of investigating the pedagogical methods of sign language as a second language.

Keywords:

explicit learning, implicit learning, modality, phonological system, second language acquisition, sign language, sign parameters
1. Introduction

*You can never understand one language until you understand at least two.*
- Geoffrey Willans

Learning a second language as an adult is universally recognized a difficult process, full of frustration and countless moments of failure that one must overcome. In fact, the process is so much more demanding than that of acquiring a first language, that over time an entire field of linguistics -second language acquisition- has been established in order to understand why. While a vast amount of research has been carried out within the field of second language acquisition, it has been focused within the context of learning a language of the same modality, or rather, learning a second spoken language when the first language is spoken. Thus, if we were to ask what the process looks like for an adult whose native language is spoken and whose target language is signed, the answers would be few and far between. Essentially, it is not yet demonstrable that the same rules apply when the distance between the first and second language includes a breach in modality.

Sign linguistics, the branch of linguistics that researches sign languages, has only very recently begun to delve into the topic of second language acquisition of sign by hearing adults, and a wide variety of questions need not only be answered still, but asked as well. The implications of posing these questions and finding responses are serious: only 5-10% of deaf children are born to deaf parents (Mitchell & Karchmer, 2004). This means that the majority of deaf children must acquire their first language from non-native signers: their hearing and speaking parents who
themselves are attempting to acquire a sign language at the same time. This might, and often
does, lead to less than ideal language input for deaf children during their critical period of
language acquisition, which in turn, can have weighty consequences. For example, it has been
found that late signers develop certain non-linguistic abilities, such as theory of mind, more
slowly (Mayberry, 1993; Mayberry, Chen, Witcher & Klein, 2011; Mayberry, 2007).

With these facts in mind, it becomes clear that detailed understanding of the process of acquiring
a sign language as a second language is necessary. Of the many questions left to be answered and
further explored, that of how hearing adults acquire a phonological system of a different
modality is of the utmost importance. Along these same lines, there has been no pedagogical
research carried out on how hearing adults are being taught to sign. It seems reasonable to assume
that, to some extent, the way one is taught something affects the way one learns it.

After reviewing the relevant literature and providing context, this paper will pose research
questions about the influence of pedagogical methods on the acquisition of phonological
knowledge of sign language by hearing adults, and the posterior implications of this knowledge
in signing perception and production proficiency.
2. Literature Review

2.1 Sign Parameters

Among the many misconceptions held by the general public regarding the nature of sign languages, the notion that they are merely an assemblage of pantomime gestures is recurrent. This is perhaps due to the strikingly obvious difference between signed and spoken languages, or rather, that the former make use of the audio-oral modality while the latter are manifested by means of the visual-gestural modality (Crasborn, 2012). Such an enormously evident divergence in the way in which these two language types are produced and perceived has led to the establishment of a myriad of false assumptions about the characteristics of sign languages throughout history. It wasn’t until the 1960’s that linguists began to actively demonstrate that indeed, like spoken languages, sign languages too are composed of meaningless units that combine to form meaningful structures. William Stokoe was the first to make the invaluable contribution that underlying the unit of the sign, there exist subcomponents (1960). Thus, Stokoe was able to reveal that Hockett’s duality of patterning applies to sign languages: “linguistic expressions can be decomposed into minimal meaningful discrete units commonly called morphemes that in turn can be decomposed into minimal distinctive though meaningless discrete units called phonemes” (Fortuny, 2010, p. 133).

Stokoe (1960) introduced the notion of three minimal components, or parameters, crucial to the formation of a sign. Firstly, handshape refers to the configuration of the fingers and the hand. Secondly, location refers to where the sign is produced, which may be in the signing space in
front of the signer or in contact with the body. Thirdly, movement refers to the motion that is produced, which can be classified either as path, in that it moves across space, or internal, in that it is produced by the hands. In time, two additional parameters were discovered to be pertinent in defining what constitutes the substructure of a sign. Palm orientation refers to the direction which the palm faces (Battison, 1978), and non-manual features refers to all those features of a sign that are not produced by the hands, such as facial expressions, mouthings and mouth gestures, and movements of the head or body (Brennan, 1992; Crasborn, Kooij, Waters, Woll & Mesch, 2008; Pfau & Quer, 2010; Lewin & Schembri, 2011).

In analogy to spoken languages, these substructure pieces are frequently referred to as “phonological parameters”, as a specific form of each parameter, for example the 5 handshape, is as meaningless on its own as is the phoneme /m/. If however, this phoneme is combined with other meaningless phonemes, a meaningful structure can be created: thus /m/ in conjunction with /æ/ and /t/ form the meaningful unit mat in English. Likewise, in American Sign Language (ASL), if the 5 handshape is articulated under the chin (location), with the palm down (orientation), the fingers wiggling (movement) and the mouth open and tongue protruding (non-manual features), the result is a meaningful sign, glossed as the English word DIRTY. Additionally, and once again as occurs in spoken languages, the minimal distinctive units that are permissible in a given sign language can vary from one language to another. They can be discovered by means of observing minimal pairs, in which two signs differ in just one of the five parameters, resulting in different meaningful units, thus demonstrating that that very parameter is a distinctive unit.
Just as in spoken language phonemes and phonological segments can be classified as marked or unmarked, so can the phonemes within each of the phonological sign parameters. In spoken languages, for example, voiceless stops, such as [p], [t], [k], are less marked than voiced stops, such as [b], [d], [g], because they are easier to produce, frequent crosslinguistically, acquired earlier by children, and more resistant to loss by aphasia (Jakobson, 1968). In sign language linguistics, the notion of markedness has been applied most frequently to the phonological parameter of handshape. A handshape is considered to be unmarked for the same reasons a segment is in spoken languages, and if: it has a maximally distinctive shape (Battison, 1978); it appears in a sign by the non-dominant hand, when this hand does not take the same handshape as the dominant hand, (Battison, 1978); it is a shape that can contact the body or the other hand with less restriction (Battison, 1978).

This section has briefly reviewed the concepts of phonological parameters of sign and markedness. These notions will reappear throughout the rest of the literature review and thesis, primarily in the context of first and second language acquisition.

2.2 L1 Acquisition of Sign Language Phonology

Of the various levels of combinatorial structure that allow speakers and signers to produce infinite meaningful utterances from a finite repertory of discrete units, phonology is the first to develop during the process of language acquisition (Morgan, 2014). An array of studies have investigated sign-exposed children in the process of acquiring a sign language as a native language (L1), and what becomes strikingly clear from the results is how their development
closely reflects that of children acquiring a spoken L1 (Chen Pichler, 2012). Nonetheless, given the differences in modality, the mechanisms involved in the process of acquisition are manifested with some differences. This section will review some of these similarities, and some of these modality differences.

