Beyond hearing : social-emotional outcomes following cochlear implantation in young children

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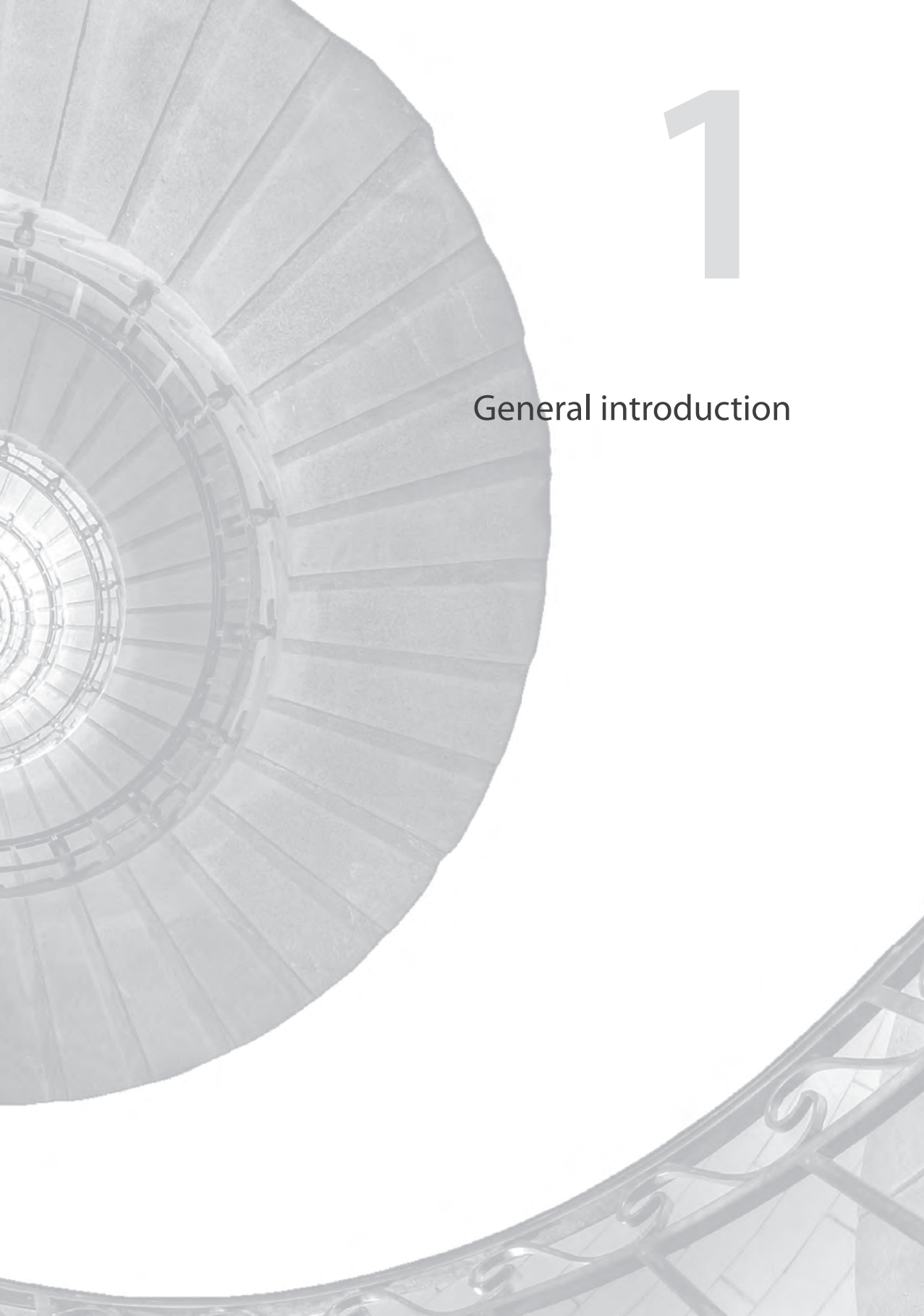

