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Chapter 5

Self-concept and ego development in deaf adolescents: A comparative study

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Abstract

Self-concept and ego development, two intertwined aspects of self indicating well-being and social-cognitive maturation respectively, were examined in a representative sample of deaf adolescents of normal intelligence (N=68), using translated and adapted versions of Harter's (1988) multidimensional measure of self-concept and Loevinger's (1998) measure of ego development. Compared to hearing norm groups, deaf adolescents showed lower levels of self-perceived social acceptance, close friendships and ego development and higher physical appearance.

Hierarchical multiple regression analyses controlling for socio-demographic variables showed positive associations of global self-worth with support for signing during childhood and quality of parent-child communication and of ego development with attending a regular school. Cluster analysis identified three social competence profiles: uniformly low competence, uniformly high competence, and low social acceptance with high physical appearance. Cluster membership was associated with school type, ego development, and (past) neurological disorder.

The results are discussed in reference to interventions aimed at the well-being of deaf youth.

Introduction

There is considerable interest in the self-concept of deaf children and adolescents (e.g., Bat-Chava, 1993; Obrzut, Maddock & Lee, 1999; Kluwin, Stinson & Colarossi, 2002; Hintermair, 2008). Positive self-concept is associated with higher levels of positive adjustment and lower levels of psychosocial problems, especially internalizing problems (e.g., Crocker, & Wolfe, 2001; Harter, 1999; Owens, Stryker, & Goodman, 2001). The majority of the work in this field has focussed on the unique challenges that deaf youth face in developing a positive self-concept amid the demands of communicative challenges and the minority status in the predominantly hearing environment. About 90-95% of deaf children are born into hearing families and most deaf children are educated by hearing teachers (e.g., see Hindley & van Gent, 2002). Communication problems may originate from a number of - at least partly related - sources. Deaf children are more dependent on vision and visual orientation than hearing peers, and they are more likely to miss or to misunderstand parts of information (Marschark & Hauser, 2008). In general, the ability of deaf children to learn spoken language remains limited despite the development of advanced amplification devices (Marschark, 2007). Moreover, most hearing individuals use more restricted communication discourse patterns with deaf children than deaf-to-deaf individuals do (Hauser, Lukomski, & Hillman, 2008). As a result of such circumstances, deaf children are at risk of suffering from less diversity in early experience (Marschark, 2007), less incidental learning (Calderon & Greenberg, 2003), and less exposure to a variety of cause-effect relationships (Marschark et al., 2008) than their hearing peers. The lasting communicative deprivation, misunderstandings and sometimes even isolation, may be particularly troublesome during adolescence when belonging to a social network and intimate attachments with parents and peers are especially important for the development of a sense of competence and for identity or ego development (Calderon & Greenberg, 2003; Schlesinger, 2000; Traci & Koester, 2003).

Self-concept and identity or ego development reflect the two intertwined aspects of self that were distinguished by William James in 1890: self as object

of one's knowledge and evaluation (Me-self) and self as actor or knower (I-self). The concept of Me-self underlies models of self-concept capable of being tested empirically; the concept of I-self underlies models of mental processes that characterize the social-cognitive structures of the knower, such as Loevinger's model of ego development (McAdams, 1998). To the best of our knowledge, no attention has been given to ego development in deaf adolescents to date. The primary aim of this study is to investigate the effects of social context and deafness-related variables on both aspects of the self in deaf adolescents.

The Me-self

Traditionally the Me-self has been studied from a one-dimensional perspective, emphasizing self-esteem or global self-worth (these labels are interchangeably used throughout the text) as an accurate, overarching evaluation of one's self in the various facets of life. But since 1980 there is a growing interest in the multi-dimensionality of the self-concept (Byrne, 1996; Butler & Gasson, 2005), referring to the construct of multiple, relatively distinct domain-specific self-concepts or self-perceived competencies related to significant aspects of life, and a separate facet of global self-worth that refers to how much one likes oneself as a person (e.g., Byrne, 1996; Harter, 1998).

Harter (2006) cites considerable literature revealing that it is one of the critical developmental tasks in adolescence to construct a proliferation of context-specific selves which emerge under the influence of cognitive-developmental advances and socialization pressures. These selves vary across social roles and relationships and include selves developed through contact with meaningful adults, primarily the parents but also others such as teachers, and selves developed through contact with male and female peers. Evidence suggests that support especially from peers in the public domain, such as classmates, is predictive of global self-worth, i.e. far more predictive than support from close friends. According to Harter (1999) the former better represents approval from a more objective, generalized Other than the approval from close friends, which is more subjective. Harter, Marold and Whitesell (1992) have revealed the existence of two clusters of self-perceived competence and support that impact global self-worth. One cluster which

comprises self-perceived physical appearance and social acceptance in particular but also athletic competence is more strongly related to peer support than to parental support. The other comprises scholastic competence and behavioural conduct and is more strongly related to parental approval. Perceived inadequacies in both the peer-salient and the parent-salient cluster have been found to be particularly powerful predictors of low global self-worth, negative affect and depressive reactions (Harter & Whitesell, 1996).

Like adolescents of other minority groups, deaf young people are confronted with the challenge of coping with multiple worlds and of moving between multiple socio-cultural contexts (e.g., see Harter, 2006). In addition, communication problems may hinder them in developing a firm social network outside their family, which is regarded as one of the key resources for support and coping with stress for deaf adolescents (Calderon & Greenberg, 2003). Consequently one would expect that the development of a sense of competence in the peer-salient social domains which may affect global self-worth is particularly complicated for deaf adolescents in the process of individuation.

However, findings from research comparing self-concept in deaf children and hearing peers are ambiguous. Some studies reported lower levels of self-esteem in hearing-impaired children and young people than in their hearing peers (Loeb & Sarigiani, 1986; Tambs, 2004; Weisel & Kamara, 2005), but other studies did not (Koelle & Convey, 1982; Cates, 1991; Kluwin, 1999). The divergent results may reflect differences between samples of deaf children with regard to deafness and context related factors that are associated with self-esteem. These associations have been the subject of much research.

Associations between contextual or deafness-related variables and self-concept.

To date, most studies on self-concept among deaf children and adolescents have focused on associations of self-esteem with the deafness-related factors and contextual factors such as a preference for a deaf or hearing acculturation style, communication with parents and regular versus special school for deaf students. Associations with multidimensional aspects of self-concept have barely been addressed.

