

# Remarks on the medical and social models of research in deafness and language development

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## Samenvatting

Onderzoek naar de taalontwikkeling van dove kinderen heeft een lange en complexe geschiedenis. Het werk op dit terrein wordt gemotiveerd door schijnbaar onverenigbare modellen voor wat doofheid betekent. Aan de ene kant documenteert het dominante medische model gehoorverlies en tekortkomingen in de gesproken taal. Zulk onderzoek draagt bij aan voortdurende verbeteringen in de gesproken taal als resultaat van neonatale screening en vroeg aangebrachte cochleaire implantaten. Aan de andere kant hebben de onderzoekers (geringer in aantal) die kijken naar doofheid en taalontwikkeling in het sociale model gepleit voor de diversiteit van dove kinderen, voor hun recht om gebarentalen te leren en te worden onderwezen in tweetalige scholen. Dit artikel bestrijkt een selectie van onderzoeksstudies over doofheid en taalontwikkeling vanuit zowel de medische als sociale modellen. Het belangrijkste doel van het artikel is om enkele opmerkingen te maken over een aantal standpunten die door onderzoekers zijn ingenomen en die om een meer zorgvuldige bespreking vragen, zodat ze het veld verder kunnen helpen. Het besluit met een suggestie voor hoe de twee divergerende modellen meer zouden kunnen samenkomen. Het voorstel is om de aandacht te vestigen op de factoren die leiden tot communicatieve interacties van een hoge kwaliteit in plaats van louter toegang tot woorden of gebaren.

## Abstract

Research on deaf children's language development has a long and complex history. Work is motivated by seemingly incompatible models of what deafness means. On the one hand, the dominant medical model documents hearing loss and spoken language deficits. Research contributes to continuing improvements in spoken language outcomes following neo-natal screening and early cochlear implants. On the other hand, the smaller number of researchers looking at deafness and language development in the social model have championed the diversity of deaf children, their rights to learn signed languages and be educated in bilingual schools. This paper covers a selection of research studies

on deafness and language development coming from both the medical and social models. The main objective of the paper is to offer some remarks concerning a set of standpoints taken by researchers which require more careful discussion in order to further the field. It concludes with a suggestion for how the two diverging models could converge more. The proposal is to focus attention on the factors which lead to high quality early communicative interactions rather than access to words or signs.

## **Preface**

Steven Gillis has published widely on child language development including the acquisition of Dutch, phonological and morphological development (e.g. Van Severen, et al. 2013), theories of acquisition (e.g. Cassani, Grimm, Daelemans & Gillis, 2018), the role of the input (e.g. Odijk & Gillis, 2022) and in terms of the current paper many studies of childhood deafness and language development (e.g. Grandon, B. Vilain, Gillis, 2019; Boonen, Kloots, Nurzia & Gillis, 2021). His deafness research includes studies of parent child interaction, phonological, grammar and vocabulary development. His research is grounded in mainstream language development theory, in particular phonological aspects of language and his development of coding and analysis systems including the Child language data exchange system (CHILDES). This grounding of deafness in wider arguments concerning language learning is very fruitful for both the small deafness field and the wider cross-linguistic comparisons of language acquisition in different contexts. His approach is to compare the development of the building blocks of speech and language in hearing and deaf children and propose explanations for why there are similarities and differences.

## **Childhood deafness and language development**

In the United Kingdom and many other western countries, 1-2 in 1000 children are born deaf (NICE, 2019). Congenital deafness therefore is a very low incidence developmental condition compared to, for example, Developmental Language Disorder (DLD, Bishop 2007) which affects 7-10% of children. Despite its low incidence rate, deafness has serious impacts on children's communication development and ensuing psycho-social milestones (Coene, Schauwers, Gillis, Rooryck & Govaerts, 2011; Theunissen, et al, 2014; Hoffman, Cejas & Quitner, 2016). Because of the implementation of neo-natal screening today, most congenital deafness is identified in the first weeks of life with families generally entering medical intervention programmes early and typically with hearing aids and then cochlear implants (CIs). An early intervention means that infants can begin to adapt to hearing the world (Levine, Strother-Garcia, Hirsh-Pasek, & Golinkoff, 2016). This has not always been the case, in the past, many children were not diagnosed deaf until significantly later and used hearing aids which provided lower quality access to sound and parental spoken communication. Consequently, it was common for Deaf/Hard of Hearing (DHH) children to have very delayed language development (Marschark & Spencer, 2006). In contrast, in current research and

