CHAPTER 7

DISCUSSION

For decades children with moderate hearing loss (MHL) were "forgotten children". Most research focused on children who were profoundly deaf, and the needs of children with MHL were underestimated by researchers, professionals, and parents (Moeller, 2007). In recent years, there has been increasing attention in the literature for young children with MHL. Most of these studies have focused on the language abilities of toddlers with MHL (e.g., Ambrose et al., 2014; Koehlinger et al., 2013; Netten et al., 2016; Stika et al., 2015; Tomblin et al., 2015), and a few studies have examined social-emotional outcomes in preschoolers (Laugen et al., 2016; Netten, 2017). The overall aim of this thesis was to expand our current knowledge regarding both the language and social-emotional outcomes of toddlers with MHL, in the context of their caregiving environment.

The model of inconsistent access (MIA) developed by Moeller and Tomblin (2015) was used as a framework for the present research about the psychosocial functioning of toddlers with MHL. MIA posits that children with HL experience limitations in their access to linguistic input, and that this leads to a reduction in linguistic experiences, which will have a negative impact on their language outcomes. Moeller and Tomblin sought to identify factors that may influence children's access to linguistic input and discerned three main factors: audibility, use of hearing aids (HAs), and linguistic input provided by caregivers. Further, they conceptualized the influence of audiological and educational interventions in their model. The prime emphasis in their studies was on audiological interventions (provision of HAs). In the current thesis we expanded MIA by adding social-emotional experiences and outcomes to the model (see Figure 1). Moreover, we added a new emphasis on the caregiving environment and family-centered early intervention (FCEI).

Four of the studies included in this thesis were conducted in one sample of children with MHL. These children were between 17 and 45 months of age. They were identified by neonatal hearing screening and all used hearing aids. In addition, all but one were enrolled in FCEI. A fifth intervention study was conducted in parents of children with moderate to profound HL. In all five studies we included both children with parents with NH *and* children with parents with HL. Many previous studies excluded children with parents with HL, which may have caused a bias in their samples.

All four studies on toddlers with MHL were focused on their language outcomes; in addition, two studies also described the toddlers' social-emotional outcomes (**Chapter 2** and **Chapter 3**). The remaining chapters examined factors related to the caregiving environment, such as parental stress (**Chapter 3**), parent-child interaction (**Chapter 4)**, and parental linguistic input (**Chapter 5)**, focusing particularly on associations between the caregiving environment, child language, and social-emotional outcomes. In the fifth study, we investigated how an interactive reading program affected parents' use of language-evoking strategies during storybook reading (**Chapter 6**).

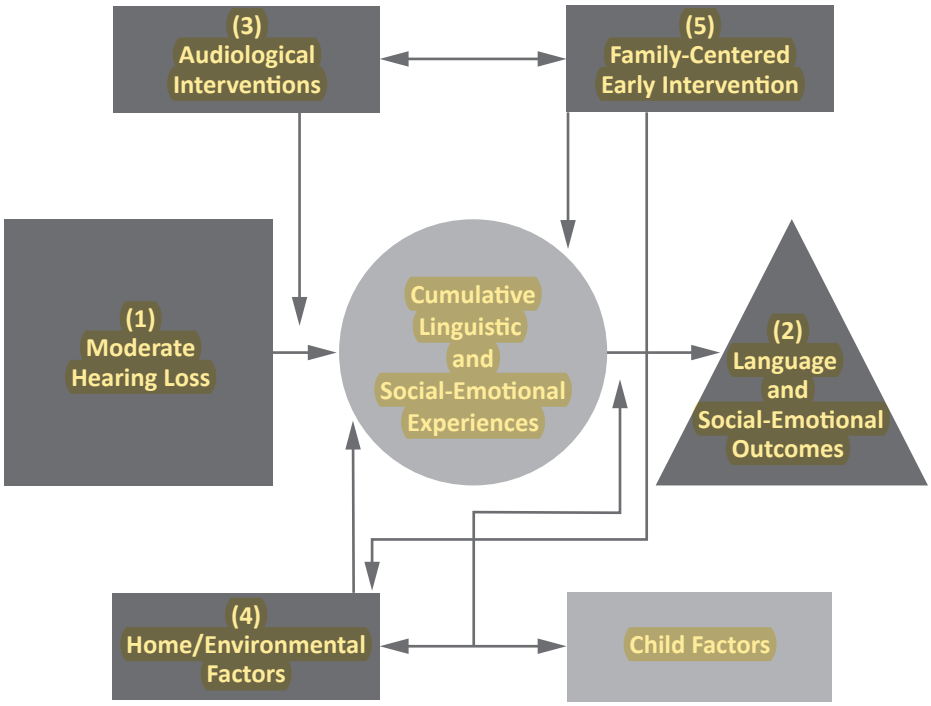

Figure 1. The expanded model of inconsistent access based on Moeller & Tomblin (2015)

Language and social-emotional outcomes of toddlers with MHL

MIA posits that children with MHL (see Figure 1, box 1) have inconsistent access to linguistic and social-emotional input, and that this places them at risk for language and social-emotional difficulties (Figure 1, box 3). Moeller, Tomblin, and colleagues (2015) found support for this hypothesis in their longitudinal study on the language outcomes in children with mild to severe HL. At first glance, the results described in the present thesis do not seem to confirm these difficulties. When we compared the language outcomes of the children with MHL in our study with those of normative samples, the findings were positive; MHL children's language scores were within the average range (but on the lower end of the scale).