While for quite some time it was thought that babbling prior to producing discernible speech was a phenomenon restricted to the acquisition process of spoken languages, Pettito and Marentette (1991) found that sign-exposed infants manually babble before signing, and within a very similar timeframe to speech-exposed infants. The authors attribute this similarity to an amodal and universal predisposition to language learning. As explained by Deborah Chen Pichler (2010), “Under this view, babbling is not triggered by motor developments of the speech articulatory system, but rather by infants’ innate predisposition towards structures with the phonetic and syllabic patterns characteristic of human language, spoken or signed. This predisposition leads to either vocal or manual babbling, depending on the input the child receives,” (p. 459). Alternatively, Meier and Willerman (1995) assume a motor-driven explanation, giving a lesser importance to the type of input. Rather, they argue that the characteristic repetition present in both vocal and manual babbling are rhythmical motor stereotypes critical to the moment of transition from uncoordinated activity to coordinated activity (Chen Pichler, 2012).

Beyond the point of babbling, both groups of language learners gradually then proceed to develop and master the relevant system of phonetic contrasts of their target language. Regarding the acquisition of the three main phonological parameters of signs, a variety of studies focused
on different sign languages report an order of acquisition. Observation of the error patterns of L1 learners reveals that handshape is the latest to be acquired and least accurately produced, followed by movement, and then location, which is continuously the most accurately produced parameter and first to be acquired (Juncos et al., 1997; Takkinen, 2003; Karnopp, 2008; Clibbens, Harris, 1993; Morgan, Barrett-Jones, Stoneham, 2007; Mann et al., 2010; Bonvillian, Siedlecki, 1996; Conlin et al., 2000; and Marentette, Mayberry, 2000, among others). Within each parameter, error observation has also led to reported orders of acquisition of individual phonemes (Chen Pichler, 2012). Both markedness and children’s developing motor abilities play an important role in the process, much as they do in the acquisition of spoken languages. For example, through consideration of the anatomy of the hand Boyes Braem (1973, 1990) proposed a hierarchy of markedness for ASL handshape. The hierarchy predicts stages of development and that substitution errors will consist in replacements made only from previously mastered stages (Boyes Braem, 1973, 1990). This dependency on earlier stages of development has been attested by a variety of studies cross-linguistically (McIntire 1977; Siedlecki, Bonvillian 1997; Conlin et al. 2000; Clibbens, Harris 1993; von Tetzchner 1984). A case study carried out by Morgan, Barret-Jones & Stoneham (2007) on a native-signer’s acquisition process revealed that the handshapes articulated most accurately were those that are commonly considered to be most unmarked.

Within the movement parameter, hand-internal movements have generally been found to be less accurately produced than path movements (Cheek et al., 2001; Morgan, Barret-Jones, Stoneham, 2007). Concerning the location parameter, signs produced in the location of neutral space or the
head have frequently been reported to be the locations most accurately and earliest produced (Marentette, Mayberry, 2000; Bonvillian, Siedlecki, 1996; Conlin et al., 2000; Cheek et al., 2001). However, in their BSL case study Morgan, Barret-Jones, Stoneham (2007) found that signs located on the trunk, the non-dominant hand or in neutral space were more accurately produced than those articulated near the face or head.

Findings such as those reviewed above, resemble findings found in L1 acquisition of spoken language, in spite of modality differences. This might lead one to wonder, firstly whether the process of acquiring a sign language as a second language resembles that of the process of acquiring it as an L1, and furthermore, how similar is the process of acquiring a spoken language as a second language to that of acquiring a signed language as a second language. The following section will survey the relevant research in the field of second language acquisition when the target language is a sign language.

2.3 L2 Acquisition of Sign Language Phonology

In contrast to the almost overwhelming amount of research that has been carried out in the field of second language acquisition (SLA) of spoken languages, sign linguists have only recently begun to explore acquisition of sign languages as a second language. By way of definition, the term second language (L2) learner is used to refer to the person who endeavors to learn a language after their native language (L1) has been acquired. In this sense, an L2 is any language learned after the L1, and therefore might not actually be the second language that a person learns, but rather the third, or fourth, etc. (Gass, 2013). Additionally, since native speakers of an oral
language who learn a sign language for the first time are adding to their language repertoire a second modality, the terminology *second modality learner*, or, M2 learners, has been introduced (Chen Pichler, 2011).

As far as the process of L2 phonological acquisition is concerned, two parts can be established. In order to accurately articulate a new sound from the target language, L2 learners must be able to accurately perceive it and store its representation in working memory (Snowling, Chiat, & Hulme, 1991). Thus, *perception* refers to the ability to segment and differentiate input, and *production* to the ability to reproduce said input. Given the modality breach between spoken and signed languages, it might be expected that the most difficult skills to acquire for hearing adult learners of a sign language are sensorimotor and phonological (Bochner et al., 2011). In line with this view, a large part of the investigation dedicated to the acquisition of a sign language as an L2 by hearing adults has been dedicated to testing phonological skills.

Rosen (2004) carried out a qualitative study of errors produced by ASL students while copying signs. He proposed a classification for errors in all five parameters based on his Cognitive Phonology Model (CPM). The model is defined as “a cognitive processing paradigm that involves the psycholinguistic use of the body as a means for perceiving, recalling, producing, and communicating phonologies. For effective production of phonology, individuals need cognitive imposition of linguistic features on their psychomotor skills” (Rosen, 2004, p. 36). Essentially, Rosen (2004) attributes the difficulty of learning a sign language for L2 learners to the fact that they must make an extra cognitive effort in order to associate linguistic content with
the articulation of movement rather than sound. Thus, errors produced are classified as either perceptual or production-related. The former consist in errors based on how learners view the signs produced by the teacher. Learners might mirror or parallel the signing they have observed rather than adapt it to their own perspective. Additionally, perceptual errors might be made due to the learners’ capacity to perceive all of the segments that compose a sign. Production errors, on the other hand, can be either dexterity based (that is, related to the anatomical capacity to align the articulators) or as a result of faulty perception.

Bochner, Christie, Hauser and Searls (2011) carried out a paired-comparison discrimination task using minimal pairs of the different phonological parameters embedded in sentences. The participants were hearing learners of ASL, at both the beginning and intermediate levels, and native deaf signers. The results revealed that native signers performed the task most accurately, followed by learners with an intermediate level, and then by those with a beginner level. Their data suggests that experience and exposure to a sign language influence phonological skills. Additionally, Bochner et al. (2011) found that participants experienced the most difficulty in discriminating in the movement parameter, followed by orientation, handshape and then location.