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General introduction

With a prevalence of around 1 per 1000 newborns (Korver, 2010; Watkin & Baldwin, 2011), each year approximately 150 to 200 children in the Netherlands are born with a hearing impairment, half of whom have a severe (61-90 dB) or profound (>90 dB) hearing loss (Korver, 2010). The neonatal hearing screening program, implemented in the Netherlands between 2002 and 2006, enables early diagnosis of congenital deafness and offers the possibility for early intervention. Today's intervention strategies, at least for young children with severe to profound hearing loss born in Western countries, usually involve implanting an electronic device called a cochlear implant (CI) in the cochlea (De Raeve & Lichtert, 2011; Hyde & Power, 2006). Instead of merely amplifying sounds like a traditional electro-acoustic hearing aid, a CI converts sounds into electrical pulses that directly stimulate the auditory nerve via an electrode array inserted in the cochlea, bypassing the damaged part of the ear and enabling individuals with hearing impairments (HI) to perceive sounds.

To date, the majority of research has been dedicated to the 'primary' outcomes of cochlear implantation, such as sound perception and speech and language development. Results from these studies generally indicate considerable improvements in these areas following cochlear implantation, particularly for children implanted before the age of 2 (Boons et al., 2012a; Connor, Craig, Raudenbush, Heavner, & Zwolan, 2006; De Raeve, 2010; Ganek, Robbins, & Niparko, 2012; Nikolopoulos, Archbold, & O'Donoghue, 1999; Niparko et al., 2010; Svirsky, Robbins, Kirk, Pisoni, & Miyamoto, 2000; Svirsky, Teoh, & Neuburger, 2004). However, it has also become apparent that providing HI children with a CI does not fully restore normal hearing, and therefore these children are still faced with difficulties in the auditory domain. Notably, in spite of improvements in language skills following cochlear implantation, many children still have significant language delays compared to normal-hearing (NH) peers (cf. Ganek et al., 2012). Moreover, children with CI have difficulties perceiving speech in noisy situations (Schafer & Thibodeau, 2006), and complex sounds such as music (Stabej et al., 2012). Children with CI also tend to be less sensitive to prosodic aspects of language like intonation (Most & Michaelis, 2012), which inform the listener about the correct interpretation of the message and about the speaker's emotional state.

In comparison to the overwhelming body of literature concerning auditory- and language-related outcomes of cochlear implantation, relatively little is known about the 'secondary' outcomes, that is, how having a CI affects

children's social-emotional functioning in daily life. It is well known that HI children (without CI) more often experience social-emotional difficulties than NH children (for a review, see Theunissen et al., 2014), yet to date few studies have examined whether these difficulties are also present in HI children who have received a CI. Moreover, the studies that have been conducted vary a lot with respect to important aspects such as sample size, comparison group, informant, age at implantation, and so on. Consequently, these studies have produced mixed findings, with some claiming substantial improvements in certain aspects of social-emotional functioning following implantation (e.g., Hopyan-Misakyan, Gordon, Dennis, & Papsin, 2009; Huttunen et al., 2009; Remmel & Peters, 2009; Tasker, Nowakowski, & Schmidt, 2010), and others reporting persisting delays in comparison to NH peers (e.g., Macaulay & Ford, 2006; Peterson, 2004; Wang, Su, Fang, & Zhou, 2011; Wiefferink, Rieffe, Ketelaar, De Raeve, & Frijns, 2013; Wiefferink, Rieffe, Ketelaar, & Frijns, 2012a).

Technology keeps evolving and as a result of that HI children are implanted at ever-younger ages[1] with more sophisticated devices, which should increase their chances for optimal development. In order to establish whether these advances in technology indeed make a healthy social-emotional development possible we have to monitor these children's development. Only then will the professionals who counsel these children be able to adequately target those areas of development that require attention. Therefore, the studies included in this thesis all aim to shed light on aspects of social and emotional functioning in a group of young HI children who have received their implant(s) relatively early in life, in order to give an overview of the status quo in the Dutch population of children with CI.

This chapter will first introduce social-emotional development from a functionalist perspective. Subsequently, an account of what is known about the social-emotional development of HI children with and without CI will be provided, followed by a discussion of two factors which play a central role in children's social-emotional development: parents and communication. Next, the heterogeneity of the population of HI children will be highlighted before the chapter is concluded with the main research questions and an outline of the studies included in this thesis.

[1] Currently, the standard in the Netherlands is to implant children before their first birthday.

