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Social emotions and social functioning in Chinese deaf and hard-of-hearing and hearing preschoolers

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Chapter 6



GENERAL DISCUSSION



Social emotions help children navigate their social lives by facilitating interpersonal interactions, strengthening social bonds, and regulating social behaviors to align with moral standards and social expectations (Tangney et al., 2007; Tracy & Robins, 2004). Empirical research has shown that social emotions play an essential role in children's social-emotional development, relating to better social competence, more prosocial behaviors, and fewer internalizing or externalizing behaviors (e.g., Decety & Jackson, 2006; Rieffe et al., 2010; Li et al., 2020; Tangney et al., 2007). However, due to hearing loss, deaf and hard-of-hearing (DHH) children have relatively limited access to social interactions, whether by participating themselves or by overhearing others during social interactions. The limited social access might cause delays in their socialization and, in turn, their internalization of social norms (e.g., Calderon & Greenberg, 2011; Leibold & Buss, 2013). These delays might further impact their acquisition of social emotions, as the elicitation of social emotions requires children to have an adequate understanding of social expectations (Tangney et al., 2007). Investigating the longitudinal effects of hearing loss on preschoolers' development of social emotions could provide valuable insights and practical suggestions for the rehabilitation and early intervention of DHH children.

Several cross-sectional studies examined the associations between hearing loss and social emotions, indicating that DHH preschoolers manifest lower levels of shame, guilt, pride, and prosocial behaviors, compared to their hearing peers (Ketelaar et al., 2015; Rieffe et al., 2010). Yet, it remains unclear how the developmental trajectories of social emotions are affected by children's hearing conditions, as longitudinal evidence on preschoolers' social-emotional development is scarce. Moreover, current studies on moral emotions mostly focus on children from Western societies, thus leaving a gap in understanding the moral development of non-Western children, such as Chinese DHH

children (Tsou et al., 2021). This thesis aimed to fill these research gaps by exploring the impact of hearing loss on developmental trajectories of social emotions in Chinese preschoolers. Using the assessment tools validated in **Chapter 2** and **4**, we investigated the impact of hearing loss on the developmental trajectories of social emotions (moral emotions and empathic levels) in **Chapter 3** and **5**. The research was conducted with samples of DHH and TH preschoolers recruited from the China Rehabilitation Research Center for Hearing and Speech Impairment (CRRCHSI) in Beijing. The longitudinal contributions of social emotions to predicting children's social-emotional functioning were also evaluated and reported in these chapters. Importantly, outcomes showed similar results between DHH and TH children as discussed in **Chapter 3** and **5**. These similarities are briefly summarized here, but the implications of these findings will be discussed in greater detail below.

(1) Comparing the levels of social emotions between groups, DHH preschoolers manifested lower levels of guilt and pride than their TH peers over time, but there were no group differences on shame or the three empathic levels. These results did not fully align with prior findings on shame and prosocial behaviors (Ketelaar et al., 2015; Tsou et al., 2021).

(2) Regarding the developmental trajectories of social emotions, linear mixed models (LMM) showed that shame, guilt, and pride increased with age, and children's hearing status did not affect the developmental trends. These results were largely in line with prior research, except for shame, which was shown in prior studies to remain static over preschool years (e.g., Li et al., 2020; Ongley & Malti, 2014). Regarding empathy, our result indicated that only prosocial behaviors increased over time in both DHH and TH preschoolers, while emotion contagion and attention to others' feelings remained static in both groups. This result was inconsistent with prior findings suggesting that

emotion contagion decreased in DHH and TH preschoolers, whilst attention to others' feelings increased in DHH preschool children (Ketelaar et al., 2015; Tsou et al., 2021).

Taken together, our results showed an overall trend that Chinese preschool DHH children manifested similar levels of social emotions and developmental trajectories as their TH peers did. It is possible that our results were affected by some latent factors such as culture and the intervention. For instance, the absence of group differences may provide supporting evidence of the positive effects of early interventions at CRRCHSI. The interpretation and implications of the results are discussed in greater detail below. We also further discuss the measurement and developmental patterns of social emotions in Chinese DHH and TH preschoolers, as well as their associations with psychosocial functioning.

