THINGS TO CONSIDER IN L1 SIGN LANGUAGE ACQUISITION RESEARCH

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ABSTRACT: This paper provides a brief overview of good practices for research on sign language acquisition and L1 sign language development. The possibilities of combining words and signs are briefly touched upon, and how modality characteristics influence bimodal bilingual acquisition, and how this in turn effects methodology and research. The responsibilities of linguists in disseminating their results amongst professionals and stakeholders such as parents of deaf children are discussed. The influence of implicit attitudinal effects on the discourse used by professionals in intervention areas is shown to have a major impact on the decision making process of parents of deaf children, which has major consequences for the future of deaf children.

KEYWORDS: Language acquisition, bimodal bilingualism, dissemination of knowledge, professional attitude.

RESUMO: Este artigo apresenta uma visão geral das boas práticas de pesquisa no campo da aquisição da língua de sinais como primeira língua. As possibilidades de combinação de palavras e de sinais são apresentadas, assim como as características da modalidade de línguas que influenciam a aquisição bilíngue bimodal e seus efeitos na metodologia e na pesquisa. A responsabilidade dos linguístas em disseminar seus resultados entre os profissionais e as pessoas envolvidas, como os pais das crianças, também será discutida. A influência dos efeitos das atitudes implícitas no discurso usadas pelos profissionais nas áreas de intervenção apresenta grande impacto no processo de tomada de decisão dos pais de crianças surdas e isso terá consequências no futuro dessas crianças.

PALAVRAS-CHAVE: Aquisição da linguagem, bilinguismo bimodal, disseminação do conhecimento, atitude profissional.

1. Introduction[2]

Since the first studies on sign language acquisition (SLA) as a first language (L1), published by Bellugi and Klima (1972) and Newport and Meier (1985), we have come a long way[3]. Initially acquisition research was mainly done on American Sign Language (ASL), but over the years many other sign languages have been studied. Research was often practice-driven by force of necessity: deaf children need support in acquiring a sign language in many countries, and for that we have to gain knowledge on the acquisition process (for a recent overview, see CHEN PICHLER, 2012). Support is needed, because the majority (90-95%) of deaf children are reared in hearing families whose members do not know sign language (e.g.

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[3] Even so, the first symposium specifically addressing L1 and L2 sign language acquisition did not take place until 2013, in Lisbon, Portugal. See http://www.ics.lisboa.ucp.pt/site/custom/template/ucptpl_fac.asp?SSPAGEID=934&lang=1&artigoID=365. The second was organized in 2015 in Amsterdam, see http://icsla2015.nl/

MITCHELL; KARCHMER, 2004), so their first language acquisition circumstances are not obvious and often exceptional (BISHOP; MOGFORD, 1993; MARSCHARK, 2009). This is true for spoken language acquisition too, since a deaf baby cannot hear the spoken words and it is nearly impossible to acquire a spoken language from visual input only[4].

Even though nowadays ≥80% of the deaf children in the developed world receive one (or two) cochlear implant(s) (HUMPHRIES et al., 2012) and benefit from these to the extent that they can much better acquire the spoken language of their environment, the majority of deaf children in the world do not have access to modern technology.

Deaf children are entitled and in need to be offered sign language in order to acquire a rich and full first language (SALAMANCA STATEMENT, 1994; UNCRPD, 2006; WHO, 2014), especially, but not exclusively, those children who do not have access to assistive technology. Linguists have a responsibility (HUMPHRIES et al., 2014) to advocate the use of sign language with deaf children:

> We argue that deaf children should be taught a sign language in the early years. This does not preclude oral-aural training and assistive technology. With a strong first language (a sign language), the child can become bilingual (with the written form of the ambient spoken language and, perhaps, the spoken form), accruing the benefits of bilingualism. (HUMPHRIES et al., 2014: p. 1)

Since most deaf children who acquire a sign language are also expected to learn the spoken language of their environment, usually deaf children are bilingual, in varied ways and different degrees. Therefore when looking at their language development, both the spoken and the sign language of the child should be considered. What further complicates matters, is that signs and words can be produced simultaneously, which is not possible in the case of two spoken languages. This bimodal bilingual development is unique to deaf and hearing children of Deaf[5] parents, and calls for specific methodology in acquisition research (see sections 3.1-3.3).

Sources for the general course of sign language development come from diverse sign languages: Brazilian Sign Language, British Sign Language, Finnish Sign language, Sign Language of the Netherlands and Spanish Sign Language, to name a few. Considering, however, that there is documentation on 138 sign language in the world (ETHNOLOGUE, n.d.) with many more sign language undocumented, the need for further descriptions is huge and urgent.

