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ABSTRACT

Hearing loss may represent a risk for developing social skills difficulties; however, little is known about the potential risk resulting from unilateral or mild bilateral hearing loss (UMHL). We compared the social skills of 14 children with UMHL and 21 children with moderate to severe hearing loss (MSHL) with those of 123 children with typical hearing (TH). All the children were 4–5 years old, and all the children with hearing loss used hearing aids. The study was carried out in Norway. Associations between social skills and age at amplification and vocabulary skills were examined. The children with UMHL had lower social skills than the TH children, whereas the children with MSHL received scores similar to those of the TH children. The children with UMHL were detected and amplified later than the children with MSHL. Early amplification was associated with better social skills but not with better vocabulary. The results suggest that despite a limited effect on vocabulary development, early intervention is likely to promote social skills development in children with UMHL.

Background

Social skills are learned behaviours that enable individuals to interact effectively with others and maintain successful relationships in a socially accepted manner (Gresham and Elliott 1990). Such skills are a vital part of the development of social competence (Rose-Krasnor 1997, Rose-Krasnor and Denham 2009, p. 171) and are associated with better mental health (Lee *et al.* 2010, Wichstrøm *et al.* 2013). Thus, promoting social skills development in at-risk groups is of vital importance.

Children who are deaf or hard of hearing (DHH) are at greater risk for developmental delays and difficulties than their peers with typical hearing (TH). This risk is often attributed to their language delays (Stevenson *et al.* 2010, Hoffman *et al.* 2015). Even mild bilateral (26–40 dB in the best ear) and unilateral losses (<25 dB in the best ear, ≥25 dB in the other) may carry an increased risk of maladaptive development (Tharpe 2008, Winiger *et al.* 2016). Still, many outcomes in children with mild hearing loss remain unexplored, particularly those associated with social and emotional development. Indeed, although children with unilateral and mild bilateral hearing loss (UMHL) are included in some studies, their social skills have not been investigated specifically. This lack of knowledge renders the provision of well-targeted, effective interventions difficult (Holstrum *et al.* 2009). As social skills acquisition

is a vital developmental task in the preschool years (Rose-Krasnor and Denham 2009, p.162), the present study explores these skills in 4-year-old children with UMHL.

Hearing loss and social skills

In general, DHH children exhibit lower social competence, including social skills, than TH children. For example, Hoffman *et al.* (2015) reported significantly lower social competence in children with severe to profound hearing loss compared with children with TH. The same conclusion was reached in studies of children with cochlear implants (Wiefferink *et al.* 2012) and mild to profound hearing loss (Meinzen-Derr *et al.* 2014). However, exceptions do exist; age-appropriate social skills have been reported among students with mild to profound hearing loss (Antia *et al.* 2011, Laugen *et al.* 2016) and in children with cochlear implants (Ketelaar *et al.* 2013). The studies that report delays and those reporting age-appropriate development do not differ regarding degree of hearing loss or age of the participants, but the use of different assessment methods and the inclusion of children with all degrees of hearing loss in the same sample may contribute to the variability in outcomes. Per date, the social skills of children with UMHL have not been investigated specifically.

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Outcomes in children with unilateral and mild bilateral hearing loss

Research on children with UMHL has mainly focused on language and academic skills and conveys mixed findings: For example, communication development in the first three years of life has been reported to be comparable to those of TH children (Fitzpatrick *et al.* 2015). As for school-age children, age-appropriate development was reported in children with unilateral hearing loss regarding intellectual efficiency (Niedzielski *et al.* 2006), and regarding language and behaviour for children with slight and mild hearing loss (Wake *et al.* 2006). In contrast, difficulties in speech and language were reported among school-age children with unilateral hearing loss (Lieu *et al.* 2010), as well as difficulties with multitasking in noise in school-age children with UMHL (McFadden and Pittman 2008). The variability in study outcomes is likely reflecting the variability in the UMHL population, and risk factors have not yet been sufficiently investigated (Winiger *et al.* 2016).

It could be argued that children with UMHL may experience fewer difficulties than children with moderate to profound loss because they have better auditory access. However, the severity of a condition and its outcomes are not always related (WHO 2001), and in some ways, children with UMHL may be subject to the same adverse conditions as the DHH population in general. Background noise, which is quite common in a child's everyday surroundings, may reduce access to social information and opportunities for social interactions, even in cases of a unilateral loss (Wie *et al.* 2010). Studies have shown that degree of hearing loss did not predict social functioning, mental health, or quality of life (Fellinger *et al.* 2008, Netten *et al.* 2015), suggesting that a less severe hearing loss does not necessarily imply fewer difficulties.