Prerequisite for studying social emotions in Chinese preschool children - the validation of questionnaires

At the start of this project, there was no questionnaire specifically designed to measure distinct moral emotions and empathy components for Chinese preschoolers. Validating suitable questionnaires developed for Western children in the Chinese context was thus a necessary first step toward fulfilling our research goals. To this end, **Chapter 2 and 4** validated two parent-report questionnaires, the Moral Emotion Questionnaire (MEQ) and the Empathy Questionnaire (EmQue), to assess the three different moral emotions and three distinct empathic levels, respectively.

The Moral Emotion Questionnaire (MEQ) was developed to assess shame, guilt, and pride in Dutch preschoolers, which had reported robust psychometric properties for construct validity (Da Silva et al., 2021). In **Chapter 2**, we tested the translated version

of MEQ on a group of Chinese children aged 2 to 6 years. Confirmatory factor analyses (CFA) indicated adequate construct validity of this Chinese version of MEQ, suggesting that Chinese children of preschool age can already experience shame, guilt, and pride, displaying corresponding behavioral reactions. Measurement invariance was met for all scales, suggesting that the values of shame, guilt, and pride as measured by the Chinese MEQ can be meaningfully compared across gender and age groups. Notably, two items from the original MEQ were removed during the constructing of the new models, which were from the “Guilt” scale depicting the emotional expressions of guilt. The removal of the items implied a cultural variance in expressing negative emotions in the Chinese social context.

The Empathy Questionnaire (EmQue) was also a parental-report questionnaire originally designed for Dutch preschoolers (Rieffe et al., 2010). The EmQue measured three distinct empathic levels/components as proposed by Hoffman (1987), and showed robust psychometric properties in the prior validation research (e.g., Rieffe et al., 2010; Takamatsu et al., 2021). In **Chapter 4**, the CFA suggested adequate construct validity, supporting Hoffman (1987) that three empathic levels develop over the preschool years. Measurement invariance of the Chinese EmQue was obtained, indicating that the scores measured by the Chinese EmQue had equivalent psychological meanings/implications for preschoolers of different genders and age. Overall, **Chapter 2** and **4** suggest that the Chinese versions of MEQ and EmQue can be useful tools for measuring social emotions in Chinese preschoolers.

The developmental trajectories of social emotions in Chinese preschool children

The development of social emotions was examined, by using a longitudinal design with two time points (approximately 15 months apart). According to our result in **Chapter 3**, shame, guilt, and pride all increased with age over the preschool years (for both DHH and TH children), which indicated that preschooler's capabilities of experiencing and expressing moral emotions may develop in accordance to their socialization (Lagattuta & Thompson, 2006). In **Chapter 5**, our results indicated that prosocial behaviors (the third level of empathy) also displayed an increasing trajectory over the preschool years, whilst unexpectedly, emotion contagion and attention to others' feelings (the first two empathic levels) remained unchanged (in contrast to the findings of Tsou et al., 2021).

Over the preschool years, children become increasingly more involved in social interactions, and during this period, they learn and begin to understand the social norms and values, and others' expectations for particular behaviors (Tangney et al., 2007). Consequently, children become more capable of reflecting on and evaluating their own social behaviors in light of social expectations, therefore their experiences of moral emotions may increase in both frequency and intensity (Chaparro et al, 2013; Daniel et al., 2014). Accordingly, our results on the development trajectories of social emotions are generally in line with prior research and theories (e.g., Tracy et al., 2007; Tracy & Robins, 2004).

However, as for the development of shame, several studies revealed that shame remained unchanged over the preschool years, because experiencing and understanding shame requires rich life experience and adequate cognitive skills, whereas preschoolers are relatively naive in experiencing deep emotions that are highly dependent on social cognition (Ross, 2017; Sette et al., 2019). Nevertheless, our longitudinal result showed an increase of shame over time in both Chinese DHH and TH preschoolers.