In order to investigate phonological complexity on production abilities, Ortega-Delgado (2013) carried out a sign repetition task with sign-naive, hearing adults. The stimuli used were categorized by sign type, in a slightly modified version of a classification devised by Battison (1978). Known as the Dominance and Symmetry constraints, Battison established four types of signs, based on the phonemes that a sign may take on depending on the usage of the hands. For
example, a two-handed sign in which the dominant hand acts upon the non-dominant hand and both use different handshapes (type 4), is more complex than a one-handed sign (type 0). Ortega-Delgado (2013) found that greater phonological complexity resulted in lower production accuracy. Furthermore, parallel to the order of L1 acquisition of phonological parameters, it was found that location was the most accurately produced parameter, followed by orientation, movement, and lastly, handshape. Ortega-Delgado (2013) notes that, “it is possible that the similar pattern of errors by children and adults is the result of the interaction between the structural complexity of signs and their frequency of occurrence,” (p. 47).

While research does answer some very important questions about the process of SLA of a signed language, there is still much left to be answered. Specifically, questions that have been asked of the process of SLA of a spoken language, ought to be asked in the case of learning an L2 of a different modality. The following section will review one of the important questions of SLA research that has not yet been applied to sign linguistics.

2.4 Spoken Language SLA: Implicit and Explicit Knowledge

Within the field of language acquisition, a recurrent research topic has been the notion of implicit versus explicit learning. Ellis (2006) described the two types of learning in the following way:

“Implicit learning is acquisition of knowledge about the underlying structure of a complex stimulus environment by a process which takes place naturally, simply, and without conscious operations. Explicit learning is a more conscious operation where the
individual attends to particular aspects of the stimulus array and volunteers and tests hypotheses in a search for structure,” (p. 3)

While it is quite clear that implicit learning is that which occurs in the context of L1 acquisition, whether it is more effective to teach adults an L2 by means of implicit or explicit teaching methodologies, and consequently, the role of implicit and explicit knowledge in L2 comprehension and production, has been a matter of debate and led to a variety of didactic paradigms throughout the years. Followers of traditional translation methodology that relied heavily on explicit knowledge and was popular in the 1960’s and 1970’s believed that it was crucial to understand and perceive the rules of the target L2 prior to adequately using them (Ellis, 2006). On the other end of the spectrum, traditions such as audiolingualism and natural, communicative approaches viewed L2 language learning as very similar to that of L1 acquisition and grammar-based learning was rejected (Ellis, 2006). Importantly, Krashen (1982) dismissed the notion of an interface between the two types of learning and knowledge, based on L2 adult students who demonstrated little fluency when conversing in their target language, in spite of possessing technical knowledge about the language’s grammar. His theory saw L2 acquisition to be comparable to that of L1 acquisition in which, so long as there is sufficient input, implicit processing is primarily responsible for the development of language skills.

Nevertheless, research that has reviewed the efficacy of grammar-free, immersion style teaching programs revealed important deficiencies in the language accuracy of L2 students (Lightbown, Spada, and White, 1993). Thus, more explicit teaching styles were then to be integrated in L2
instruction, and the Focus on Form tradition evolved (Long, 1991). As Ellis (2006) describes it, “Prototypical Focus on Form instruction involves an interlocutor recasting a learner’s error in a way that illustrates its more appropriate expression,” (p. 4).

Krashen’s (1982) non-interface assumptions were later to be rejected, specifically by Schmidt (1990), who proposed that conscious effort, manifested by noticing, is a necessary condition in order for input to become intake in L2 acquisition. Through all of these tendencies in SLA research, the field was left with a sort of “weak-interface”, in which it became clear that explicit knowledge is crucial both to the process of perceiving and selectively attending to the target L2, and in facilitating the “noticing” of specific linguistic features of the input and subsequently in the gap between what is produced by the learner (Ellis, 2006). The conclusion, thus, is that both implicit and explicit knowledge, while dissociated, mutually influence each other in the learning process. As of yet, no research has been carried out investigating the nature of implicit and explicit knowledge in the acquisition of an L2 in a second modality.

2.5 Phonological Knowledge and Language Acquisition

The term phonological awareness refers to the metalinguistic knowledge of a language’s sound structure, and a speaker’s conscious ability to identify and manipulate sounds (Liberman & Shankweiler, 1985; Wagner & Torgesen, 1987). Previous research has yielded results that suggest that deaf signers are sensitive to the phonological structure of sign language, and even to a parameter-based lexical organization (Grosvald, Gutiérrez, Hafer, and Corina, 2012; Carreiras,
Gutiérrez Sigut, Baquero, & Corina, 2008). A few studies have investigated the role of phonological knowledge in sign language acquisition and they will be reviewed below.

Corina, Hafer and Welch (2014) created a phonological awareness task that consisted in viewing two nonsense signs, then isolating the parameters of handshape, movement, and location parameters and recombining them to create an existing sign in ASL. Participants were individuals that were either exposed to sign language at an early age (before the age of 8), a late age (after the age of 8), or were native signers (they had learned to sign from a native signer). The latter group of participants performed most accurately on the test than did the early or late learners. Importantly, the authors point out that early and late signers did not ‘fail’ the test, but rather that they were less accurate. Therefore, they concluded that native language acquisition is not a necessary requisite for developing metalinguistic skills in a sign language.

Mann, Marshall, Mason and Morgan (2010) carried out a nonsense sign repetition task with a group of deaf children acquiring BSL as their L1 and a group of sign-naive hearing children in order to investigate the effects of phonetic complexity on perception and production accuracy and to consider the universality of sign language processing. The results revealed a correlation between repetition accuracy and fine motor skills. Whereas deaf children improved in accuracy with age, indicating the effects of experience on processing skills, both groups were affected by phonetic complexity. These findings would suggest that visual and motoric aspects play an important role in processing this modality of language. Nevertheless, the authors point out that phonological knowledge of sign language is a relevant factor. Firstly, deaf children were able to
complete the nonsense task at a younger age than sign-naive hearing children. Secondly, deaf children performed significantly better than hearing children regarding production accuracy even though they revealed the same fine motor skills (tested by a bead stringing activity). Thirdly, it was found that their performance on the nonsense sign task correlated with their general BSL skills.

Phonological knowledge, as of yet, has not been investigated in the context of SLA of a sign language by hearing adults. When developing a new phonological system, however, it might be of interest to understand how a student’s explicit understanding of said system influences their capacity to perceive and produce the target language.

3. The Present Study

Acquiring a signed language as an L2 for a hearing adult means making a leap in modality. Contrary to what happens when a hearing adult endeavors to master another spoken language as their L2, when one adds a second modality to their language repertoire, one must master an entirely new way to express language. The very obvious difference in transmission implies acquiring the ability to express linguistic content through articulators that were previously used for other daily tasks and to accurately perceive meaning in the same structures articulated in the same way. The new phonological system that must be learned is not merely different in what it permits and allows, but in how it is manifested. Given that this type of acquisition poses
obstacles different to those of spoken L2 acquisition, there is a variety of questions left to be answered about the process.