clinical practice, the majority of DHH children have age-appropriate spoken language development compared with their hearing peers (Dettman et al, 2016). Despite this progress some DHH children's language development continues to be variable. It is estimated that around 30% of children still experience delays (Bruijnzeel, Ziylan, Stegeman, Topsakal & Grolman, 2016).

Addressing the root cause of this large variability is the key topic of this paper. There is a debate as to why DHH children continue to have delays in language development between two broad groups of researchers in the medical and social models (e.g. Geers, et al. 2017 vs Hall, Hall & Caselli, 2019). These two models are often at loggerheads with very little cross-communication.

### **Medical versus social models of research on deafness and language development**

In the wider literature two main models are prominent in understanding disability: the medical model and the social model (Marks, 1997). Briefly, the medical model states that disability is a 'problem' within the person, caused by disease, trauma, or other health conditions and therefore requires sustained medical care and a cure. Whereas the medical model sees disability as a problem with the person, the social model considers the problem within wider society. The social model sees "disability" as a socially constructed problem in the environment that prevents disabled people from fully integrating. In the social model, disability is not an attribute of the individual but rather a complex collection of conditions created by the social environment. These two models applied to the study of deafness mean very different things for researchers (Power, 2005, Beaudry, 2016).

Much research on childhood deafness and hearing loss comes from the medical model (Geers et al, 2017; Grandon et al, 2019, Bruijnzeel et al, 2016) which views deafness as a sensory deficit or hearing impairment and investigates how subsequent medical interventions can improve hearing and remediate spoken language development delays. From many studies of DHH infants within a medical framework, several factors that contribute towards typical spoken language development in DHH children have been identified. These include, however are not limited to: early identification and aiding (Spencer & Marschark, 2010), age at implantation (Dettman et al., 2016), non-verbal cognitive ability (Cejas et al., 2018), underlying causes of deafness, and family involvement (Watkin et al., 2007).

A main topic in DHH infant language development research in the medical model is how to optimize spoken language development through earlier age of implantation (e.g. Bruijnzeel et al, 2016). Medical interventions attempt to restore functional hearing at a young enough age to reduce the risk of language delays. Decreases in children's age at implantation and increases in duration of CI usage are both associated with gains in language development (Bruijnzeel et al, 2016). However, it is currently not possible to implant DHH babies

until around 9 months of age and in many countries, CI happens around 24 months. In the UK for example the selection process for CI candidacy and the ensuing time for medical appointments can delay the process to around 18 months. This leaves a significant time period, where DHH children have reduced access to spoken language. Thus, the medical model attributes part of the variability seen in DHH infants' language development after CI to the early period of reduced access to sound and spoken language.

In stark contrast to a medicalization of deafness, the social model looks at the whole DHH child, not just their deafness. A recurrent theme in this model is the acceptance and celebration of the acquisition of signed language by DHH children (Hall, Eigsti, Bortfeld Lillo Martin, 2018). A comparatively smaller field of research produced from the social model maintains that DHH children should not be 'medicalized' (Hall, Hall & Caseli, 2019) instead deafness should be viewed as an aspect of human diversity, indeed, rather than a hearing "loss," the social model refers to the importance of signed language, deaf culture and deaf "gain." The main evidence for language development and the importance of signed language within the social model comes from two sources: studies of deaf adults who learned signed language at deaf schools (before the implementation of neonatal screening, more children had severe language delays and were exposed to signing in the many deaf schools that existed) and language development of native signers. A native signer is a DHH child of DHH parents who is exposed to a signed language from birth. Native signers make up 5-10% of the DHH child population (Mitchell & Karchmer, 2006). The other 90-95% are infants with hearing parents who have no experience of signed language and deafness. Research in the social model argues that if native signers have 'normal' language and cognitive development, other DHH infants could achieve this if their parents learned to sign early and at a well enough level (e.g. Caseli, Pyers & Lieberman, 2021). Explanations for variability in language outcomes by researchers in the social model thus come from the environment rather than the child's deafness. Hearing and speaking parents who offer poor or no access to a signed language are 'depriving' the DHH infant of their 'natural' language (Hall et al., 2019; Davidson, Lillo-Martin & Pichler, 2014).