Conflicting results have been reported in regard to the deafness-related factors degree of deafness (Beck, 1988; Jambor & Elliot, 2005; Van Gurp, 2001; Weisel & Kamara, 2005), and time of onset (Loeb & Sarigiani, 1986; Warren & Hasenstab, 1986; Weisel & Kamara, 2005). While non-syndromal genetic deafness has been associated with a better psycho-social adaptation and communicative attunement between parents and child (e.g., Marschark, 1993; Bat-Chava, 1993; Hindley & Van Gent, 2002) than other causes of deafness, i.e. acquired (viral infections, prematurity, rhesus antagonism, meningitis etc.) or syndromal genetic (hereditary deafness accompanied by other physical abnormalities), we could not find any study on the association between self-concept and cause of deafness. More consistent findings have been reported on the association between the contextual factors deaf or hearing acculturation style and communication with parents and self-esteem. As deaf people participate in both the deaf minority culture and the hearing majority culture around them, a certain amount of identification with and acculturation into each culture will result. Two studies found positive associations between aspects of identification with the Deaf community (e.g., preference for sign language, having primarily deaf friends, involvement with the community) and self-esteem (Bat-Chava, 2000; Jambor & Elliot, 2005). Hintermair (2008) and Maxwell-McCaw (2001) and found that a marginal acculturation style, i.e. lacking the anchor of a positive preference for either a deaf, a hearing or a bicultural way of life, was linked to lower self-esteem. In accordance with the premise that signing better fulfills basic visual needs and the visual-spatial experience of deaf children, good parental signing proficiency has been associated with higher levels of self-esteem in the child, regardless of parental hearing status (Bat-Chava, 1993; Desselle, 1994). In line with these findings, satisfaction with home communication has been positively associated with both self-perceived scholastic and social competence, and marginally to global self-esteem (Leigh, Maxwell-McCaw, Bat-Chava & Christiansen, 2009). Studies of the association between the contextual factor type of school and self-esteem have yielded more inconsistent findings. A number of researchers (e.g., Farrugia & Austin, 1989; Musselman, Mootilal, & MacKay, 1996; Weisel & Kamara, 2005) have addressed the hypothesis that attending regular school settings is associated with the experience of insecurity

and loneliness, social rejection and low self-esteem in deaf students as compared to attending a special school for the deaf. Indeed, in one multidimensional study higher levels of global self-esteem and more positive self-perceptions in the domains of physical appearance and peer relations were found in moderately to profoundly hearing-impaired adolescents of normal intelligence who attended a special, i.e. a segregated, residential school setting, as compared to peers in more integrated school settings (Van Gorp, 2001). However, other studies reported reverse findings: higher levels of global and domain specific self-perceptions were observed in samples of mainstreamed deaf adolescents irrespective of the use of a cochlear implant (Leigh et al., 2009), mainstreamed hard-of-hearing students (Mejstad, Heiling, & Svedin, 2009), or in younger hearing-impaired children (Keilman, Limberger, & Mann, 2007). Yet another group of studies could not confirm an association between the type of school setting and self-esteem (Bat-Chava, 1993; Kluwin et al., 2002; Jambor & Elliot, 2005).

The I-self

McAdams (1998) argued that the I-self may be viewed as the process of synthesizing subjective experience, conceptualized as the ego in Loevinger's model of ego development (Loevinger, 1976). Ego development may be portrayed as a series of changes in social-cognitive maturation along lines of impulse control, complexity of self reflection, interpersonal relations and conscious preoccupations (Recklitis & Noam, 2004). The level of ego development has proved to be relevant to a wide variety of psychological issues in the adolescent period (see Westenberg, Blasi, & Cohn, 1998).

On the basis of their study of ego development in a representative sample of over 2500 children and adolescents, Westenberg, Jonckheer, Treffers and Drewes (1998) provided descriptions of the first four ego levels that represent the stages of ego development found between late childhood and late adolescence: the impulsive, self-protective, conformist and self-aware ego levels. The *Impulsive* level is characterized as a combination of impulsivity, vulnerability, and dependency. Impulsive individuals are very dependent on direct care, guidance and protection by their caretakers, and attach importance to physical strength,

both within themselves and in their caretakers. The keyword at the *Self-protective* level is 'control'. Manipulation of one's own feelings (e.g., denial of pain or hurt feelings or of problems in general) is typical as an interpersonal style characterized by manipulative, opportunistic or hostile qualities. In contrast, *Conformist* individuals are socially attuned and will try to meet the demands of their reference group, in terms of the right opinions, correct behaviour, desired appearance, and expected level of performance. The dominant characteristic of the fourth stage, *Self-Aware*, is that the person has begun to recognize that not everyone, including possibly him/herself, conforms to the previously simple role-related stereotypes. Alternative possibilities are discovered and explored that were previously out of bounds for the Conformist.

There are substantial individual differences in the speed and timing of the developmental steps, partly related to differences in genetic and socialization factors, parental support, events such as exposure to a different or widening social context, and cognitive abilities (e.g., Dubow, Huesmann, & Eron, 1987; Newman, Tellegen & Bouchard, 1998). We are not aware of studies that have examined ego development levels and their correlates in a deaf population. We would expect to find a lower mean level of ego development in deaf adolescents as it is rather likely that they have had difficulties with socialization and with obtaining support from their parents because of a limited shared communication mode with hearing significant others (e.g., Vaccari & Marschark, 1997; Wallis, Musselman & MacKay, 2004).

Moreover, the challenge of getting access to a broader social context might be hindered due to either restricted opportunities of getting access to outside activities in the case of segregated, residential placement (Musselman et al., 1996) or considerable communicative differences with less familiar and predominantly hearing others in new socio-cultural environments. Therefore, one might expect to find lower levels of ego development in subgroups of deaf adolescents as compared to hearing peers of the same age.

The current study

The current study compares domain-specific self-perceptions and global self-

worth in deaf adolescents with those of hearing peers. We expected discrepancies between deaf and hearing adolescents to occur primarily in the social domains of self-perception. Novel in this field is the study of ego development in deaf adolescents, both as a related aspect of self and as an index of psychosocial maturity. Levels of ego development in deaf adolescents are compared to those in hearing peers. We expected to find a preponderance of lower ego levels in the deaf sample based on the assumption that most deaf children and adolescents are still growing up under often less favourable environmental conditions which may hinder social, emotional and cognitive development (e.g., Calderon & Greenberg, 2003; Hauser & Marschark, 2008).

In addition, we examined deafness-related variables including degree and cause of deafness and (past) neurological disorders, and the contextual variables place of residence, type of school, parental support for signing during childhood, quality of communication between parents and child as currently experienced by both, and preferential aspects of identification with deaf people. We explored whether these are associated with self-esteem or ego development. We also considered whether one or more of these variables incrementally predict self-esteem or ego development, beyond the variance accounted for by socio-demographic variables (i.e. age, gender, IQ and parental SES).