The research reviewed above sheds some light on the process. It is clear that experience and age of exposure lead to a cultivation of phonological knowledge that improves perception and production skills of sign parameters (Bochner, Christie, Hauser, Searls, 2011; Corina, Hafer, Welch, 2014; Mann, Marshall, Mason and Morgan, 2010). Additionally, evidence suggests that phonological complexity can impact production and perception accuracy (Ortega-Delgado, 2013; Mann, Marshall, Mason and Morgan, 2010). What has not yet been asked specifically is how an L2 learner’s phonological knowledge interacts with their perception and production abilities of sign parameters. Since for a native speaker of an oral language, learning a sign language means acquiring the ability to use new articulators for linguistic expression, it may be possible that greater explicit emphasis on the role played by these articulators will increase the likelihood of greater competence in the perception and production of the sign language. Therefore, the present thesis proposes the following research questions:

1. Do teaching methods with a greater focus on the explicit learning of phonological knowledge lead to greater phonological awareness by L2 learners of LSC at the A1 level?

2. Does greater phonological awareness lead to better performance in the perception and production of the phonological parameters of sign?
In all likelihood, the best way to answer this question is by means of a longitudinal study. Given the limitations present however in carrying out this thesis, this was not an option. Therefore, a pilot study has been carried out in order to attempt to give some indication that the longitudinal study would be a worthwhile affair. The research question adapted for this pilot study is:

*Will L2 students of LSC at the A1 level perform better on perception and production tasks after having recently participated in an educational activity designed to obtain explicit phonological knowledge?*

The remainder of this thesis will therefore be organized in the following way. First, the pilot study that was carried out will be presented. Second, a proposal will be made for the longitudinal study designed to answer the principal research questions proposed.
4. Pilot Study

4.1 Introduction

Crucial to the methodology involved in answering the principal research questions is time. True phonological awareness is most likely cultivated over time and through sufficient exposure to the target language. In asking whether teaching methods with a greater focus on explicit learning of the phonological parameters increases phonological awareness, and in turn, if greater phonological awareness leads to better performance in perception and production of sign parameters, the factors of time and exposure are not eliminated from the question. Answering that question entails modifying teaching curriculum and methodology, but most likely still requires its employment over a long enough period for it to be effective. Unfortunately, external circumstances did not allow for a wide time range in which to complete such experimental work for this thesis. Time was of the essence and a longitudinal study was an impossibility. Therefore, the question had to be addressed in a different way.

It seemed that the adequate way to do so was to utilize one of the methods proposed for the longitudinal study and test whether it might have a short term effect. Specifically, then, the research question was transformed to ask whether recent participation in an activity designed to elicit previously acquired, explicit, phonological knowledge could influence in the posterior usage of that phonological knowledge in perception and production tasks. The study was designed for hearing adult L2 learners of LSC, enrolled at the local LSC school Àgils in Barcelona. These students had already been dedicating time to learning LSC, and therefore some
degree of phonological awareness was assumed to have been acquired by all participants. In order to elicit this knowledge, a didactic activity was designed and used on the test group, while the control group did not participate in this activity. It consisted in presenting the students with specific examples of one of the phonological parameters, handshape, and asking them to think of signs learned during their LSC course in which that specific handshape appeared. Since participants then had to actively and explicitly focus on the parameter of handshape, the question was whether when completing the perception and production tasks just afterward, they would be inclined to focus on the handshape parameter more closely and therefore perform the tasks more accurately.

The decision to focus solely on one phonological parameter was, once again, due to time constraints. The phonological parameter of handshape was decided on as the object of study. The stimuli used to trigger phonological knowledge consisted in LSC handshapes, and the stimuli used in the perception and production tasks consisted in ASL signs. This was done to ensure that students were not familiar with the signs, and therefore it was possible to better test their perception and production and abilities and eliminate the possibility of memory and/or familiarity with the signs playing a principal role. Nonetheless, it was ensured that the handshapes articulated in the ASL signs were also permitted in LSC, and therefore at some point or another, students should have made use of those handshapes. This eliminated the likelihood of dexterity problems that may arise when learning and articulating a new handshape. Furthermore, the stimuli were designed so that handshapes used first in the test group activity did not appear later in either the perception or production tasks. In the event that the test group did actually
perform the tasks with greater accuracy, this result could not be attributed then to having just recently practiced those handshapes.

The perception task consisted in a very simple minimal pair paradigm, in which participants had to view two videos and decide whether the sign that articulated was the same in both or different. The production task consisted in the viewing of a video of a sign, in then reproducing it.

4.2 Methodology

4.2.1 Participants

Ten volunteer participants (mean age = 28.8, 80% females) were recruited from a semi-intensive, A1 level LSC course at Àgils School. With the exception of three students, all had begun to study LSC, without any prior experience or knowledge of sign languages, in February 2015. Two students began slightly later, in March 2015. A third student had begun studying in October 2014, 4 hours weekly at the same center, and had changed into the semi-intensive course in February 2015. The class meets for four hours, twice weekly. Students varied in the amount of extra hours dedicated to the study of LSC outside of the classroom, from as little as no extra study time to as much as 10 extra hours of dedication. In general, the motivation for attending the class and learning LSC were of an intrinsic nature: in order to broaden general knowledge, for future work possibilities, an interest in learning something new, etc. One participant had signed up due to a medical condition that will lead to hearing loss (neurofibromatosis). Regarding knowledge of other sign languages, two participants reported that two weeks prior to their participation in the study, they had begun an introductory course to International Sign.
4.2.2 Stimuli

4.2.2.1 Didactic Activity Material

Materials for the didactic activity carried out with the test group prior to the perception and production tasks consisted in handmade drawings of specific handshapes. The handshapes were all permitted in LSC, and based on the textbook used in class, should have been familiar to the participants based on the vocabulary they had already acquired at that point. Additionally, it is important to note that the handshapes used for the didactic activity did not appear in any of the video pairs for the perception task, nor did they form part of any of the target signs used in the production task. The drawings can be found in Appendix A.

4.2.2.2 Perception Task Material

The target sign videos were chosen from those available on the online video dictionary of ASL, which can be found at signingsavvy.com. Stimuli for the perception task consisted in 15 minimal pairs that differed only in handshape. Additionally, 5 pairs of videos that differed in a variety of parameters, and 5 pairs that consisted in the same video repeated twice were randomly added to the task in order to serve as a control, yielding a total of 25 test pairs. The participants were also presented with a practice pair before starting the task. The video pairs were presented in one continuous video in which first the pair number appeared on a black screen, followed by the first sign of the pair, then by a black screen for 3 seconds, and then the second sign. Immediately afterward a screen appeared instructing participants to “Answer 1”, or the corresponding number. The order in which the pairs appeared was completely random. The complete list of signs used can be found in Appendix E.
4.2.2.3 Production task material

For the production task, 21 target sign videos were also chosen from signingsavvy.com. The signs were chosen based on a typology similar to that of Battison (1978), used to classify signs based on articulatory difficulty. A few modifications were made in order to account for the principal focus of the pilot study: handshape. The typology is as follows, exemplified in Figures 1 and 2 by signs which have been reproduced from *The American Sign Language Handshape Dictionary* (Tennant, Brown, 1998):

Type 1: One-handed signs with only one handshape.