### **Interim Summary**

DHH children's language development is influenced by factors originating from both within and surrounding the child. DHH babies are medically diagnosed deaf and receive early interventions focusing on their hearing via clinical professionals who prioritize hearing and speech. Some DHH children and their families meet with professionals, families, and other DHH adults and children, who provide experiences of signed language and what deafness means from within a social model. Researchers in deafness and language development from within each model put emphasis on different factors, that is, (1) hearing loss leads to reduced early access to environmental speech and variability in language development (medical model) and (2) poor access ('deprivation') and slow development of signed language leads to language delays (social model). It is possible that for a percentage of DHH children, both frameworks can be implemented, while neither alone is the answer for all DHH chil-

dren. In moving the field forward, a set of issues in the literature need further investigation. The rest of this paper covers some of these issues.

## **Issues to clarify in the literature before moving forward**

### **The CI ensures language development**

The rapid increases in the number of DHH infants implanted and the improvement in CI technology has led to great advancements in spoken language development for most DHH children but not all (approximately 30% have continued language delay: Bruijnzeel, Ziylan, Stegeman, Topsakal & Grolman, 2016). Research studies from the medical model report that these problems are also apparent in more complex areas of language and during more demanding cognitive tasks (Geers, et al. 2009). Increased difficulties with higher-load tasks suggests that cognitive abilities supporting language development are also variable in DHH infants (Edwards & Isquith, 2020).

Hearing parents assume they can talk and interact with their DHH infant as they do with hearing babies (Marschark & Spencer, 2006). This assumption is natural, as most parents want their baby to be part of their own particular culture and social world. However, deafness alters the naturalness of this early interaction. While CI improve hearing, they cannot on their own solve the complex problem of how parents and children communicate best with each other. In hearing families, a particular early issue even after an early CI, is the establishment of successful communicative routines with the DHH infant (Levine, Strother-Garcia, Golinkoff & Hirsh-Pasek, 2016, Kelly et al, 2022).

### **Signed language delays spoken language development**

Some studies written from the medical model suggest that learning signed language or sign support systems (e.g., Sign Supported English: SSE) can interfere with the development of spoken language (Geers et al., 2017), while other studies have found that learning signed language can in fact support the acquisition of spoken language (Davidson et al., 2014). An absence or severe reduction of spoken language input from parents (because they are signing all the time) would likely reduce the DHH child's ability to acquire spoken language. But this either/or situation is an unlikely one in the lives of DHH infants. It is more realistic that hearing parents speak and use signs together in some form of fluid bilingualism (Hermans, van Berkel-van Hoof & Knoors, 2021). More work is needed to determine the role of learning signed language or SSE as a facilitating factor for spoken language acquisition.

### **Deaf children experience language 'deprivation'**

In the last few years, the pre-existing term 'language deprivation' has entered the deafness research literature in light of the social model (e.g. Caselli, et al 2021). 'Deprivation' is a very

strong negative term in developmental psychology and especially language studies, stemming from work by Curtiss (2014) on Genie and the orphanage literature (Windsor, 2007). In the context of DHH children's development, is it accurate to talk about language deprivation at all? The first question we should ask is 'Who is doing the depriving'? The answer in the papers from the social model is hearing non-signing parents. Remember if we cannot look to the child's deafness as a cause of their language delay (that is the way the medical model sees deafness) we must look to the parents. However, many studies find no difference in the quantity of spoken language input to hearing and DHH infants (e.g. Ambrose, et al 2015).

