Psychopathology in hearing-impaired children

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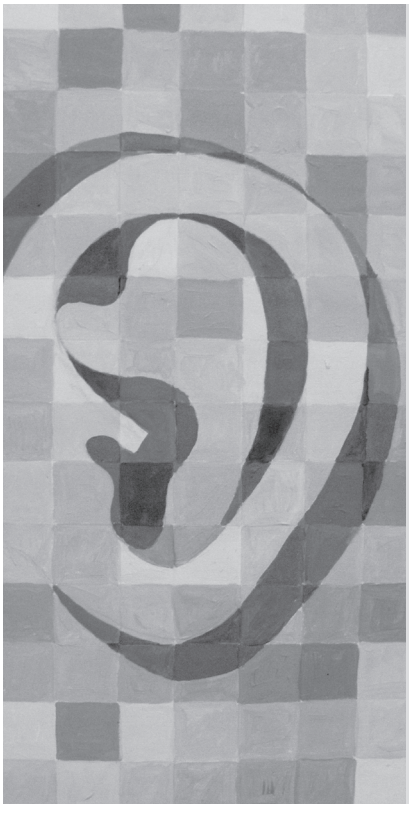
CHAPTER 8



General discussion

INTRODUCTION

The aim of this thesis was to expand knowledge involving psychopathology and its risk and protective factors in hearing-impaired (HI) and normally hearing (NH) children, aged 9 to 16 years. This age range was chosen because it is a transition phase marked by crucial emotional and behavioral changes that pertain to emerging adulthood. Hearing impairment was defined as having pre- or perilingual losses of at least 40 dB in the best ear. The participants had no other disabilities, such as visual impairment or Autism Spectrum Disorder, because the synergistic effects of multiple disabilities are known to be extensive [1]. The heterogeneity, typical for the HI population, was guaranteed by recruiting in various ways (e.g., hospitals, Speech and Hearing centers, special schools for the deaf and mainstream schools, as well as primary and secondary schools, and via social media), resulting in a representative sample.

Past research showed that HI children are more vulnerable to mental health and QoL problems than their NH counterparts [2-11]. However, scarce literature involving specific forms of psychopathology and the risk and protective factors is available. Therefore, the following three key points were examined in this thesis:

1. The occurrence of various forms of psychopathology in HI children, as compared to NH children;
2. The influence of having CIs or conventional hearing aids on psychopathology;
3. Which medical, audiological, linguistic, intellectual, educational, and sociodemographic factors are relevant for levels of psychopathology.

In the first paragraph, the main findings per aim are listed. Clinical relevance and implications are described in the second paragraph. Third, suggestions for future research are provided. Last, a number of concluding remarks are given.

MAIN FINDINGS OF THIS THESIS

Aim 1

Psychopathology in HI children

For the majority of psychopathological areas assessed, significantly more difficulties were found in HI children when compared to NH controls (chapters 2 to 6). We used well-designed, psychopathology-specific questionnaires that were adjusted to the language skills of HI participants, by formulating all items clearly and simply, in the preferred mode of communication to ensure children's understanding.

To our knowledge, this has never been done to such a large extent and for various specific psychopathological forms. Yet, our findings are in line with the vast majority of literature[2,3,5-7,9-16], but as already shown in chapter 7, the majority of these studies have been using general questionnaires to assess psychopathology, such as the Child Behavior Checklist or the Strengths and Difficulties Questionnaire [17-20]. Although these questionnaires give a good first impression, they are not tools that measure psychopathology specifically. Therefore, this thesis adds to the current knowledge, by

showing that next to lower mental health and QoL, more depression, anxiety, aggression, ADHD, ODD, CD, and psychopathy are found in HI children.

Aim 2

The influence of CIs and conventional hearing aids

Some remarkable and interesting outcomes were observed when the HI group was divided by their type of hearing device. Despite the fact that CI children initially experienced higher degrees of hearing loss (111 dB on average) than children who received hearing aids (mean value 68 dB), the levels of psychopathology of CI recipients often equaled those of children with hearing aids (chapters 2 to 6). Moreover, for some forms of psychopathology (including social anxiety and internalizing symptoms, chapter 4 and 6), CI children reported lower scores than children with hearing aids. The low scores were even similar to those of NH children. These results were underscored by the fact that none of the psychopathological areas were related to degree of hearing loss (chapters 2 to 6). When speculating what the reason for this noteworthy and definitely positive finding for CI recipients could be, it has to be said that the CI and hearing aid groups were completely similar regarding age, gender, SES, intelligence, language and communication skills. So, we can conclude that the difference actually was the result of the improved auditory input of the CI in combination with the CI rehabilitation program.