Nevertheless, within our study, the language scores achieved by the children with MHL were lower than those of the children with NH. Given that children from higher socioeconomic status families are known to have higher language abilities (Hart & Risley, 1995), the high score relative to normative samples may be due to the relatively high socioeconomic status of the children in our sample. Approximately 40% of the mothers in our study (in both groups) had a high educational degree, compared to 28% of the Dutch population in general (CBS, 2013). This suggests that the comparison of our MHL

group with the NH group within our study is more representative. Consequently, taking into account the socioeconomic status of the participants, although the MHL group's language scores were within the normal range, they seem to fall behind the NH population.

This line of reasoning is consistent with the findings by Moeller and Tomblin (2015) concerning children with mild to severe HL. Those researchers also reported language scores within the normal range with regard to standard achievement tests, but lower than the socioeconomically matched group of children with NH (Tomblin et al., 2015A). Tomblin et al. (2015B) already questioned solely relying on comparisons with standardized test norms in judging the developmental outcomes of children with HL. They argued that comparison with children from similar home backgrounds might be more realistic. In that perspective we may also conclude on the basis of our findings that children with MHL are indeed at a higher risk for language difficulties.

The studies on social-emotional outcomes described in this thesis are among the first to report outcomes in this domain in a sample of young children with MHL. Based on MIA, we would expect children with MHL to have fewer opportunities to learn about the emotions, intentions, and desires of other people, which would result in poorer social-emotional outcomes, such as difficulties in Theory of Mind (ToM) development. ToM, the ability to understand that other people's feelings and thoughts may be different from one's own, is crucial for children to engage successfully in interactions with others (Denham, 2003). In this thesis we examined some precursors of ToM, such as intention understanding and joint attention during observation tasks (**Chapter 2**). Children with MHL, aged 29 to 32 months, had more difficulties in understanding other people's intentions and exchanged fewer social-communication cues (e.g. eye contact and smiling) during episodes of joint attention than children with NH. In a recent study by Netten et al. (2017), the ToM development of three- to five-year-olds with MHL was found to lag behind children with NH. The current findings suggest that these difficulties are already evident in toddlerhood and provide support for the hypotheses of MIA.

In addition to these precursors of ToM (i.e., indicators of early cognitive empathy), we also examined affective empathy, i.e., whether children were affected by the emotions of other people. Affective empathy can already be observed in newborns (McDonald & Messenger, 2011), for example if they start to cry in response to the cries of another baby. Since the capacity for affective empathy is assumed to be innate, we had no reason to assume that this capacity would be affected in children with MHL. The observation tasks that we used in our study showed positive outcomes for children with MHL and confirmed our assumption: no differences were found between children with MHL and NH children, which was also confirmed by parent reports.

In sum, although children with MHL felt touched by another person's emotions (affective empathy), they had more difficulties in understanding other people's intentions (cognitive

empathy). Both affective and cognitive empathy are needed to support a friend in distress. Not understanding the causes of other people's distress could seriously harm relationships, especially when children grow older and more socially adapted behavior is expected from them (Rieffe et al., 2017). Lower levels of cognitive empathic behavior may therefore result in difficulties in interacting with other people when children with MHL grow up.

In addition to these child tasks and child observations, parents were asked to rate their children's social-emotional functioning through questionnaires (**Chapter 3**). Parents of children with MHL reported similar levels of behavioral problems (externalizing, internalizing, and dysregulation) in their children compared to parents of children with NH. Parent reports thus suggested that having MHL did not affect social-emotional outcomes; however, the observation measures used in **Chapter 2** showed a less positive picture.

One explanation for these differing conclusions concerns the research methods used: parent reports versus observation by researchers. These two kinds of informants do not necessarily give the same kind of information. For example, a parent observes the child in his/her daily interactions with family members and friends, whereas a child observation task is usually carried out by a trained researcher who is not familiar to the child. A meta-analysis on cross-informants correlations concerning behavioral and emotional problems showed low correlations between parent reports and trained observers (Achenbach, McConaughy, & Howell, 1987). In our study, different social-emotional constructs were measured during the child observations than in the parent reports. Whereas the parent reports had a more problem-focused orientation (dysregulation, internalizing and externalizing behavior problems), the child observation measures reflected common daily social behaviors during in vivo interactions. It is also important to note that the children were relatively young, whereas social-emotional behavior problems become more apparent at an older age and when children engage more with peers. Social-emotional behavior problems may lie ahead for these children with MHL if they have difficulties in understanding their peers' intentions. Therefore we conclude that children with MHL are at risk for poorer social-emotional outcomes.