It is theoretically more accurate to say hearing non-signing parents are 'depriving' the DHH child of signed language. However, aside from input the question is what does the infant uptake from the language addressed to them: what form of input is the most accessible? There have been very few empirical studies of hearing parents using signed language or SSE with their DHH infants. It is not clear what is optimal in terms of uptake: fluent and constant spoken language input, SSE or a learner version of signed language input (Lu, Jones & Morgan, 2016).

### **Generalizability of research on deaf children who are native signers**

Much language development research in the social model uses a small group of DHH native signing children and reports age-appropriate early language and cognitive development (e.g. Wolfe, Herman, Roy & Woll, 2010). The explanation offered from studies of native signers for this optimal outcome is high quality input from DHH adults who use visual-tactile strategies during interaction, which offers potentially maximal uptake for DHH infants. Researchers often generalize these findings to the 90-95% of DHH infants with hearing parents. All DHH children, the argument goes, have as much potential to learn language given a specific language environment i.e. parents who are fluent users of a sign language. There remains an assumption in the social model that hearing parents can provide this type of language input and secondly DHH children can benefit from this input to develop age-appropriate language and cognitive abilities. There are insufficient studies of DHH children with hearing parents who use signs to answer these questions at this point (but see Caseli et al, 2021). More research on hearing parents using signs, as well as, SSE will allow language development investigators to support policy makers. Should we organize health-funded interventions so that all DHH children are exposed to signs (social model) or just focus sign interventions on those children who have less fluency with spoken language, despite all the medical interventions being made available (medical model)? This is a complicated question as hearing parents and professionals do not know, in the majority of cases, in advance if their DHH baby is going to be a successful spoken language learner (some DHH children have known factors mediating spoken language success e.g. malformed cochlea). The social model responds to this uncertainty with a straightforward answer: 'all DHH infants need to learn signed language just in case' (Wiefferink, et al, 2008). Yet, language learning as adults is not a trivial thing for parents in terms of effort, outcome and resources. At the same time these same parents and other children in the family are already native speakers of one or more spoken language. For the same question related to educational provision see Knoors

& Marschark (2012).

## **Common ground: communication as the goal rather than words or signs**

Returning to one aspect highlighted previously as contributing to variability in language development: family involvement or quality of parent-child interaction. Morgan, Curtin & Botting (2021) highlighted one aspect of early communication development as being particularly vulnerable to developmental disruptions during the first 12 months of life: the establishment of intersubjectivity. Intersubjectivity refers to the establishment of meaningful and reciprocal exchanges between individuals. Intersubjectivity develops between the infant and the parent through contingent interaction during communication (Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008). There are several advantages for future language learning that stem from good early social interaction: DHH infants' ability to reciprocate, share attention and intentionally communicate with hearing family members. DHH infants who are engaged and attempt to communicate socially can also shape the hearing adult's responses. In this perspective, first the DHH infant grasps that the function of social interaction is to share ideas. Once this is in place, then the infant is motivated to learn the symbols (words, signs or SSE) to express and receive these ideas.

Rather than focusing on speaking or signing there is a compromise position that both models can work together to achieve. Both the medical and social models can agree that successful communication patterns, in whatever form or combination of language/s that the parent and child are comfortable using, if established early in development, will foster good future language development. There are a handful of intervention studies that take this compromise position with positive results (Roberts, 2018; Kelly et al, 2022).

## **Conclusion**

Research over the last 30 years has documented great advancements in the language outcomes of DHH children following neo-natal screening and the implementation of early CIs. At the same time, there is a continuing debate as to why a proportion of DHH infants continue to display variability in outcomes. Explanations have been put forward stemming from a medicalized model of the DHH infant, stressing access to sound, and a social model which points to a lack of access to signed language as explaining variability. Both sides of this debate have taken standpoints concerning the CI as a cure for deafness, that signed languages impinges on spoken language, the 'language deprivation' DHH children experience from hearing parents and the generalizability of research on native signers. In all these areas it is vital that more research is carried out before any concrete recommendations can be offered. One area which offers a middle ground is around improving the quality of early parent-child

interaction and the establishment of intersubjectivity to support future cognitive and language development.

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