LANGUAGE AND PUBLIC POLICY

Ensuring language acquisition for deaf children:
What linguists and educators can do?

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ABSTRACT

Parents of small deaf children need guidance on constructing home and school environments that affect normal language acquisition. They often turn to physicians and spiritual leaders and, increasingly, the internet. These sources can be underinformed about crucial issues, such as matters of brain plasticity connected to the risk of linguistic deprivation, and delay or disruption in the development of cognitive skills interwoven with linguistic ability. We have formed a team of specialists in education, linguistics, pediatric medicine, and psychology, and at times specialists in theology and in law have joined our group. 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. We have published in medical journals, addressing primary care physicians, in a journal with a spiritual-leader readership, and in a health-law journal.
Keywords: deaf children's rights, first language acquisition, brain plasticity, sign languages, ethics and activism in scholarship

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INTRODUCTION

1. The policy problem. We argue that beliefs about spoken and sign languages among underinformed professionals have serious consequences; parents are advised to make decisions and construct home and school environments that affect normal language acquisition among deaf children. In Turkey, around 90% of deaf children are born to hearing parents (Moores, 2011) who have no family history of using a sign language. The remaining 10% are born to deaf parents, and in most cases, though not always, the primary language of the home is a sign language. Many hearing parents are initially uninformed about fundamental language matters and turn to the medical profession, the internet, their spiritual leaders, and/or their friends and family for advice about the language choices they need to make for their children (Luterman 2009, Gregory 2008, Porter & Edirippulige 2007). Too often, those they turn to are under- or misinformed about the language needs of deaf children (Meader & Zazove 2005). Parents are often told that the best way for their child to acquire spoken language is to raise them without sign language. In many cases, parents are advised that sign is to be chosen only as a last resort (Petitto 2008, Johnston 2006), and that great effort should be devoted instead to the acquisition of speech. Given that these parents are hearing and unfamiliar with deaf people's lives and sign languages, many opt for the more typical oral and/or aural choice (speech and audition only).

In addition, over 80% of deaf children in developed countries receive cochlear implants (CIs), and the percentage is increasing (Boyes Braem & Rathmann 2010). CI is now the treatment of choice in the medical sciences for most children with sensorineural hearing loss (SNHL) (Niparko 2009), and sign language is seen as both a barrier to learning speech and a symptom of treatment failure (Broesterhuizen & Leuven 2008). The most frequent recommendation is to isolate deaf children from sign language environments during the important years of first language acquisition (Wrigley 1997, Padden & Humphries 2005, The Canadian Hearing Society 2005, Krausneker 2008). However, CI has a variable rate of success with respect to long-term language development. (Rather than interrupt the discussion with a long list here, we indicate these references with two asterisks in the bibliography.) The factors involved in CI success are not well understood, although age of the patient (Tomblin et al. 2005, Vermeire et al. 2005, Nicholas & Geers 2007, and many others), onset of deafness (Leung et al. 2005, Green et al. 2007), coding strategies (Skinner et al. 2002), family socioeconomiceducation level (Svirsky et al. 2004, Szagun 2008), and surgical technique (Meshik et al. 2010) are relevant. Even under optimal conditions, CI implantation does not guarantee first language acquisition. Many implanted children who are born deaf or become deaf in the first few years of life experience little to no success in language acquisition with a CI, and only turn to sign language after the early critical period. Unfortunately, this means these children run the risk of never having completely fluent use of either a spoken or a sign language.

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Further, not meeting the language needs of deaf children can mean harm to their psycho-social health, putting them at risk for depression, behavioral problems, social disorders, and juvenile delinquency (Northern & Downs 2002, Andrews et al. 2003, Schick et al. 2006, Leigh 2009). They are more likely to engage in criminal behavior in later life (Kleimenov & Shamkov 2005, Miller et al. 2005), to be the target of abuse of various sorts (Sullivan & Knutson 2000, Knutson et al. 2004, Kvam 2004), and to rely on the social services safety net. Long term, language access is critical for the participation of deaf people in preventive health and health care services (Iezzoni et al. 2004, McKee, Barnett, et al. 2011, McKee, Schlehofer, et al. 2011), education (Oliva 2004), mental health care (Steinberg et al. 1998), the workplace (Rashid et al. 2011, Haynes & Linden 2012), and social relationships (Gerich & Fellinger 2012).

