



Comparative Reflections on the Acquisition of Language in Hearing and Deaf Children: A Case of Natural Learning of Mexican Sign Language



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Abstract

Sign languages are visual and iconic languages used by Deaf communities worldwide. Sign language develops from the linguistic stimulus in the visuo-gestural modality, unlike hearing children who receive the stimulus in the auditory-vocal modality. This paper presents one case study in Mexico where deaf children naturally acquire Mexican Sign Language (LSM). Deaf children can access and develop sign language if the immediate context offers ways parallel to oral language development. Universal Grammar and biolinguistics support the natural process of the acquisition of languages.

Keywords: Deaf children; Mexican sign language; Hearing; Natural learning

Introduction

About the naturalness of language acquisition

Systematic and purposeful studies refer to sign language being linguistically equal to oral languages [1], with equal naturalness in its acquisition. Studies regarding language acquisition have achieved significant progress thanks to the antecedent of universal grammar [2], from now on, UG. The theory of Generative Grammar states that the child's early language acquisition is a process of grammatical induction. It implies that the child has an innate capacity to develop her or his own linguistic experience from this language stimulation. Then, the child experiences the grammatical rules, and he or she must induce the grammatical inner to the Universal Grammar [3].

Understanding grammatical induction in the prelinguistic stage

Different approaches over the years have nourished children's understanding of grammatical induction. The biggest problem to solve in the mid-70s was the need for a clear notion of how grammatical induction operated in children. At the end of the 70s, the deduction of the principles and parameters of the Universal Grammar model led to a radical reformulation of language acquisition and its development. This reformulation instills no specific rule for the child to induce and acquire language in early language acquisition because there is no specific language system for the child to internalise. In addition, as Khul [4], states

neuroscience studies have demonstrated that the child induces grammatical rules in the language acquisition process.

Understanding the induction of grammatical rules according to each language

The principles and parameters considered the variability between languages in the first stage of the Universal Grammar model (UG). UG observed that those principles that followed a rule generated different results between different languages. Thus, this interlingual variation exists because these principles allow restricted variability between languages [5,6]. Under this conception, the particular grammar of a language is simply the UG but with the parameters arranged in a particular way according to each language. The particular arrangement of the parameters according to each language receives the name of the "Parametric Model".

The Parametric Model impacted the field of comparative syntax as it established a theoretical language that allowed an understanding of the constants between the different languages. The Parametric Model facilitated the understanding of the ranges of variation between languages. Either the UG and Parametric Model framework is helpful to understand the objective of this article: Adding support that signs languages, like all languages, present variation and natural induction of their grammatical rules in the prelinguistic stage of the deaf child.

Prelinguistic development in hearing and deaf children

The prelinguistic stage considers the time between birth and when a person begins to use words or signs meaningfully. It is a time when children often increase their ability to communicate with others, first using eye gaze, paying attention, and social-emotional affection, and then adding gestures and other nonverbal means to communicate. This stage lays the foundation for the later development of skills such as using words (or signs) and their combination in sentences to communicate [7].

In this exact order of ideas, the parameters theory has had essential contributions to analysing the null subject in the first linguistic productions. The null subject is the omission of the subject pronoun [6,8,9], shed light on the variations in null subjects between some languages. Furthermore [8,9], studied the mechanism of language production in children early in various languages, including Spanish, English, and German. These authors did findings on null subjects. They observed that in the first productions, all languages allow the null subject even when the adult language no longer allows it.

For their part [10], proposed two hypotheses regarding the analysis of the Omitted Subject in the first children's productions:

I. The first is the hypothesis of the parameters established in the early stage (Very Early Parameter Settings -VEPS). This hypothesis proposes that the basic parameters in a language are established correctly very early, that is, at observable ages around 18 months.

II. The second hypothesis consists of early knowledge of inflexion (Very Early Knowledge of Inflexion -VEKI). This hypothesis implies that the child, in the earliest stage, knows the grammatical or phonological properties of many critical inflectional elements of his language. Based on the Royal Spanish Academy, inflexion is an elevation or attenuation done with the voice, breaking it or going from one tone to another. Meanwhile, in the specific field of grammar, an inflexion is an alteration of specific agents that implies a change in the root vowel or the ending to encode particular contents.