Aim 3

Risk and protective factors

Two more factors appeared crucial when evaluating the level of psychopathology: type of school and preferred mode of communication (chapters 2, 3, and 5), with children attending special schools for the deaf and/or using sign or sign-supported language as preferred mode of communication reporting more psychopathological symptoms than children at regular schools using spoken language. Past research confirmed these findings, as shown by the review in chapter 7 [16,21,22]. Plausible reasons for the found disadvantages of special schools and sign (-supported) language could be that these children have fewer contacts with NH children, reducing social interaction and enhancing the chance of social isolation. This theory was supported by the finding that less communication deficits were related to less psychopathology (chapter 4, 5, 6, and 7).

CLINICAL RELEVANCE AND IMPLICATIONS

Findings with respect to aim 1

More psychopathology in HI children

Psychopathological disorders have wide-ranging consequences for daily social and occupational functioning and the utilization of medical services, including an economic burden to society [23-26]. Therefore, it is of the utmost importance to screen on psychopathology in this vulnerable group of patients, in order to detect and treat the psychological problems in time.

Currently, many HI children with psychopathology receive no treatment, and only the ones that evidently stagnate in their social and emotional development are referred to specialized care. This is underlined by the fact that in children with psychopathology but without any hearing impairment, only a small minority (approximately 25%) receive care of mental health services [27-30]. Actually, it is assumed that because of the language barrier and subsequent isolation relatively more HI children have no access to mental health services [11,31]. Therefore, we must pro-actively approach each HI child and screen his or her on symptoms of psychopathology.

In this respect, a new initiative has been started in the Netherlands: a website (www.emotieweb.nl) that is accessible for professionals. With this tool, HI children can be screened on their social and emotional development as well as levels of psychopathology. After filling out the questionnaires on the website, scores are automatically derived and based on norm scores of NH children and other HI children. With these comparative scores, the professional have an indication to which extent a child is socially and emotionally developed in comparison to peers with and without hearing loss and when indicated, the HI child can be referred to specialized health care.

A second, more prevention-oriented approach in diminishing psychopathology in HI children would be to improve social and emotional skills, since well-replicated literature demonstrated that a lack of these skills is the first step towards developing psychopathology [32-39]. Multiple trainings and/or exercises with this purpose have been described in literature, of which many have been adopted in practice. For example, it could be helpful to improve understanding and communication of emotions, Theory of Mind (i.e., the capacity to understand that others can think and feel differently), mental state vocabulary, and social interactions [35,36,40-44]. Teaching of these social and emotional skills must be offered by professionals with experience with HI patients and could be adapted by parents and schools. Hopefully, the above-mentioned screening and training options will lead to a significant decline of psychopathology in HI children in the near future.

Findings with respect to aim 2

CI recipients are equal to or outperform children with hearing aids

Cochlear implantation and its rehabilitation process have extensively changed treatment and prognosis for patients with sensorineural hearing loss who have no or minimal profit of conventional hearing aids [45-47]. This improvement has been confirmed and extended by the outcomes of this thesis, since children with CIs appeared to function at similar psychopathological levels as children with hearing aids, and sometimes outperform these children, despite the more severe hearing losses in CI recipients compared to children with hearing aids (mean difference 43 dB). Chapter 4 and 6 even showed that CI recipients were more comparable to NH children than to children with hearing aids involving both internalizing and externalizing symptoms. Hence, profoundly HI or deaf children can be "successfully (re)integrated into the hearing world through a multidisciplinary approach involving otorhinolaryngologists, audiologists, and speech/language pathologists" [48].

One has to bear in mind that the children in our sample mainly consisted of one of the first generations of children who underwent implantation. In our sample, most children

received their CIs at older age (mean age 3.8 years, range 0.9 – 10.8) while nowadays, the majority of children are implanted in their first or second year of life. In addition, we found that early age at implantation contributed positively to a number of psychopathological areas (chapter 2 and 4), like it does for speech and language development. Therefore, early implanted children are hypothesized to experience less psychopathology when compared to the late implanted children. It would be very interesting to investigate young implanted children in this respect.

Compared to the CI recipients, children with hearing aids have relatively high levels of psychopathology. This is concerning. It could be postulated that when all children with hearing aids would have had the same rehabilitation program as CI recipients, in terms of monitoring, attention, and counseling, they would have had similar levels of psychopathological symptoms as CI children. Thus, the fact that hearing aided children lag behind their implanted counterparts could be caused by a lack of 'tailormade' care. Whereas CI children follow an extensive and personalized rehabilitation program of approximately one year, hearing aided children usually have much fewer contact moments with professionals. Except for the audiological fitting, most of these children only return to a hospital or Speech and Language center, when they actually have problems (e.g., progressive hearing loss, frequent otitides, or delayed speech and language development). Besides the lack of attention, other explanations can be given. For example, it was found that particularly children with hearing aids at special schools had high levels of psychopathology. These children have less contact with peers in the hearing society and feel more isolated. Additionally, attending special schools brings along feelings of stigma and discrimination. Alternatively, HI children with difficulties (e.g., language delays or mental health problems) are more likely to be referred to special schools, so caution is warranted when interpreting these findings. Therefore, future research must clarify what exactly the mechanisms are that lead to higher levels of psychopathology in hearing aided children at special schools.

