coursework as a way to improve the students' communication skills. Further, they state that the larger culture is hearing and therefore students need to be able to conform to the hearing culture and learn spoken English or oral techniques. These administrators believe that the world is a hearing one and that deaf students need to be assimilated into that larger world.

The paradigm clash over language choices in turn impacts the social constructs of culture for a deaf child. After decades of classroom teaching and heated debates at conferences and in the pages of publications, oralism and sign language are here to stay. Both sign language and spoken language meet the standards of a whole language linguistically; both are recognized as official whole languages with their own linguistic rules, classifiers, and syntax, and both carry the same potential for acquisition of a language. Although they may be defined as equivalents linguistically, however, they are perceived and signified differently. The contrasting linguistic attitudes have grave implications for the diverse meanings of what it is to be deaf and the place of deaf people in society. Throughout history, these linguistic attitudes have constructed the reproduction of inequality by determining which language placement for the deaf is the most natural and privileged. These divisive attitudes about language choices have forced a particular identity onto the deaf worldwide. Recognizing the implications of linguistic attitudes provides opportunities for constructive and reflective dialogue so that the relationship between the center and the margins of power, and between deaf people and society at large, can be reexamined.

Thomas P. Horejes and Catherine O'Brien

See also Language Attitudes; Manualism, Philosophy and Models of; Oralism, Philosophy and Models of; Oralism, Psychological Effects of

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Language Acquisition and Development

The study of first- and second-language (L1 and L2, respectively) acquisition has the goal of characterizing the emergence of linguistic structures of a new language by individuals of different ages. More specifically, the field of L1 acquisition studies how infants gradually develop a native language from birth until they become proficient users of a language. L2 acquisition is significantly different in that learners already have an L1 and go on to learn an additional language. One of the most important features of L1 acquisition is that it is an effortless process because the flexibility of toddlers' brains allows them to learn a language without conscious knowledge or without awareness of its grammatical rules. In contrast, L2 acquisition often happens when learners' cognitive capacities are not as flexible as children's, and as a result, language learning requires conscious effort to understand and learn the structure of the target language. Another important distinction is the source of the linguistic input. In the case of L1 acquisition, parents, caregivers, and the surrounding community are the source of the target language and as such provide a rich linguistic environment from which to absorb grammatical

information. In contrast, L2 learners are exposed to the target language in a classroom and get more restricted input from teachers and from other peers learning the language.

The discovery that sign languages exhibit the same linguistic organization as spoken languages led to an equally important discovery: Sign language acquisition has striking similarities with the acquisition of spoken languages. Learners of a sign language such as L1 and L2 have to distinguish the minimal constituents of signs to develop a manual phonology; they have to learn how to inflect a sign to change their meaning; and they have to know the order of the different constituents to express an intended meaning. That said, the differences in modality between sign and speech (acoustic vs. manual) also give rise to certain features of language acquisition that are exclusive to sign. The following sections describe some of the most relevant features that characterize sign L1 and L2 acquisition.

The Acquisition of a Sign Language as L1

Studying the acquisition of a sign language as L1 is a complicated endeavor given the scarcity of deaf children acquiring a sign language from birth. Although it is easy to find a large group of hearing children and characterize their linguistic development, it is significantly more difficult to find Deaf children who are acquiring a sign language from their signing parents. This is largely due to the fact that only a very small proportion of deaf children are raised in a household where sign language is the main means of communication. As a result, most deaf children lack constant exposure to a sign language, and instead receive delayed and intermittent linguistic input. The discontinuous input has severe consequences in the acquisition of a first and of subsequent languages. Delayed exposure to a first language also brings disadvantages in the development of other cognitive skills, for example, in how children interpret other people's intentions (Theory of Mind). Depending on the age and amount of exposure to a sign language, deaf signers have been categorized as the following:

1. *Native signers:* They have been exposed to a sign language from their signing parents from birth. Caregivers are usually active members of the Deaf community, which provides children with a rich linguistic environment from which they can learn a sign language in addition to the input received at home.
2. *Early signers:* It has been calculated that between 90 and 95 percent of deaf children are born to hearing couples who have never been exposed to a sign language. Sometimes hearing caregivers go on to learn a sign language after their deaf child is born, and as a result offer poor and insufficient linguistic input to their children. Early signers often receive their linguistic input from interpreters, communication support workers, or other deaf children when they attend a Deaf school. Attending a school for the Deaf is often considered the moment when language development actually begins. For this reason, many regard early signers as those first exposed to a sign language between the ages of 5 and 6.
3. *Late signers:* Late signers are often individuals who resorted to oralization, the process by which deaf individuals are taught to speak and to understand members of the hearing community through lipreading. These individuals are not exposed to a sign language until the age of 6 or later and, as a consequence, have severe problems acquiring a first and subsequent languages.
4. *Home signers:* These constitute the most extreme case of delayed exposure to a sign language. In fact, these deaf individuals have been surrounded by a speaking community all their lives and thus have been deprived entirely of a sign language and have not been taught how to speak or lip-read. Home signers communicate with members of their family through a rudimentary manual system invented within the household. This manual system consists of gestures representing the form of an object or through pointing. Home signers are often found in remote areas with poor provision for deaf individuals.