Caregiving environment

In the model of inconsistent access, home and environmental factors such as **parental stress, perceived social support, parental interaction skills**, and **parental hearing status** are identified as factors that are likely to contribute heavily to the language and social-emotional outcomes of children with MHL (see Figure 1, box 4). Raising a child with MHL brings multiple challenges for parents, who often have no prior experience with HL. Parents have to adapt their communication strategies, are often confronted with choices about hearing aids, and may have concerns about their child's future development. Therefore, raising a child with MHL might be more demanding and stressful for most parents than raising a child with NH.

Previous studies have, in general, not found elevated **stress levels** in parents of children with mild to profound HL compared with parents of children with NH (Hintermair, 2000; Pipp-Siegel et al. 2002; Topol et al., 2011; Stika et al., 2015). However, none of these studies focused specifically on children with MHL and their parents. In this thesis we examined parental stress in parents of 17-to-33-month-old children with MHL (**Chapter 3**). In line with the previous studies we found that – based on a comparison of group means – parents experienced similar levels of parental stress to parents of children with NH. These positive findings may be due to the fact that all but one of the children in our study and their parents were enrolled in an FCEI program. Early interventionists visit the families in their homes on a regular basis, providing them with information and emotional support. This may prevent or reduce parental stress in families with a child with MHL.

Another way to examine these scores is to take into account individual differences within the groups. Depending on various situational, intra- and interpersonal factors, some parents may not experience any stress, whereas others – including parents with normal hearing children – may feel much more stressed. In line with other studies, when individual differences in parental stress levels (in the parents of both the MHL and the NH children) were examined, these levels were indeed related to children's language and social-emotional outcomes in both groups (Pipp-Siegel et al. 2002; Hintermair, 2006; Quittner et al., 2010; Topol et al., 2011; Stika et al., 2015). In fact, the current findings revealed that parents who perceived higher levels of parental stress reported more internalizing, externalizing, and dysregulation behavior problems and less competence in their children. Also, parents who perceived higher levels of parental stress had children with lower language abilities. But these findings are irrespective of children's hearing status. Because our study had a cross-sectional design, the causality of the associations found remains unclear and could be bi-directional.

Apart from the study by Hintermair (2006), the current study is one of the first to examine **perceived social support** in relation to parental stress in parents of children with HL. Social support can act as a buffer against parental stress, and the current findings indeed indicated that parents who felt more supported by their social network perceived lower levels of parental stress. However, parents of children with MHL felt less socially supported by their family and friends than parents of children with NH. This latter finding might result from the tendency to underestimate the needs of children with MHL. For family and friends the impact of MHL may be less clear because children with MHL often react to sounds and speak relatively well. Consequently, friends and family may be less supportive towards parents of children with MHL than these parents might wish.

Another factor concerning a child's home included in the MIA is **parental interacting skills**. In this thesis we focused on three aspects of parental interacting skills: **emotional availability**, **joint engagement**, and **parental talk**. Emotional availability refers to quality of the emotional connection between parent and child. On the part of parents this conveys

parents' sensitivity to be affectively available and appropriately responsive to their children's signals.

A study on deaf children with cochlear implants showed lower levels of **parental emotional availability** compared with parents of children with NH (Quittner et al., 2013). Furthermore, this aspect of parent interacting skills was positively associated with children's language development. These findings were partly confirmed in our study on the emotional availability in the parent-child interactions of 29-to-45-month-old children with MHL and their parents (**Chapter 4).** We also found higher levels of emotional availability to be associated with better child language outcomes. However, in contrast to the findings in children with cochlear implants, our observations revealed that parents and children with MHL were as available to each other as parents and children with NH. Since emotional availability is an important aspect of attachment (Biringen, 2017), we can tentatively assume that having MHL does not negatively affect the fundamental bonding between parents and children.

Joint engagement was a second aspect of parental interacting skills that was examined (**Chapter 4**). Joint engagement is the ability to engage a social partner's attention for an object or event to share the experience, and this is related to children's language and social-emotional outcomes (Tomasello, 2003; Cejas et al., 2013). Previous studies have shown that parents and children with HL experience difficulties in establishing and maintaining joint engagement with each other (Lederberg, et al., 1990; Nowakowski et al., 2009; Nittrouer, 2010; Cejas et al., 2013). However, these studies did not focus exclusively on children with MHL. In the current thesis joint engagement was examined in children with MHL, and the results showed similar difficulties to those reported in these previous studies. Children with MHL, aged 29- to 45-months-old, and their parents had briefer episodes of joint engagement than children with NH and their parents.

The fact that these episodes of joint engagement are shorter will probably reduce the children's opportunities for language and social-emotional learning. The results indeed indicated that duration of joint engagement was associated with children's language outcomes. Children with better language abilities were involved in longer episodes of joint engagement. This association is probably bi-directional: if children have better language abilities it is easier to keep the interaction going, and at the same time longer episodes of joint engagement will provide more opportunities to enhance children's language development, resulting in better language outcomes.