A Functionalist Perspective on Social-Emotional Development

Emotions signal that something in the environment needs our attention, and they induce changes in bodily systems such as the muscular and nervous system. For example, facial muscles contract, heart rate increases and blood flows to extremities in order to prepare us to quickly deal with the situation at hand (Levenson, 1999; Scherer, 2000). The 'fight-or-flight' response, aimed at survival of the individual, may be the best known example of an action tendency that can be triggered, but there is a host of other goals (personal as well as social) that may be evoked by a situation (Gross & Thompson, 2007).

Besides alerting us that something is at stake, emotions also have a strong communicative function (Parkinson, 1996; Scherer, 2000). In the first few months of life, infants start to express a range of emotions, including happiness, anger, sadness, and fear. These emotions, along with surprise and disgust, are called basic emotions. They develop at an early age and are assumed to be innate and universal (Izard, 1991). At first, the expression of an emotion is a mere reflection of the infant's internal state, but infants soon learn to appreciate the communicative value of emotions, and will start to express emotions intentionally. They quickly learn that smiling will lead to positive responses from caregivers, and that crying will lead to comforting and attention to their needs.

Emotions are often caused by a social event, and in turn exert an influence on the social situation at hand. The expression of emotions informs our surroundings of our intentions, needs, goals, and so on (Keltner & Haidt, 1999). These emotional messages do not stand alone, but are part of a chain reaction (Gross & Thompson, 2007; Scherer, 2000); the communication partner is affected by the perceived emotion (for example, sadness) of the sender, which may trigger an emotion (empathy) and corresponding action tendency (comforting) in the partner. This chain reaction in turn can have an effect on the social relationship between the communication partners (strengthening of the friendship). From this example, it becomes apparent that emotional functioning and social functioning are difficult to distinguish from one another. Emotional functioning refers mainly to the extent to which one's own and other people's emotions are understood and to the ability to regulate one's emotions, whereas social functioning involves the extent to which one is able to adaptively interact with others.

Children's emotional competence increases with age (Pons, Harris, & de Rosnay, 2004). Although infants are already able to experience and express emotions such as happiness upon seeing a familiar person and sadness or anger in case of physical discomfort, they do not fully comprehend these emotions yet. With increasing age, children gradually learn to label emotions, to link them to the situations that evoked them, and to consciously regulate (e.g., mask or tone down) the expression of emotions according to the demands of the (social) situation (Denham et al., 2003; Pons et al., 2004; Saarni, 1999). Besides the challenge of dealing with their own emotions, there is the additional challenge of attending to other people's emotions and learning to interpret these correctly. Together, these emotion skills provide a foundation for children's social functioning across different settings, such as home, neighborhood and school (Calkins, Gill, Johnson, & Smith, 1999; Denham et al., 2003).

The most important developmental task that young children face is how to successfully interact with people in their surroundings, and especially with their peers (Denham et al., 2003). In other words, children need to become socially competent. Social competence is associated with success in other areas of development, such as school readiness and achievement (Guay, Boivin, & Hodges, 1999; Welsh, Parke, Widaman, & O'Neil, 2001; Wentzel, 1991; Ziv, 2013), and is a key contributor to mental health and well-being later in life (Burt, Obradovic, Long, & Masten, 2008; Denham et al., 2003). Children who are able to regulate their own emotions and, equally important, who are able to acknowledge other people's emotions are more likely to show adequate behavioral responses in social situations. Conversely, children with underdeveloped emotion skills are more likely to bluntly express their emotions, without regard for the other person's feelings. Consequently, emotionally competent children are often better liked by other people and regarded as more socially competent than children with less sophisticated emotion skills (Denham et al., 2003; Diener & Kim, 2004).

Social-Emotional Development of Hearing-Impaired Children

In general, typically developing children seem to acquire social-emotional skills effortlessly over time. However, it takes a well-oiled machine for all of these skills to develop age-appropriately. This becomes clear when turning to the atypically developing group of HI children, who have been found to experience considerable social-emotional difficulties. For example, in comparison to NH children, HI children are reported to show more behavior problems (Barker et al., 2009; Theunissen et al., in press; Van Eldik, Treffers, Veerman, & Verhulst, 2004), to more often experience symptoms of depression and/or anxiety (Kouwenberg, Rieffe, & Theunissen, 2011; Theunissen et al., 2011; Theunissen et al., 2012; Van Eldik et al., 2004; Van Gent, Goedhart, Hindley, & Treffers, 2007), and to have difficulties with peer relations (Cappelli, Daniels, DurieuxSmith, McGrath, & Neuss, 1995; Kouwenberg, Rieffe, Theunissen, & de Rooij, 2012; Wolters, Knoors, Cillessen, & Verhoeven, 2011). Most of these studies have been conducted with school-aged HI children who were not fitted with a CI, but these findings may nonetheless be indicative of the social-emotional functioning of children with CI. As children with CI were sound-deprived prior to implantation and a CI does not fully restore normal hearing, their social-emotional development could still be impaired.