Some studies have found that children with UMHL may actually be worse off in some respects than children with moderate to profound hearing loss: Wake *et al.* (2004) reported that children with mild hearing loss had lower health-related quality of life than those with profound loss, whereas Keilmann *et al.* (2007) found lower self-confidence among children with UMHL than among those with more severe hearing loss. However, both these studies report a potential selection bias in their samples. Children with UMHL who have no difficulties may not be enrolled in services, and therefore not included in studies.

In sum, there are good reasons to investigate the development of children with UMHL because milder hearing loss does not necessarily imply a milder impact and because such knowledge is important for service planning.

Early hearing detection and intervention

UMHL is not as easily detected as moderate to severe hearing loss (MSHL). Traditionally, children with UMHL have received intervention, including amplification, at a much later age. With the implementation of universal newborn hearing screening, the age at detection has been dramatically reduced for children with UMHL (Fitzpatrick *et al.* 2014). Still, the services provided to children with UMHL may vary greatly in content and extent. For example, in U.S.A., access to early intervention services depends on whether or not the state includes UMHL as eligibility criteria (Holstrum *et al.* 2008). Moreover, the lack of best practice protocols and uncertainty among parents and professionals may contribute to a wide variability in the timing and content of service provision (McKay *et al.* 2008, Walker *et al.* 2014). In a Canadian population study, the time from diagnosis to amplification ranged from 0 to 6 years (Fitzpatrick *et al.* 2014). As hearing aid fitting often takes place in parallel with other types of intervention, such as parent support, a delay in amplification could reflect a delayed onset of intervention in general. Late detection and intervention could compromise the development of social skills. In preschool children with severe to profound hearing loss, lower social competence was associated with later detection and lower language skills (Hoffman *et al.* 2015). Further, Martin *et al.* (2011) reported difficulties in larger social settings, including more than one other person, for children aged 5–6 years with cochlear implants. However, in contrast, no problems in peer relationships were reported in a longitudinal study of school-age children with cochlear implants (Bat-Chava *et al.* 2014), or in preschool children who had their cochlear implantations early (Ketelaar *et al.* 2013). In sum, social skulls outcomes may vary depending on age at detection, language and communication factors as well as the specific social setting. However, these issues have not previously been addressed in the UMHL population specifically.

How social skills relate to language development

There is general agreement regarding the reciprocal relationship between language and social skills: Language ability facilitates social interaction, and social interaction promotes language development (Cochet and Byrne 2016). In the DHH population, language delay is frequently mentioned as a contributor to difficulties in many areas, including social skills (Stevenson *et al.* 2010, Hoffman *et al.* 2015). Even very small language delays can have a significant impact on the development of social competence (Meinzen-Derr *et al.* 2014).

This relationship between language and social skills easily translates into an understanding of social skills problems as secondary to language problems,

suggesting that if language delays are minimized, the risk of social skills problems is also reduced. However, it is possible that language and social skills development are affected by the hearing loss directly or via a mediating factor. For example, Tuller and Delage (2014) suggested that the effects of language delays in children with mild to moderate hearing loss might be mediated by a hearing loss-related compromise of working memory. In support of this hypothesis, others have reported that children with UMHL expend more cognitive resources when listening or multitasking compared with TH children (McFadden and Pittman 2008, Dokovic et al. 2014). If more cognitive capacity is being directed towards other tasks, such as listening, social skills development is likely to be affected.

The present study

Our aim was to examine the extent to which children with UMHL are at risk for social skills difficulties compared with TH children and children with MSHL. We expected that children with UMHL would have more social skills difficulties than children with TH; however, we did not form a specific hypothesis regarding whether they would struggle more or less than children with MSHL. As children with UMHL and MSHL are likely to differ regarding vocabulary and age at amplification, we also explored how these factors were associated with social skills. Because parental education level has been reported to predict developmental outcomes in DHH children in general (Ching et al. 2013, Porter et al. 2013), this variable was also included.

Method

Participants

For the UMHL and MSHL groups, participants were included if they were 4–5 years old, they used a hearing aid in one or both ears, and spoken Norwegian was used in the home by the child and at least one parent. Children with additional diagnoses were not included. Although children with cochlear implants may have similar audiological characteristics as children with UMHL or MSHL, they were excluded because of the differences in audiological history (having no or little access to sound the first months of life) and differences in access to intervention. Families were recruited via invitation letters distributed by two special education providers and by 19 of the 21 audiology departments that serve children in Norway. In all, 79 letters to families throughout Norway were distributed, and 36 families agreed to participate. One of the children was excluded due to language difficulties. Of the 35 participating children, 30 used their hearing aids most of the time according to their parents. Seven children had one parent who spoke

Table 1. Demographic profile of the participants.