Most studies investigating sign L1 acquisition report the linguistic development of native signers, which is the ideal scenario in which a deaf child could learn a first language. However, given that most deaf children are born to hearing parents, the developmental trajectory of sign language acquisition reported in the literature is not necessarily what most deaf individuals experience. Nonetheless, these studies are informative about how language is acquired in the manual modality. Importantly, these studies have revealed that sign language development draws parallels with the acquisition of a spoken language. Acquisition of speech and sign follow very similar developmental trajectories, and in both modalities, learners reach the same milestones at approximately the same time. These striking similarities have led to the conclusion that human beings are just "lingual" and that the capacity to acquire language does not distinguish whether it is expressed through the vocal tract or through the hands.

Parents' linguistic input has important consequences in children's language development. Caregivers are sensitive to children's need for clear input and, as a result, modify their signing accordingly. Parents adopt a number of strategies to produce a type of signing specifically designed for their children. Child-directed signing, also called motherese, helps children identify boundaries in a continuous stream of signs and facilitates the segmentation of individual lexical items. Features of child-directed signing include repetition of the movement of a hand, displacement of the location of a sign to the child's direct eye gaze or to her body, omission of hand internal movement, and exaggeration of the sign. Child-directed signing has a positive effect because deaf children are more attentive and responsive to this form of interaction than to signing addressed to adults.

Manual babbling is probably one of the first indications of the emergence of a linguistic system. Deaf children acquiring a sign language from their birth produce manual babbling from approximately the age of 10 months. Manual babbling is characterized by the presence of hand configurations that are part of the signed phonological system of the target sign language. The handshapes produced by toddlers are qualitatively and quantitatively different from the hand movements produced by age-matched hearing children. That is, manual babbling has specific hand configurations and distinctive rhythmic patterns that emulate some of the hand movements used during adult signing. Manual babbling has the function of allowing children to explore the structure of a sign language by producing its contrastive features. Through manual babbling, deaf toddlers exercise the syllabic organization of a sign language as well as its distinctive elements.

Cross-linguistic research investigating the development of a phonological system has concluded that the phonological components of a sign are mastered at different stages. These parameters are the configuration of the hand (handshape), the place of articulation (location), and the trajectory of the hands in space (movement). Regardless of the target language, children find handshapes the parameter most difficult to acquire, followed by movement, and location is the easiest. It has been argued that the difficulty in handshape articulation is attributed to children's lack of sufficient fine motor dexterity to move the distal joints of the hand. In contrast, location is the first to be mastered because it is the parameter most visually salient and does not require fine motor skills.

One of the most significant similarities between sign and speech L1 development relates to the development of a lexicon. In signed languages, Deaf children produce their first recognizable sign at the age of 8.5 months. The first 10 signs are normally produced at the age of 13.2 months, and the first two sign combinations appear at around the age of 17 months. These linguistic milestones occur 2 to 3 months earlier than the equivalent for hearing children acquiring a spoken language. It appears that deaf children have a slight advantage (3 months) in the acquisition of a lexicon.

An important focus of attention in sign L1 acquisition has been the presence of iconicity. In all signed languages, the structure of a large number of signs is motivated by the form of the object or event the signs represent. For example, in many sign languages, the sign TO-EAT represents a person bringing food to the mouth. Researchers have

been interested in investigating whether the direct relationship between a sign (e.g., TO-EAT) and the action or object it represents (the action of eating) could help children understand the meaning of a sign, and whether such signs thus are acquired earlier than signs where this relationship is absent (arbitrary signs). The earliest investigations concluded that iconic and arbitrary signs are learned at the same rate because children lack the world knowledge to make the association between a linguistic form and the object it represents. These findings have been recently challenged, with some studies showing that the first signs of children's lexicon are iconic and that iconic signs depicting actions may help children in sign language development.

Other aspects of sign L1 acquisition, like syntax, morphology, and pragmatics, have been less explored, so only the future will shed light on the developmental trajectory of these linguistic levels.

The Acquisition of a Sign Language as L2

Sign L2 acquisition investigates how hearing adults go on to learn a sign language as L2. This population is unique in that learners have a first language in the spoken modality and aim to acquire a second language in a second modality (sign). In fact, these learners are often referred to as M2 learners because the target L2 is expressed in a different modality than their L1 (L1 speech–L2 sign). Understanding the mechanism of sign L2 acquisition is particularly relevant because it has important consequences in the Deaf community. Hearing parents of deaf children, sign language interpreters, and communication support workers require good signing skills to become good linguistic models for deaf children and to bridge the communicative gap between deaf and hearing people. However, compared to sign L1 or spoken L2 acquisition, the study of sign L2 acquisition remains widely unexplored. The few studies available have mainly investigated sign articulation, phonological development, and the role of iconicity in sign language development by hearing adults.