Type 2: One-handed signs in which there is a change in handshape.

Type 3: Two-handed signs, the non-dominant hand is a mirror image of the dominant hand.

Type 4: Two-handed signs, dominant hand acts independently from the non-dominant hand, but both use the same handshape.

Type 5: Two-handed signs, dominant hand acts independently from and upon the non-dominant hand, both hands present different handshapes.

Type 6: Two-handed signs, hands act simultaneously and have the same handshapes at all times, but the handshapes change during the sign.

Type 7: Two-handed signs, dominant hand changed handshape and moves independently of the passive hand.
Figure 1: Sign types 1-4.
There were three signs chosen of types 1, 2, 3, 4, and 6. Due to a mistake in classification, and the decision to eliminate two signs from the results because of poor viewing conditions, there was only 1 instance of type 5 and four instances of type 7. In addition to the 21 signs used for the
task, an additional five signs were used as practice before the participants completed the task. Production of these practice signs was not considered in the final results. The videos were compiled into a format similar to the perception task stimuli. On a black screen there first appeared a fixation point for 3 seconds, and then the target sign. After the target sign another black screen that lasted 5 seconds. The fixation point then returned, and the next sign appeared. The complete list of signs used for this task can be found in Appendix F.

4.2.2.4 Survey material

A very brief survey designed to elicit metalinguistic knowledge from the participants was created. It consisted of the following prompt, translated from Catalan: “Please make a list of all the formational parameters, that is, the basic components of a sign.” The wording of this prompt was taken from the LSC textbook used in their class, so as to increase the probability that they would understand what was being asked of them. Ideally, the students would have listed the five phonological sign parameters.

4.2.3 Procedure

4.2.3.1 Didactic activity procedure

Prior to completing the perception and production tasks, a group of five randomly selected participants completed a didactic activity designed to stimulate phonological knowledge, specifically of the handshape parameter. The five participants sat around a table, where 12 drawings of specific handshapes lied face down. Participants were instructed to take turns choosing a handshape card. When a card was chosen, the handshape was revealed and
participants were told to think of and report in which LSC signs that handshape appeared at some point. Participants discussed and considered options as a group and created a list of signs for each particular handshape. Each participant wrote down on a numbered sheet of paper provided by the experimenter the signs that corresponded to each handshape. Due to time constraints, the activity was not completed in full, and of the 12 handshapes, 3 were not used for the task.

4.2.3.2 Perception task procedure

After having completed the didactic activity, participants returned to their LSC class. Individually, participants were called out to complete the tests. First, participants were asked to read the perception task instructions, written in Catalan. The experimenter ensured that they had understood the instructions, and to further guarantee this, the participant completed the practice pair with the experimenter. The videos were presented on a Macbook 13” screen at a distance of approximately two feet, and after viewing each pair the participant circled either “SAME” or “DIFFERENT” on their answer sheet. The whole process lasted approximately 5 minutes.

4.2.3.3 Production task procedure

Once the perception task was completed, participants read the written instructions for the production task. After having ensured their comprehension, they were instructed to complete the warm-up signs and ask the experimenter any questions they may have had. The videos were presented on the same Macbook 13” at a distance of about two feet. Participants were sitting down for this task and a Samsung Hyper Dis video 65X camera was set up on a tripod at a distance of about 5 feet in order to record their production of the target signs. They first viewed
the target sign and were instructed to reproduce the sign that they had seen once it was no longer present on the screen, or rather during the 5 seconds of black screen that followed each sign. When they had completed the warm-up videos, and all questions were resolved, they then completed the rest of the task, which lasted approximately 7 minutes.

4.2.3.4 Survey procedure

Finally, students were asked to sit down at the table and to complete the survey. Participants were instructed to spend no more than 3 minutes writing their response and to answer to the best of their knowledge.

4.3 Analysis

4.3.1 Analysis of the perception task

Regarding the perception task, each individual test item was simply marked as correct or incorrect. The total test scores for each participant was the percentage of correct answers.

4.3.2 Analysis of the production task

The accuracy scores for the production task were calculated solely on the basis of the handshape parameter. For each of the seven sign types previously outlined, there was a maximum possible score. This score was simply the sum of the handshapes that appeared in the signs. The maximum scores of each sign type are presented in Table 1.
<table>
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<td>Type 7</td>
<td>3</td>
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Table 1: Maximum points attainable for sign types

As a side note, it might seem that each type should increase in difficulty and thus in maximum points possible. However, the main concern was whether the handshapes would be reproduced accurately, and the only way to score that was to observe whether all of the corresponding handshapes that appeared in the target sign were reproduced by the participant. After points had been tallied, it would then be possible to see if two given handshape types of the same possible maximum score, differed in mean accuracy scores because of added phonological complexity (for example, both in types 3 and 4 two handshapes are articulated, but type 4 might be more difficult to reproduce because the hands do not move in mirror image of one another).

Thus, two raters reviewed the signs as reproduced by the participants and compared them with that which appeared in the target videos. In some cases, the differences in production might have been due to natural sign variation, but since the participants were explicitly instructed to repeat the sign exactly as it was presented, any difference in the production of the handshape parameter
was considered to be incorrect. For example then, if for a type 6 sign in which both hands are mirror images of each other and the handshape changes (resulting in a total of four articulations of handshapes, two by each hand), the participant did not accurately articulate one of the handshapes on one of the hands, the total score would be 3 points out of a possible 4.

The two raters scored all of the participants individually and then reviewed their results together. At first, the two raters agreed on 81% of the cases, but after careful review and discussion, they were able to agree on 100% of the cases.

4.3.4 Analysis of the survey

For the survey, and although this was not used for any part of the statistical analysis conducted, answers were reviewed to see if in general participants were able to explicitly state the five phonological parameters. This was purely a qualitative study, as will be discussed below in the results section.

4.4 Results

An independent samples t-test was conducted to compare both the total perception scores of the group that participated in the didactic activity (the test group) and the group that did not (the control group), and the production scores of both groups. Regarding the perception scores, there was no statistically significant difference between the test group scores (M=80.8, SD=17.29) and the control group (M=81.6, SD=12.83); t (8) = -.083, p = .94. Likewise, comparison of the
production scores revealed no statistically significant difference between the test group (M=34.6, SD=4.45) and the control group (M=32.8, SD=7.25); t (8) = .47, p = .65. Therefore the null hypothesis cannot be rejected, and it cannot be concluded that participation in the didactic activity led to increased accuracy on the production and perception tasks.