Variable	TH (n = 123)	UMHL (n = 14)	MSHL (n = 21)
Age, mean (SD) months	55.1 (3.5)	57.5 (5.1)	56.1 (6.9)
Boys	54.9 (3.5)	59.4 (5.4)	57.8 (7.1)
Girls	55.0 (3.5)	55.6 (4.4)	54.8 (6.8)
Male gender, no (%)	59 (48.0)	7 (50.0)	9 (42.9)
Gestation age, mean (SD) weeks	39.4 (3.0)	39.3 (2.4)	39.6 (3.0)
NICU stay, no (%)	11 (8.9)	3 (21.4)	6 (28.6)
Degree of hearing loss, no (%)			
Unilateral		4 (11.4)	
Mild (26–40 dB)		10 (28.6)	
Moderate (41–55 dB)			15 (42.9)
Moderately severe (56–70 dB)			4 (11.4)
Severe (71–90 dB)			2 (5.6)
Hearing aid use, no (%)			
Most waking hours		9 (64.3)	21 (100.0)
Half of waking hours or less		4 (28.6)	0 (0.0)
Missing		1 (7.1)	0 (0.0)
Age at detection, median (interquartile range), months		22.1 (14.4)	11.5 (15.6)

Note: TH = typical hearing; UMHL = unilateral and mild bilateral hearing loss; MSHL = moderate to severe hearing loss. NICU = neonatal intensive care unit.

another language than Norwegian. Fourteen children were in the UMHL group, and 21 were in the MSHL group. All 35 children had spoken Norwegian as their preferred mode of communication, reported by their parents. Six of the children (two in the UMHL group, four in the MSHL group) preferred to support their spoken Norwegian with signs.

A control group of TH children was drawn from an existing community sample, which is described in Wichstrøm et al. (2012). From the original sample of 1250 children, 180 were drawn to act as a control group; this procedure is described elsewhere (Laugen et al. 2016). Data regarding social skills were available for 123 of these children, who comprised the TH group included in the analyses. Further details are provided in Table 1. A larger proportion of children with hearing loss (both MSHL and UMHL) than TH children had been admitted to a neonatal intensive care unit (NICU) (p = .018). No other differences among the groups were identified.

Measures

We used the Norwegian version of the Social Skills Rating System – Parent Report (SSRS; Gresham and Elliott 1990). The questionnaire includes 39 items presenting examples of social behaviours such as following household rules or making friends. The behaviours are rated by the parents in terms of frequency (how often the behaviour occurs) and importance (in the parent's opinion, how important the behaviour is for the child's development). In this study, only the frequency scale was used. SSRS is developed for children aged 3–18 years. Whereas the original SSRS uses a 3-point Likert scale, the Norwegian version extends the scale to 4 points (0 = never, 1 = sometimes, 2 = often, 3 = very often) (Ogden 2003). This version of the SSRS has shown good validity in

Norwegian TH populations (Ogden 2003, Gamst-Klaussen et al. 2016). The Cronbach's alpha for the total score was .89 for the total sample and .88 for the HH children.

We included one measure of receptive vocabulary: the Peabody Picture Vocabulary Test – Third Edition (PPVT-III; Dunn and Dunn 1997). A child is presented with four drawings and is asked to point to the drawing that corresponds to the target word presented by the test administrator. The test consists of 10 blocks of 12 items each, with increasing level of difficulty. The testing is terminated when the child gives eight wrong answers within one block. The PPVT-III is widely used both in TH and DHH populations (Betz et al. 2013, Bennett et al. 2014). The instrument was translated into Norwegian and tested in a pilot study (not published). Some changes in the item order were made to maintain the increasing level of difficulty also in Norwegian. The Cronbach's alpha for our sample was .97 for both the total sample and for the DHH children. Although receptive grammar is only one aspect of language development, the PPVT-III shows moderate to strong correlations with other language measures and is considered useful as a screening instrument for children with language difficulties (Williams and Wang 1997, p. 46). Still, caution is needed when interpreting the data.