Considering that most studies on preschool children's social emotions are based on samples from Western countries, (potential) cultural variances have not been taken into account. In cross-cultural comparisons, shame is typically viewed as a maladaptive emotion in individualistic-oriented societies, as it often entails a depreciation of one's self-esteem that is not socially acceptable (Hofstede, 1980; Tracy et al., 2007). On the contrary, China is an East Asian country where collectivistic-oriented cultural ideology prevails (Hofstede, 1980). In the Chinese tradition, shame could be adaptive in various social circumstances, as the Chinese indoctrination encourages its social members to prioritize collective values over personal accomplishments. In this cultural atmosphere, shame functions to induce self-reflection and to keep social behaviors aligned with the moral norms (Bagozzi et al., 2003; Wang et al., 2020).

In fact, Chinese parents often use shame as a parenting strategy/tool to motivate children to improve and perfect themselves (Stadter & Jun, 2020). The high frequency of inducing shame for disciplinary purposes could contribute to more displays of shame in Chinese children, and this cultural explanation may partially account for the increase of shame during the preschool years in Chinese children. However, our studies in this thesis did not examine any cultural factors, such as cultural identity. Hence, the cultural influence remains an assumption and requires further investigation by future research. This issue is further discussed as a limitation in "Implications and Future Directions".

As indicated by prior research, as socialization progresses, preschoolers become more willing to engage in social learning and develop a better understanding of other's perspectives along with a stronger motivation to help others in distress (Beeler-Duden et al., 2022; Zahn-Waxler et al., 1992). Consequently, children display more prosocial behaviors taking the forms of helping, sharing, and comforting in the preschool years

(Tsou et al., 2021). Our finding regarding the developmental trajectory of prosocial behaviors (i.e., an increase over time) was in line with prior research.

However, our results indicated that emotion contagion and attention to others' emotions remained stable, whereas our hypotheses were that emotion contagion would decrease with age, and attention to others' feelings would increase with age (Tsou et al., 2021). According to prior studies, given that children's cognitive abilities and emotion regulation develop as their socialization carries on, they tend to be increasingly capable of regulating their emotional arousal, therefore their emotion contagion should decrease with age across the preschool years (Rieffe et al, 2010; Tsou et al., 2021). A possible explanation for our unexpected finding may be that we tracked children's development across a relatively short time span (i.e., an average interval of 15 months), which might not be sufficient to capture a significant change in their developmental trajectories (see "Considerations and Future Directions" for further discussions).

Associations between social emotions and psychosocial functioning in Chinese

DHH and TH preschoolers

Lastly, the association between social emotions and children's psychosocial functioning was examined, both cross-sectionally and longitudinally. According to our analysis on concurrent validity in **Chapter 2**, preschoolers' display of shame was related with more internalizing and externalizing behaviors. Furthermore, in **Chapter 3**, the linear mixed models (LMM) demonstrated that the mean and the change levels of shame contributed to more externalizing behaviors over time for both DHH and TH preschool children. In particular, for TH children, their mean level of shame contributed to predicting lower social competence over time. Taken together, our results from both the cross-sectional

and longitudinal studies suggest that shame may be maladaptive to preschoolers' social-emotional development: frequent, intense shame can disrupt and jeopardize children's interactions with others, leading to more social avoidance and reactive aggression (e.g., Fergus et al., 2010; Gruenewald et al., 2004). This result is in line with those findings on shame based on Western children (Bennett et al., 2005; Fergus et al., 2010), yet it contradicts studies suggesting that shame can benefit individuals' social competence in (South-)East Asian countries (Bagozzi et al., 2003; Heine, 2002). Further investigations into how cultural identities affect children's understanding of shame is warranted, as our studies did not account for any cultural variables.

As for guilt and pride, the manifestations of guilt and pride were related to better social competence. Also, the mean and change levels of guilt and pride contributed to better social competence over time in TH and DHH preschoolers, whilst the mean level of guilt contributed also to fewer internalizing and externalizing behaviors among these preschoolers (see **Chapter 4**). Our findings on guilt and pride were by and large in line with previous studies, indicating a positive impact of guilt and pride on the psychosocial functioning of preschool children, which were not influenced by hearing loss (Broekhof et al., 2018; Ketelaar et al., 2015).