Finally, this is the first study on deaf adolescents to explore profiles of self-concept in the peer-salient social domains of physical appearance, social acceptance and athletic competence, and associations of these profiles with global self-worth, ego development, deafness- and contextual variables.

Method

Participants

Participants in the study were recruited from the total secondary school population of a large organization for deaf children and adolescents in the Netherlands which offers both special education with or without residential facilities, and educational counselling facilities for deaf children and adolescents who are integrated into ordinary schools (for details of the sampling and data collection procedure see Van Gent, Goedhart, Hindley & Treffers, 2007).

Table 1.
Socio-Demographic and Deafness Related Characteristics

Socio-Demographic Characteristic	N	%	Deafness Related Characteristic	N	%
<i>Age</i>			<i>Degree of deafness^{a b}</i>		
Mean 16.5 years; SD 1,8			73-95 dB or Cochlear Implant (N=3)	16	25
Range 13-21 years			≥96 dB	49	75
<i>Gender</i>			<i>Cause of deafness</i>		
Boy	31	46	Hereditary, non-syndromal	19	28
Girl	37	54	Acquired or syndromal	27	39
<i>Performance IQ^b</i>			Unknown	22	32
Mean 109.8; SD 13.2			<i>History of neurological disorders^c</i>		
<i>Ethnicity</i>			None	44	65
Dutch	50	73	One or more	24	35
Other (Turkish/Moroccan/other)	18	26	<i>Place of residence</i>		
<i>Highest educational level parents</i>			Residential setting	26	38
Low	21	31	Parental home	42	62
Middle	18	26	<i>Type of school</i>		
High	21	31	Special school for the deaf	50	74
Unknown	8	12	Ordinary school	18	26
<i>Family Composition</i>					
Two biological parents	49	72			
Other	19	28			

Note. ^a Deafness can be functionally defined as the permanent bilateral severe to profound lack of hearing speech and other sounds, and quantified as the unaided average hearing impairment for the better ear of more than 70 decibels (dB) according to the available audiological information. ^b Missing quantitative data with 1-3 cases.. ^c Cases for which specialist medical care had been provided in the past. The first category of all categorical variables is coded as 0, the next as 1, etc.

The content of educational programs is much the same throughout The Netherlands, the only difference being their location. The sample (N=94) may be regarded as representative of the population of deaf adolescents of normal intelligence in the Netherlands. We obtained informed consent from 70 of the 94 students (74%) and their parents. The final sample consists of 68 students because the self-concept measure was missing for two of the students due to scheduling problems. Permission to use information from their school file was obtained from 18 of the 24 non-respondents. The non-respondents were significantly older, showed a lower mean IQ and were more likely to have psychosocial stressors (e.g., family conflicts, penal violation, or sexual abuse). Table 1 shows descriptive statistics of demographic and deafness-related characteristics of the participants.

Measures

Self-concept. Self-concept was assessed with the Dutch language version (Treffers et al., 2002) of the Self-Perception Profile for Adolescents (SPPA; Harter, 1988). Because of socio-cultural differences between the United States and the Netherlands/Flemish Belgium, the Dutch language version measures self-perceived competence on six specific domains of life, i.e. Scholastic Competence, Social Acceptance, Athletic Competence, Physical Appearance, Behavioural Conduct, and Close Friendships as well as self-perceived general competence, i.e. Global Self-worth. Each subscale contains 5 items. Each item comprises descriptions of two different kinds of teenagers. The adolescent is first asked to decide which of the two is most like him- or herself, for example (from the adapted Dutch deaf version): 'Some young people have many friends' BUT 'Other young people do not have many friends' (Social Acceptance) and 'Some teenagers are happy with themselves most of the time' BUT 'Other teenagers are not very happy with themselves' (Global Self-worth). The adolescent is then asked to indicate the degree to which he or she is like the chosen description by choosing one of the following options: 'Is completely like me' OR 'Is a little like me'. Answers are scored from 1 to 4, with 4 representing higher self-concept, according to the choices the adolescent has made. For example, the score 1 is assigned when 'Some teenagers have many friends' and 'Is completely like me' were chosen. The score 2 is assigned

when 'Other teenagers have many friends' and 'Is a little like me' were chosen, and so forth.

The internal consistency of the scales in the Dutch norm group ranged from $\alpha=.65$ (Scholastic Competence) to $\alpha=.88$ (Athletic Competence); the 3-5 week test-retest correlations ranged from .72 (Global Self-worth) to .87 (Athletic Competence). A team of deaf and hearing professionals, all fluently signing and experienced in working with deaf adolescents, adapted the Dutch version of the tool by minimizing metaphoric language and difficult words. In the current sample, we found internal consistencies below 0.70 with the subscales Scholastic Competence ($\alpha=.58$) and Behavioral Conduct ($\alpha=.64$); the highest internal consistency ($\alpha=.73$) was found with Physical Appearance and Global Self-Worth; for Social Acceptance .72 was found, and for both Athletic Competence and Close Friendships .71. The inter-correlations of the SPPA-scales were comparable with the inter-correlations found in the Dutch norm group, except for Social Acceptance and Close Friendship that showed lower correlations with the remaining scales. Physical Appearance showed the strongest correlation with Global Self-worth, as was also found in the Dutch norm group. With respect to the validity of the SPPA competence scales, we examined correlations of these scales with competence items from the Child Behaviour Checklist (CBCL; Achenbach, 1991a; Verhulst, Van der Ende & Koot, 1997a) that were reported by 47 parents. Significant Spearman correlations were found between Social Acceptance and competence item 'number of friends' ($r=.36$, $n=47$, $p<0.05$), and between Close Friendship and 'contacts with friends' ($r=.33$, $n=47$, $p<0.05$). In addition, we found significant correlations of Scholastic Competence with the sum of the items assessing current academic performance ($r=.38$, $n=41$, $p<0.05$) and with the adaptive functioning item 'how much is he/she learning?' ($r=.29$, $n=66$, $p<0.05$) from the Teacher's Report Form (TRF; Achenbach, 1991b; Verhulst, Van der Ende & Koot, 1997b). The Lonely scale of the Semi-structured Clinical Interview for Children and Adolescents (SCICA; McConaughy & Achenbach, 1994; Kasius, 1997), showed negative correlations with Close Friendship ($r=-.26$, $n=68$, $p<0.05$) and Physical Appearance ($r=-.23$, $n=68$, $p<0.05$). Negative Spearman correlations were also found between Athletic Competence and total number of (past) physical disorders ($r=-.24$, $p<0.05$) and history of neurological disorders ($r=-.30$, $p<0.05$).