The theory of language development is closely related to VEPS and VEKI [10]. The VEPS theory is beneficial to show and confirm how the child correctly learns the values of the parameters before showing this learning in the production of it [6], in agreement with the VEPS theory, proposes that the child quickly sets the correct value of the null subject. If VEPS is correct, children cannot use negative information in their productions, so Hamburger and Wexler, based on Brown and Hanon [11], rule out "Negative Evidence in Language Acquisition". Negative evidence would help eliminate ungrammatical constructions by revealing what is not grammatical. VEPS, VEKI and Negative Evidence in Language Acquisition shed light on the bio-linguistic background supporting development in all languages' prelinguistic.

A second impact of VEPS on learning is the nature of learning itself. That is, based on the child setting the parameter value correctly before the one-word stage, they know to set the parameter without guidance, as perceptual learning. According to VEPS theory, perceptual learning is the basis of linguistic parameter setting. Consequently, learning theory and the empirical properties of grammatical development converge on perceptual learning as the correct model of grammatical evolution.

Authors such as Rizzi [6], and Valian [9], support Wexler's theory (1973-1998); however, the most critical support for the argumentative logic of this theory (VEPS AND VEKI) is the discovery of the Optional Infinitive (OI) stage in the development of Children's grammar by Wexler [12]. The Optional Infinitives (OI) stage is when the child presents optional infinitives, showing a higher proportion of null subjects than of main verbs in the infinitive tense.

Summarising, the Optional Infinitives stage results from the maturation of Universal Linguistics. Then, the development interacts with the particular characteristics of each language. Examples of optional infinitive languages are Danish, German, English, French, and Irish, which are still under study. Italian, Spanish and Catalan are not Optional Infinitive languages [13-15]. In addition, the literature reports differences in the distribution of null subjects contingent on verbal inflexion between the different languages of null subjects. They frequently appear in a percentage of 70 to 95% of null subjects in non-finite verbs and 15 to 30% in infinitive verbs. Given this result, various theories [16].

Wexler [8] also names null subjects of final verbs as a type of pragmatic error. Languages like English sometimes omit certain

types of topics. Regarding this phenomenon, Wexler and Chien [17], explained that some children's productions in specific languages treat information that is not a substantial topic as a topic of great importance, so an important issue is consequently omitted. The authors comment (Chien & Wexler) [17], that this phenomenon is consistent with the general vision in which the child assumes that those who listen to him know more than they know now. For this reason, the child believes that some subjects that constitute vital topics should be omitted.

From the above, in some languages, the child presents a pragmatic error (natural and expected at his age) since he treats some topics that are not very dominant as if they were and, consequently, omits them. Languages like English sometimes need to catch certain types of cases. Wexler and Chien [17], concluded that in some languages, the child presents a pragmatic error (natural and expected at his age) since he treats some topics that are not very dominant as if they were and, consequently, omits them. As mentioned in the Theory of the Parameters of Universal Grammar by Chomsky [2], this phenomenon of the percentage of null subjects and the distribution of verbs seems to only occur in some languages since each language sets its respective parameters. Based on these findings, Wexler [8], demonstrated that the characteristics of null subjects changed depending on the language and concluded that null subjects are natural and expected in the Infant stage of Optional Infinitives. Regarding these findings, Wexler [8], demonstrated that the characteristics of null subjects changed depending on the language and concluded that null subjects are natural and expected in the Infant stage of Optional Infinitives. Rizzi [6], supporting Wexler's [8], argument about the naturalness of null subjects in children's productions, added that in early linguistic productions, children tend to omit null subjects even when the target language is not the subject.

Consequently, the omission of the subject in the first productions is a very stable and constant phenomenon in language development. Studying other languages confirmed the proposal for omitting the null subject.

On the other hand, Van Kampen pointed out that the child omits this topic from a very early age. In this regard, Wexler [8], showed that children miss topics more frequently than adults would expect. Likewise, he showed that German children present the characteristics of the Optional Infinitives stage and that they should produce final verbs in the last position. According to the parameters of the Universal Grammar, all these phenomena of the percentage of null subjects and the distribution of verbs seem to only occur in some languages since each language sets its respective parameters. Based on these findings, Wexler [8], demonstrated that the characteristics of null subjects changed depending on the language and concluded that null subjects are natural and expected in the Infant stage of Optional Infinitives.