A questionnaire was used to collect information concerning the child's hearing loss and family background. The child's level of hearing loss was reported by the parents separately for each ear using the categories normal (<25 dB), mild (26–40 dB), moderate (41–55 dB), moderately severe (56–70 dB), severe (71–90), and profound (>90 dB). Based on the hearing level of the best ear, the DHH children were assigned to the UMHL ($\leq$40 dB) or the MSHL (>40 dB) group. Age at identification and amplification were reported in months. As amplification and early intervention services in Norway often take place within a short time frame, the age at amplification provides an estimate of the onset of early intervention. Education levels were reported for each of the parents on an 11-point scale (1 = did not complete elementary school, 11 = PhD). Parental education was calculated as the mean level of both parents. If data for one parent was missing, the level reported for the other parent was used. Although maternal education level was frequently used in the previous literature, we chose to include paternal education due to the increasing involvement of fathers in their children's lives (Coleman et al. 2004). Conducting the analyses using maternal education only did not alter the results.

Procedure

This study is part of a larger project addressing psychosocial development, emotion comprehension and social skills in HH preschool children (Laugen et al. 2016). The children with hearing loss were seen either at home, in daycares, or at the facilities of a local service provider, according to the family's preference. The parents completed the questionnaire while the child's vocabulary comprehension was assessed by a clinical psychologist experienced in working with DHH children. The families of the TH children were seen at NTNU, the Norwegian University of Science and Technology. The study was approved by the Regional Committee for Medical and Health Research Ethics, Central Norway.

Statistical analysis

To ensure that assumptions of normal distribution were met, the dataset was examined using boxplots, skewness and kurtosis values, the Kolmogorov–Smirnov test, and Levene's test. Age at amplification and parental education did not meet the assumptions of normality, even when transforming procedures were used; therefore, nonparametric tests were chosen for the analyses that included these variables. Because parametric tests have some advantages over nonparametric tests (Lydersen 2015), we chose to use parametric tests whenever this was possible.

Differences in social skills and vocabulary scores between the groups were explored using univariate analysis of variance (ANOVA). Due to the unequal sample sizes, Hochberg's GT2 was used for the post hoc analyses (Hochberg 1974). For parental education, the Kruskal–Wallis test was used. The difference in age at amplification between the UMHL and MSHL groups was determined using the Mann–Whitney test. The effect sizes in the ANOVA are reported using omega squared (ω^2); suggested values for small, medium and large effect sizes are .01, .06 and .14, respectively (Kirk 1996).

To explore whether social skills were associated with vocabulary, age at amplification and parental education in the children with hearing loss, Kendall's tau correlations for social skills, vocabulary, age at amplification and parental education were calculated.

Results

The social skills, vocabulary, age at amplification and parental education values for the three groups are displayed in Table 2. The TH children and the children with MSHL showed similar levels of social skills. In contrast, the children with UMHL were rated almost one SD lower than the TH group. An ANOVA yielded a group effect on social skills, $F_{(2,154)} = 4.11$, $p = .018$, $\omega^2 = .04$. Hochberg's GT2 post hoc analysis confirmed that the scores of the children with UMHL were lower than those of the TH group ($p = .014$). As can be seen in Table 2, social skills in children with UMHL seem considerably lower than in children with MSHL, however this difference did not reach significance ($p = .126$).

The vocabulary scores also showed a significant group effect: $F_{(2,154)} = 3.372$, $p = .037$, $\omega^2 = .03$. The

Table 2. Psychometric properties and group values for social skills, vocabulary and age at amplification.

Instrument	Items	Range	α	TH (n = 123)	UMHL (n = 14)	MSHL (n = 21)
SSRS	40[a]	0–120	.89	66.1 (11.2)[b]	56.7 (13.3)[b]	64.9 (13.8)[b]
PPVT-III	120	0–120	.97	64.2 (19,7)[b]	53.3 (24.9)[b]	54.6 (21.0)[b]
Parental education		1–11		7.0 (3.5)[c]	5.3 (2.8)[c]	6.5 (1.5)[c]
Age at amplification		1–60			36 (14.5)[c]	8 (26)[c]

Note: TH = typical hearing; UMHL = unilateral and mild bilateral hearing loss; MSHL = moderate to severe hearing loss. SSRS = Social Skills Rating System.
 PPVT-III = Peabody Picture Vocabulary Test, 3rd Edition.
[a]The form has 39 items; one item appears in two subscales.
[b]Mean values, SDs in parentheses.
[c]Median values, interquartile range in parentheses.

post hoc tests did not yield any significant results; however, when UMHL and MSHL were combined, the children with hearing loss scored lower than the TH group: $t = 2.60$, $p = .01$, $g = .50$. Additionally, the children with UMHL were fitted with hearing aids later than the children with MSHL, $U = 205.0$, $p = .001$, $r = .55$. Parental education levels for the three groups were not significantly different, $H(2) = 3.97$, $p = .14$.