A third aspect of parental interacting skills examined in this thesis was **parental talk** (**Chapter 5**). Several studies showed that the quantity and quality of parental talk is related to children's language outcomes (Cruz, et al., 2013; DesJardin & Eisenberg, 2007; Hoff-Ginsberg, 1985; Taumoepeau & Ruffman, 2006; Zimmerman et al., 2009). Quantity of parental linguistic input refers to the number of words and utterances parents to which

expose their children. Quality of parental linguistic input, on the other hand, refers to the way parents talk to their children; researchers often distinguish between low-level and high-level linguistic input. The use of low-level language – such as asking closed questions, using directive language, imitating, and labeling – is believed to be less language-evoking, whereas high-level language use – such as asking open-ended questions, expanding, and recasting – will evoke more linguistic responses in children (Ambrose et al., 2015).

A recent study in children with mild to severe HL showed that their parents exposed them to more low-level language and less high-level language than parents of children with NH (Ambrose et al., 2015). Furthermore, this low-level language was associated with poorer language outcomes, and high-level language was associated with better language outcomes. In this thesis we examined the quantity and quality of parental linguistic input in 29-to-33-month-old children with MHL. In general, the current findings were in line with the results of Ambrose et al.. Parents of children with MHL were shown to be as talkative during a free-play activity as parents of children with NH, but they used less high-level language during the activity. Furthermore, the association between child language outcomes and parental linguistic input was also confirmed in this thesis. Children with poorer language outcomes were exposed to less talk, more low-level language, and less high-level language. The question remains whether parents intuitively adapted their own language levels because of their children's lower language abilities, or whether they provided their children with lower-quality input.

One aspect of high-level language, the use of mental state references, was of particular interest to us because of the reported association with social-emotional outcomes (Devine & Hughes, 2016). Studies have shown that parental mental state language (e.g., use of words such as *think*, *believe*, or *desire*) was related to children's ToM development (Moeller & Schick, 2006). Parents of children with HL were shown to use less mental state language than parents of children with NH (Moeller & Schick; Morgan et al. 2004), which was again confirmed in our study on children with MHL. This finding may be of concern because earlier studies have reported on ToM difficulties in children with MHL (Netten et al., 2017). The active use of mental state language is one way to promote the ToM development of children with MHL

A final aspect of the home and environmental factors in MIA concerned **parent characteristics** such as parental hearing status. In many studies parental hearing status is used as an exclusion criteria, such that children whose parents also have HL are excluded. To prevent a bias in our sample we included both children whose parents also have HL and children of NH parents. In the current study a relatively high percentage of children with MHL had a parent with HL. In a recent study by Wong et al. (2017) on the psychosocial development of five-year-olds with HL, around 18% of the participating children (N = 301) had one or more parents with HL. Interestingly, Wong et al. reported that more children with HAs had parents with HL than children with cochlear implants. Because most children

within the HA group had MHL, this is in line with our finding. Parents' hearing status did not seem to affect our results. Analyzing the data without the children who had a parent with HL revealed the same results. This is in line with the findings of Dammeyer (2010), who reported that parental hearing was not related to the psychological well-being of children with HL.

All in all, in the model of inconsistent access, home and environmental factors (Figure 1 box 4) are believed to contribute to children's language and social-emotional outcomes. During interactions with their parents, children build on their linguistic and social-emotional experiences, and over time these cumulative experiences will enhance their language and social-emotional abilities. In this thesis we examined the extent to which children with MHL had less access to these experiences because of factors in their caregiving environment, and how these factors were indeed related to their language and social-emotional outcomes. The results indicated no difficulties in the affective relationship between parents and children with MHL. This indicates that the basic parent-child bonding is not affected and is thus available to children with MHL. However, the parent-child interactions provided less opportunity for language and social-emotional learning, because these interactions were briefer and linguistically less rich. The caregiving environment was indeed related to children's language and social-emotional outcomes. We suppose this relation to be bi-directional and suggest adapting the model of inconsistent access by adding a connection from language and social-emotional outcomes (Figure 1, box 2) to home and environmental factors (Figure 1, box 4). Based on our finding we stress the need to support parents in optimizing their parental interacting skills.

Interventions

In the model of inconsistent access two types of interventions are included: audiological interventions (Figure 1 box 3) and family-centered early interventions (FCEIs) (Figure 1 box 5). Both these types of interventions are believed to affect access to linguistic and social-emotional experiences. Audiological interventions, such as hearing aid provision, improve children's access to speech and sounds and have proved to be effective in promoting children's language outcomes (McCreery et al., 2015). Family-centered early intervention for children with hearing loss is intended to strengthen caregivers' interactions with their children to support children's language and social-emotional development (Moeller et al., 2013). In this thesis the focus was on FCEI, and the only audiological intervention measure taken into account was the age at which hearing aid amplification was introduced.

Several studies showed that an early start of FCEI is associated with better language outcomes in children with HL (Ching et al., 2017; Holzinger, Fellinger & Beitel, 2011; Moeller, 2000; Yoshinaga-Itano et al., 1998, 2001). In the current study, approximately 70% of the children with MHL were enrolled in FCEI within the first six months of life.

We examined whether the child's age at the start of FCEI was related to parental stress (**Chapter 3**) and parental linguistic input (**Chapter 5**). The current findings showed no relation between these variables – with one exception: Age at the start of FCEI was related to parental low-level language use (use of directive language). Children who enrolled early were exposed to more directive language than children who enrolled later. A similar association was also found for the age of hearing aid amplification and use of directive language.