As for empathy, our results on concurrent validity (**Chapter 4**) and longitudinal associations (**Chapter 5**) revealed that prosocial behaviors contributed to better social competence, fewer internalizing and externalizing behaviors over time in DHH and TH preschoolers, suggesting that prosocial behaviors may be largely adaptive to children's psychosocial functioning, regardless of their hearing abilities (Salerni & Caprin, 2022; Ashori & Aghaziarati, 2023).

However, our cross-sectional research (**Chapter 3**) found emotion contagion to relate with more internalizing behaviors and lower social competence; The linear mixed

models (**Chapter 5**) also showed that the mean level of emotion contagion contributed to more internalizing and externalizing behaviors across time in both DHH and TH preschoolers. In other words, too much emotion contagion may be an emotional burden and a sign of a lack of regulation abilities for preschoolers (Geng et al., 2012; Rieffe et al., 2010). A possible explanation is that Chinese children, influenced by the collective cultural norms, are more interdependent and more emotionally affected and disturbed by contagious emotions as compared to their Western counterparts (Atkins et al., 2016; Matsumoto et al., 2008). Future research is needed to verify/complement our findings and explore the cultural variances of social emotions impacting children's psychosocial development.

As for attention to others' feelings, Spearman correlations (**Chapter 4**) showed that attention to others' feelings was related to better social competence, but also more internalizing behaviors. Linear mixed models (**Chapter 5**) showed that the mean level of attention to others' feelings contributed to better social competence in DHH and TH preschoolers. However, the change in scores of attention to others' feelings contributed to predicting fewer internalizing behaviors over time in DHH preschool children. These findings thus indicate an impact of hearing loss on children's development in terms of switching attention to others, which will be discussed in the next section.

In sum, shame and emotion contagion, both implying a self-focus perspective, are related to more maladaptive psychosocial functioning, whereas the other emotions studied in this thesis, including pride, guilt, and the second and third levels of empathy (i.e., attention to others' emotions and prosocial actions), which allocate one's attention and cognition onto the outside world, are related to better psychosocial functioning over time.

The impact of hearing loss on preschoolers' development

Overall, the lack of differences between DHH and TH Chinese children in our studies was striking and positive. The longitudinal findings obtained in our **Chapter 3** and **5** did not show a significant impact of hearing loss on the abovementioned developmental trajectories: the developmental trends, or the increasing/decreasing rates of shame, guilt, pride, and empathy, were similar in Chinese DHH and TH preschoolers.

Group differences between DHH and TH preschoolers were shown only on the levels of guilt and pride: DHH children manifested lower levels of guilt and pride over time compared to their TH peers, and these group differences persisted in the preschool years. Accordingly, we summarize: (1) Hearing losses limit children's access and social to their social world from an early age, leading to lower levels of guilt and pride (whilst not for shame and empathy). (2) Hearing losses may not affect the trajectories of moral development, and the lower levels shown in DHH children persist in preschool years.

When the relations between social emotions and psychosocial functioning were considered, an impact of hearing loss was indicated: shame contributed to lower social competence over time in TH preschoolers only. Considering that the manifested levels of shame were indifferent in DHH and TH preschoolers, these results might indicate that the link between shame and social competence is more salient in TH children. As TH children are more involved in social activities, manifesting more shame could imply lower social adaptability and lower self-esteem (Ferguson et al., 1999); but this effect might be less pronounced in DHH children who have relatively limited social access (Netten et al, 2015).

The impact of hearing loss was shown also on attention to others' feelings. This level of empathy contributed to better social competence of DHH and TH preschoolers,

thus supporting Hoffman (1987) that the switch of attention from the self to the outer world is dependent on socialization. However, attention to others' feelings contributed also to fewer internalizing behaviors in only the DHH group. Presumably, when DHH children focus their attention on the social world, they have less energy to ruminate on their negative thoughts or emotions, resulting in fewer internalizing behaviors (Tsou et al., 2021). The impact of hearing loss on preschool children's empathic development, therefore, is likely to be mediated by their social participation. Yet, these assumptions may need further verification. Nonetheless, they highlight the importance of creating inclusive environments, just as the CRRCHSI practitioners did in the early intervention programs to safeguard DHH children's development.

