ARTIGOS

The cherology awareness in Portuguese sign language [1] [2] [3]

A consciência querológica na língua gestual portuguesa

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Abstract

The Portuguese Sign Language (*Linguagem Gestual Portuguesa*, LGP) is a structured and natural language and should therefore be elected to enable the learning process of Portuguese deaf children. However, there is still a need to expand its knowledge, especially about the various acquisition periods. Special attention should be paid to cherology - study of the appropriation and the process of construction of this competence by the child/subject. The scarce evidence on cherology awareness demonstrate that its development plays an important role in the process of language acquisition. Therefore, the children environment must be supportive and promote contact with their natural language. Due to the relevance of linguistic environment, it is important to address the different contexts in the acquisition of sign language, as well as the cherology parameters. Finally, the conceptual and methodological gaps will be addressed. There is no existent measure for the assessment of cherology awareness.

Keywords: language acquisition, acquisition contexts, deaf, Portuguese sign language, cherology awareness, assessment

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Resumo

A língua gestual portuguesa (LGP) é uma língua estruturada e natural, devendo, por isso, ser a escolhida no processo de ensino-aprendizagem das crianças surdas portuguesas. No entanto, há a necessidade de expandir o seu conhecimento, sobretudo sobre as etapas de desenvolvimento e aquisição, dando especial atenção à consciência querológica – estudo da apropriação e o processo de construção desta competência pela criança/sujeito. Apesar da necessidade de maior aprofundamento dessa temática, as evidências apontam que o seu desenvolvimento assume um papel importante no processo de aquisição da linguagem. Neste sentido, atendendo à escassez de informação científica sobre a temática, este artigo, em formato de revisão de literatura, propõe-se a abordar a aquisição da LGP, através da descrição detalhada dos seus estágios, bem como dos diferentes contextos de aquisição. A consciência querológica é, então, abordada no âmbito da sua aquisição, parâmetros e lacunas – conceituais e metodológicas –, inerentes ao seu estudo e avaliação.

Palavras-chave: *aquisição da linguagem, contextos de aquisição, surdo, língua gestual portuguesa, querologia, avaliação*

Acquisition and development of Portuguese Sign Language

The theories on language acquisition and development are vast and diverse. According to Chomsky (2006), the predisposition to acquire language is an innate ability of the human being. In the course of these innate-based theories, Lenneberg (1967) points to the Critical Period Hypothesis, an ideal window for language acquisition, with its peak around age 2, a consequence of the brain neuroplasticity evidenced by children in the process of language acquisition (Neville & Bavelier, 2002). Some authors corroborate the first idea, arguing that the neuronal circuits responsible for language acquisition are regulated by the experiences lived during the critical period (Johnson & Newport, 1989; Knudsen, 2004). Chomsky's theory (Chomsky, 1959), in contrast to the behaviorist idea (Augusto, 1995) - individuals are clean slates, with no natural ability to acquire language, which happens only from social interaction - assumes that human beings have a genetic predisposition concerning an innate ability to produce, understand, recognize and acquire language.

Thus, language is defined as an innate ability (Chomsky, 2006) that humans have to produce, understand, and develop language, and that serves as a tool for them to communicate and interact with each other (Franco et al. 2003). Its acquisition and development result from the (quality of) interaction between the child and the environment (Sim-Sim, 1998), which, the

more stimulating it is, and the richer the experiences lived, the greater the chances of developing the linguistic component of their natural language (Quadros & Cruz, 2011; Sim-Sim et al., 2008).