Ego Development. The level of ego development was assessed using the Sentence Completion Test for Children and Youths (SCT-Y; Westenberg et al., 2000). The SCT-Y is the Dutch version of the Washington University Sentence Completion Test (WUSCT; Hy & Loevinger, 1996; Loevinger, 1998), specifically constructed for use with children over 8 years of age and adolescents. The SCT-Y consists of 32 sentence stems, for example 'School...', 'My biggest problem is...', and 'A good father...'. The respondent is instructed to 'complete the following sentences in any way that you wish'. Responses to sentence items are scored for ego level, i.e. from 2 (impulsive) to 5 (self-aware), using the published manual. Item scores were used to compute the Total Protocol Rating (TPR) and the Ego Level Score (ELS). The TPR reflects the respondent's core ego level, e.g., impulsive, self-protective, conformist, or self-aware. This rating was obtained by matching the respondent frequency distribution of ratings for each item with the prototypical frequency distribution described in the manual. The ELS is computed as the sum of the scores of the 32 items. Consistent with the requirement that the SCT-Y should tap a one-dimensional construct, the items of the SCT-Y represent a 1-factor structure (Westenberg et al., 2000). In the current study two psychologists who were trained in scoring the SCT-Y, scored the ego levels of 18 randomly selected participants independently. The interrater-agreement on TPR was excellent ($\kappa = 1.0$), which is in line with findings in other studies (e.g., Westenberg, Drewes, Goedhart, Siebelink, & Treffers, 2004). The remaining 52 participants were scored by one of them.

In support of the validity of the SCT-Y in the present study, the product-moment correlation between performance IQ and ELS ($r = .28$, $p < 0.05$) was nearly equal to the corresponding average correlation ($r = .29$) found in the meta-analysis of Cohen & Westenberg (2004). As in previous studies (see Westenberg et al., 2000), we found a higher ELS score for girls ($t(66df) = 2.14$, $p < 0.05$) and a positive Spearman correlation with the level of parental education (available for 60 participants: $r = .33$, $p < 0.05$).

IQ. In accordance with contemporary practice in testing the intelligence of deaf adolescents in the Netherlands, Wechsler performance scales from the Dutch version of the WISC-R (De Bruyn, Vander Steene, & Van Haasen, 1986) were used with most participants in this study.

Support for Signing, Parent-Child Communication and Identification with Deaf People. Items from the Deaf Young People's Guided Interview Schedule and the Parents' Guided Interview Schedule (Gregory, Bishop & Sheldon, 1995) were used to measure the constructs *Support for Signing in Childhood (SSC)*, *Quality of Parent-Child Communication as currently perceived by both parents and adolescents (QPCC)*, and *Identification with the Deaf People (IDP)*. Responses on the selected questions were coded 1 if indicative or 0 if not indicative. See Appendix for the indicative responses of Support for Signing during Childhood (5 items), Quality of Parent-Child Communication (6 items) and preferential aspects of Identification with Deaf People (5 items). Missing items (answers such as 'don't know', or 'other') were replaced by the rounded mean score of the non-missing items of the scale. As at most two missing values were allowed, Support for Signing in Childhood and Quality of Parent-Child Communication were missing from one participant, Identification with Deaf People from two participants. Coefficient alpha of the scales were Support for Signing in Childhood: .74; Quality of Parent-Child Communication: .64; Identification with Deaf People: .66.

We found positive Spearman correlations of SSC with QPCC and IDP and a negative correlation between QPCC and IDP (see Table 3). In addition, we found a positive correlation of Quality of Parent-Child Communication (QPCC) with two variables that are negatively related to IDP, type of school and communication mode, indicating that a higher level of QPCC was found with adolescents attending a regular school and with adolescents using spoken language. The negative correlation of QPCC with family composition indicates a lower level of QPCC for adolescents growing up in one-parent families. Multiple regression analysis revealed unique contributions of SSC, IDP and family composition to the prediction of QPCC. These findings lend support to the validity of these measures because they are in line with results of previous studies indicating that (1) early adaptation to visual communicative needs of a deaf child promotes parent-child communication and social interaction (e.g., Marshark, 2007), (2) deaf cultural preferences are negatively associated with the quality of parent-child communication (Leigh et al., 2009), and (3) parental distress, such as the experience of a lack of social support, is a significant source of negative parent-

child interaction (e.g., Calderon & Greenberg, 1999). Finally it may be noted that Identification with Deaf People was more likely with adolescents at special schools or in a residential setting than among those attending ordinary schools or living with their parents.

Procedures

At the start of the each individual assessment session, the participants were consulted to determine their preferred mode of communication with the interviewer, i.e. sign language (Nederlandse GebarenTaal, NGT), sign supported Dutch (Nederlands ondersteund Met Gebaren, NMG) or spoken Dutch, and to decide on the assistance of a professional interpreter (in NGT or NMG). The Gregory's interviews with parents and with adolescents were conducted by a child psychologist. The intelligence of the participants was tested by a psychologist. The preferred mode of communication was recorded as oral communication or signing + (i.e. use of signing and/or speech and speech reading depending on their conversation partners).

The psychologist or the psychiatrist who also conducted a diagnostic interview with the participants assisted with the completion of both the SPPA and the SCT-Y. The participants had ample opportunity to receive instructions on completing the SPPA and the SCT-Y. They were urged to get additional clarification in their preferred mode of communication and in line with the instructions of the manual before completing the questionnaires.

Data analysis

Statistical analyses were performed using SPSS Version 18.0 for Windows. To test the independent contribution of deafness-related or context variables to the prediction of Global Self-worth and Ego Level Score, we performed hierarchical multiple regression, entering first a block of social-demographic characteristics (age, gender, IQ, ethnicity and parental SES), followed by those deafness-related and context variables that showed significant associations with Global Self-worth and Ego Level Score, respectively. Predictors were standardized to remove any collinearity that involves the intercept. All models were evaluated for multivariate

outliers, using the SPSS default value for standardized residuals as cut-off for removing them.

Cluster analysis with the SPPA-scales Social Acceptance, Athletic Competence and Physical Appearance, was performed using the two-step procedure as suggested by Clatworthy, Hankins, Buick, Weinman, & Horne (2007). In the first step, Ward's hierarchical clustering procedure was applied based on squared Euclidian distances between cases on each clustering variable. A relative large increase in the cluster agglomeration coefficient was used as a criterion to select a solution (this procedure is equivalent to the inspection of the plot of eigenvalues in factor analysis). In the second step, a non-hierarchical K-means cluster analysis was conducted with the centroids from Ward's method solution used as the seed points. The K-means procedure was done as an independent check on the stability of the cluster structure and as a way of optimizing cluster membership.