Additionally, failure to acquire language in the early years results in delay or disruption in the development of cognitive skills that interweave with linguistic ability. Such children have trouble with verbal memory organization (Rönnberg 2003), mastery of numeracy and literacy (MacSweeney 1998), and higher-order cognitive processing such as executive function and theory of mind (Courtin 2000, 2010, Courtin & Melot 2005, Morgan & Kegl 2006, Schick et al. 2007, Courtin et al. 2008, Figueras et al. 2008, Marschark & Hauser 2008, Remmel & Peters 2009).

Globally, SNHL is one of the most common among those birth conditions labeled 'defects' by the medical profession. Profound SNHL occurs in two or three out of 1,000 newborns in North America (National Institutes of Health 2011) and is as high as three out of 1,000, depending on the severity threshold used in a given study and whether unilateral hearing loss is included (Spivak 2007, Kozak et al. 2009). In Germany, profound SNHL occurs in one to three out of 1,000 newborns (Schnell-Inderst et al. 2006). In Nigeria, a striking number of twenty-eight per 1,000 infants have permanent congenital and early-onset hearing loss (Olusanya et al. 2008). Poverty, combined with many other factors, produces higher levels of SNHL; lower socioeconomic areas around the world are home to higher numbers of people with SNHL (for Canada, see Bowd 2005; for India, see Reddy et al. 2006; for Malawi, see van Hasselt & van Kregten 2002; for Pakistan, see Musani et al. 2011; for the United States, see many, especially Oghalai et al. 2002 and Prince et al. 2003). Most deaf and hard-of-hearing children live in developing
countries (Jauhiainen 2001, Tucci et al. 2010). Nevertheless, in developing countries, an increasing percentage of deaf children do get CIs, and there is an outcry among the medical profession for CI funding (Garg et al. 2011, Saunders & Barrs 2011). Postnatal causes of SNHL include bacterial meningitis, beta-hemolytic streptococcal sepsis, toxins, trauma, and late onset due to gene mutation (Paqarkar et al. 2006); by school age, six to seven out of 1,000 children have permanent hearing loss, most of which is SNHL (Bamford et al. 2007). Given all of these frequency data and the trend toward speech-only training in medical settings, it is clear that a significant number of children in the world with SNHL are likely to be given CIs and kept away from sign language during their early years, and, consequently, run a high risk of linguistic deprivation and related cognitive deficits.

2. The linguistic evidence that informs this policy problem. Before entering into the linguistic evidence, it is important to recognize nonlinguistic debates concerning language choices for deaf children. The Food and Drug Administration (FDA) approved the use of CIs in adults in 1984, in children aged two and above in 1990, and in children aged twelve months and above in 2000. Almost this entire time, there has been a controversy revolving around the question of whether CIs would remove a child from Deaf communities and eventually threaten Deaf communities with extinction (Winefield 1987, Grant 2008). There has also been much discussion over ethical concerns of CIs that go beyond linguistic issues and surgical-risk issues (Christiansen & Leigh 2002). Here, we set these debates aside not because they are wrong-minded, but because they obfuscate the linguistic issues, which, by themselves, are straightforward and compelling. With respect to the linguistic evidence, two points can be made, one involving recognition of the fact that both the oral-aural and the manual-visual modalities of language nourish the brain's language mechanism, and the other involving the recognition of changing plasticity in the brain with respect to first language acquisition.

2.1. Two modalities of language. First, language and the brain are flexible with respect to modality. Both spoken and sign languages can nurture brain development, as is shown by much research on the structure of particular spoken and sign languages and on language universals (see a multitude of articles in many linguistics journals, including Sign Language & Linguistics and Sign Language Studies, as well as more recently in journals that do not focus on sign languages, such as Language; and see a variety of comprehensive books, such as Sandler & Lillo-Martin 2006, Brentari 2010, Pfau et al. 2012), on language acquisition (Newport & Meier 1985, Meier & Newport 1990, Petitto & Marentette 1991, Lillo-Martin 1999, among many others), on language processing