The mother tongue, spoken in the family and with emotional weight, is naturally acquired and conditions the socialization process. The second language, on the other hand, is a language learned in a school context (or not), and is not natural to the child's family circle (Spinassé, 2006). It is therefore legitimate that deaf children, like hearing children, have access to their own natural language (Rubio & Queiroz, 2014), a language (input and output) visual-manual or sign language (Batista, 2010; Mineiro et al., 2008), or Portuguese sign language (LGP), which will ground the learning of a second language, i.e., Portuguese (Batista, 2010). Deaf children need to internalize the linguistic rules of the LGP, going through the same phases and stages of acquisition of oral language by hearing children (Newport, 1988; Petitto, 1987; Petitto & Marentette, 1991). Sign language processing is performed in the same place (left hemisphere) as speech and sound, i.e., oral language (Pettito & Marentette, 1991; Pettito et al., 2000; Quadros et al., 2010), and the human brain is programmed to build any language matrix. Although exposure to oral linguistic input is more available to deaf children, since about 90% are children of hearing parents (Batista, 2010), oral language was not created in order to meet the biological needs of deaf children, since it does not present a sensory modality available and possible for them, often leading to poor and limited language acquisition.

Deaf children of deaf parents who are exposed to their natural and mother tongue, the Sign Language (Lillo-Martin, 1986; Meier, 1987; Petitto, 1987), develop grammatical rules in a similar way to hearing children in relation to oral language (Quadros & Cruz, 2011) in a facilitated communicative process (Reis, 1997). On the other hand, the acquisition of sign language proficiency by deaf children with hearing parents who do not master sign language will be compromised (Neville & Bavelier, 2002; Newport, 1990; Singleton & Newport, 1994) at several levels, including cultural and individual identity (Amaral, 1999). According to Neves and Miranda (s.d.), when deaf children are not exposed to sign language early on, they will create their own gestures, with their own grammatical rules, seeming to contribute to the natural impulse that human beings have in language acquisition (Chomsky, 1959). The language acquisition of Portuguese deaf children should be made through their natural language, i.e., LGP, expressed through a visual-spatial modality (Quadros, 1997), being the only one that allows them to access a linguistic and communicative input for a perfect development of their language (Amaral, 2006).

The second context to which the child is exposed after the family, will be the school. In the Portuguese case, they are expected to attend the Reference Schools for Bilingual Education of Deaf Students (*Escolas de Referência para Educação Bilingue de Alunos Surdos*, EREBAS), which guarantee "a bilingual education that ensures the full cognitive and communicative development of the deaf child" (Batista et al. 2011, p.7, free translation). It is in these schools that children acquire the language and live with their deaf peers, from preschool education to high school (Lima, 2011). According to Carmo et al. (2007), bilingual education is now seen not as a necessity for deaf students, but as a right (Decree-Law No. 54/2018) aiming at the competence in both languages: the natural language (LGP) and the official language of the country (Portuguese) (Carmo et al., 2007).

When deaf children express their first gestures, they usually do so with modifications in the cheremes, i.e., in their parameters, changing configurations or producing inappropriate movements, corresponding to the execution of simpler gestures, and the semantic fields more easily grasped are those related to the child's environment (family, food, animals, toys, means of transport, clothing, etc.) (Carmo et al., 2007). Caregivers are the first to detect differences in development when compared to peers, highlighting the importance of the age at which they realize that the child is deaf. The average age at which a deaf child is diagnosed is around 18 and a half months (Geffner et al.1978). The whole process from diagnosis to realization may take about 2 years.

Quadros et al. (2010) evaluated the language development of deaf children and adolescents with different ages of onset of exposure to sign language (Brazilian sign language), or input, also considering the context of acquisition. The sample was divided into two different groups: those who acquired sign language before the age of 4/6, and those who acquired between the ages of 7 and 9. The analysis of the length of exposure to language is crucial. Children who acquired sign language before the age of 4/6 years show a more consistent vocabulary development. All those evaluated (100%) who had early language acquisition are able to correctly establish the use of classifiers in the language. On the other hand, children with early exposure, but less than 4 years of exposure, show some difficulties in establishing referents in space.

The deaf child, born and raised in a hearing family, develops coping strategies, heavily depending on their mother figure, with a tendency to oral language (Reis, 1997), damaging the

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maturation process that induces autonomy (Lane et al. 1996). Thus, it is crucial that deaf child comes into contact with their natural language early on, through early intervention. They should often socialize with fluent sign language persons that may, in some way, assist in the process of acquisition and maturation of sign language. It is also up to the parents of these children to encourage the study of this language, so that within the family, sign language may be used as the main fashion of communication.