Regarding associations between social skills, vocabulary, age at amplification and parental education, a negative relationship between age at amplification and social skills was found: $\tau = -.256$, 95% BCa CI $[-.002, -.477]$, $p = .044$. In other words, later amplification was associated with lower social skills. No other significant correlations emerged.

Discussion

Social skills in children with UMHL

In our study, the children with UMHL were rated by their parents as having considerably fewer social skills than the TH children. In contrast, no such difference was detected between the children with MSHL and TH.

The relationship between the severity of a condition and its functional outcomes is not necessarily linear (WHO 2001). In the DHH population, adolescents with less severe hearing loss might be more vulnerable to emotional disorders, such as anxiety, than adolescents with profound hearing loss (van Gent *et al*. 2011), and similar findings have been reported for health-related quality of life (Wake *et al*. 2004).

Issues of identity and expectation could play a role in the difficulties of children with UMHL. Children with UMHL may more likely be compared with their TH peers and expected to speak, listen, and function well socially in a hearing environment; whereas the families of children with MSHL may more readily adapt their communication environments to fit the child's preferences, and the children may identify with the Deaf community. Consequently, a child with UMHL could experience a larger discrepancy between their auditory abilities and expectations than a child with MSHL.

Another difference between children with UMHL and MSHL is that hearing aid use is less consistent in UMHL children compared with MSHL children (Walker *et al*. 2015), which may influence the degree to which they participate in social settings. In our study, the majority of children with hearing loss used their hearing aids most of the day; the five children who did not belonged to the UMHL group. Further analyses of the effect of hearing aid use were not conducted due to the small sample size. Still, a more frequently mentioned explanation for difficulties in the UMHL population – their later age of hearing loss detection and intervention – was supported by our findings related to age at amplification.

Age at amplification

The difficulties of children with UMHL are often attributed to age at detection and intervention; historically, these children are diagnosed late and thus miss many years of support (Moeller 2007). Although the implementation of universal newborn hearing screening has provided the ability to identify UMHL earlier than before, our study found that the children with UMHL were diagnosed later and received their amplification later than the children with MSHL, even though all were born in hospitals with universal newborn hearing screening. The later amplification could reflect hesitation and lack of knowledge among professionals concerning the need for amplification and early intervention, as described in other studies (McKay *et al*. 2008, Fitzpatrick *et al*. 2016). Likewise, a Canadian population study revealed that children with UMHL often experienced a considerable delay between diagnosis and amplification (Fitzpatrick *et al*. 2014).

The association we found between late age at amplification and lower social skills scores aligns well with previous research indicating several developmental advantages associated with early intervention (Yoshinaga-Itano 2003). Although early amplification has been considered most effective for children with severe and profound hearing loss (Ching *et al*. 2013), the outcomes of our study underscore the importance of an early diagnostic process leading to early intervention for children with UMHL. However, as amplification and other types of intervention often co-occur, it is not clear from our study whether the amplification itself or other types of intervention might be more important. Most likely, the combination of several interventions, in interaction with child and family characteristics, contribute to the outcome.

The relationship between social skills and vocabulary

Our study contrasts with the finding of Hoffman *et al.* (2015), who found an association between language and social skills; however, it aligns well with other studies reporting a lack of association between different language measures and social functioning in children. For example, Netten *et al.* (2015) suggest that rather than specific language measures such as vocabulary, communication abilities (for example, the use of complex sentences) could be more accurate for predicting social functioning. DeLuzio and Girolametto (2011) suggest that rather than vocabulary as measured by a standardized test, the acquisition of the specific vocabulary used in the child's environment (for example, in preschool) could be of greater importance.

The 2007 position statement from the Joint Committee on Infant Hearing (Joint Committee on Infant Hearing 2007) states that the goal of early intervention is to promote language development, which in turn affects other areas, such as socio-emotional development. The language measure in our study was limited to vocabulary scores; still, our findings suggest that social skills difficulties might not follow from vocabulary delays. Rather, vocabulary and social skills development seem to develop more independently from each other, possibly with working memory as the mediating factor, as suggested by Tuller and Delage (2014). Such cognitive costs are likely to affect both social skills and different aspects of language development, such as vocabulary. To develop effective early intervention services, it is important to confirm or disconfirm the existence of such a relationship in future studies, which need to include larger samples than the present study.