Results

Differences in self-concept and ego development with Hearing Adolescents

As gender and educational level were associated with most SPPA-scales in the Dutch norm group (Treffers et al., 2002), boys (N=219) and girls (N=380) with a comparable educational level who were part of the Dutch norm group were selected for the hearing comparison group. We used the means and standard deviations on the SPPA-scales of the boys and girls of the comparison group to compute T-scores for boys and girls separately (for the boys and girls of the comparison group, the mean T-score is 50, standard deviation is 10). Means and standard deviations of the T-scores on the SPPA-scales of the deaf adolescents are presented in Table 2. One-sample t-tests showed that the mean T-scores in our study sample were significantly lower than 50 for Social Acceptance and Close Friendship and significantly higher than 50 for Physical Appearance. It may be noted that the mean score on the three social competence scales (Social Acceptance, Physical Appearance and Athletic Competence) is 49.9, i.e. about the same as the mean of hearing adolescents. The mean T-score of Global Self-worth and the remaining competence scales were not different from 50.

The observed prevalence of the stages in the current sample was compared to the prevalence of the corresponding stages in hearing boys and girls between the ages of 13 and 15 years, as documented in the Dutch manual (Westenberg et al., 2000). Using the chi-square test we found a significant difference between the distributions of the levels of ego development, i.e. the observed prevalence of the impulsive and self-protective stages in the current sample of deaf adolescents was higher than the expected prevalence (i.e. the prevalence with hearing young adolescents), the observed prevalence of the conformist and self-aware stages was lower (see Table 2).

Table 2.

Mean (SD) T-Scores of Perceived Competence Scales (SPPA-scales) and Observed and Expected Prevalence (Percentage) of Stages of Ego Development (TPR)

	SPPA-scales		Ego Development (TPR)		
	Mean T-score (SD)	t (67 df) ^a	Observed (%)	Expected (%)	χ^2 (3 df) ^b
SPPA-scales					
Scholastic Competence	51.7 (9.2)	1.53			
Social Acceptance	45.1 (10.7)	-3.75***			
Athletic Competence	52.2 (9.5)	1.88			
Physical Appearance	52.3 (8.8)	2.16*			
Behavioral Conduct	49.9 (9.9)	-0.06			
Close Friendships	45.9 (13.0)	-2.62 *			
Global Self-Worth	48.0 (9.6)	-1.75			
Stages Ego Development					58.64***
Impulsive			16 (24%)	3.4 (5%)	
Self-protective			31 (46%)	27.2 (40%)	
Conformist			20 (29%)	34.0 (50%)	
Self-aware			1 (1%)	3.4 (5%)	

Note. TPR=Total Protocol Rating. ^a One-sample t-test of mean=50; . ^b One-sample chi-square test of difference between observed and expected prevalence of the stages of ego development; *, p<0.05; **, p<0.01; ***, p<0.001.

Table 3.
Intercorrelations Among Study Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1. Gender	-																			
2. Age	-.12	-																		
3. Performance IQ	-.15	.04	-																	
4. Ethnicity	-.12	.11	-.28 ¹	-																
5. Parental Educ. Level	.08	-.10	.06	-.32 ¹	-															
6. Family Composition	.11	.02	-.29 ¹	.07	.18	-														
7. Degree of deafness	.12	-.01	.05	-.21	-.13	-.10	-													
8. Cause of deafness	-.02	.12	-.08	.12	.26	.10	-.02	-												
9. History of neur. dis.	.06	.00	-.15	-.16	.08	.09	.05	.47 ²	-											
10. Place of residence	-.25 ¹	.36 ²	-.07	.21	-.25	-.02	-.08	.03	-.07	-										
11. Type of school	.15	-.20	.39 ³	-.28 ¹	.35 ²	-.23	.06	-.07	-.03	-.48 ³	-									
12. SSC	-.03	.13	-.12	-.03	-.07	-.08	.01	-.13	.05	-.01	-.07	-								
13. QPCC	-.12	-.04	.14	-.16	.19	-.29 ¹	.06	.08	.04	-.11	.43 ³	.32 ¹	-							
14. IDP	.03	.38 ²	-.15	.20	-.33 ¹	.03	.04	-.07	-.09	.40 ³	-.66 ³	.33 ¹	-.27 ¹	-						
15. Social Acceptance	.01	-.07	-.20	.25 ¹	.05	.22	.06	-.24	-.12	.25 ¹	-.28 ¹	.22	-.09	.25 ¹	-					
16. Athletic Competence	.24 ¹	-.12	-.02	.08	.01	-.21	-.17	-.25	-.30 ¹	-.05	.07	.11	-.05	-.07	-.01	-				
17. Physical Appearance	.05	-.03	.14	-.02	.06	.04	-.07	.05	-.10	.14	.26 ³	.19	.20	-.01	.20	-.28	-			
18. Global Self-worth	.03	-.10	.21	-.19	-.14	-.15	.02	-.06	.04	.05	.22	.32 ¹	.27 ¹	.07	.08	.20	.54 ²	-		
19. Ego Level Score	.24 ¹	.02	.28 ¹	-.13	.33 ¹	.04	-.09	.20	.06	-.29	.65 ³	-.17	.23	-.43 ²	-.18	-.22	.17	-.02	-	

Note. SSC=Support for Signing in Childhood; QPCC=Quality of Parent-Child Communication; IDP=Identification with Deaf People. ¹: p<0.05; ²: p<0.01; ³: p<0.001 (2-tailed significance levels).

Inter-correlations of study variables

Spearman correlations of demographic, deafness-related and contextual variables, the SPPA social competence scales, Global Self-worth and Ego Level Score are presented in Table 3. It may be noted that no association was found between Global Self-worth and Ego Level Score, and that both variables were associated with different contextual variables. A higher level of Global Self-worth was associated with more Support for Signing in Childhood (SSC) and a better Quality of Parent-Child Communication (QPCC). Higher levels of Ego Level Scores were found among girls, among participants with a higher IQ, with parents of a higher educational level, among participants attending an ordinary school and among participants having a lower Identification with Deaf People. In addition, we explored the associations of respondent's actual preference for signing with Global Self-Worth, SSC and QPCC. These associations were not significant. Instead, the actual preference for signing was negatively associated with type of school (i.e. preference for speech when attending regular school) and Ego Level Scores (Spearman's $r = -.57$ and $-.41$ respectively).

Unique contributions of contextual variables in predicting Global Self-worth and Ego Level Score

Hierarchical multiple regression analyses were used to examine whether contextual variables that were significantly associated with Global Self-worth and Ego Level Score respectively, predicted these variables, over and above the socio-demographic characteristics age, gender, IQ, and parental educational level as a measure of socio-economic status (SES). The results of these analyses indicated that Support for Signing in Childhood and Quality of Parent-Child Communication significantly increased the prediction of Global Self-worth, while type of school significantly increased the prediction of Ego Level Score (see Table 4).