Singleton and Newport (1994) found that deaf children exposed to sign language after the age of 12, when compared to those exposed from birth, showed greater difficulties in constructing sentences. Meier (2002) also mentions that the ability to verbal agreement, as well as other morphological aspects, significantly depends on the critical period of acquisition. If there is no exposure to sign language, their language may be limited to the use of isolated and familiar gestures, serving only to express basic needs (Amaral & Coutinho, 2002).

LGP Stages

One should consider that, from an early age, deaf child communicates not only by looking and babbling, but also by gesture and facial expression, being able to distinguish gestures, as the hearing child can distinguish words (Schirmer et al. 2004). 2004). These authors highlight two main stages: 1) **pre-linguistic**, which consists of phonetic production, which in sign languages means making small meaningless configurations (from birth to 11 months); and 2) **linguistic**, which involves the production of small gestures with isolated and/or combined meanings, until they begin to expressing themselves through more complex structures, between the ages of 1 and 14 (Costa et al. 2002; Schirmer et al., 2004). This acquisition assumes visual discrimination, body control of movements, rules governing social interaction, understanding and expression of communicative intentions, based on the discovery of the surrounding universe (Carmo et al., 2007).

The first stage - **pre-linguistic** - involves organizing the neurophysiological and psychological structures of the child (Lima, 2000) with babbling, which evolves from reflex to an approximation of the phonetic models of the mother tongue, in all children (hearing and deaf), whose production is expressed by sound (syllabic babbling with combinations that are part of the phonetic system of sign languages), and by gestural means (e. g.: raising your arms

to ask for your lap or point to something you want (Fernandes, 2003; Petitto & Marantette, 1991; Quadros, 1997). Deaf children produce gestural syllabic sequences equivalent to the syllabic units found in vocal babbling (Petitto & Marantette, 1991). Differences can be found in the behavior of deaf and hearing infants (Sim-Sim, 1998) with the development of their modality babbling. Between 12 months and 2 years, the **stage of a gesture** takes place (Quadros, 1997), disappearing the recourse to "pointing" which is replaced by grammatical elements of the language (Petitto, 1987) or by gestures with broader meaning (Ingram, 1982). Just as an example: the recourse to the GO FOR A WALK gesture is used to convey "I want to go for a walk" or "Mom went for a walk" in association with the child's daily activity, such as: MILK, MOTHER, FATHER (Quadros & Cruz, 2011), among others.

Although, in general, children produce isolated words or gestures to talk about things in their daily life, it is in the **stage of early combinations** (from 2 years old on), due to the increase in the child's lexical field, that the first gestural combinations appear (Pettito & Marentette, 1991; Quadros, 1997), with production supported by the combination of two or more gestures (Quadros & Cruz, 2011), and in a certain order. The premature sentence structure used by deaf children in this stage, is subject-verb (SV), verb-object (VO) or, still, in a subsequent period, subject-object-verb (SOV) (Hoffmeister, 1978; Quadros & Cruz, 2011). This lack of the subject/object in productions may indicate the marking of the pro-drop parameter, i.e.: reduction/omission of the pronouns, when they can be pragmatically inferred (Lillo-Martin, 1986; Quadros, 1997).

There are two verb classes in sign languages (Meier, 1987; Quadros, 1997; Quadros & Cruz, 2011; Silva, 2010): those that present agreement and, therefore, can be flexed (e.g.: GIVE, TELL, ASK, HELP); and those that present lexical and phonological limitations and, therefore, do not incorporate spatial points, also known as simple verbs, i.e., those that do not present any agreement, such as verbs anchored to the human body (e.g..: THINK, KNOW, LIKE). This suggests that deaf children, during sign language acquisition, should also adopt two different strategies in marking grammatical relations: word order and the incorporation of spatial points or pronouns, the second of which involves the process of verbal agreement which directly depends on the acquisition of the pronominal system, that is, the establishment of points in space (Quadros & Cruz, 2011).