Findings with respect to aim 3

The importance of type of school, mode of communication, and communication skills

Knowledge about the factors related to psychopathology in HI children is incredibly important, because identifying these factors will presumably lead to an improvement of targeted screening, intervention, and counseling trajectories [49]. It could also lead to a better understanding of the large variability often observed in HI children and, secondly, to more accurate predictions of performance in the future. The fact that type of school, mode of communication, and communication skills were three influential factors for the level of psychopathology, is a quite logical finding because these factors are intertwined: children with good communication are less likely to attend special schools. Enhancing age-appropriate communication skills is one of the keys to better social and emotional development. In the studies of this thesis in which communication skills were taken into account (chapters 2, 4, 5, and 6), better communication was associated with less psychopathological symptoms for most areas assessed. Hence, professionals, schools, and family should focus on and encourage communication, in order to diminish or even prevent psychopathology.

FUTURE RESEARCH

During and after conducting this research, many new hypotheses and questions emerged. It would be interesting to perform studies in which these hypotheses are tested. One of the first and most important issues would be to evaluate the CI rehabilitation programs. We do not know whether the positive outcomes for CI recipients were caused by the auditory properties of the CI itself or by a combination of the CI and its rehabilitation program. To unravel this, all CI centers could be contacted to inventorize their implantation trajectories in terms of counseling and monitoring. Similar information has to be gained for children who received hearing aids. With information of both the CI and hearing aid trajectories, future research could determine to which extent the rehabilitation programs are influential.

A second topic for future research concerns early-screened HI children. Since the introduction of the Newborn Hearing Screening (NHS) throughout the Netherlands in 2006, hearing loss has been detected substantially earlier than in the period before, in which all of the participants of this research were born [50,51]. Therefore, these children are not completely comparable to the new generation of HI children, who are generally early screened, detected, and receive early intervention. The results of this thesis (chapters 2, 4, and 6) showed indeed that early amplification was associated with lower levels of psychopathology, so it is hypothesized that the next generation of HI children will be less prone to developing psychopathology.

A third and final suggestion involves bilaterally implanted children. In our study sample, few children (*n* = 14) have been implanted bilaterally, while nowadays a larger share of severely to profoundly HI children has bilateral CIs in the Netherlands. Children aged 0 to 5 years can receive bilateral CIs, and in 2013 the selection criteria will be broadened to the age of 18. Although no differences between uni- and bilaterally implanted children were detected in any of our studies, it would be interesting to further investigate psychopathology in a larger sample, because the first studies worldwide are promising, as they demonstrated improved language skills for bilaterally implanted children when compared to unilaterally implanted children [52-59]. Since better language was identified as a protective factor for psychopathology, it could be that bilaterally implanted children experience less psychopathology.

CONCLUDING REMARKS

This thesis provides overwhelmingly positive results for CI recipients by showing that CI children can perform at similar levels as children with hearing aids and in some cases even at levels of NH children, not only in terms of speech and language, but also in terms of psychopathology. Yet, we still have to bear in mind that a large heterogeneity typifies the HI population and makes individualized evaluation, screening, and treatment necessary. Hearing impairment does not exclusively contribute to the genesis of psychopathology, but many other factors have to be taken into account when evaluating the origins of

psychopathology. Particularly children with hearing aids at special schools must receive increased attention and more care, because they are at high risk for developing psychopathology.

This research has several strengths. First of all, all psychopathological symptoms were assessed by means of different questionnaires, in a large and representative group of children. The sample size is comparable with other relevant studies, such as the studies of Wake et al. (2004) and Geers et al. (2011) [60,61]. Not only parents were asked to report on the problems, but also the children themselves were used as informant and all questionnaires had high internal consistencies. Secondly, the assessment of all HI participants was done in a bimodal way of communication when desired, in order not to miss or underestimate the problems due to communication barriers often encountered in HI individuals. Concluding, the utmost effort was put into methodological issues.

For the future, we hope that research in the field of psychopathology and the social and emotional development in HI children will continue, as also desired by other researchers [3,8,11,62]. There are still many research questions that need an answer. Furthermore, there is a need for longitudinal studies, because that is the only way in which causal risk and protective factors for psychopathology can be confirmed. Moreover, identifying and understanding these factors help identify those at risk for psychopathology and lead to an improvement of targeted screening, intervention, and counseling trajectories, thereby reducing morbidity.

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