This directive language provided by parents was negatively related to children's language outcomes. While the use of directive language may be positive for young children at the pre-linguistic level, for the next level of language development children need high-level language exposure. This is an important issue that needs to be addressed in FCEI. Professionals should carefully monitor children's language development so that they can adjust their guidance to parents when children reach the next step in their development. They should guide parents in the transition from using directive language to more eliciting language.

Chapter 6 examined an intervention to promote parent's use of high-level language. One way to expose children to high-level language is by reading storybooks with them. Interactive reading in which the child is actively involved in the reading activity and parents use language-evoking strategies is positively related to literacy and language outcomes in children (Bus et al., 2008). In this study we examined the effect of an interactive reading program on parents' interactive reading behavior. We hypothesized that guiding parents in applying these strategies would expand the language and social-emotional experiences of children with MHL. The results showed that after participating in the program, parents of children with HL used more interactive reading strategies during storybook reading; these strategies included asking open questions, following a child's lead, and engaging the child in the story.

Although we did not directly examine the effect of this intervention on children's outcomes, we may assume that providing them with more experiences will benefit their language and social-emotional outcomes. This thesis contributed to the model of inconsistent access by providing evidence for FCEI on parental interacting skills (Figure 1, box 5)

Limitations and future directions

As in any research project, this study had its strengths, but also its limitations which suggest directions for future studies to further increase our knowledge on this particular population. First, the design of the project described from Chapter 2 to Chapter 5 has certain limitations. The sample that participated in these four studies was relatively small, and the relationships between variables we discussed were all based on cross-sectional data. Though for this reason the results should be regarded as tentative, they are

nevertheless important because these studies were among the first to focus specifically on language and social-emotional outcomes in young children with MHL. More replication studies should be undertaken in larger samples to confirm the results and assumptions made on the basis of these findings. Furthermore, longitudinal research is needed to determine the causality of the associations found.

Second, audiological interventions (Figure 1 box 3) such as hearing aid provision are also supposed to affect the access to linguistic and social-emotional outcomes concerns. Effective early use of HAs – properly fitted and worn consistently – has been shown to be an important predictor of language outcomes in children with MHL (McCreery et al., 2015) and it is plausible that this could also contribute to better social-emotional outcomes. Unfortunately, however, we lacked data concerning HA use. Although data on the age of amplification were available, data on the consistent use of HAs and appropriate fitting were lacking. Future research could examine the extent to which a timely and consistent use of HAs also contributes to MHL children's social-emotional outcomes.

Third, the caregiving environment is also considered important for children's linguistic and social-emotional experiences and outcomes. In this thesis parental interacting skills were indeed shown to be related to children's language outcomes. In addition, children with MHL were exposed to less high-quality talk by their parents, which may be interpreted as a risk factor for children's language development. Parents may be too protective of their children and may therefore not provide them with the challenges they need to further develop. Alternatively, it could be argued that parents were in fact sensitive to their children's language levels and intuitively adapted their own language levels to the lower language skills of their child. In that case, the lower level of parental talk might be interpreted as a protective factor for children's language development, avoiding making overly high demands of their children. In future research these possibilities should be further examined, because this kind of new information will be crucial for parents and professionals to adapt their language levels to challenge children with MHL but not overstress them.

Fourth, parental interacting skills were not examined in relation to children's social-emotional outcomes. Future studies could focus on these associations in children with MHL. Specifically, it could be important to investigate the relation between parents' use of mental state language and children's ToM development. Given that parental linguistic input is also important in the ToM development of children with NH (Adrian et al., 2007), children with MHL might rely even more strongly on their parents in this respect, since they will have more difficulties overhearing other sources that provide spontaneous information, such as their siblings or peers.

Fifth, the current thesis focused on the youngest possible age, 17- to 46-month-olds. This implies that we could examine relationships of the MHL children with their parents, but

not yet with their peers. Peer interactions are important for children to learn to collaborate, negotiate, solve problems, and share with others. As children grow up they engage more and more in interactions with peers, for example at school. Children with MHL are confronted with extra challenging social situations at school. For example, classroom acoustics or noisy playgrounds may make it difficult for them to optimally engage with others. It would therefore be crucial to also examine the social interactions of school-age children with MHL, especially in the playground, when children really have the opportunity to play with others. Both the quantity and quality of this play with other children will provide more insight into the social-emotional functioning of children with MHL in daily life. Technologically innovative methods, such as sensor data, could shed new light on MHL children's social participation and subsequent development.

Clinical implications

The current findings emphasize the importance of carefully monitoring the outcomes of children with MHL and their families. Monitoring the progress of children with HL is one of the ten best practice principles of FCEI stated in an international consensus paper by Moeller and others (2013). In the Netherlands, almost all organizations that provide FCEI for children with HL and their families collaborate in monitoring these outcomes. Professionals use this monitoring system to evaluate individual children's outcomes and to set intervention goals with parents for the future development of their children. Further, this monitoring system is used to obtain more insight into the group of children with HL in general and into the effects of FCEI.