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(Emmorey 2001, among many others), on neurolinguistics (Poizner et al. 1987, Neville 1995, among many others), on language pathologies (Corina 1998, among many others), and on second language learning (Newport 1990). (We have chosen to cite seminal works, which laid the foundation for much following research.) Too often in the relevant medical literature, we find the confused belief that language is equivalent to speech despite a half-century of research on sign languages. For example, consider this statement from Kral and O'Donoghue (2011:485): 'Nonetheless, the available evidence suggests that early intervention through sensory restoration offers the best hope of mitigating the pernicious effects of hearing deprivation on multiple lev els of brain function'. The authors recognize that absence of hearing can lead to absence of language, which can, in turn, lead to cognitive deficits, but they see 'sensory restoration' (i.e. auditory restoration) as the only way to ensure language and to prevent cognitive deficits that follow from absence of language input. This quotation is representative of the basic misconception that equates language with speech. Published policy statements about deaf children recommend early screening; early intervention; close and continued monitoring of the child's communicative, language, motor, cognitive, and social-emotional development; and protection of infant and family rights through informed choice, decision making, and consent (Early Hearing Detection and Intervention Information & Resource Center 2004, Joint Committee on Infant Hearing 2007, Department of Health and Human Services 2009, and so on). Frequently, such recommendations discuss almost exclusively audio-verbal therapy (AVT) via habituation and vocal output, although more recent policy statements emphasize cognitive language development and the importance of nurturing and communicating with the child regardless of modality. Nevertheless, primary care physicians express a lack of confidence in discussing follow-up procedures and intervention needs for deaf newborns because of their lack of familiarity with deafness (Moeller et al. 2006), and thus immediately refer the parents to audiologists, whose primary concern is auditory input, often with no or only skeptical recommendations of looking into sign language options. Evidence that there are at least two modalities that offer a normal pathway to language acquisition is often disregarded, leading to a failure to understand and take advantage of the flexibility of the human brain.

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2.2. First language acquisition and plasticity. The second relevant linguistic point with respect to the policy problem is that first language acquisition takes place most naturally and successfully in the first few years of life; if a child is not exposed to accessible or learnable language on a regular and frequent basis before the age of around five years old, that child is unlikely to ever use any language with native-like luency across the grammar (Lenneberg 1964, 1967, Mayberry 1994, 1998, Hall & Johnston 2009, Hudson & Newport 2009). Over the years we see a gradual decline in the ability to acquire a first language (note that a second language is a separate matter with distinct considerations—our concern here is first language acquisition). Some areas of the grammar seem to be resilient; that is, even in the absence of early input, they can be mastered later in life (see Goldin-Meadow 2003, 2005), such as word order, while other areas of language are more fragile and, without input in the very early years, tend to never get mastered, such as complex morphology, as in verb agreement (Wood 2007, 2011). Evidence for this sensitive (or critical) period comes from children whose language development is somehow special, and from children who have been neglected and/or abused.

Aphasic, bilingual, and deaf individuals. Lenneberg (1967) reported that children with acquired aphasia can recover completely, but adults cannot, concluding that there must be a critical period for language acquisition. Later research on aphasia shows variable recovery from aphasia with children (Woods & Carey 1979, for example), but worse prognosis for adults (Martins 2004). Other works on aphasia likewise support a critical period for first language acquisition (Alajouanine & Lhermitte 1965, and Goorhuis-Brouwer 1976, a study written in Dutch and reported on in English in Snow & Hoefnagel-Höhle 1978). Similarly, evidence on bilingualism supports the existence of a sensitive period. In a study of twenty-year-olds comparing monolinguals, early bilinguals (before the age of ten), and late bilinguals, early bilinguals and monolinguals displayed the same level of proficiency in English and a greater proficiency than that of late bilinguals. Further, the age of onset of bilingualism was negatively correlated to English proficiency across all bilinguals (Luk et al. 2011). Finally, and most important to us, studies of deaf children who did not receive accessible language until after the critical period due to lack of hearing aids (Curtiss 1994, Grimshaw et al. 1998) or because they were denied sign language (Mayberry & Fischer 1989, Emmorey & Corina 1990, Newport 1990, Emmorey 1991, Mayberry & Eichen 1991, Wood 2007, 2011, among many others) show reduced language facility. Deaf children who were first exposed to an accessible language (i.e. a sign language) at varying ages show varying degrees of mastery of language as they age, with early learners doing far better than late learners overall (Newport & Supalla 1987, Johnson & Newport 1989, Newport 1990, 1991, Boyes Braem 1999, Galvan 1999, Helmuth 2001, Newport et al. 2001, Singleton & Newport 2004, Morford & Hänel-Faulhaber 2011, Wood 2011, Cormier et al. 2012, Skotara et al. 2012).