Now let us turn to some abilities that may lie at the root of these poor outcomes in HI children. A core ability which motivates people to behave well towards others is ***empathy***: the ability to sympathize with other people and to respond to their needs. Empathy is often referred to as the 'social glue' in human relationships, in the sense that it prompts people to help and not harm each other, and thus promotes social relationships (Baron-Cohen & Wheelwright, 2004; Eisenberg & Miller, 1987; Jolliffe & Farrington, 2006). Obviously, a blatant disregard of a friend's distress would not do the friendship any good, whereas an empathic response shows that you care, which will strengthen the bond between you. Newborns already show signs of empathy in their reflexive crying in response to another infant's crying sounds (McDonald & Messinger, 2011). These early behavioral responses have led researchers to suggest that the predisposition to experience empathy is hardwired in the human brain (Decety & Meyer, 2008). Witnessing another person's emotion automatically triggers the so-called mirror neuron system, which makes the neurons fire as if the onlooker

is experiencing the emotion oneself (Preston & de Waal, 2002). In children, but also in adults, this mirroring of emotions can, for example, be seen when the onlooker also flinches as if in pain in response to seeing someone stumble and fall. This affective catching of the other person's emotion allows the onlooker to experience what the person in distress is experiencing, and ought to make it easier for the onlooker to respond appropriately.

Assuming that a neurological basis for empathy indeed exists, no differences in the ability to experience empathy should be expected to emerge between HI children and NH children. Yet, empathy is supposed to involve not only an affective but also a cognitive component (Baron-Cohen & Wheelwright, 2004), which makes the story of HI children's empathy development a bit more complex. The cognitive component of empathy denotes the ability to understand the other person's distress (Jolliffe & Farrington, 2006). In other words, it reflects the capacity to consider the other person's perspective. In typically developing children, this cognitive component usually kicks in during the second year of life with the ability to differentiate between self and other. Children realize that it is the other person who is experiencing the distress, which is a starting point to make inferences about the origin of the distress (Hoffman, 1987). Identifying its cause allows children to select the appropriate prosocial response (e.g., comforting, distracting, sharing) to alleviate the distress. Although prosocial responses can already be observed in 1-year-olds, these responses increase both in frequency and sophistication over time (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). For example, a 1-year-old child might understand that a crying playmate needs comforting and will call his own mother. A 3-year-old child, on the other hand, might fetch the playmate's mother because he understands that this will be much more comforting to his playmate.

The cognitive component of empathy is closely related to, and sometimes even used interchangeably with ***Theory of Mind*** (ToM), as both involve perspective-taking skills. Whereas there is a paucity of studies concerning empathy in HI children, a by comparison almost overwhelming amount of studies describes ToM in this population. These studies (e.g., Peterson, 2009; Peterson & Siegal, 2000; Russell et al., 1998; Terwogt & Rieffe, 2004; Woolfe, Want, & Siegal, 2002) convincingly point to a significantly delayed development of perspective-taking skills in HI children compared to NH children. This could imply that, even though the predisposition for empathy is inborn, impaired perspective-taking skills might nonetheless hamper HI children's empathy development.

Beyond the capacity to understand the origins of other people's distress, ToM refers to the wider notion that other people's actions and emotions are the result of their inner thought processes, i.e., their intentions, desires and beliefs, which are not necessarily consistent with reality or with the onlooker's preferences or goals (Wellman, 1990). The ability to ascribe mental states to other people makes it possible to predict and make sense of other people's behavior, and to coordinate one's own responses accordingly. ToM is considered to be essential in order to attain social competence, which is illustrated by studies showing that well-developed ToM skills are associated with higher levels of peer acceptance and positive social interactions (Slaughter, Dennis, & Pritchard, 2002; Watson, Nixon, Wilson, & Capage, 1999), whereas deficits in ToM are associated with peer problems and behavior problems (Caputi, Lecce, Pagnin, & Banerjee, 2012; Olson, Lopez-Duran, Lunkenheimer, Chang, & Sameroff, 2011).