Hearing learners of a second spoken language have to learn the sounds not present in their L1. In a similar way, hearing adults have to learn the manual phonological elements that constitute the target sign language. In order to do that, learners must be able to distinguish the parameters from a sign language so that they can learn them. This is not an easy process because some phonological parameters are easier to discriminate than others are. It has been observed that the most difficult parameter to discriminate by hearing adults is movement, followed by orientation, then handshape, and location is the easiest to discriminate. Regarding sign production, it has been reported that handshape is the most difficult to articulate, followed by movement, then orientation, and finally location. In addition, learners at the earliest stages of sign L2 learning tend to make *proximalization errors*, which involve moving the joints closer to the torso instead of moving the wrists or the elbows. This results in signs being articulated in an overextended signing space.

Apart from describing the type of articulation errors in sign L2 learners, research has been unable to determine the source of such errors. Some propose that they stem from learners' inability to perceive the exact features of a sign or learners lacking the necessary motor dexterity to produce signs' exact components. In particular, it has been argued that because L1 (speech) and L2 (speech) are expressed in two different modalities, there is no possibility for linguistic transfer to take place. However, Gerardo Ortega and Debbie Chen Pichler have argued that transfer may be possible from learners' co-speech gestures.

Speakers of all cultures and ages have a complex gestural system that is highly synchronized with their speech. Some gestures involve reenactment of an action (e.g., mimicking the action of eating), or they can represent visual properties of objects (e.g., tracing the shape of a ball). Gestures can also refer to an object in the immediate environment by pointing, or they can have more conventionalized forms within a culture, such as the gesture "thumbs-up." The gestures used by the speaking community have many similarities with a large number of signs. Some studies have reported that indeed hearing speakers are inaccurate at producing the exact hand configuration of many signs because they produce the handshape on their gestures instead of the conventionalized form of the target sign. For example, learners of

British Sign Language tend to substitute the handshape of the sign TO-WRITE with a hand configuration that resembles that of the gesture *to get the check*. Similarly, learners of American Sign Language have difficulty producing a closed fist with opposed thumb, for example, in the sign SENATE, because their gestures are generally produced with a closed fist with unopposed sign. The gestural influence in sign L2 acquisition could explain in part why iconic signs are easier to learn than arbitrary signs. It is possible that learners can recognize the iconic link between a sign and its referent, or perhaps iconic signs resemble speakers' gestures and thus facilitate learning.

In sum, L1 and L2 sign language acquisition has been demonstrated to have striking similarities with the acquisition of spoken languages, but studies have also demonstrated the presence of some developmental features that are exclusive to learning a language in the visual modality.

Gerardo Ortega

See also American Sign Language, Positive Psychological Effects of; Linguistics: Gestures and Homesigns; Psycholinguistics, Milestones in

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Language Assessment Tools

There is a growing need among teachers and other practitioners in deaf education for instruments to assess sign language development. This need follows the implementation of sign language as a means of communication and instruction in schools for the deaf in many countries. Currently, only a small number of sign language tests are commercially available and also suitable for school use. In this entry, we present examples of sign language assessments that have been developed for use in schools. In addition, we discuss key issues related to the availability and usability of these tests in schools, followed by issues regarding test development and diversity of the target population of a sign language test. We conclude with the implementation of information and communication technologies in sign language testing.

Examples of Sign Language Tests

The *British Sign Language Receptive Skills Test* (Herman, Holmes, & Woll, 1999) was one of the first tests developed for sign language. This test assesses the comprehension of specific morphosyntactic structures (e.g., spatial verb morphology, negation, number, and distribution) in British Sign Language (BSL) by deaf children aged 3–13. The test has been normed on 135 children and shows evidence for reliability and validity. It uses a multiple-choice format. This test has been adapted for a number of other sign languages, including American Sign Language (ASL) and German Sign Language. An online version that will be usable with different sign languages is currently under development.

The *Test Instrument for Sign Language of the Netherlands* (Hermans, Knoors, & Verhoeven, 2010) is another test that is currently available to schools. It consists of nine different computer-based subtests that focus on receptive and expressive Sign Language of the Netherlands (SLN) skills across different domains (i.e., phonology, morphosyntax, and narrative skills). This test has been developed for children 4–12 years of age and has been normed on 330 deaf children.

The *American Sign Language–Proficiency Assessment* (ASL-PA; Maller, Singleton, Supalla, & Wix, 1999) is used to determine nonnative deaf children's level of ASL proficiency, with the goal of monitoring their acquisition process. The ASL-PA assesses a broad range of linguistic structures of ASL, for example, one-sign/two-sign utterances, nonmanual markers (e.g., *wh-* questions), and deictic pointing/indexing. The test has been used with 80 deaf children aged 6–12 years. The test is used mainly for research purposes, although it is planned to make the ASL-PA available to teachers.