In this paper some good practices in L1 sign language acquisition and bimodal bilingual acquisition research (sections 2 and 3) are presented. Subsequently a short discussion follows (section 4) on how parents of deaf children can be supported by professionals and linguists alike. This paper hopes to contribute to the dissemination of knowledge about the importance of sign language research in support of equal rights of deaf children for a rich general development and optimal chances for full participation in society.

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[4] Speechreading is very hard to do, even for seasoned users like deafened people who already have a spoken language as their L1 when they become deaf; and nigh impossible without intensive training for deaf children who do not know anything of the spoken language yet (e.g. Woodhouse, 2007; Woll 2012a/b).

[5] The convention is followed here to refer to people with a hearing impairment as 'deaf' and people who use sign language as their natural language, and who consider themselves as linguistically and culturally belonging to the Deaf linguistic minority, as 'Deaf'.

2. Overview good practices SL acquisition research

L1 sign language acquisition research is of course embedded in the long tradition of first language acquisition research for spoken languages. The choice of design, subjects and data collection will be briefly discussed here where they are different from spoken language studies, as well as the transcription process. Most of what is described comes from Baker, van den Bogaerde & Woll (2008), but see also de Quadros et al. in Orfanidou, Woll & Morgan (2015). Furthermore a very brief overview of the general course of the SLA process will be presented in this section.

2.1 Choice of design, subjects and data collection

As in all research, the design of a study on sign language acquisition is driven by the research question, which determines whether it is to be a case or group study, is done cross-sectional or longitudinal, and whether or not a control group(s) is/are in order. Age of the child is also is an important factor in establishing the relevant research questions and can be a restriction for the duration of the session(s).

The selection of subjects is often difficult, on the one hand because of the scarcity of deaf children born to deaf parents who are raised with a sign language as an L1, on the other hand because of logistic and ethical issues (see also sections 3 and 4). The variety in the path and rate of language acquisition is great for all children, and even more so in deaf children, given the diversity in language input and hearing status. Finding large groups of L1 signing *deaf* children is usually not possible, even though the number of L1 signing *hearing* children is larger. This latter group is being studied more recently as a source for bimodal bilingual (sign/spoken bilingual) acquisition studies (e.g. BISHOP; HICKS, 2009).

When selecting the subjects, age of onset of deafness, degree and duration of hearing loss and medical history of the children are all influential variables that need to be controlled for. Other aspects like linguistic background, age, gender, intelligence, socio-economic background of the parents, hearing status of the parents, and so forth also play a role and should be considered (HART; RISLEY, 1995). Deaf signing children are not always registered as such and are thus hard to locate, and are often scattered across a region. Since the deaf population is usually small, anonymity is difficult to preserve, and ethical issues may arise from the ease of identification through the visual data (IPROSLA, 2012) or from other sources (medical see MCKEE; SCHLEHOFER; THEW, 2013; social see YOUNG; HUNT, 2011).

Data collection is always sensitive to the surroundings where it takes place, but in particular so with deaf children. For instance, if the video recordings are done in the school of the child where usually no sign language is used, this fact will influence the language choice of the child, who may subconsciously opt for the spoken language or a more speech-driven form of signing (see section 3). This may also be true of course for the home surroundings (DE HOUWER, 2007). In order to extract as much and the best sign language as possible, it is therefore important to have people interact in sign language with the child or at least, create a sign-eliciting ambiance. In the case of a (bimodal) bilingual focus, the persons interacting with the bilingual child should also be fluent bimodal bilinguals. If this aspect is not taken into account, sub-consciously made sociolinguistic adaptations by the child may obscure his/her true proficiency in either language or the bilingual mode (see e.g. VAN DEN BOGAERDE; BAKER, 2005, 2009; EMMOREY et al., 2008). In order to ensure that the conditions for optimal data collection are respected, performing a pilot study in the field of SLA is always a necessity.

Sign language data are recorded on video. This calls for sophisticated filming technology, as well as knowledge how best to capture the moving hands, body and face of the signer(s). Since facial expression can carry grammatical meanings (e.g. SANDLER; LILLO-MARTIN, 2006), and eye-gaze, for example, plays a role in turn-taking (VAN DEN BOGAERDE; BAKER, 2014), the face should be clearly visible too; this demands optimal lightning conditions and camera position. If the child is filmed in interaction with another person, both persons should be on camera, preferably through the use of two cameras, positioned in such a way that the two recordings can be combined for the transcription and analyses phases. When two signers are filmed, usually their productions can be annotated in the same file. See for detailed information how to accumulate a sign language corpus for instance Crasborn & Zwitserlood (2008), Lillo-Martin & Chen-Pichler (2008), IPROSLA-Clarin (2009), Hochgesang et al. (2010).