While typically developing children show a dramatic increase in ToM understanding between the ages of 2 and 5 (Wellman, Cross, & Watson, 2001), HI children generally reach a fully-fledged ToM at a much later age, lagging several years behind their NH peers (for an overview, see Peterson & Siegal, 2000). Albeit still limited, ToM development in children with CI has received a fair amount of attention over the last couple of years. Whereas studies conducted with HI children without CI have consistently found a delay in ToM development, findings from studies conducted with children with CI are not as straightforward. Some studies report that ToM skills of children with CI are on a par with those of NH children (Remmel & Peters, 2009; Tasker et al., 2010; Ziv, Most, & Cohen, 2013). Yet, others report impairments in comparison to NH peers (Macaulay & Ford, 2006; Peterson, 2004). The studies by Peterson and by Ziv and colleagues were the only ones comparing HI children with CI to HI children with conventional hearing aids, in addition to NH children. Both studies found no differences in ToM skills between the HI group with CI and the HI group without CI. Yet, in the Peterson study both HI groups were outperformed by the NH group, whereas this was not the case in the study by Ziv and colleagues. Although these studies provide a first insight into the ToM skills of children with CI, a consensus as to these children's ToM development has clearly not yet been reached. It should be noted that the samples in some of the studies were quite small, and some children were implanted relatively late compared to current standards. Moreover, in some of the studies children were up to 12 years old, which makes it hard to identify any delays in skills that would typically develop between the ages of 2 and 5.

As described above, people rely on ToM skills during social interactions to infer how to respond to other people. Yet, on a broader scale, it is people's moral sense which guides their behavior. This moral sense denotes a basic understanding of what is right and wrong. It is the corresponding experience of so-called ***moral emotions*** such as shame, guilt and pride which alert us when we have violated a norm or when we have done something exceptionally well. Moral emotions urge people to behave appropriately, i.e., according to the norms and values of the group or society at large, and thereby aid children to become socially competent (Barrett, 1995; Stearns & Parrott, 2012). The importance of moral emotions is stressed by the finding that psychopaths and criminal offenders often report a lack of these emotions (Holmqvist, 2008; Mealey, 1995). It seems that feeling guilty when harming another person or feeling ashamed when violating a norm prevents one from doing this again. Quite like empathy, moral emotions make us want to do the right thing and avoid doing harm to others. In other words, they help to regulate our behavior in ways that are consistent with the demands of our surroundings.

Moral emotions are acquired in interaction with the social environment. In order to experience a moral emotion, children need to be aware of the prevailing standards and to be able to judge their behavior according to these standards (Lewis, Alessandri, & Sullivan, 1992). This puts a lot of strain on young children's cognitive capacities. It was therefore once believed that children would not be able to experience moral emotions before the age of about 7 years old because they would not have reached the required level of cognitive maturity (Piaget, 1932/1965). Yet, ensuing studies have shown that infants and preschoolers already show behaviors that are interpreted as signs of moral emotions (Barrett, 2005; Draghi-Lorenz, Reddy, & Costall, 2001; Lewis et al., 1992). This seemingly incompatible finding can be explained in terms of social scaffolding, a notion which stems from Vygotsky's (1978) sociocultural theory. Social scaffolding refers to the role of parents as guides or mentors who instruct, model, and assist their children as needed during their learning process. Young typically developing children learn from their parents how they should behave, and when they have violated a norm and consequently should feel ashamed or guilty. Or, in the case of pride, when they have exceeded expectations (Mills, 2005). The amount of scaffolding needed will gradually decrease until children have fully internalized a set of moral standards and are able to regulate their behavior accordingly.