Considering that only one other longitudinal study investigated the development trajectories of these distinct empathic components in DHH and TH preschoolers (Tsou et al., 2021), it is unclear to what extent our results revealed the reality. Meanwhile, we also cannot rule out the possibilities of latent effects (e.g., the effects of the interventions and hearing rehabilitation) or biases (e.g., caused by data attrition, or the short intervals in between data collections). Important to note that the governmental support and early intervention projects of CRRCHSI, may be crucial to the hearing rehabilitation of DHH preschoolers, and these might have contributed to these amazingly positive outcomes when DHH and TH children were compared.

The Chinese national hearing-screening policy for new-born infants guarantees early detection of hearing loss and deafness from birth (Wen & Huang, 2023); and the financial support for HA/CI usage enables nearly 80% of the DHH population to assist their hearing with suitable equipment (Jiang et al., 2019). The governmental screening tests and health insurance for HA/CI ensure that DHH children are diagnosed since birth, and have access to suitable hearing equipment (Ding et al., 2009; Wen & Huang,

2023). It is worth mentioning that most of the children in our sample received bilateral CI or HA at a very young age, which seemed to be a great support for them to overhear speeches. As a comparison, prior studies were based on DHH children who received unilateral CI/HA relatively later in their childhood (e.g., Ketelaar et al., 2015), therefore the children in our study may have certain advantages in language and social-emotional development.

Accordingly, our Chinese DHH children had already received sufficient medical and rehabilitation treatments compared to those of other countries (Jiang et al., 2019). On this basis, CRRCHSI also provides rehabilitation projects focusing on one-on-one interventions and establishing inclusive environments. Through close interactions with practitioners, our DHH children had access to a sufficient amount of verbal input which safeguarded their language development. On this basis, the language development of our DHH participants in CRRCHSI was to some extent safeguarded and might have a smaller impact on their social-emotional development (Li et al., 2017).

Furthermore, our DHH participants were assigned to special classes consisting of only DHH children who received intensive care from the teachers, so that they could study in an inclusive environment and socialize with their peers in daily lives, which may therefore facilitate their social development. These inclusive environments created by CRRSCHSI could increase DHH children's motivation for social participation in their DHH community and overcome their barriers in interpersonal interactions. Thus, we could presume that our DHH participants have better communicative abilities and social skills, which led to better development of social emotions accordingly.

To summarize, the governmental policies and rehabilitation projects improved our DHH participants' hearing status and possibly safeguarded their social development. By these means, similar results were shown regarding the development trajectories of

social emotions of DHH and TH children. Yet, it is noteworthy that our research did not use quantitative methods to study the impact children's hearing losses their social emotions. Instead, we operationalized DHH and TH as a categorical variable, and thus future studies are still needed to deepen our understanding.

Considerations and Future Directions

Our research raises issues that demand further consideration. First, further research is called for to examine the effects of early intervention and rehabilitation projects on DHH children's social participation and development. Our **Chapter 3** and **5** revealed that children's hearing loss contributed only to delays in manifested levels of guilt and pride in DHH children, whereas having no impact on most aspects of the development of social emotions. Presumably, our samples of DHH and TH preschool children might have smaller gaps in social participation than we previously expected, because of the governmental support and early intervention/rehabilitation projects for DHH children (Ding et al., 2009; Li et al., 2017; Wen & Huang, 2023). Yet, several limitations and suggestions for future research are important to note here.