2.2 Transcription

In this section follows a brief discussion of some good practices for data transcription, the unit of transcription, and which method of transcription can be selected. Fortunately, modern technology has made linguistic transcriptions a lot easier for linguists today. Annotation systems like ELAN (CRASBORN; SLOETJES, 2008; 2014) and online manuals how to use ELAN for child language research purposes (see also CHEN PICHLER et al., 2010), or other systems have made our work easier and more reliable. Still, we need to choose *how* to annotate the signs: since there is no script for sign languages that is commonly used (but see Sutton's SignWriting), important decisions have to be made about, for example, whether or not to use glosses. The sign, for example, for 'bicycle' presented in Figure 1 is glossed as BICYCLE (usually in small caps).

Figure 1 ASL BICYCLE[6]
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In ELAN it is possible to align all sorts of annotations, organized in tiers, to video frames in such a way that both the video fragment and the annotation chosen for analysis can be viewed at the same time. The tiers (horizontal lines with information) can be used for all linguistic levels: phonetic, phonological, morpho-syntactic, including information on non-manual grammatical markers, semantic or pragmatic aspects. Which information is chosen, is of course dependent on the research question(s). Examples of analysis templates are extensively described, with many clear examples, in the online ELAN manual (HELLWIG, 2014).

The unit of transcription, depending on the research question, can be the sign, the clause, the sentence or discourse-dependent units (e.g. shared topic) per signer. Clause and sentence boundaries are not as clearly established yet in many sign languages as for spoken

[6] Picture of BICYCLE is taken from the internet: http://www.lifeprint.com/asl101/pages-signs/b/bicycle.htm and used with permission as per ©2014, www.Lifeprint.com.

language (CRASBORN, 2007), so it must be made quite clear what the criteria or definitions are for any given study. A decision must also be made about mouth movements and to what extent they are included in the transcription. This is quite a basic decision, since for instance in Sign Language of the Netherlands mouthings are an intrinsic part (SCHERMER, 1990; BANK, 2014) whereas in other sign languages they are less important.

A code-book, where decisions on transcription matters are logged, is indispensable for continuity in and reliability of the transcriptions (see e.g. ZWITSERLOOD; CRASBORN, 2008). An inter-rater reliability test of the transcribers should always be part of the process too (e.g. CHEN PICHLER et al., 2010) before analyses start.

3. Course of SLA development

In this section a very brief overview of the most important milestones in the sign language acquisition process will be provided. This overview is taken from Baker, van den Bogaerde & Woll, 2008 (which in turn is based on 2005, p. 49-51).

In the pre-lingual phase, during the first 9 months, one of the most difficult things in sign interaction is the regulation of eye-gaze. The signing adults must make linguistic and non-linguistic actions visible to the developing infant. Attention getting strategies of deaf adults in interaction with babies have been described extensively (see e.g. HARRIS; MOHAY, 1998; VAN DEN BOGAERDE, 2000; LOOTS; DEVISÉ; JACQUET, 2005). Since eye contact or, at least, visibility of signs is a prerequisite for signed interaction, turn-taking patterns, including the corresponding eye-gaze behavior, are one of the first things that deaf babies have to learn. And which is, by the way, one of the hardest things that hearing parents of deaf babies have to learn too, being accustomed to hearing interaction strategies (HARRIS; MOHAY, 1998). In this period the child may begin to copy sign-related gross motor gestures of the parents, and the first non-linguistic pointing gestures occur at the end of this period, to self, to other people and to objects. Rhythmic movements of the child (babbles, see PETITTO; MARENTETTE, 1991; VOLTERRA; ERTING, 1994) are recognized early as imitations by signing deaf adults or by hearing parents of hearing children who offer 'baby signs' to their offspring (GOODWYN; ACREDOLO, 1993; PIZER; WALTER; MEIER, 2007).

Around the first birthday, the first referential signs appear and somewhat later, between 1;6 and 1;11 linguistic pointing to others appears. Verbs occur now in the lexicon, albeit only in simple (citation) form and with no distinction from noun forms. Children start to combine signs (two-sign utterances) and sign order is used to mark semantic relations.