Despite the fact that, at this stage, children use "pointing" to refer or reach someone/something, and the apparent relationship between the form and meaning of this action (the act of pointing represents the LGP pronouns), this pronominal system is used unconsciously, without understanding the pronouns referring to the linguistic system (Lillo-Martin et al., 1998; Quadros et al. 2001). At this stage, children, when referring to themselves, resort to pointing to a receiver, and there is a direct correlation between this frequent error, observable in all children (hearing or deaf), and the process of language acquisition (Petitto, 1987). The naming of objects is only done in situations of immediate context, not yet making the syntactic use of space.

Between 2 and 3 years of age - **stage of multiple combinations** - the vocabulary explosion takes place, both in terms of gesture production and comprehension: the child talks about what it is doing, identifies things, describes people and objects, highlighting their characteristics, and starts using short sentences (Quadros, 1997). The child begins to make some derivational distinctions (e.g.: the distinction between the gesture SITING and CHAIR (Lillo-Martin, 1986), but does not yet use pronominal identification to refer to people/things that are not present (Quadros, 1997), using only nouns that are not associated with points in space (Quadros & Cruz, 2011).

If the referent is present in the discourse location, the child makes consistent use of the pronominal system and spatial cues, resorting to pointing that also relates to the systems of determiners and modifiers, pluralization, and verbal modulation (Hoffmeister, 1978). Although with some errors (absence of referents), the pronominal system and verbal agreement with referents present in the context develop around the age of 3 (Petitto, 1987; Quadros, 1997; Quadros & Cruz, 2011), while difficulties are observed in verbal inflection (Klima & Bellugi, 1979) and the use of verbs as having a single verbal class (Meier, 1987). Initially, the placement of points in space is performed inconsistently, with no association between location and reference, also complexifying verbal agreement (Meier, 1987). Lillo-Martin (1986) questions the iconicity (relation between form-meaning, referent-referent) of sign languages - visual-spatial and not auditory-oral - as well as its relation in the process of language acquisition, despite pointing out that the acquisition of the pronominal system and verbal agreement are carried out in the same way as in oral languages (Meier, 1986).

Finally, in the **stage of the use of referents**, from 5, 6-6, 6 years, the child reports simple and complex facts, past or present (Quadros & Cruz, 2011), in a long conversation, and with appropriate spatial representation regarding pronouns, correct use of syntactic function and consistent use of global morphological agreement (Amaral, 2006; Quadros & Cruz, 2011). The competence to communicate is matured around the age of 7, and the linguistic use and acquisition of space in sign language (Brazilian sign language) implies (Klima & Bellugi, 1979; Silva, 1999): information regarding the generalized differences of the place where the gesture is performed; the establishment of different spatial points; the identification of spatial location in a conscious way, and the use of it in the speech in a contrasting way. The speech is increasingly coherent and clear, recognizing the complexity of grammatical structures (Quadros & Cruz, 2011).

Sign languages have linguistic aspects, in the visual-spatial scope, equivalent to oral languages (Bellugi et al., 1989; Stokoe et al. 1976), denoting an analysis at all levels of linguistics, including cherology awareness, which, as the central theme of this article, will be described next.

Cherology awareness

Studies on oral language phonological awareness are extensive, in that the relationship between this ability and success in learning to read an alphabetic code is evident (Freitas et al. 2007; Santos et al., 2016). This awareness is also a valuable tool in the intervention to promote the acquisition of writing (Freitas, 2004; Freitas et al. 2007).

In LGP, cherology awareness, equated to phonological awareness in the Portuguese language, is a skill or metalinguistic awareness that involves knowledge of the formal features of language (Nóbrega 2019; Oliveira, 2015; Stokoe, 1960). However, addressing the structure of this strand in LGP is still a major challenge due to the lack of studies in the area (Correia, 2009), with terminological issues being one of the problems. Although both types of awareness - phonological and cherology - are equated, it should be understood that the former uses sound as expression (*fonos* from the Greek means sound), and the latter uses the hand to express itself (*kiros* from the Greek means hand). Therefore, it is preferable to adopt the second terminology when referring to sign language (Correia, 2009; Stokoe, 1960). Thus, in this study, in order to meet the visual-hand modality of language, we follow Stokoe's (1960) proposal, using cherology

awareness that derives from chereme, the minimal unit of visual languages, rather than phonological awareness, which refers to phonemes, the minimal units of oral languages. This option only intends to adjust to the aforementioned etymological root of both terms and their adequacy to a language that has only a visual-motor modality and not oral-auditory.