Moral emotions in HI children (with or without CI) have not been examined to date. Taking into account the requirements for moral emotions, we might assume that HI children will lag behind their NH counterparts. First, to experience moral emotions without any external guidance, once again perspective-taking skills come into play. As discussed earlier, these are known to be impaired in HI children (Peterson & Siegal, 2000), and might still be impaired in children with CI (Macaulay & Ford, 2006; Peterson, 2004). For example, in order to feel guilty, you need to understand that the other person was harmed and that it is your behavior which caused this harm. Second, HI children, also after they have received their CI, do not have access to the social world on a comparable level to NH children. Persisting language difficulties (cf. Ganek et al., 2012) could hamper communication with role models, making it plausible that HI children (with or without CI) do not receive the same amount of social scaffolding as their NH peers. Since moral emotions are learned in interaction with the social environment (Barrett, 1995; Mills, 2005), opportunities to learn about these might be limited for children with CI.

Underlying Factors: Parenting Practices and Communication

The learning processes involved in attaining emotional and social competence are subject to input from knowledgeable others. In early childhood this input is mainly provided by parents. As discussed before, parents can actively try to teach their children new things through the process of social scaffolding. Yet, a lot of teaching takes place implicitly. Infants for example observe their parents' behavioral response in an ambiguous situation in order to know how to react themselves, a process which is known as social referencing (Feinman, 1982). Inconsistent responses or a lack of response from parents may leave children confused as to how they should interpret a situation or to what is expected from them. A harsh and punitive parenting style, with little room for children to explore boundaries, and little or no social scaffolding, hampers children's social-emotional development. Sensitive and responsive parenting, on the other hand, may help children acquire social-emotional skills (Kawabata, Alink, Tseng, Van Ijzendoorn, & Crick, 2011; Stack, Serbin, Enns, Ruttle, & Barrieau, 2010).

Raising a HI child undoubtedly is challenging for parents. While the neonatal hearing screening enables early intervention, the diagnosis of deafness shortly after birth usually comes as a shock for parents. Since 90% of HI children are born into hearing families (Mitchell & Karchmer, 2004), parents have to learn to adapt to the special needs of their HI child. This may mean that parents have to familiarize themselves with sign language in order to effectively communicate with their children, a language which is grammatically and syntactically very different from spoken language and therefore very hard to master. If parents opt to have their HI child fitted with a CI, this implies enrollment in a rehabilitation program, frequent hospital visits, doing speech exercises at home, taking their child to a specialized play group for HI children which might not be located around the corner, and so on. In sum, parenting a HI child (with or without CI) is demanding and stressful (Hintermair, 2006; Quittner et al., 2010; Zaidman-Zait, 2008). High experienced levels of stress, in turn, could negatively impact the way these parents raise their children. Although to date no research is available on parenting styles of parents with children with CI, parents of HI children without CI are reported to lean more towards a punitive and less towards a sensitive parenting style than parents of NH children (Knutson, Johnson, & Sullivan, 2004; Meadow-Orlans, 1997).

Spoken language is the primary tool for parents to teach their NH children new things, and this becomes even more important as children grow older. Many skills, including those in the social-emotional domain, are learned or refined through discourse, either through direct instructions or explanations, or by overhearing conversations between other people (Vaccari & Marschark, 1997). Language and communication issues in HI children are often reported to underpin these children's social-emotional difficulties (Peterson & Siegal, 2000; Vaccari & Marschark, 1997). Parents of HI children experience difficulties when interacting with their children, and interact with their children less frequently compared to parents of NH children (Barker et al., 2009; Gale & Schick, 2009; Prezbindowski, Adamson, & Lederberg, 1998). Having conversations about abstract topics such as emotions is particularly difficult if children's primary mode of communication is sign language as most parents are not fluent signers (Peterson & Siegal, 2000; Vaccari & Marschark, 1997). Consequently, it is deemed more difficult for HI children than for NH children to gain emotion knowledge and to put this knowledge to use during social interactions.

Providing HI children with a CI restores sound perception to some degree and could therefore benefit these children's spoken language acquisition, and in turn their communication skills. Multiple studies have indeed shown the positive effects of cochlear implantation on language development (e.g., Boons et al., 2012a; Ganek et al., 2012; Niparko et al., 2010; Svirsky et al., 2000; Tomblin, Spencer, Flock, Tyler, & Gantz, 1999). Yet, many children (in particular those implanted after two years of age) do not reach age-equivalent spoken language skills even after years of CI use (Boons et al., 2012a; Ganek et al., 2012; Nicholas & Geers, 2007). This could imply that communication between parents and their children with CI is also still impaired, which could negatively impact children's ability to learn from their parents.