First, we must point out that we collected only two waves of longitudinal data with 49% attrition at the second wave, in **Chapter 3** and **5**. Although simulation studies indicated that an attrition rate of lower than 50% was considered acceptable for LMM analyses, higher attrition rates still lead to larger biases in estimations (e.g., Pan & Zhan, 2020). For instance, an unneglectable issue was that those participants who dropped out at the second wave were slightly different from those participants who stayed on several study variables (e.g., guilt, internalizing behaviors), and these differences could lead to higher sampling bias and lower external validity of our results. Furthermore, due to the

fact that our two-wave longitudinal data had an interval of 15 months, our examination of the development trajectories was thus based on a 15-month interval. Considering that the development of social emotions is a continuous, gradual process, a relatively short period for longitudinal tracking might not be sufficient to capture all significant changes in preschool children's development. In other words, the data quality may be a potential factor that influenced our final results (e.g., the result that hearing loss did not affect preschoolers' empathic development). Therefore, in further explorations on this topic, future studies will benefit from collecting data from larger samples as well as tracking children's development for a longer period.

Second, although our studies explored the developmental trajectories of several social emotions in DHH and TH respectively, we did not evaluate or quantify children's social participation and the latent effects of early interventions. Further investigations are warranted to further our understanding of this issue, for example, wearable sensors are useful for assessing children's interactional patterns in schoolyards and playgrounds, which can provide quantitative measures of children's social participation and feedback information for the improvement of rehabilitation projects (e.g., Nasri et al., 2023).

Third, although our studies explored the development of social emotions among Chinese preschoolers, we did not measure any cultural factor. Despite the adequacy of the construct validity of social emotions, cultural variances may still exist especially on the associations between social emotions and psychosocial functioning. Prior findings show that social emotions may function differently in different cultural contexts. For example, shame motivates self-improvement in South-East Asian countries (e.g., Cole et al., 2006; Heine, 2002); whereas shame is maladaptive to children's socialization in the Chinese cultural contexts (e.g., Wu et al., 2020; Zhong et al., 2008). Furthermore, East-Asian individuals tend to experience more intense arousal by witnessing others in

distress and are more heavily affected by contagious emotions, compared to Western individuals (Atkins et al., 2016; Matsumoto et al., 2008; Markus & Kitayama, 1991). These results imply cultural variances in individuals' subjective emotional experiences and behavioral reactions to social emotions. Future research is recommended to include cultural variables such as cultural orientation and cultural identity in their study designs to better examine these cultural effects.

CONCLUSION

This thesis planned to investigate the developmental trajectories of moral emotions and empathy and their associations with psychosocial functioning, in preschoolers with and without hearing loss. Our validation studies provided supporting evidence that the two questionnaires used by our research could successfully distinguish shame, guilt, pride, and three empathic levels in Chinese preschool children. Furthermore, our longitudinal studies suggested that shame, guilt, pride, and prosocial behaviors increased across the preschool years, whilst children's emotion contagion and attention to others' feelings remained stable. These moral emotions and empathic levels played an essential role in facilitating children's social development as well as in regulating children's behavioral problems. Overall, we found that hearing loss affected children's displays of guilt, pride, as well as the psychosocial functioning of shame and empathy. These findings support our assumption that children's access to the social world is crucial to their socialization and social-emotional development. Hearing loss, which can lead to challenges for social participation, may delay children's social-emotional development, hence more research attention should be paid to reducing DHH children's difficulties in language and social

development. Additionally, more research could focus on adapting the environment as to better benefit these children and provide them with better access to their community.

This thesis shed light on the crucial significance of the hearing rehabilitation and early intervention programs in improving children's hearing conditions, language skills, and social-emotional functioning. The national screening and insurance of China played a key role in diagnosing hearing loss shortly after birth, and in supporting DHH children's hearing by using devices such as CI and HA. Furthermore, one-on-one interaction can improve DHH children's language development by providing them with large amount of verbal input. More importantly, creating an inclusive and accessible environment where DHH children can easily participate in social interactions and learn social knowledge is vital for children's social-emotional development. Our findings have shown a narrowed gap between DHH and TH children in their social-emotional functioning. Researchers should further verify our findings and take steps to adapt the physical and social environment for DHH children to support their social-emotional development.

Hopefully, our research can inspire other like-minded researchers. We envision future research that deepens our understanding of preschool children's social-emotional development and the challenges DHH children face in navigating the social world.

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