At the present time, the monitoring system integrates parent reports about children's social-emotional functioning and standardized language tests. In the current thesis the use of these language and social-emotional measures revealed, on average, no difficulties for toddlers with MHL compared with the standardized norm references. However, when the MHL children were compared with children from similar socio-economic backgrounds, risks for language difficulties did indeed emerge. In addition, observations showed that these toddlers encountered challenges in social interactions with others. This latter finding indicates that the current monitoring system should be broadened to include more social interaction measures, including parent-child interaction measures. In addition, it will be important to integrate measures that reflect more enhanced language abilities that are needed in interactions with others, for example the pragmatic use of language.

Promoting children's language abilities is one of the main goals of FCEI, and the current findings highlight once more the importance of stimulating this area of MHL children's development. In addition to providing HAs, professionals should guide parents in using language-evoking strategies. The current results showed that the use of such strategies was positively related to children's language abilities. More attention and guidance should thus be given to supporting parents in using these strategies. The results reported in Chapter 6 show that an interactive reading program was effective in promoting parents'

use of language-evoking strategies. Therefore it is suggested that interactive reading programs should be integrated into FCEI.

Early parent-child interactions are crucial for children's development. However, children with MHL experience some difficulties in interactions with their parents. Interventions to strengthen parent-child interactions are thus important. Video-feedback intervention has proven to be effective in promoting parental interacting skills in parents of children with HL (Casseratti-Lam, 2015). Early interventionists may use this technique during their house visits in order to reinforce positive parental interaction behavior.

Another best practice principle of FCEI is supporting families socially and emotionally, for example by building families' networks (Moeller et al., 2013). The results show that parents of children with MHL tended to feel less supported by their families. Since for the social network the impact of MHL on daily life is not always obvious, friends and family may be less supportive that parents might wish. Professionals can actively support parents by providing information about MHL during meetings for families' social networks.

To conclude: toddlers with MHL experience some challenges in establishing and maintaining meaningful interactions with others. They share fewer social cues with others and have more difficulties in understanding others' intentions. Since these challenges do not emerge clearly if we focus solely on parents' general reports of social-emotional functioning, there is a risk that the needs of children with MHL may be underestimated. In addition, if their language abilities are even within the normal range of standardized language tests, parents and professionals may think that these children are doing well enough to engage successfully in interactions with other people. Consequently, further guidance or monitoring of children with MHL may not seem necessary. However, fine-tuned social skills, especially, are essential in building and maintaining friendships and meaningful relations with others. Holding conversations, supporting a grieving friend, or resolving conflicts are all examples of situations that require these sophisticated social skills. To maximize the outcomes of children with MHL, we should support them in learning these skills.

Final conclusions

Research on children with MHL is relatively scant, but the model of inconsistent access (Moeller & Tomblin, 2015) provides a good starting point to examine the specific role of psychosocial factors, both in the children and their parents, in children's language and social-emotional outcomes. In the project described in this thesis, we aimed to contribute to the field by expanding this model of inconsistent access to include social-emotional experiences and outcomes. The overall results indicated no risk factors in the parent-child affective domain: Toddlers with MHL were affected by the emotions of other people, they were affectively available to their parents and their parents to them, and their parents did not feel more parental stress than parents of children with NH. These findings provide

a positive and promising basis to build on the challenges found in the domain of meaningful social interactions. This positive information is important for professionals, but certainly also for parents who are seeking to support the development of their child with MHL, since it can boost parents' confidence in their own important role.

Within their social interactions, toddlers with MHL had more difficulties in understanding the intentions of others and exchanged fewer social-communicative signals. Their parents used less rich and diverse language in these interactions. Sharing emotions, thoughts, and experiences with social partners gives meaning to interactions and teaches children about other people's intentions and perspectives. This social sharing takes time, but toddlers with MHL and their parents were restricted in their time. It was more difficult for them to obtain and maintain their social partner's attention, which led to less time to share. Consequently, there were fewer opportunities for language and social learning.

Interventions should support parents in increasing the time they engage in meaningful interactions with their child. One way to do this is by guiding parents in using interactive reading strategies while reading storybooks their children. Interactive storybook reading is a way to engage both social partners in the interaction and to expose children to a rich and diverse language. This thesis showed that early interventionists could guide parents in reading storybooks this way.

In 1977 Julia Davis referred to the group of children with MHL as a "forgotten group", and although attention for these children has increased in recent years, research on them is still relatively scarce compared to that on deaf children. The present thesis shone a spotlight on children with MHL, which has resulted in more knowledge, but also new questions. I hope that this thesis will encourage others – both researchers and professionals – to keep alive this attention for children with MHL.

REFERENCES

Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: implications of cross-informant correlations for situational specificity. *Psychological bulletin*, *101*(2), 213.

Adrián, J. E., Clemente, R. A., & Villanueva, L. (2007). Mothers' use of cognitive state verbs in picture-book reading and the development of children's understanding of mind: a longitudinal study. *Child development*, *78*(4), 1052-1067.

Ambrose, S. E., VanDam, M., & Moeller, M. P. (2014). Linguistic input, electronic media, and communication outcomes of toddlers with hearing loss. *Ear and Hearing, 35*(2), 139-147.