Additionally, in order to determine whether there was a correlation between scores on the perception task and on the production task, a Pearson Correlation test was conducted. It was found that perception scores and production scores were not correlated; r (8) = .58, p = .082.

Lastly, scores were compiled for each participant for each of the sign types. For example, there were 4 instances of signs of type 7, and since the maximum score for a type 7 sign was 3 points, then the maximum score for all type 7 signs was 12 points. An independent samples t-test was then conducted to determine whether there was any significant difference in the total productions scores for each sign type between the test and control group. No statistically significant difference was found between groups on any of the sign types. The write-up of these results can be found in Appendix H.

Regarding the results of the survey carried out, it must be noted that these results are more qualitative in nature than quantitative. It might be possible to calculate a score for each individual, allocating one point for each phonological parameter that they properly named, for a maximum of five points. However, as becomes clear from reviewing the surveys (which can be found in Appendix G), there are a variety of instances in which it is not quite clear to what the
participant is referring. For example, one participant wrote, “the position of the fingers, hand, body…” Should this be understood as the parameters of handshape and non-manual features? It’s quite difficult to make that decision without further discussion with the participant. What does become clear from reviewing the surveys is that, while some participants have some kind of understanding of the phonological parameters, they are, for the most part, incapable of articulating them in a succinct fashion such as demanded by the survey. In fact, no participant was able to simply list the five phonological parameters by their common terminology. As phonological awareness was not measured, it is difficult to know whether or not the ability to explicitly state the substructure of a sign is indicative or not of greater or lesser phonological knowledge.

4.5 Discussion & Conclusions

There was very little difference in the perception and production test results between the group that participated in the didactic activity prior to testing and the group that did not, and in no case can this difference be considered statistically significant. Nonetheless, it should be noted that for the production task the average mean of the test group was slightly greater than that of the control group. While this may have been due to a variety of factors, including chance itself, and while we cannot reject the null hypothesis due to lack of statistical significance, it would be opportune to consider one possible explanation. Upon being presented with a specific handshape, students were instructed to recall signs that they had learned in their course in which that handshape appeared. During this process, the students discussed options amongst themselves, and in order to make decisions about which signs used the handshapes, they articulated the signs.
The didactic activity lasted approximately 30 minutes, but during those 30 minutes students’ explicit phonological knowledge was exploited, and their production skills were also put to use. It may very well be, that this brief activity led to the very small difference in mean production scores between groups. It may not have led to a difference in perception scores because the didactic activity did not require such explicit usage of perception skills. Of course, there exist many other possible explanations for these subtle difference in results, and to be quite clear, they are by no means statistically significant. Nevertheless, this possible explanation cannot be fully discarded.

A brief discussion on the limitations of this study is in order. In the first place, this was a very small pilot study, with only ten participants divided into two groups. Any outliers could drastically change the outcome of mean scores. In a language acquisition study, regardless of whether there exists a change in modality from the L1 to the target L2, a myriad of factors play a role in successful acquisition. Personal aptitude, motivation and age, are all examples of factors that were difficult to control for, especially considering the time and budget constraints with which this study was carried out. Therefore, any one of these factors may have affected test scores and led to outliers that in turn, skewed the mean scores.

Therefore, while a significant difference was not found between the two groups that underwent different treatments, this is not necessarily indicative of the invalidity of the main research questions proposed for a longitudinal study. Rather, it can be taken as a confirmation of the need to carry out a different sort of study in order to answer those questions. The pilot study merely
attempted to ascertain the effect of recent activity (participation in the didactic activity) on production and perception performance, which is not the same as measuring the resulting effect of the same, or similar, treatments over a longer period of time. Additionally, with the exception of the qualitative study, phonological awareness was not measured. Thus, it may very well be the case that some of the participants in the control group, despite not having participated in the didactic activity, had acquired more phonological knowledge throughout the months of their LSC course than some of the members of the test group.

In short, while truly conclusive answers cannot be derived from the results of the pilot study, this merely motivates the need for further investigation on the topic. The next section will be dedicated to making a proposal for said further investigation.

5.0 Proposal for Future Research

To date, no research in L2 acquisition of sign by hearing adults has focused on the efficacy of employed teaching methodologies, specifically on implicit and explicit learning. Rather, as previously discussed in the literature review, investigation in this area has centered principally on production and perception errors of the phonological parameters. However, the unique situation in which these L2 learners find themselves, that of learning a second modality at an age in which cognitive and motor-skill abilities are fully developed, merits asking certain questions about the impact of didactic methods, and that of explicit phonological knowledge on perception and
performance. The very questions that have been asked of the process of SLA within the same modality deserve to be asked of the SLA process when the L2 is of a different modality.

Might not the way in which students think about the target language affect their language skills and performance? And might not, in the case of L2 students of sign, certain teaching methodologies be employed to transform the way that students understand the workings of their target language? Could greater explicit, metalinguistic knowledge lead to better linguistic performance? As reviewed in section 1.4, explicit and implicit metalinguistic knowledge of an L2 mutually influence one another in the language and are both necessary for becoming proficient in that L2 (Ellis, 2006). Therefore, it would be worthwhile investigating, in the first place, if didactic methodologies with a greater influence on explicit learning, yet still combined with implicit learning techniques, might lead to greater phonological awareness. And if, in turn, this greater phonological knowledge affects performance on perception and production tasks.

In order to test this, a longitudinal study might be carried out, with sign-naive hearing adults endeavoring to learn LSC for the first time. Ideally, there would be a total of 60 participants that would be divided into two groups. The two groups would attend weekly sessions of an LSC course, but they would undergo different pedagogical treatments for a period of at least six months.

The curriculum used to instruct the control group will consist, above all else, in implicit learning methods. Very little focus will be given to the instruction of metalinguistic knowledge. In
general, the students will learn LSC by means of teacher demonstration. The students will have a textbook, that consists in pictures of the signs organized by thematic content, and the teacher will demonstrate the correct articulation of each sign, as a whole, as seen in Figure 3. After having been presented with the content of a certain unit, students will then use these signs (in addition to previously acquired signs) to participate in some kind of communicative activity with their peers. At the beginning of the course, the students will be given a unit on the substructure of sign, as is the current practice, but this will not later be exploited in their learning process.