Heterogeneity of the Population

Thus far in this introduction, findings have been described as being applicable to the whole population of HI children (with and/or without CI). However, it should be noted that the population of HI children with CI is inherently heterogeneous. Although the population of typically developing children by no means is a homogeneous one, for example with regard to socio-economic status, upbringing, or intelligence, the population of children with CI varies on a number of additional aspects. To name just a few: the age at which children acquired their hearing loss, the degree of hearing loss pre-implantation, the extent to which children benefit from their implant, uni- or bilateral implantation, contralateral stimulation, age at implantation and duration of implant use, parental hearing status, preferred language mode, presence of additional disabilities, characteristics of the rehabilitation program children are enrolled in, and so on. Although the sample of children with CI involved in the studies which form the content of this thesis was not nearly large enough to control for each of these factors, efforts were made to keep a few of them constant and to examine the influence of others. All CI participants were born to hearing parents, had no apparent additional disabilities, had severe to profound hearing losses which were either congenital or acquired prelingually (i.e., before the age of 2 years), and had received their (first) implant at the mean age of 1.5 years and at least before the age of 3 years. Note that this sample was selected to reflect the Dutch population of young children with CI at the present time.

However, generalizations to the whole population of young children with CI, especially to those with concomitant disabilities, should be made with caution.

Rationale and Outline of this Thesis

Numerous reasons could be provided that underline the importance of studying social-emotional functioning in this particular population of children with CI. First and foremost, knowledge concerning this area of development in children with CI is lacking, while there is ample evidence that social-emotional skills of deaf children without CI do not always develop age-appropriately or along the same developmental trajectories as in the NH population (Barker et al., 2009; Gray, Hosie, Russell, Scott, & Hunter, 2007; Kouwenberg et al., 2012; Ludlow, Heaton, Rosset, Hills, & Deruelle, 2010; Peterson & Siegal, 2000; Theunissen et al., 2011; Van Gent et al., 2007; Woolfe et al., 2002). Ideally, we would like to compare a sample of children with CI to a control group of NH children as well as to a control group of HI children without CI, in order to pry out the effect of a CI on HI children's social-emotional development. However, this is rendered impossible by the mere fact that nowadays almost all parents of children with severe to profound hearing losses opt for their child to receive a CI (De Raeve & Lichtert, 2011; Fortnum, Marshall, & Summerfield, 2002; Johnston, 2004; Preisler, Tvingstedt, & Ahlstrom, 2002). The few children that do not receive a CI are often not comparable to the majority that does. For example, these children have additional disabilities or they have HI parents who more often choose not to have their child implanted. HI children from HI parents share a common language and for example have well-developed ToM skills, as opposed to HI children from NH parents (Peterson & Siegal, 1999).

A second reason worth mentioning here is the potential for timely interventions that the outcomes of the studies reported in this thesis may offer. Assuming that children with CI will show impairments or delays in at least some areas of social-emotional development, outcomes of these studies will enable professionals to target interventions at specific areas of social-emotional development that require attention. Not only will this be more efficient than interventions directed at the whole spectrum of social-emotional development, but detecting risk factors and impairments early in life offers the possibility to remediate these before they progress or negatively affect other

areas of development, which is both cost effective for society and beneficial for children's well-being.

The main question that underlies all studies included in this thesis is whether young (i.e., 1-to-5-year-old) HI children with a CI are comparable to NH peers regarding their social-emotional functioning. Part of this question is answered by examining group differences with respect to levels of social-emotional functioning. Additionally, in several studies the relations between various aspects of social-emotional functioning are examined in both groups of children separately. And finally, possible factors underlying the social-emotional development of children are studied, such as language skills, parenting practices, or CI-related variables.

In ***Chapter 2***, the development of a parent questionnaire aimed at measuring empathy in young (1-to-5-year-old) children is described. This questionnaire is used in the study described in ***Chapter 3***, which examines the ability of children with CI and NH to empathize with other people, and how this ability is related to social competence. ***Chapter 4*** focuses on the theory-of-mind abilities of children with CI compared to NH children. ***Chapter 5*** concerns the extent to which moral emotions are expressed by children with CI and their NH peers, and the associations within each group with various aspects of social functioning. ***Chapter 6*** examines the role of parents with regard to their children's social-emotional development. In the concluding ***Chapter 7***, findings from the previous chapters are integrated and their implications are discussed.