Table 4.

Standardized Regression Coefficients for Hierarchical Regression Analyses Predicting Global Self-worth and Ego Level Score.

Predictors	Global Self-worth ¹		Ego Level Score ²	
	Step 1 β	Step 2 β	Step 1 β	Step 2 β
Step 1				
Gender	.12	.18	.30*	.21*
Age	-.16	-.16	.05	.16
IQ	.31*	.27*	.27*	.02
Parental Educational Level	-.20	-.24*	.27*	.06
Step 2				
SSC		.24*		
QPCC		.32*		
IDP				-.12
Type of school#				.62***
R ²	.15	.36	.25	.59
R ² Δ	.15	.21	.25	.34
F Δ	2.56*	9.21***	4.84**	23.51***
Df	4.59	2.57	4.59	2.57

Note. β = standardized beta reflects association of dependent variable with predictor, with simultaneous control of all predictors in the same step. ¹: three outliers were removed from the model; ²: two outliers were removed from the model. SSC=Support for Signing in Childhood; QPCC= Quality of Parent-Child Communication; IDP= Identification with Deaf People. #: codes: 0=special school for the deaf, 1=regular school. *: p<0.05; **: p<0.01; ***: p<0.001.

Social Competence Profiles

Cluster analysis was conducted on the three SPPA-scales indicating social competence (see Harter et al., 1992), i.e. Social Acceptance, Physical Appearance and Athletic Competence, to find groups with similar social competence profiles. In the first step, the clustering agglomeration coefficient indicated three-cluster solutions as rather large increases were found in going from three clusters to two, whereas the increase from four to three clusters was essentially the same as the increase from five to four clusters (the 5 largest coefficients were 201, 148, 112, 95, and 80). In the second step, the centroids of the three-cluster solution were used as seed points for the K-means procedure.

The first cluster consisted of 30 adolescents, who scored high on the three social competence scales (see Table 5). This profile was labelled 'high' social competence. In the second cluster there were 25 adolescents, whose scores on the social competence scales were uniformly low. This profile was labelled 'low' social competence. The third cluster consisted of 13 adolescents who reported a particularly low level of Social Acceptance, a mean level of Athletic Competence and a relatively high level of Physical Appearance. This profile was labelled 'mixed' social competence. Girls and boys were evenly distributed in the clusters; the mean age of the clusters was about the same.

Analyses of variance with social competence profile as the independent measure and the continuous study variables as the dependent measure were used to examine linear and quadratic trends. Chi-square tests were used to investigate the association of the clusters with the categorical variables history of neurological disorder(s) and type of school that were found to be associated with one of the three social competence domains (see Table 3).

As shown in Table 5, adolescents with high or low social competence profiles reported higher or lower levels, respectively, on all remaining SPPA scales, except Scholastic Competence. Adolescents with a mixed profile reported a very low level of Close Friendship, but a high level of Behavioural Conduct and a relatively normal level of Global Self-worth.

Table 5.

Means and Standard Deviations of Continuous Study Variables and Frequencies and Percentage of Categorical Study Variables for Social Competence Clusters, and Associations of Study Variables with Social Competence Clusters.

	Mean (SD) or Number (row %)			Trend Analysis		
	Low SC (n=25)	Mixed SC ^a (n=13)	High SC (n=30)	Limear F(1,65)	Quadratic F(1,65)	χ^2 (2df)
Scholastic Competence	50.8 (8.9)	48.9 (8.7)	53.6 (9.4)	1.41	1.36	
Social Acceptance	44.4 (8.1)	30.5 (7.6)	52.1 (6.2)	18.14***	62.95***	
Athletic Competence	46.5 (6.0)	51.8 (11.4)	57.1 (8.6)	21.98***	0.00	
Physical Appearance	44.0 (4.7)	55.6 (6.0)	57.7 (7.0)	68.12***	6.38*	
Behavioral Conduct	46.8 (11.3)	56.0 (9.3)	49.9 (7.7)	1.26	6.93*	
Close Friendships	42.7 (12.5)	37.6 (17.3)	52.1 (7.6)	9.29**	7.34**	
Global Self-Worth	43.8 (8.4)	49.8 (10.7)	50.7 (9.1)	7.86**	0.87	
Ego Level Score	103.1 (10.5)	115.9 (16.2)	100.8 (15.0)	0.56	10.75**	
SSC	1.9 (1.7)	1.8 (1.3)	2.8 (1.7)	4.35*	1.08	
QPCC	3.8 (1.8)	4.8 (1.4)	4.0 (1.8)	0.28	2.83	
IDP	2.8 (1.5)	1.7 (2.0)	3.1 (1.4)	0.42	5.90*	
History of neurological disorders						8.29*
- None	13 (30%)	6 (14%)	25 (57%)			
- One or more	12 (50%)	7 (29%)	5 (21%)			
Type of school						18.04**
- Special school for the deaf	21 (42%)	4 (8%)	25 (50%)			
- Ordinary school	4 (22%)	9 (50%)	5 (28%)			

Note: ^a: Mixed SC= Low Social Acceptance and High Physical Appearance; SSC=Support for Signing in Childhood; QPCC= Quality of Parent-Child Communication; IDP= Identification with Deaf People. *: p<0.05; **: p<0.01; *** p<0.001

The quadratic trends found with Ego Level Score and Identification with Deaf People indicated that the 'mixed' cluster showed higher mean scores on Ego Level Score and a lower mean score on Identification with Deaf People. As indicated by the significant linear trend, a higher level of Support for Signing in Childhood was associated with high social competence. The chi-square analyses showed significant associations of the social competence profiles with a history of neurological disorder(s) and type of school. More specifically: the percentage of adolescents with a history of neurological disorder(s) was lowest in the high social competence profile, and the percentage of adolescents attending an ordinary school was highest in the 'mixed' profile.

Discussion

The goal of this study was to examine self-concept and ego development in deaf adolescents by (1) comparing the levels of both aspects of self with the levels found in hearing norm groups, (2) identifying profiles of peer-related social competence in deaf adolescents, and (3) examining the associations of social competence profiles with global self-worth, ego development, deafness-related and contextual variables.

Deaf adolescents reported lower Social Acceptance and Close Friendship scores and higher Physical Appearance scores as compared to hearing peers from the norm group with a comparable educational level. These findings confirm and extend the evidence from the comparative and multidimensional study by Capelli et al. (1995) showing that younger deaf children primarily experience self-concept problems in the social domains. As no difference was found for Global Self-worth in the whole sample, it may be hypothesized - in line with the theory of Harter (1999) - that a number of adolescents in this sample were able to discount the importance of social acceptance and close friendships, i.e. they decreased the relevance of the domains they did not feel competent in, in order to maintain a positive sense of Global Self-worth. At the same time, discounting often accompanies the endorsement of those domains in which one feels most competent, even with the tendency to inflate one's sense of competence, particularly in young people with higher self-worth (Harter, 1986). The finding of a higher mean score for Physical

Appearance suggests that - at least in this sample - self-enhancement strategies operated especially within the domain of Physical Appearance, the domain most highly correlated with Global Self-worth across studies (Harter, 1999).