![Figure 3: example of sign illustration. Reproduced from the LSC A1 level course book used at Ágils school.](image)

The test group will be taught by means of a curriculum that gives a greater emphasis to the explicit learning of the structure of LSC. Like the control group, students will learn new signs via demonstration by the teacher and with a textbook that contains images of the signs organized by thematic content. However, the demonstration of the signs will be broken down into parts, and the teacher will make an extra effort when presenting each sign to clarify the articulation of each individual phonological parameter for that sign. In the textbook (which as of yet does not exist,
and will have to be created), next to each image of a sign, there will be a space provided where students should describe each of the five phonological parameters, as seen in Figure 4. Necessarily, the students will have to pay detailed attention to the substructure of the sign as they learn it.

Figure 4: prototype of modified textbook. Image reproduced from the LSC A1 level course book used at Ágils school and modified.

In addition to this difference in explicit analysis of new signs, students in the test group will participate in activities designed to evoke this explicit knowledge, similar to that used in the pilot study with the control group. For example, students might be presented with a specific value of a phonological parameter and asked to think of signs that they have learned in which that value is articulated. Another example of an activity would be a game that consists in the challenge of articulating a sign in which one of the parameters coincides with a parameter of a sign previously articulated by another student just prior.
In order to answer the first proposed research question (“Do teaching methods with a greater focus on the explicit learning of phonological knowledge lead to greater phonological awareness by L2 learners of LSC at the A1 level?”), it is necessary to measure the phonological awareness obtained by each individual from both groups. In order to do so, the paradigm created by Corina, Hafer and Welch (2014) will be adapted for LSC and employed. These researchers created a phonological awareness test for ASL that, as they state “requires the explicit manipulation of structural properties of ASL signs” (Corina, Hafer and Welch, 2014, p. 534). Participants will view videos of two nonsense, pseudosigns and will be asked to isolate the phonological parameters of each one. Having done so, participants will then be asked to combine the separated phonological parameters from the two pseudosigns to create an existing sign in LSC. The participants will have to choose between three possible answers - one of which is correct. All three signs will be existing LSC signs, but only one can actually result from combining the phonological parameters of the two pseudosigns. It will be ensured that all of the signs used in this task had appeared at some point during the duration of the LSC course.

The students’ answers will be analyzed, as either correct or incorrect and a total score will be calculated. This score will be the measure of phonological knowledge, and it will be possible to compare means to see if the test group has accumulated greater phonological knowledge through teaching methodologies with a greater emphasis on explicit learning than the control group has. Afterward, participants will complete the perception and production tasks used in the pilot study. The stimuli, once again, will consist in signs from ASL in order to ensure that memory does not
play a role in the production task, and signs will be chosen based on a typology of phonological complexity. Scores will be calculated as was done in the pilot study. With these three scores, the data will be analyzed to find out whether there is a correlation between phonological awareness and performance in perception and production tasks.

6. General Conclusions

The main objective of this paper has been to identify a relevant gap in sign linguistics research and to propose an adequate methodology that might fill in the missing answers. Through a review of the relevant literature, it has become clear that phonological knowledge improves with exposure to sign language (Bochner, Christie, Hauser, Searls 2011; Corina, Hafer, Welch 2014; Mann, Marshall, Mason and Morgan 2010) and that phonological complexity can impact production and perception accuracy (Ortega-Delgado, 2013; Mann, Marshall, Mason and Morgan, 2010). Additionally, it has been established that, as far as SLA of spoken languages is concerned, there exists a mutual influence of implicit and explicit knowledge (Ellis, 2006). And given that learning a signed language as a hearing adult, whose native language is spoken, implies mastering a new motor skill (specifically, that of using new articulators to express linguistic content) a great cognitive effort is necessary. Therefore, the questions begging to be asked concern how the L2 learner of a sign language acquires a phonological system of a different modality, and whether knowledge of that system, or rather phonological knowledge might have an impact in perception and production accuracy.
As mentioned, these questions are best answered by a methodology designed to be employed over time. Since a great deal of time was not available for the preparation of this master thesis, the research questions were adapted and it was asked not whether greater explicit phonological knowledge influences signing proficiency, but if recent usage of phonological knowledge can impact signing proficiency. By means of the pilot study presented, there was an attempt made at answering this question. Nonetheless, the results were quite varied, and no clear correlation can be established from them. It is possible that participation in the didactic activity, which focused primarily on production, might account for the slight, and not statistically significant, difference between the test group and the control on the production task, but from the data at hand this cannot be confirmed. Additionally, a small survey was carried out, which revealed that participants were for the most part unable to state all five phonological parameters of sign. This may reflect ignorance of the substructure of sign which in turn could impact perception and production accuracy, or, it may reflect a simply inability to explicitly articulate metalinguistic rules, which may or may not affect signing proficiency.

The last section of this paper was dedicated to a proposal for a longitudinal study designed to better answer the principal research questions. The proposed study should be carried out over a minimum of six months, although it could be over an even longer period of time. The importance of the study is twofold: firstly, it would examine the effectiveness of implicit and explicit pedagogical methodologies. No research has been carried out as of yet on the pedagogy of sign as an L2 for hearing adults, and this is a reasonable place to start due to the the break in modality between students’ L1 and their target language. Secondly, it would first measure phonological
awareness, and then examine the existence of a correlation between this and perception and production accuracy.

One of the principal objectives of this paper, was to make clear the importance of continued research in the area of second language acquisition of sign by hearing adults. Many questions are left to be answered, and this paper highlights some of these which are quite relevant. Understanding how adults accustomed to using their vocal and auditory system for linguistic communication develop the capacity to communicate in a gestural-visual modality is not only pertinent to pedagogical practices, but to the field of language acquisition as a whole.
7. Appendix A

Handshape drawings used for the didactic activity with the test group

1.

2.
9. [Hand gesture with one extended finger]

10. [Hand gesture with three fingers extended and thumb touching the palm]
8. Appendix B

Example of participant answer sheet used in didactic activity with test group

Número de participante: 5

1. mera, enviar, universitario

2. ¿i, j, tacón, problemas, pipa, feliz, idioma, instituto, y, z?

3. amarillo, día, año, odio, guitarra, pizza, pobre, lavavajillas, persona,

4. pasto, transportar, fútbol, bicicleta, volver, avión, teléfono fijo, deber, cansado

5.

6. guitarra, pelota, sol, par, abril, lluvia, muebles, radio, cocina, cocina, animales

7. pájaro, despertar, paloma, pico, presa, virus, escribir

8.

9.

10. Poder, idéntico, seguro, que, septiembre, hora en punto especial

11. Ti, llave, tienda, pasta dientes

12. techo, piso, extranjero, lavabo, calefacción
9. Appendix C

Instructions and answer sheet for perception task.

TASCA 1

A continuación veré una serie de vídeos agrupados en bloques de dos. A cada vídeo hi ha una persona que fa un signe. La vostra tasca consisteix que decidiu si el signe que apareix és igual o diferent al altre signe del mateix bloc. És possible que el signant en algun bloc canviï.