The development of phonological/cherology ability begins early on, showing manifestations throughout language development, and progresses throughout childhood (Sim-Sim, 1998). Its stages depend on the child's cognitive and intellectual development, on the linguistic experiences provided, on formal exposure to the alphabetic system of their language (Freitas, 2004), and also, in the case of LGP, on the articulatory system, i.e., on fine motor skills (Karnopp, 1999).

Speech acquisition, under normal circumstances, happens naturally and spontaneously (Freitas et al., 2007; Sim-Sim, 1998); however, faculties such as reading and writing require "training the speech chain segmentation ability" (Freitas et al., 2007, p.7, free translation), such as segmenting sentences into words, words into syllables, and syllables into the several sounds that compose them. It is also important, in the view of the same authors, to realize that a language is made up of minimal linguistic units (speech sounds or segments), and the characters of the alphabet, in writing, represent these minimal units.

According to the Natural Phonology Theory, phonological processes are innate, natural and universal (Lima & Queiroga, 2007), and can also be identified in visual-spatial modality languages, manifesting themselves by the alteration of one or more constituents of the gesture, so it can be said that a gesture comprises cherology processes (Guimarães & Campello, 2018).

For Carroll et al. (2003), the development of phonological awareness consists of a progression from large units (words) to the awareness of small units (phonemes). Similarly, in LGP, through the contribution of Stokoe (1965), it was found that the sign should not be seen as a whole, but rather, made up of discrete and arbitrary parts. Thus, when LGP is the mother tongue of the deaf child, initially the awareness happens with the use of large units (gestures) and only at a later stage the child begins to be aware of the use and existence of minimal units, i.e., the parameters of LGP (configuration, place of articulation, movement, palm orientation and facial expression). Correia (2009), comparing LP to LGP, illustrated the idea through the following example: considering the word "pato", composed of four phonemes /p/a/t/u/, one sees that by combining it with other minimal units, a new word emerges (e.g: /p/a/ta/). The

same happens with the alteration, absence of one of them or even the presence of a new unit. Also in LGP the gesture is composed of several discrete units - gesture parameters - that will define the overall meaning of the gesture (Correia, 2009). As can be seen in the case of the sign words *mulher* (Figure 1) and *difícil* (Figure 2), which, although composed of the same hand configuration - "*indicar*" - have different meanings.

From birth, children are unconsciously sensitive to sounds or cheremes, in an auditory or visual way, respectively, revealing an epiphonological or epi-cherology behavior, which translates into the ability of early discrimination of sounds/cheremes (Basso, 2006).
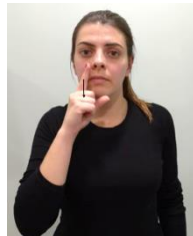

Figure 1: *Gesture for MULHER*

Figure 2: *Gesture for DIFÍCIL*

According to Freitas and collaborators (2007), the process of analyzing words in their oral segments, or gestures in their minimal segments (cheremes), is a slow and difficult process, beginning at a pre-conscious level, i.e., with a phonological or cherology sensitivity, showing only functional knowledge (implicit awareness), progressing to its awareness, revealing meta-phonological or meta-cherology behaviors (explicit awareness).

The variability in exposure and experience with sign languages is quite considerable, so that most deaf children may show a process of delay in their acquisition, often with a first exposure limited to pre-school or primary school. Also, the number of deaf adults whose initial experience was based on oral education, and therefore learned/acquired their natural language as adolescents, is significant (Corina et al., 2014). The authors examined the sensitivity to the structural parameters of gestures (minimal units) during sign language learning, showing that those who acquire sign languages late show lower efficiency, regarding the decoding of cherology forms, corroborating Guimarães and Campello (2018).