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in early linguistic shows, children tend to omit null subjects even when the target language is not the subject null. Consequently, the omission of the subject in the first productions is a very stable and constant phenomenon in language development—these conclusions about the stability and continuous phenomenon in all languages. It does not mean that there is no variability between languages.

Non-linguistic factors which impact language development

Recent cross-linguistic studies have revealed that there are background factors in the language production of each child. It can be biologically (internal) and environmentally (external) determined. Among many of them, the effects of gender, birth order and maternal/paternal education level have been particularly well studied [18]. This last study suggested lexical and world combination ability in children of two years varied significantly with gender but not with external factors. The authors concluded that internal factors might influence early language development more than external factors.

Biolinguistics for all languages

In all languages, some biolinguistic input is disposed of for language development. Everyone is born with the capacity to develop and learn a language. Language development is instinctive [19]. Biolinguistics is a theory that postulates the existence of an innate mental structure that allows the production and comprehension of any statement in any natural language, enabling the process of acquisition and spoken language. It requires very little linguistic input for proper functioning and develops practically automatically [20,21]. In the following provision, we expose the case of deaf children and their similar process to early language production.

What is the provision for early language production of deaf children?

Based on the results of the studies of Lillo-Martin and Henner [22], on the acquisition of word order in American Sign Language (ASL), Dutch Sign Language (NGT) and Brazilian Sign Language (Libras) are compatible with the theories and observations of spoken language acquisition, indicating that the basic canonical word order is typically observed as soon as words are combined and that, in general, children who acquire languages with variability in word order quickly develop operations that alter word order for various purposes of information structure grammatically [23].

We have exposed some comparative reflections of the prelinguistic stage of hearing and deaf children, finding that if a deaf child is exposed to sign language early, he shows at the same time the prelinguistic changes expected in oral languages. However, there are some differences in the prelinguistic acquisition of sign language, mainly due to the visogestural modality. It is discussed below.

Effects of the viso-gestural modality of sign language on prelinguistic development

As mentioned above, children can perceive and develop sign language in ways that are pretty parallel to spoken language development. However, it is also necessary to consider some modality effects. For example, the different physical development of the articulators for signing versus speech probably plays a role in the earlier first signs, as discussed above. No human being is born with a mental grammar of a particular language but can acquire any grammar of a natural language [5]. In our experience with deaf children in Mexico, they naturally acquire Mexican Sign Language (LSM) as sign language develops from the linguistic stimulus in the visuo-gestural modality; unlike hearing children, the stimulus is given in the auditory-vocal modality.

The iconicity of sign languages

Sign language is iconic, meaning it mostly remains on culture-associated codes. Iconicity allows sign languages to be universally understood since they are limited to concrete and pictorial concepts while developing several ideas simultaneously [24]. In the case of visogestural languages, signs are linguistic signs in which a visual image perceptible to the senses is present,

associated with a mental image that, in turn, time is linked to the previous one. Therefore, linguistic signs in this language also distinguish between two planes. The first plane is the signifier, which consists of a visual kinesic image in the plane of expression associated with a mental idea. The second plane is the concept in the domain of meaning. In the LSM and other sign languages (Libra, .. LSC, etc.), lexical signs reproduce some aspect of the object or action they name. These signs are recognised as predominantly iconic signs [25].

Sign languages are natural languages developed in Deaf communities with the same linguistic status as spoken languages [26]. In Mexican Sign Language, the use of space by the signer is part of its grammar, the iconicity to acquire and express abstract concepts. One of the most used syntactic structures is the general form: Object-Subject-Verb (OSV). Mexican Sign Language (LSM) has different grammatical structures, as we present structures more frequently among all the disposed of ones. It is important to remark on the nature of Sign Language as a tridimensional language, allocated in the physical space and conform the messages from the most general ideas to the specific characters (Figure 1) (Table 1).



Figure 1: Tri-dimensional nature of sign language.

Table 1: Most frequently syntactic structure of LSM.