Between 2;0 and 2;5 the lexicon is expanding, with a marked different phonology from adult signers. Pointing at addressee appears first, followed by pointing to (present) 3rd person, and by 2;5 2nd and 3rd person are correctly distinguished. Also during this period, agreement verbs are beginning to be used mostly as unanalyzed rote forms, and there might be overgeneralization of inflection rules, with plain verbs inflected. First distinctions between nouns and verbs may occur, not always correctly.

In the next period, between 2;5 and 2;11, classifiers may occur in spatial verbs, but with no evidence of productive use yet and with unmarked or incorrect hand shapes. Productive use of verb agreements also emerges.

Between 3;0 and 3;5 inflection of spatial verbs for movement and manner occurs, but not yet combined, and correct use of classifiers can be observed. For objects present in the environment, verb agreement is mastered, but omission of verb agreement with abstract spatial loci can be seen well after 3;0. Also the first correct use of some number and aspects morphemes in verbs are found.

Between 3;6 and 3;11, lexical compounds are used but without correct stress patterns, and verbs now contain movement and manner aspects, still produced sequentially rather than simultaneously at the beginning of this period. Verb agreement now can be found with abstract loci, although establishment of coordinated referents at these loci is not yet correctly produced.

At the age of 4;0 - 5;0 children create compounds, with different phonology and meaning from adults' compounds. Morphologically, they show some control of abstract loci use, associated with referents, toward their fifth birthday. Verb agreement with single subject is usually marked correctly, although overgeneralizations of verb inflections rules can still be observed, as well as innovative forms of noun-verb distinctions.

After 5;0 most morphology is mastered at the sentence level, although complex forms still cause difficulty. Narrative skills begin to develop, with correct application of grammatical structures, but where cohesion, use of role etc. only mature between 6-10 years. The full correct use of classifiers and spatial verbs is not mastered until 9 or 10 years.

The above overview for sign language development is based on the assumption, that a child receives full and rich sign language input during the early years (≤ 5yrs) of his or her life. This is true then for deaf and hearing children with deaf signing parents, or with hearing parents who are fluent in sign language. In the next subparagraphs three different groups of children will be briefly discussed to illustrate the complex sign language acquisition situation of many children (see also section 1).

3.1. Deaf Children of Deaf Parents (DCDP)

As mentioned before, only 90-95% of deaf children have deaf parents. Most Deaf parents use a sign language with their children, and sometimes also the spoken language of the hearing majority. Their children not only acquire sign language in a natural way, but are also socialized and enculturated in the Deaf culture of their Deaf community. This 'incidental learning' at home and elsewhere is highly important in any child's development (CALDERON; GREENBERG, 2003; MARSCHARK; HAUSER, 2012) and forms the basis for individual progress and identity development in relation to others. Through encounters with hearing people Deaf children also learn how to behave in spoken language interactions. Children of Deaf parents are often called the culture carriers, because they are the only ones who grow up in a natural signing and Deaf cultural environment (LANE; PILLARD; HEDBERG, 2010).

Of course, there are many deaf adults who had hearing parents and who grew up with oral language only, and who do not use sign language with their children. Not much is known about the language development of these deaf children, but they are in similar circumstances as deaf children of hearing parents, language-wise. However it has been noted that deaf children of non-signing deaf parents still benefit from the easy acceptance by their parents (see also section 4) from a social-emotional point of view (e.g. CORSON, 1973 in HARRIS,1978, LANE et al., 2010).

3.2. Hearing children of Deaf parents (HCDP)

Hearing children of Deaf parents acquire a sign language similar to deaf children of deaf parents, except that because of their hearing they can also acquire the spoken language effortlessly from their deaf parents (if offered) and/or hearing relatives or acquaintances. There is a small percentage of hearing children who may show speech delays because of too little correctly spoken input (SCHIFF-MEIJERS, 1993; PRESTON, 1995) but most studies show that HCDP develop as full bimodal bilinguals in the same way as other bilingual

children do (VAN DEN BOGAERDE, 2000; VAN DEN BOGAERDE; BAKER, 2005, 2009; TANG; SZE; LAM, 2007; KANTO; HUTTUNEN; LAAKSO, 2013; LILLO-MARTIN et al., 2014).

One interesting phenomenon is the fact that these children, also as adults, mix words and signs in complex constructions according to grammatical rules that are not fully understood or described yet (but see CHEN et al., 2014). These mixes are called code-blends. Studies of these blends show that the more fluent the children are in the two languages, the more skilled they are in using the two languages separately or blended (BAKER; VAN DEN BOGAERDE, 2014).