Ambrose, S. E., Walker, E. A., Unflat-Berry, L. M., Oleson, J. J., & Moeller, M. P. (2015). Quantity and quality of caregivers' linguistic input to 18-month and 3-year-old children who are hard of hearing. *Ear and hearing, 36*, 48S-59S.

Bus, A. G., Van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research, 65*(1), 1-21

CBS (2013). Statline: Beroepsbevolking; kerncijfers naar geslacht en andere persoonskenmerken. CBS, Den Haag / Heerlen.

Cejas, I., Barker, D. H., Quittner, A. L., & Niparko, J. K. (2014). Development of joint engagement in young deaf and hearing children: effects of chronological age and language skills. *Journal of Speech, Language, and Hearing Research*, *57*(5), 1831-1841.

Ching, T. Y., Dillon, H., Button, L., Seeto, M., Van Buynder, P., Marnane, V., ... & Leigh, G. (2017). Age at intervention for permanent hearing loss and 5-year language outcomes. *Pediatrics*, *140*(3), e20164274.

Cruz, I., Quittner, A. L., Marker, C., DesJardin, J. L., & Team, C. D. I. (2013). Identification of effective strategies to promote language in deaf children with cochlear implants. *Child Development, 84*(2), 543-559.

Dammeyer, J. (2010). Psychosocial development in a Danish population of children with cochlear implants and deaf and hard-of-hearing children. *Journal of Deaf Studies and Deaf Education, 15*(1), 50-58.

Denham SA. Emotional Development in Young Children. New York, NY: ThenGuilford Press, 1998.

DesJardin, J. L., & Eisenberg, L. S. (2007). Maternal contributions: supporting language development in young children with cochlear implants. *Ear and Hearing, 28*(4), 456-469.

DesJardin, J. L., Doll, E. R., Stika, C. J., Eisenberg, L. S., Johnson, K. J., Ganguly, D. H., ... & Henning, S. C. (2014). Parental support for language development during joint book reading for young children with hearing loss. *Communication disorders quarterly*, *35*(3), 167-181.

Devine, R. T., & Hughes, C. (2016). Family correlates of false belief understanding in early childhood: A Meta-Analysis. *Child Development*.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*: Paul H Brookes Publishing.

Hintermair, M. (2000). Hearing impairment, social networks, and coping: The need for families with hearing-impaired children to relate to other parents and to hearing-impaired adults. *American Annals of the Deaf, 145*(1), 41-53.

Hintermair, M. (2006). Parental resources, parental stress, and socioemotional development of deaf and hard of hearing children. *Journal of Deaf Studies and Deaf Education, 11*(4), 493-513.

Hoff-Ginsberg, E. (1985). Some contributions of mothers' speech to their children's syntactic growth. *Journal of Child Language, 12*(2), 367-385.

Holzinger, D., Fellinger, J., & Beitel, C. (2011). Early onset of family centred intervention predicts language outcomes in children with hearing loss. *International journal of pediatric otorhinolaryngology*, *75*(2), 256-260.

Koehlinger, K. M., Van Horne, A. J. O., & Moeller, M. P. (2013). Grammatical outcomes of 3-and 6-year-old children who are hard of hearing. *Journal of Speech Language and Hearing Research, 56*(5), 1701-1714.

Lam-Cassettari, C., Wadnerkar-Kamble, M. B., & James, D. M. (2015). Enhancing parent-child communication and parental self-esteem with a video-feedback intervention: outcomes with prelingual deaf and hard-of-hearing children. *Journal of Deaf Studies and Deaf Education, 20*(3), 266-274

Laugen, N. J., Jacobsen, K. H., Rieffe, C., & Wichstrom, L. (2016). Predictors of psychosocial outcomes in hard-of-hearing preschool children. *Journal of Deaf Studies and Deaf Education, 21*(3), 259-267.

Lederberg, A. R., & Mobley, C. E. (1990). The effect of hearing impairment on the quality of attachment and mother-toddler interaction. *Child Development, 61*(5), 1596-1604.

McCreery, R. W., Walker, E. A., Spratford, M., Bentler, R., Holte, L., Roush, P., et al. (2015). Longitudinal predictors of aided speech audibility in infants and children. *Ear and Hearing, 36*, 24S-37S.

McDonald, N. M., & Messenger, D. S. (2011). The Development of Empathy: How, When, and Why. In A. Acerbi, J. A. Lombo, & J. J. Sanguineti (Eds.), *Free will, Emotions, and moral Actions: Philosophy and Neuroscience in Dialogue*. Rome: Pontificia Università de la Santa Croce

Moeller, M. P. (2000). Early intervention and language development in children who are deaf and hard of hearing. *Pediatrics*, *106*(3), e43-e43.

Moeller, M. P., & Schick, B. (2006). Relations between maternal input and theory of mind understanding in deaf children. *Child Development, 77*(3), 751-766.

Moeller, M. P. (2007). Current state of knowledge: psychosocial development in children with hearing impairment. *Ear and hearing*, *28*(6), 729-739.