TOSOVQ	SOV	TSOV	TPSVA
Time – Place – Subject – Object – Verb – Question	Subject + Object + Verb	Tense + Subject + Object + Verb	Time + Place + Subject + Verb + Adverb

Next are the keys to trying the syntactic structure of LSM

Time: When?

Place: Where?

Subject: Who?

Object Which?

Verb: What is the action or what happens/happened?

The subsequent provision is related to the one work developed in Mexico.

The learning of Mexican Sign Language (LSM) in children without linguistic development of LSM: One experience of natural learning in Mexico. The learning space for deaf users in the Central Library of the State of Hidalgo, "Ricardo Garibay," has provided linguistic input in LSM to deaf children and their families. This program has benefited around fifty hearing families with a deaf member between 3 and 4 years old. For sixteen years, linguistic input has been offered in lexical, syntaxis and pragmatics approaches so children can develop the meanings using a grammar by themselves [27].

This experience is nationally unique, while the LSM is naturally and gradually acquired. Deaf Linguistics Models guide this

learning, so the interaction from the interculturality encompasses all this learning of LSM.

One example of the activities in the learning room for deaf users can be appreciated in Figure 2. One common objective for families: Communication with their children. Families' journey to communicate with their deaf children is often challenging and complex in Mexico. Families arrive at the learning space for deaf users at the "Sala de Silentes, Biblioteca Central del Estado de Hidalgo Ricardo Garibay", usually because they are looking forward to supporting the writing learning process of their deaf children. They did not find this support in the health institutions as they adopted a view from the rehabilitative medical approach, likewise "a solution to deafness". Health Institutions have some responsibilities in this one-part view as they frequently recommend not bringing deaf children near the signs. With this last information in mind, families hope to find a place that rehabilitates in orality.



Figure 2: Learning space for deaf users at the "Sala de Silentes, Biblioteca Central del Estado de Hidalgo Ricardo Garibay".

From the above background, when families arrive at this learning room, they suppose deaf children will receive speaking tutoring. After a few weeks, they are usually disappointed and quit [28,29]. Like oral languages, they expect their children, when using hearing aids, to develop oral language. It is frequently that deaf people are deprived of their natural language in the first years of life.

Why does the learning room support learning in the community?

Learning in the community facilitates acquiring the LSM more naturally and fluidly. The learning room for deaf users favours a coexistence between equals (deaf-deaf) at an early age. A group of deaf people grow up together, sharing experiences, friendships

and signs. In the same learning room, there is a common bond among children, young and Deaf adults who are linguistic models of the LSM. This friendship among equals builds an identity as Deaf users of the Mexican Sign Language. They identify with LSM and increase their confidence to express themselves visually-gesturally daily [30,31]. This gradual acquisition process of LSM, while they express heartfelt admiration for deaf youth and adults who master LSM. They also express positive emotions about going to the service. Although they do not have mastery of the lexical signatures of the LSM, spontaneous configurations arise to express their ideas as they appropriate their language.

Back and forward in LSM learning

There is one problem in the persistence of acquiring LSM. A couple of months after having begun the interacción in the learning group, it is common for families to quit. They usually return with their deaf children after a few years. However, children have lost precious early years to access comprehension and language. Although they begin later with this approach to the LSM, there are evident differences in the proficiency of the language: Deaf children who acquire it at an earlier age reach a higher speed of the signs and comprehension of messages than children who access discontinuous LSM learning.

Conclusion

Sign languages are complete and integral languages as oral ones. Prelinguistic acquisition of deaf children is through the visual channel. Sign languages are visual languages and allow deaf children to access them naturally. Deaf children must be immersed early, simultaneously with their deaf counterparts. The theory of the Parameters of Universal Grammar by Chomsky [2], sheds light on how each language sets its parameters. In addition, some languages allow pragmatic error while children of early age frequently omit subjects.

In all languages, some biolinguistic input is disposed of for language development. Everyone is born with the capacity to develop and learn a language. Language development is instinctive [19], while linguistic input allows deaf children to develop comprehension and sign language as hearing children develop oral language. The opportune stimulation of language allows the development of this faculty at an early age. It enables children to produce spontaneously and recognise the grammatical rules of any language they were exposed to, whether oral or visual.

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