The relationship between learning to read in an alphabetic code has been studied by McQuarrie and Abbott (2013), and significant correlations have been demonstrated between

ASL cherology awareness and reading performance in a second language, in this case English. These authors further argue that having a strong phonological (or cherology) base is more important than the modality it takes (oral or sign). Holmer et al. (2016) assessed the Swedish Sign Language cherology awareness of 13 deaf children, and word reading in (oral) Swedish, and developed the Cross-modal Phonological Awareness Test, and a Swedish phonological awareness test. The results showed that deaf children who are more aware of the cherology of the sign language to which they are exposed have an easier time reading words in the oral language environment.

In the American Sign Language (ASL) setting, Corina et al. (2014) investigated the relationship between ASL cherology awareness and English phonological awareness. A total of 87 deaf people participated in the study, divided according to their exposure to ASL into three groups: ASL as a mother tongue; exposed before the age of 8; and exposed after the age of 8. To carry out the study, the authors assessed ASL cherology awareness and compared it with English phonological awareness. The results showed that deaf people, exposed early to ASL, performed better on the first test. They also found a positive correlation between ASL cherology awareness and performance on the English phonological awareness test. Thus, one may wonder about the possible correlation between the cherology awareness of a sign language and the reading ability of a second language, such as written Portuguese.

In this follow-up, Cruz (2018) clarifies that late exposure to the natural language of deaf children may prove to be a detriment in the language acquisition process. In addition, it is also pointed out that the learning of writing before an alphabetic code is influenced by this exposure, since deaf children with a late exposure learn a second language (Portuguese, in this case), through an alphabetic code (direct relationship with the sounds), supported by the low knowledge of their first language (sign language). Cruz (2018) highlights the importance and need for these children to be monitored by specialists and proficient in their sign language, to prevent and identify deviations in the language acquisition process at different language levels.

In this regard, the school role in promoting phonological awareness and, in the case of LGP, cherology awareness, involves promoting the development of sensitivity to the phonic (or cherology) aspects of the language "with the aim of promoting phonological awareness, understood as the ability to identify and manipulate oral units" (Freitas et al., 2007, p.8, free

translation). The authors also mentioned that, through systematicity and consistency, this ability should be stimulated from an early age in all children, thus promoting academic success.

Crume (2013) verified, through a questionnaire, how ASI teachers drew on their practices and beliefs to promote the learning of cherology awareness of this language in ASL/English bilingual education. Results showed that these teachers exploit ASL cherology awareness as a strategy in promoting their students' literacy. The respondents pointed out that, in addition to the need for the use of varied strategies, a good knowledge of the structure of ASL provides a solid ground for its development, helping deaf students to make more connections between words and language.

Thus, and although the relationship between reading ability and cherology awareness is not yet proven, Cruz (2018) states that the construction of cherology knowledge of a sign language largely depends on the acquisition and solid knowledge of the language, making it an object of thought and reflection - metalinguistic ability. Thus, Cruz (2018) concludes that early access to the sign language of their country, as well as strategies in promoting the teaching of cherology, may significantly contribute to success in reading a second language.

Acquisition of cherology awareness

Studies on cherology acquisition are still scarce, with those conducted in ASL and, occasionally, in sign language standing out. Siedlecki and Bonvillian (1993) establish three measures of cherology awareness: the **order of acquisition**, with place of articulation being the first to be acquired, followed by movement and hand configuration; **production accuracy**, with average values of 83% for place of articulation, 61% for movement and 49% for hand configuration; and **frequency of production**. Similarly, Marentette (1995) found that the acquisition of the articulation place parameter was the most correctly produced, and only 16 of 182 substitutions were not articulation sites close to the correct target. According to the author, all this evidence reflected in an early age is explained by the language modality, which is visually produced, and to the body scheme.