In line with our expectations, this study found a much higher percentage of deaf adolescents at lower, pre-conformist stages of ego development than the expected percentage of hearing peers. We suggest that lower levels of ego development must be expected because deaf youth today often grow up under less favourable environmental conditions which may hinder social, emotional and cognitive development. The finding of a strong association between ego development and type of school, even after taking gender, age, IQ and parental educational level into consideration, suggests that a special school for the deaf may offer less favourable environmental conditions. However, in this study we did not examine language ability in signed or spoken language. As language ability may be associated with both the type of school and with ego development it may partly explain the correlation found between type of school and ego development. Nevertheless, this finding corresponds to previous studies indicating that, besides genetic and socialization factors, cognitive abilities, parental support, exposure to a different or widening social context contribute to ego development (e.g., Dubow et al., 1987; Newman et al., 1998). The percentage of participants in the (post) conformist stages (89%) was even higher among the subgroup of deaf adolescents attending ordinary school than the corresponding percentage (75%) among hearing adolescents of the same age. In contrast, 90% of the adolescents attending a special school were in the pre-conformist stages. However, this large difference not only reflects the influence of the social context. The adolescents attending an ordinary school were significantly more often female, had a higher IQ, were less often immigrants, and more often had parents with a higher educational level (see Table 3). Given the importance of ego development, i.e. the importance of changes along lines of impulse control, complexity of self reflection and interpersonal style (Recklitis & Noam, 2004), further differentiated and longitudinal studies are needed to reveal those factors which may constitute a testable focus for interventions contributing to progression in ego development. For instance, the presence of behavioral problems could be one of the inhibiting factors. Deaf students with behavioral problems are more

likely to be referred to a special school (Lynas, 1995; Van Gent et al, 2007), and evidence suggests that behavioral problems occurring in early adolescence hinder the attainment of the conformist level of ego development in adolescents at pre-conformist ego levels (Krettenauer, Ulrich, Hofman, & Edelstein, 2003).

Support for Signing during Childhood (SSC) and Quality of Parent-Child Communication (QPCC) predicted Global Self-worth level beyond the variance explained by IQ and parental educational level in this sample. This finding fits with Harter's (1999) theory that positive self-worth is strongly dependent on the level of support from meaningful others, and corroborates previous studies which showed that both visual linguistic support (Bat-Chava, 1993; Desselle, 1994) and satisfactory communication at home (Leigh et al., 2009) are seen as predictors of self-esteem. Neither Global Self-worth nor satisfaction with communication at home was associated with the adolescents' communication mode. This is in line with the finding in other studies (Van Gurp, 2001; Weisel & Kamara, 2005) of no association between Global Self-worth and the preference for either signed or spoken language by deaf adolescents and young adults themselves.

Based on the broadly accepted view that communicative barriers in a hearing world especially affect social well-being and self-concept in social interactions (e.g., Calderon & Greenberg, 2003; Oblowitz, Green & Heyns, 1991; Schlesinger & Meadow, 1972), cluster analyses were performed on three competence domains indicating peer related social competence, i.e. Social Acceptance, Physical Appearance and Athletic Competence. Similar to results of other cluster analyses (i.e. Salmivalli, 1998), high and low social competence profiles were found, showing high and low scores in these three domains, respectively. Our cluster analysis also identified a mixed profile, characterized by a very low score on Social Acceptance and a high score on Physical Appearance.

Membership of the low social competence cluster was associated with low self-perceived competence in most other domains except the parent-related domain of Scholastic Competence. This suggests not only that the adolescents in this cluster feel inadequate in these domains, but also that they cannot discount the importance of these domains, and that they cannot escape from their unfavourable circumstances. This might put them at an increased risk of developing depressed

affect and anger as suggested by Harter (1999), and indicates the need for support from parents and others. Many adolescents in this cluster had a history of neurological disease, which in itself may add to the threat of unfavorable but unavoidable social comparisons (e.g., Mussweiler, Gabriel & Bodenhausen, 2000; Van Gent et al., 2011).

Inclusion in the mixed cluster (low Social Acceptance and high Physical Appearance) was associated with a normal level of Global Self-worth, the highest mean Ego Level Score, a hearing acculturation style and a hearing social context. Apparently adolescents in this cluster were able to maintain an average level of Global Self-worth roughly equal to the mean of hearing norm peers, by discounting the importance of the social domains in which they were experiencing less competence or support (Social Acceptance and Close Friendships). At the same time, they endorsed the importance of domains in which they experienced competence or support, i.e. the peer-related domains of Physical Appearance and Athletic Competence and the parent-related domain of Behavioral Conduct (with mean levels of competence in the scholastic domain). Most adolescents in this cluster lived with their parents and attended ordinary schools, which in itself was also positively associated with ego development. The finding of the lowest level of Social Acceptance in this cluster, containing the majority of adolescents attending an ordinary school, supports the view that those adolescents who are included in mainstreaming, have a particularly hard time socially and lack support from the majority of hearing peers. In our sample, most students attended education in larger hearing schools with no or very few other deaf students as class peers, i.e. on the basis of individual inclusion. Therefore they had fewest opportunities to socialize, on a day-to-day basis with other deaf people, who can validate who one is as a person (Harter, 2006). But, taking into account the average level of Global Self-worth of the adolescents in this cluster, it would seem that they have accepted the experience of little peer support as a social condition that has little to do with their personal values. Our finding of greater differentiation in self-perceptions among social self-concept domains in this mixed cluster is in line with a more mature cognitive-developmental level, as compared to a simpler pattern in the other clusters (Harter, 1986; 2006). As with previous research showing that higher

ego levels are associated with more complexity of self-reflection and interpersonal relations (Recklitis & Noam, 2004; Westenberg, Siebelink, Warmenhoven, & Treffers, 1999), we found that 9 (70%) of the 13 adolescents with a mixed social competence profile were in the (post) conformist stage. In contrast, more than 75% of the adolescents with either a high or a low social competence profile were in a pre-conformist stage.

Adolescents in the high social competence cluster also showed relatively high scores on Close Friendships and Scholastic Competence, but mean scores on Behavioral Conduct and Global Self-worth. Such a profile probably indicates a combination of intrapersonal self-enhancement strategies, i.e. the tendency to endorse the importance of the domains one feels competent in, the tendency to take more responsibility for success than for failure, as well as the tendency to overrate one's competence, all of which might reflect the impact of a younger mental age, and a more idealized and less differentiated self-concept (e.g., Harter, 2006).