CONCLUSION

2.3. Relevance to the policy problem. The combination of these two facts, that cognitive ability can develop in either language modality and that there is a sensitive period for first language acquisition (regardless of whether abuse or neglect is involved), is of

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crucial relevance to the problem. While the first fact is by and large ignored in the literature that favors CI, the second fact has long been accepted. Much research has shown better auditory results with earlier implantation; this has been the spur to implanting children before the age of two, and often before the age of one (Yoshinaga-Itano et al. 1998, Yoshinaga-Itano et al. 2000, Waltzman & Roland 2005, among many others). The crucial problem is that even with early implantation, the level of aided hearing is less than optimal, which makes acquisition of a spoken language imperfect and difficult and, most of all, unpredictable (Santarelli et al. 2008). The problem is magnified if the child's environment is noisy and unclear. The bottom line is that many children do not acquire a spoken language fully with a CI, and one cannot predict with reliability which children fall into that group. Even work that is explicitly supportive of CI includes statements such as 'there remains huge, unexplained, variation in outcomes from implantation and the challenges of ensuring life-long use and benefit remain (Archbold & O'Donoghue 2009:457). For this reason, the failure of the relevant medical professionals to recognize the viability of sign languages means that these children run a risk of, and indeed often experience, linguistic deprivation. But sign languages are viable human languages, with all of the cognitive benefits attributed to spoken languages. Further, sign languages are accessible to all deaf children, even to the deaf-blind child, since there are tactile versions of sign languages (Mesch 2001). If deaf children acquire a sign language during the early years of life, they will not risk linguistic deprivation and the consequent cognitive deficits. Many studies show that deaf children who sign achieve better in school than those who do not, regardless of other factors (such as whether their parents are deaf or hearing and whether they have assistive hearing devices and/or oral training) (Padden & Ramsey 2000, Strong & Prinz 2000,Mayer &Akamatsu 2003, Paul 2003, Schick 2003, Allen et al. 2007, Wilbur 2008). Indeed, ASL skill above other possible factors correlates strongly with reading achievement (Chamberlain & Mayberry 2008). Moreover, the deaf child who acquires a sign language and then learns the written and, perhaps, spoken form of a spoken language is bilingual. Bilingualism has great benefits for the deaf child in cognitive, social, and educational areas (Wilbur 2001, Christiansen & Leigh 2002). In fact, both the sign language and the spoken language of bilingual deaf children displaymore syntactic complexity than that of theirmonolingual peers (Klatter-Folmer et al. 2006). In addition, the evidence that high proficiency in two or

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more languages results in more creative thinking in problem solving, and better mental flexibility and cognitive control that persists through late adulthood, is firm (Cummins&Gulustan 1974, Prinz&Strong 1998,Bialystok et al. 2004,Baker 2006, Lightbown&Spada 2006, Bialystok et al. 2007, Kushalnagar, Hannay, & Hernandez 2010). All around the world children are raised multilingually, and the bilingual-bicultural trend for deaf education is a mega-trend (Munoz-Baell et al. 2008). Dual proficiency in a sign language, such asAmerican Sign Language, and in a spoken language, such as English, affords the deaf child the benefit of adapting to both signing and nonsigning peer groupswith greater ease, resulting in better overall socio-emotional and behavioral development (Marschark 2009). Information of this sort will, we hope, disarm those who are strongly attached to the promotion of CI-only choice

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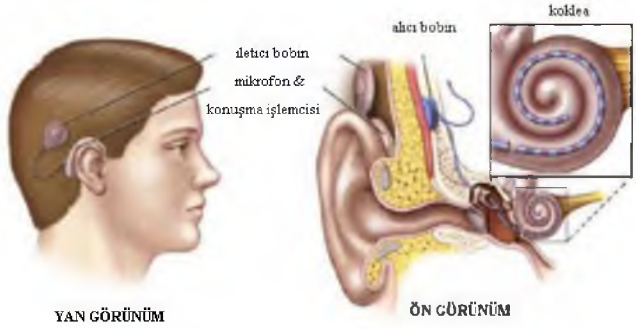

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