With the benefit of their residual hearing, children with UMHL have access to some auditory information starting at birth. Thus, the onset of amplification may not have such a dramatic effect on vocabulary development as it would for children with severe or profound hearing loss. In fact, it has been argued that screening and early intervention for children with slight and mild hearing loss (16–40 dB) may not be necessary (Wake *et al.* 2006). However, whereas linguistic information might be readily audible in quiet surroundings for children with UMHL, less-pronounced preverbal signals, which are assumed to be important in early socioemotional development (Papoušek 2007), might not be perceived. Moreover, sounds such as the parent speaking from another room or the parent speaking in a room with background noise might be lost. Missing such subtle but socially important sounds may influence the behaviour of the child, for example, in terms of the ability to calm down. Unless the parent is aware of the hearing loss, such behaviours might be misinterpreted, thus causing long-term effects on social skills development (Sameroff and Fiese 2000, pp. 3–19). In contrast, early intervention may provide better auditory access through amplification and increased parent competence, thus minimizing such misinterpretations and promoting social skills development.

Limitations

Our study has several limitations. Most importantly, the sample size is rather small, and the findings must be interpreted with caution. There may have been differences and associations that we were not able to detect, and the effect sizes were small to medium. Further, due to the small sample, we were not able to analyse the children with unilateral and mild hearing loss separately. Although these groups face many similar difficulties, there are also important differences, such as the increased difficulties in sound localization in unilateral hearing loss (Winiger *et al.* 2016).

Many children with UMHL do not have hearing aids. Hearing aid use may not be indicated for their type or degree of hearing loss, the hearing loss may not have been detected, or amplification may have been recommended but not used by the child. As our study included only children with hearing aids, caution is needed in the interpretation of the findings.

We also lack information about the families' participation in early intervention services. Just as they are at risk for later amplification, children with UMHL may also risk receiving less follow-up because their needs could be underestimated or less visible (Holstrum *et al.* 2008). Although it is reasonable to assume that early amplification is accompanied by other intervention services, there are also likely to be cases in which families are enrolled in early intervention services before or after the child is fitted with hearing aids.

Social skills, such as knowing how to compromise or ask for help, are important components of a child's development of social competence. However, it must be noted that even with a wide repertoire of skills, challenges regarding adjusting one's behaviour to various contexts and individuals may remain (Rose-Krasnor 1997, Rose-Krasnor and Denham 2009, p. 168). Thus, although assessing social skills provides valuable information about the challenges and strengths of children with hearing loss, the broader picture of social competence should not be neglected. In addition, as mentioned by Antia *et al.* (2011), it is possible to have excellent social skills but still lack close friends.

Conclusion

Our study suggests that children with UMHL are at risk of social skills difficulties. They are also at risk for vocabulary difficulties; however, there is not a strong relationship between the two areas of development.

Further, children with UMHL were identified and amplified considerably later than children with MSHL.

Although children with UMHL may not benefit from early amplification in terms of vocabulary development, the impact on social skills is substantial; however, future studies should confirm our findings and clarify whether the contributing factor is amplification itself or other aspects of early intervention. In any case, our findings have implications for early hearing detection and intervention. Current screening methods often fail to detect mild hearing losses (Johnson *et al*. 2005), and improvement in terms of increased sensitivity in the screening instruments is needed. Further, children with any degree of hearing loss should be considered eligible for early intervention.

Our results suggest that the development of social skills needs to be monitored in children with any degree of hearing loss, even those with good vocabulary scores.

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Disclosure statement

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Notes on contributors

Nina Jakhelln Laugen is a PhD student at the Norwegian University of Science and Technology and a clinical psychologist at the Department of Hearing Impairment, Statped. She has worked in early intervention for children with hearing loss at an individual and group level and in service development. Her current research addresses psychosocial development in hard-of-hearing children.

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Professor Carolien Rieffe holds an endowed chair at Developmental Psychology, Leiden University on social and emotional development in children with auditory and/or communication impairments, which was funded by the Dutch Foundation for the Deaf and Hard of Hearing Child in 2010. In 2015, she was also made an Honorary Professor at UCL Institute of Education, London, UK. The research in her lab (www.focusonemotions.nl) is focused on the development of emotional competence in a social context, and its links with psychopathology in children and adolescents in typical and atypical development (autism, deafness, language impairments, and cultural differences).

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