This assumption is supported by the finding of significantly lower socio-cognitive maturity among adolescents in this cluster than among adolescents in the mixed cluster. Inclusion in the high social competence cluster was also associated with the absence of neurological disorders, which in itself is significantly associated with non complicated familial deafness (Van Gent et al., 2011), and the highest rates of support for signing and preferential aspects of identification with deaf people and type of school. This adds support to the view that pre-existing familiarity with deafness, parental support and an otherwise positive engagement in a primarily deaf environment correlates with a high sense of social acceptance. The three children of deaf parents (see Table 1) typically belonged to this cluster; this is in line with Crowe (2003), who found that deaf respondents with deaf parents scored higher on self-esteem compared to those with hearing parents, regardless of signing ability.

Limitations

There are several limitations to this study. Firstly, as there are neither measures for socio-cognitive maturity nor multidimensional self-concept measures with firmly

established psychometric properties specifically developed for using with Dutch deaf children and adolescents, standard instruments were used and adapted for using with deaf subjects. The possible issue of limited understanding of language used in the self-report questionnaires was addressed by communicating in the participants' preferred mode of communication and by encouraging them to seek assistance when needed. Moreover, research has demonstrated that the SCT-Y is fairly robust regarding modified administration procedures (e.g., Drewes & Westenberg, 2001). Secondly, as with all cross-sectional studies, findings do not allow for strong causal conclusions. Finally, another limitation of this study is the relatively small sample size and the substantial number (26%) of non-respondents. In view of the characteristics of the non-respondents (lower IQ and higher rates of psychological stressors) it might be hypothesized that the levels of Global Self-worth and ego development in the participating sample are not underestimated.

Implications for interventions and future research

Findings from this study extend our understanding of the dynamics of self-concept, i.e. on how facets of self-concept may be differentially related to a set of intrapersonal and contextual characteristics (including [past] neurological disorders) in samples of deaf adolescents. They may help to identify more specific directions for preventive and socio- and psychotherapeutic interventions with deaf children and adolescents. For example, it may prove especially relevant to mobilize sources of social approval and promote acceptance and validation of personal competences by significant others, particularly peers and parents, for those members of the low social competence cluster who seem unable to discount the importance of specific domains.

For members of the mixed social competence cluster, approval and acceptance by peers may be an important intervention target in order to prevent or diminish the risk of social isolation. Members of both clusters may be at even greater risk of developing a depressed affect if they suffer from additional physical distress through a history of neurological disorder, which may add to the risk of unavoidable negative self-evaluation (see Harter, 1986; 1999) and loss of self-esteem (Pyszczynski & Greenberg, 1987). Associations between ego development,

the three social competence profiles and these contextual factors may point at other points of intervention. For instance, the finding of a high rate of lower levels of ego development among adolescents in the high social competence cluster suggests that many adolescents from this cluster in particular are inclined to intrapersonal self-enhancement and overestimating one's own competence. Excessive overestimation has a negative impact on social relations (Harter, 2006) and is associated with behavioral problems which indeed were found more often among adolescents at special schools (Van Gent et al., 2011).

Finally, findings indicate directions for further research in longitudinal studies to determine causal relations. Such studies should include a range of putative predictors of multidimensional aspects of self-concept and social-cognitive maturity, including language ability, which in itself is reciprocally related to socio-emotional and cognitive development (Marschark, 2007), and should also make use of observational measures (e.g., Wauters & Knoors, 2008; Wolters, Knoors, Cillesen, & Verhoeven, in press) in addition to the previously mentioned variables under scrutiny. It is recommended that further research be directed at adolescents with cochlear implants which are changing the face of deafness in many ways and at great pace (e.g., see Marschark, 2007). In The Netherlands about 90% of deaf pre-schoolers now have implants, and in the near future larger groups of adolescents may profit from the positive effects of early implantation on hearing, speech perception and spoken language skills, communication and socialization, academic achievement, and in other areas of functioning. Despite the many reported benefits of CI, data on associations of CI with self-esteem and psycho-social adjustment are still few and findings as well as conclusions vary substantially (e.g., see Leigh et al., 2009; Martin, Bat-Chava, Lalwani, & Waltzman, 2010; Nicolas & Geers, 2003). As the development of children with and without implants may be different in many domains, it is very important to include the effects of CI in future studies.

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Appendix

Responses to selected items from the Deaf Young People's Guided Interview Schedule and the Parents' Guided Interview Schedule (Gregory, Bishop, and Sheldon, 1995) that were used as indicators for Support for Signing in Childhood (SSC, e.g., 'Was signing encouraged at home?' [A45c]), Quality of Parent-Child communication (QPCC, e.g., 'Was it ever difficult to explain something to your mother or father?' [A23]; 'Do you feel that because [sometimes] communication is a problem there are parts of his/her life you know nothing about?' [P161]), and Identification with Deaf People (IDP, e.g., 'If you had a very deaf child how would you communicate with him or her?' [A48], 'Are his/her friends mostly deaf or hearing?' [P177]). The number of the interview question is noted between brackets, with A and P denoting the interview schedules for adolescent and parents respectively.

Responses on the selected questions were coded 1 if indicative or 0 if not indicative, i.e. the total number of indicative responses is used as scale score.

Indicative responses of SSC.

1. Parents showed a positive attitude towards sign language (A44).
2. Signing in class was allowed or encouraged in childhood (A45a).
3. Signing in playground was allowed or encouraged in childhood (A45b).
4. Signing at home was allowed or encouraged in childhood (A45c).
5. At least one of the parents used sign or a combination of sign and spoken language in childhood (P130).

Indicative responses of QPCC.

1. Feels well understood by parents (A13).
2. Has not experienced any difficulties to explain something to parents (A23).
3. Has the opportunity to talk things over in depth with family (A25).
4. Has not been treated differently by family because of deafness (A27).

5. Parents report no particular situations which present difficulties in communicating with their deaf son/daughter (P144).
6. Parents don't feel that there are parts of their deaf child's life that they don't know because of communication difficulties (P161).

Indicative responses of IDP.

1. Manages in following conversations with a group of deaf friends reasonably to good. ^a
2. Knows people close to him/her using sign language (A46).
3. Would use signing if parent of a deaf child (A48).
4. Most or all close friends are deaf (A66c).
5. Parents report that most or all friends are deaf (P177).

Note: ^a In the Dutch translation of the interview with young people, a question about following conversations with a group of deaf friends was added to the question about following conversations with a group of hearing friends in the original interview (A38)