As HCDP are both raised in the Deaf and in the hearing community, they are considered bicultural. Many of them have positive, tight connections to the Deaf community, but some wrestle with their double cultural identity (PRESTON, 1995; WILHELM, 2008).

3.3. Deaf Children of Hearing Parents (DCHP)

It is still the case that in many countries where there are no opportunities to receive or use expensive assistive hearing technology, deaf children with hearing parents are raised without a spoken language, without a sign language and without contact with the deaf community. These children have no full first language but might develop a very basic gestural communication system with the people in their environment, called home-signs (see GOLDIN-MEADOW, 2005). Some children manage to acquire some spoken language to a limited extend, depending on residual hearing and commitment of their close ones. Fortunately, in many such countries there is now a growing awareness of the value of sign language for deaf children, and bilingual education is emerging in many places (MARSCHARK; TANG; KNOORS, 2014) parallel to the organization of family guidance programs.

In so-called developed countries, the situation is quite different. Here the introduction of new technologies like cochlear implants (CI) had a huge impact. First on the spoken language acquisition of deaf children: when implanted young (before or around first birthday) the majority of deaf children are able to acquire the spoken language of the hearing community and function as hard-of-hearing children in different degrees (BLUME, 2010). This has several consequences, for instance that even if sign language was offered during the first few years of the child, the hearing parents focus more on the spoken language development of the children (which is *their* first language) and sign language use (of whatever quality) declines as the child grows older and more proficient in the spoken language. Secondly, the majority of the deaf children with a CI attend mainstream education, and do not come into contact with other deaf children or deaf adults and consequently, also not into contact with Deaf culture. When in some children around age 5;0 or later it appears that their spoken language is not progressing as desired, it is often too late to remedy the loss of full and rich language input during those early years. Even so, for some deaf children the best option is then to 'return' to special education and acquire sign language at a later age (MAYBERRY, 1993).

It is the hearing parents who ultimately decide on whether or not to provide their child with a cochlear implant, on which language(s) to offer their child and what type of education. Their decisions will have a huge impact on their child's development. The next section is dedicated to the decision making process of the parents and influential parties therein.

4. Decision making by parents

In the western world there are many professionals involved once deafness is diagnosed in an infant, nowadays often through neonatal screening procedures as early as three weeks after

birth (HYDE, 2005; WHO 2010). The manner in which these professionals advise hearing and deaf parents of deaf children is of paramount importance for the decision-making process of the parents (YOUNG et al., 2006; MATTHIJS et al., 2012). Early intervention has been demonstrated to be imperative in order to create optimal chances for the deaf child to fulfill its potential. Moeller et al. (2013) published an International Consensus Statement, which contains 10 principles which should guide Family Centered Early Intervention (FCEI). When searching these principles with the key words 'sign language' six statements can be found about sign language necessity and uses (in Background and Purpose and principles 5, 6, 7, 8). From these text fragments it becomes evident that professionals are convinced of the uses and importance of signs or signed language and contact with the Deaf community and the Deaf in early intervention programs. However, the key to successfully engaging hearing parents during the first few years of their deaf baby to use signed communication, is *not* the fact that full and correct information is provided regarding its importance, but the *implicit* message the professional conveys through his or her attitude and choice of words (MOUVET et al., 2013). Mouvet et al. stress the importance of awareness in professionals about the influence of their discourse manners on mother-child interaction. Young et al. (2006) conducted research into what information provision and informed consent of parents of deaf children actually meant. They concluded that the rights of the family to exercise their own autonomy [may] conflict with the future autonomy of the child, and this raises questions about the obligations of society to intervene in order to protect the child's open future (YOUNG et al., 2006: p. 333).

5. Final considerations

Considering what we know about sign languages, and about the circumstances under which deaf children may or may not acquire their local sign language as well as the spoken language of their environment, it is not surprising that we are still wrestling with linguistic, socio-emotional, cultural and ethical questions on how to raise deaf children to their full potential. Sign language acquisition research is complex, not only because of methodological issues, technical and ethical restrictions and an impressively varied research population, but also because, as linguists, we should ask ourselves what our role is regarding sign language research and the deaf communities (HUMPHRIES et al., 2014). What we do has impact, and influences parents and professionals who may not necessarily fully understand the implications of our findings. We should endeavor to promote our results and make these suitably accessible for non-linguists, so that all may benefit from our research and knowledge.

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