Karnopp (1997) presented the linguistic description of the process of acquiring the place of articulation, through the following leveled order regarding the acquired points: 1st) neutral

space, trunk, chin and forehead; 2nd) hand and cheek; 3rd) mid-face, wrist, neck, head; 4th) forearm; 5th) upper arm. On the other hand, and taking into account movement acquisition, Siedlecki and Bonvillian (1993) found correct production in 58% (under 14 months of age), 63% (between 14 and 15 months), and 62% (over 16 months) for this parameter.

Siedlecki and Bonvillian (1993) highlight an increasing development of acquisition of the hand configuration parameter, relating it to the correct production and the number of different productions according to age. Marentette (1995) found a large production of different hand configurations, although most consisted of only three configurations present in ASL: number 5, number 1 and letter A, given their simpler linguistic representation (Karnopp, 1999; Siedlecki & Bonvillian, 1993). Since configurations vary between sign languages, in Table 1 we tried to relate the configurations found in previous studies approached using the LGP configurations.

In a pioneering study on the acquisition of LGP, between 10 months and 2 years, with a profoundly deaf child, daughter of deaf parents, we found certain errors in the appropriation of cherology category (Carmo, 2010): awareness of the minimum unit of the hand configuration with a percentage of 43.02%; location (9.88%), movement (6.40%), direction (2.91%) and place of articulation of the hand (1.74%). These results are in line with other studies, with deaf children between 2 and 12 years old, daughters of deaf parents, in which the hand configuration parameter shows the highest rate of alterations (Guimarães & Campello, 2018; Karnopp, 1997, 1999), and with deaf children between 3 and 7 years old, in which the hand configuration parameter was the most affected, followed by location, movement, and direction, with some gestures revealing more than one alteration in the phonological process (Guimarães & Campello, 2018).

Regarding semantic categories, Carmo (2010) found in a case study that the child performed 145 different gestures, and the first and most frequent configuration to be evoked was the "Open Hand", since it tends to be easier to perform. After the third month of study, a new configuration appeared in the child's cherology field (Letter "S"), with total manipulation of the hand, even totally closed. Only after the fourth month of observation, it was possible to verify the non-use of the hand in its entirety and, over the following months, totaling 32 configurations, Carmo (2010) verified a greater diversification and use of configurations.

Table 1: *Relation between ASL and LGP configurations. (Adapted from Karnopp, 1999, p.182; Carmo, 2010)*

ASL configuration		Similar configuration in the LGP	
Configuration name		Configuration name	
Number 5		Open Hand	
Number 1		Indicate	
Letter "A"		Iota	

The author concluded that the cherology components of the movement were mostly performed correctly and efficiently: 100% correct in the gestures that had as a minimum unit the movements of circling, fingering, twisting and rubbing (Carmo, 2010). Similarly, all showed a high percentage of efficiency in the execution of directions, with the exception of the upward movement direction (66.67%). In the location parameter there were no major changes (Carmo, 2010).

The cherology assessment of Cruz (2008) argues that it is necessary to promote good gesture formation in the execution of gestures, so its items are pooled taking into account the evolution of acquisition: (a) gestures produced with one hand, with one or two hand configurations; (b) gestures produced with both hands, with the same configuration, occurring, mostly, the condition of symmetry; and (c) gestures produced with both hands, being the configurations different, that is, one hand is dominant, and the other serves only as a point of articulation (non-dominant). In oral language, errors in phonological processes may be (Guimarães & Campello, 2018): substitution processes - in which there is a change/contrast in sublexical units, such as "*sapo*" for "*tapo*"; structural modifier processes - referring to the combination of phonemes in the formation of morphological and lexical units, such as "*árvore*" for "*rávore*"; and context-sensitive processes - in which there is reference to the substitutions of features or segments by others from the closest phonological context, such as "*chupeta*" for "*chucha*". In the cherology component, Liddell and Johnson (1989), pioneers in this study, classified the most frequent errors (Table 2) into: epenthesis, omission, metathesis, gemination, assimilation, reduction and perseveration, and anticipation (Guimarães & Campello, 2018).