Primer veureu a la pantalla el número del bloc de vídeos. Després veureu el primer signe del bloc, seguit per una pantalla negra, i després el segon signe del bloc. A continuación veureu la instrucció “Contesteu 1” (o el número del bloc corresponent). En aquest moment, haureu de marcar al full si són iguais o diferents per a aquella pregunta, fent un cercle a la vostra resposta.

Primer farem una prova. Si teniu qualsevol pregunta, ara o durant la prova, sisplau, demaneu-ho.
10. Appendix D

Número de participant:

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11. Appendix E

Instructions for production task.

TASCA 2

Aquesta tasca consisteix que repetiu una sèrie de signes que veureu.

Primer veureu una pantalla negra amb una línia al mig. Després apareixerà el signe que haureu de repetir. Després la pantalla es tornarà negra, i tindreu 5 segons per repetir el signe. Sisplau, no repetiu el signe fins a que la pantalla s’hagi tornat negra.

Primer de tot farem una prova de 5 signes, per què us familiaritzeu amb el procés.

Si teniu qualsevol dubte ara o Durant la prova, sisplau, comunique-ho.
12. Appendix F

List of sign pairs used in perception task

1. Diferents: ME/MY
2. Iguals: CIRCLE
3. Diferents: DEMOCRAT/REPUBLICAN
4. Diferents: PEOPLE/BICYCLE
5. Diferents: SWEET/CUTE
6. Diferents: CAR/WHICH
7. Diferents: COUGH/WE
8. Diferents: ROOSTER/FATHER
9. Diferents: TRANSLATE/NUMBER
10. Diferents: FEAR/PAY
11. Diferents: APPROVAL/STOP
12. Iguals: AREA
13. Diferents: SENIOR/TEMPERATURE
14. Diferents: WORSHIP/WRESTLE
15. Diferents: WHITE/LIKE
16. Diferents: HOME/YESTERDAY
17. Iguals: BLACK
18. Diferents: GENIUS/NECKTIE
19. Igual: PROUD
20. Diferents: APPLE/CANDY
21. Diferents: RED/CUTE
22. Iguals: LOSE
23. Diferents: CABBAGE/CONFLICT
24. Diferents: OWL/BINOCULARS
25. Diferents: ONION/CHINESE
13. Appendix G

List of signs used in production tasks (with their sign type in parenthesis)

1. DECREASE (4)
2. DECORATE (3)
3. BUILD (3)
4. SUBTRACT (7)
5. EAGLE (1)
6. STRUGGLE (3)
7. LEARN (7)
8. FLOWER (1)
9. ANYTHING (2)
10. TEST (6)
11. ABOUT (5)
12. SUMMER (2)
13. TAKE ADVANTAGE OF (7)
14. SPREAD (6)
15. INCOMPETENT (7)
16. STUDY (4)
17. OLD (2)
18. TOUGH (4)
19. ACCIDENT (6)
14. Appendix H

Completed participant surveys.

Número de participant: 7

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

- LA EXPRESIÓN FACIAL.
- LAS MANOS
- EL MOVIMIENTO DE LAS MANOS.
- EL MOVIMIENTO DEL CUERPO
Número de participant: 2

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

- Configuració de la mà
- Configuració del rostre
- (x) del cos
- Posició de la mà respecte al cos
- Petjada als ulls, al pôt,
- Direccionalitat del moviment, cap al cos
de dreta a esquerra, de costat a d’alt, etc.
Número de participant: 3

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

- De forma real de l'objecte que volem descrire.
- El pes del objecte o persona.
- La grandària.
- Si està a prop o lluny.
- Si té moviment o no.
- Si el podem tocar o no.
- El que ens transmet (faístic, si ens agrada o no...) → expressió facial.
- Perspectiva respecte altres coses.
Número de participant: 4

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe: (Avian quants n'he comptat correctament...)

- Les mans (ós d'una o dues)
- El moviment de les mans (sentit)
- Direcció (cap a on va orientat) (cap enrere, cap avanç, etc. o dreta,...)
- 4 vocals: directes o no directes
- Classificadors (estables dins
- Expressió facial (un temani)
- Estructura per part (començar amb + o - dits,
  o des de d'un punt a un altre, i acabar diferent)

Número de participant: 5

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

\[ \text{NO} \quad \text{SE} \]
Número de participant: 6

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

- la posició mans / dits
- la localització en el cos
- la posició facial
- el ritme (vegeu com posar el signe)

Número de participant: 7

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

A FORMA DE LA LLANO PUEDE SIGNIFICAR MAS DE UNA COSA, DEPENDIENDO DE LA DIRECCIÓN O MOVIMIENTO, DEPENDERÁ SI QUEREMOS EXPLICAR LO QUE HACEMOS CON UN OBJETO, LA CARRIÓN DEL MISMO PUDO SER LA CONTINUAR CON MAS DE UN SIGNO.
Número de participant: 8

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

Els paràmetres bàsics constitutius que formen un signe són:

- El significat.
- La forma i/o característiques
- Els detalls dels objectes, persones o animats
- El sònic del país on provin i l'idioma que tinguin
  es fan en una manera o en una altra.

Número de participant: 9

Siusplau, feu una llista de tots els paràmetres constitutius, és a dir, els components bàsics que formen un signe:

Moviment de la mà
La posició dits, ma, cos...
Expressió de la cara
15. Appendix I

Write up of results of sign type comparison.

1. Type 1:
No statistically significant difference was found between the mean scores of the test group (M=1.8, SD=.44) and the control group (M=1.4, SD=.54), $t(8) = 1.26, p = .242$.

2. Type 2:
No statistically significant difference was found between the mean scores of the test group (M=4.2, SD=.44) and the control group (M=4.4, SD=1.51), $t(8) = -.283, p = .784$.

3. Type 3:
No statistically significant difference was found between the mean scores of the test group (M=5.2, SD=1.78) and the control group (M=4.4, SD=2.0), $t(8) = .653, p = .532$.

4. Type 4:
No statistically significant difference was found between the mean scores of the test group (M=4.4, SD=.89) and the control group (M=4.2, SD=1.30), $t(8) = .283, p = .784$.

5. Type 5:
No statistically significant difference was found between the mean scores of the test group (M=2.00, SD=0) and the control group (M=2.00, SD=0).
6. Type 6:

No statistically significant difference was found between the mean scores of the test group (M=7.2, SD=3.0) and the control group (M=10.0, SD=1.51), t (8) = -1.871, p = .098.

7. Type 7:

No statistically significant difference was found between the mean scores of the test group (M=9.6, SD=1.5) and the control group (M=6.6, SD=2.96), t (8) = 2.013, p = .079.
16. Bibliography