Moeller, M. P., & Tomblin, J. B. (2015). An introduction to the outcomes of children with hearing loss study. *Ear and Hearing*, *36*(0 1), 4S

Moeller, M. P., Carr, G., Seaver, L., Stredler-Brown, A., & Holzinger, D. (2013). Best practices in family-centered early intervention for children who are deaf or hard of hearing: An international consensus statement. *The Journal of Deaf Studies and Deaf Education*, *18*(4), 429-445.

Morgan, G., Meristo, M., Mann, W., Hjelmquist, E., Surian, L., & Siegal, M. (2014). Mental state language and quality of conversational experience in deaf and hearing children. *Cognitive development, 29*, 41-49.

Netten, A. P., Rieffe, C., Theunissen, S., Soede, W., Dirks, E., Korver, A. M. H., …Frijns, J.H.M. (2015). Early identification: Language skills and social functioning in deaf and hard of hearing preschool children. *International Journal of Pediatric Otorhinolaryngology, 79*(12), 2221-2226.

Netten, A. P., Rieffe, C., Soede, W., Dirks, E., Korver, A. M., Konings, S., ... & DECIBEL Collaborative study group. (2017). Can you hear what I think? Theory of mind in young children with moderate hearing loss. *Ear and hearing*, *38*(5), 588-597.

Nittrouer, S. (2010). *Early development of children with hearing loss*. Plural Publishing

Pipp-Siegel, S., Sedey, A. L., & Yoshinaga-Itano, C. (2002). Predictors of parental stress in mothers of young children with hearing loss. *Journal of Deaf Studies and Deaf Education, 7*(1), 1-17.

Nowakowski, M. E., Tasker, S. L., & Schmidt, L. A. (2009). Establishment of joint attention in dyads involving hearing mothers of deaf and hearing children, and its relation to adaptive social behavior. *Am. Ann. Deaf*, *154*(1), 15-29.

Quittner, A. L., Cruz, I., Barker, D. H., Tobey, E., Eisenberg, L. S., & Niparko, J. K. (2013). Effects of maternal sensitivity and cognitive and linguistic stimulation on cochlear implant users' language development over four years. *The Journal of Pediatrics*, *162*(2), 343-348.

Rieffe, C., Dirks, E., Vlerken, W., & Veiga, G. (2017). The empathic mind in children with communication impairments: The case of children who are Deaf or Hard of Hearing (DHH); children with an Autism Spectrum Disorder (ASD); and children with Specific Language Impairments (SLI). In V. Slaughter and M. de Rosnay (Eds.), *Theory of mind development in context.* New York: Routledge. ISBN: 978-1-138-81158-4.

Saunders, H., Kraus, A., Barone, L., & Biringen, Z. (2015). Emotional availability: theory, research, and intervention. *Frontiers in psychology*, *6*, 1069.

Stika, C. J., Eisenberg, L. S., Johnson, K. C., Henning, S. C., Colson, B. G., Ganguly, D. H., & DesJardin, J. L. (2015). Developmental outcomes of early-identified children who are hard of hearing at 12 to 18 months of age. *Early Human Development, 91*(1), 47-55.

Taumoepeau, M. (2016). Maternal expansions of child language relate to growth in children's vocabulary. *Language Learning and Development, 12*(4), 429-446.

Tomblin, J. B., Harrison, M., Ambrose, S. E., Walker, E. A., Oleson, J. J., & Moeller, M. P. (2015A). Language outcomes in young children with mild to severe hearing loss. *Ear and Hearing, 36*, 76S-91S.

Tomblin, J. B., Walker, E. A., McCreery, R. W., Arenas, R. M., Harrison, M., & Moeller, M. P. (2015B). Outcomes of Children with Hearing Loss: Data Collection and Methods. *Ear and Hearing*, *36*(0 1), 14S–23S

Tomasello, M., Carpenter, M., Call, J., Behne, T., & Moll, H. (2005). Understanding and sharing intentions: the origins of cultural cognition. Journal of Behavioral and Brain Sciences, 28(5), 675–691.

Topol, D., Girard, N., St Pierre, L., Tucker, R., & Vohr, B. (2011). The effects of maternal stress and child language ability on behavioral outcomes of children with congenital hearing loss at 18-24 months. *Early Human Development, 87*(12), 807-811.

VanDam, M., Ambrose, S. E., & Moeller, M. P. (2012). Quantity of parental language in the home environments of hard-of-hearing 2-year-olds. *Journal of Deaf Studies and Deaf Education, 17*(4), 402-420.

Wong, C. L., Ching, T. Y., Cupples, L., Button, L., Leigh, G., Marnane, V., ... & Martin, L. (2017). Psychosocial development in 5-year-old children with hearing loss using hearing aids or cochlear implants. *Trends in hearing*, *21*.

Yoshinaga-Itano, C., Sedey, A. L., Coulter, D. K., & Mehl, A. L. (1998). Language of early-and later-identified children with hearing loss. *Pediatrics*, *102*(5), 1161-1171.

Zimmerman, F. J., Gilkerson, J., Richards, J. A., Christakis, D. A., Xu, D. X., Gray, S., et al. (2009). Teaching by listening: the importance of adult-child conversations to language development. *Pediatrics, 124*(1), 342-349