Table 2: *Errors in cherology processes. (Adapted from Guimarães and Campello, 2018)*

Errors in cherology processes		
Process	**Subprocess**	**Example of the error**
Replacement process	Replacement: change in the content of one or more parameters of the gesture.	Replacement of rectilinear motion with circular motion.
Structural modifying process	Epenthesis: addition of a segment to the gesture	Addition of a hand in the execution of the SPEAK gesture (this gesture is executed with only one hand).
	Omission: Absence of the execution of a certain parameter in the gesture.	Does not perform the movement in a given gesture.
	Metathesis: Change of a segment of the gesture from the end to the beginning.	Alteration of the movement and place of articulation of the DEAF gesture, starting in the mouth and ending in the ear.
Context-sensitive process	Assimilation: Incorporation of a segment into the gesture, influenced by surrounding structures.	Change of the dominant hand in the execution of the goal gesture from "Open hand fingers together" to "indicate", due to the influence of the non-dominant hand.

Final remarks

Sign languages have linguistic aspects of visual-spatial nature, equivalent to oral languages (Bellugi et al., 1989; Stokoe et al., 1976), and as a natural language of deaf children should be taught early, as a natural process (Quadros & Cruz, 2011) in all school activities (Carmo et al., 2007). Despite the tendency for exposure to oral linguistic input (Batista, 2010) deaf children, when fully exposed to their natural and mother tongue (Lillo-Martin, 1986; Meier, 1987; Petitto, 1987), develop grammatical rules in a similar way to hearing children in relation to oral language (Quadros et al., 2001).

Despite the differences at the cherology structural level of a visual language and phonological level of an oral language, it is found that the processing of this knowledge is similar (Cruz, 2018). The child is sensitive to sounds or cheremes (in the case of Sign Languages) from birth, which translates into the ability of early discrimination of sounds/cheremes (Basso, 2006). According to Freitas and collaborators (2007), the process of gesture analysis in its minimal segments (cheremes) is a slow and difficult-to-access process, starting in a pre-conscious level, i.e., with the cherology sensitivity, showing only functional knowledge (implicit awareness), progressing to cherology awareness (explicit awareness). Thus, it can be concluded that this ability represents a very relevant milestone in the acquisition and development of sign language,

since it is used from the beginning until the language matures. In addition, one should also take into account that there are other factors that influence language: culture, ethnicity, country, television, conversational peers, experiences, age of caregivers, multilingualism, school, socioeconomic status, among others (Hoff, 2006).

Investigations on the implication of age of language acquisition on cherology awareness and sign language comprehension and production (Corina et al., 2014; Crume, 2013; McQuarrie & Abott, 2013) reinforce the importance of early acquisition of natural language by deaf children. Although studies are still pioneering, there seems to be a positive correlation between cherology awareness in reading an alphabetic code and the reading proficiency of a second language - written Portuguese (Cruz, 2018). Then, it is fundamental to consider the assessment of language acquisition a necessary step in the teaching-learning of it (Cruz, 2018). This idea is defended by Lima (2011), who states that the evaluation of language development serves to perceive the level of the assessed individual, as well as the need for some kind of intervention.

The assessment, monitoring of the learning process and planning of interventions in the Portuguese language, more precisely in terms of cherology awareness, still has some gaps at the national level, namely in terms of: conceptual scope, with limited evidence of the developmental profile of sign language acquisition and reflection on the representativeness and significance of the selected items; and methodological scope, with a tendency for studies with small samples and without an examination of the main psychometric properties (content and construct validity, and reliability), with limited publication, which limits its usefulness. Moreover, most of the available instruments only assess partial aspects of cherology awareness: some use the discrimination of minimal pairs, others ask the respondent to perform the gesture, assessing their cherology proficiency, and still others assess only the parameters with greater focus on the hand configuration, movement and location parameter.

Thus, it could be stated that there is no instrument in the field of LGP to assess emerging language, which affects the transition between pre-linguistic and linguistic stages (Afonso 2011). In this field, little attention is given to cherology awareness and its assessment, justifying further research on the topic.

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