Chapter 4

Self-concept and Psychopathology in Deaf Adolescents: preliminary support for moderating effects of deafness-related characteristics and peer problems

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Journal of Child Psychology and Psychiatry, 2011, 52, 720-728
The definitive version is available at www.blackwell-synergy.com.

Abstract

Background: High rates of psychopathology were found amongst deaf adolescents, but little is known about the psychosocial risk factors. This study investigated whether (1) less severe deafness and/or acquired or otherwise complicated deafness, and (2) having mainly contacts with hearing people, each represent chronic stressful conditions that moderate the associations between self-esteem and emotional problems. In addition the moderating effect of observed peer rejection on the association between social acceptance and behavioural problems was explored. **Method**: Deaf adolescents of normal intelligence (N=68) completed the Self Perception Profile for Adolescents. Psychopathology was assessed using a semi-structured interview with adolescents and reports by parents, teachers and expert ratings. Data on moderator variables were collected from school records, parental and teachers' reports. **Results:** Emotional mental health problems were negatively associated with self-esteem and positively with peer rejection. The association between self-esteem and emotional problems was moderated by the deafness variable less severe deafness or acquired or otherwise complicated deafness. Behavioural mental health problems were positively associated with social acceptance and peer rejection but negatively with the amount of involvement with hearing people. Peer rejection moderated the association between social acceptance and behavioural problems. **Conclusions**: The findings emphasize the importance of considering self-concept dimensions, peer problems and deafness- and context-related characteristics when assessing and treating deaf adolescents.
Key words: self-esteem, stress, mental health, hearing loss, adolescence

Introduction

Rates of emotional and behavioural disorders are higher in deaf children and adolescents than in hearing peers (Hindley, Hill, McGuigan & Kitson, 1994; Van Gent, Goedhart, Hindley & Treffers, 2007). Research findings suggest that not deafness as such, but other risk factors contribute to psychopathology in deaf adolescents (Van Gent et al, 2007). First of all, central nervous system disorders and other physical health problems have repeatedly been associated with psychopathology among deaf populations (e.g., Sinkkonen, 1994; Van Gent et al., 2007), as well as in general populations (e.g., Wallander, Varni, Babani & Wilcox, 1988). Secondly, previous research has identified chronic stressors that are unique to deaf people, i.e. characteristics of deafness such as the degree, cause and age of onset, and factors related to environmental context such as parental hearing status and the type of school attended (e.g., Dammeyer, 2009; Hindley et al., 1994; Polat, 2003). However the results of this research are inconsistent. For example, an association between mental health problems and communication mode was found in some studies (Vostanis, Hayes, Du Feu & Warren, 1997; Van Gent et al., 2007) but not in others (Hindley et al., 1994; Polat, 2003). Such inconsistencies may be due to differences in sample composition, methods or informants (e.g., Dammeyer, 2009; Van Gent et al., 2007), or may indicate the impact of other possible significant factors (Polat, 2003). Following the suggestion of Polat and in accordance with self-esteem vulnerability models (e.g., Hammen, 2005), we examined the association between self-esteem, unique stress factors and psychopathology among deaf adolescents.

Self-esteem, chronic stress and emotional mental health problems

A substantial body of evidence from studies with general, i.e. hearing, populations indicates that low self-esteem is related to emotional mental health problems (Baumeister, Campbell, Krueger & Vohs , 2003; Harter,2006). In addition, evidence from longitudinal studies suggests that low self-esteem in adolescence is an independent predictor of depression (Orth, Robins, & Roberts, 2008) and anxiety (Trzesniewski et al. , 2006). Two studies found negative associations

between self-esteem and total mental health problems (Mejstad, Heiling & Svedin, 2009) or unspecified psychiatric caseness (Hindley et al., 1994) in samples of hearing-impaired youth. To the best of our knowledge, no studies have examined associations between self-esteem and emotional or behavioural mental health problems among deaf adolescents in greater detail. Studies in samples of children and adolescents with other physical handicaps have documented small to moderate negative associations between self-esteem and emotional (e.g., Dahlbeck and Lightsey, 2008; Bilboul, Pope & Snyder, 2006) or emotional and behavioural problems (Hoare & Mann, 1994).

According to the buffer hypothesis (see Baumeister et al., 2003), low self-esteem might contribute to emotional problems because individuals with low self-esteem lack the coping resources that buffer the deleterious consequences of chronic or acute stressors whereas individuals with higher self-esteem are assumed to have better coping resources. For instance, social comparison research has found that persons with low self-esteem are less capable of making effective use of self-protection strategies to reduce the threat of unfavorable but unavoidable social comparisons, like ignoring the presumed superiority of the comparison standard, or lowering its importance or relevance (e.g., Mussweiler et al., 2000). In addition, low self-esteem has been associated with a reduced ability to abandon an unattainable goal or standard by substituting it with positive affirmations on another aspect of self, making it harder to disengage from unconstructive repetitive thoughts about negative self-discrepancies (Watkins, 2008). Self-regulation theory states that maladaptive perseveration on irreducible negative self-discrepancies due to chronic conditions implicating a threat, a loss, a failure or interpersonal difficulties is associated with emotional problems and disorder (Pyszczynski & Greenberg, 1987).

Based on this theory, it may be hypothesized that adoption of hearing-related standards by deaf adolescents will elicit recurrent maladaptive perseveration on irreducible negative self-discrepancies between having restricted hearing or feeling handicapped otherwise as one's actual state, and being hearing or healthy as one's desired but unattainable standard. Consequently, specific deafness-related and contextual variables that contribute to the salience of hearing-related standards,

will induce chronic stress. As deaf adolescents with high self-esteem are assumed to have better coping resources than those with low self-esteem, we expected that the association between self-esteem and emotional problems would be especially strong where these stress-inducing variables are present, i.e. these variables would moderate the relationship between self-esteem and emotional problems.

Firstly, in line with the suggestion that the profitable use of residual hearing makes it more difficult to accept deafness (Polat, 2003), the deafness characteristics, a lesser degree of deafness or having a cochlear implant (CI) may contribute to the salience of health-related standards. This may be illustrated by the finding that deaf students with more hearing residuals hide their deafness, i.e. by pretending to understand everything when interacting with hearing people (Jambor et al., 2005). Secondly, neurological disorders and other physical disorders which co-occur much more often with acquired and syndromal deafness than with uncomplicated deafness of genetic origin, may provoke a deaf child to perceive himself as handicapped in a primarily hearing and healthy world. Moreover, acquired deafness may contribute to the perception of being handicapped, especially when this perception is reinforced by hearing parents and other family members. Thirdly, the environmental context of having contacts mainly with hearing significant others, as indicated by living with hearing parents, and attending a mainstream school, may contribute to the salience of hearing-related standards. This is supported by findings that a greater amount of contacts with hearing people is associated with less identification with the Deaf community (Jambor et al., 2005) and a more hearing oriented acculturation style (Hintermair, 2008).

Self-concept, peer rejection and behavioural mental health problems

Harter (2006) proposed that behavioural problems are associated with low self-esteem because negative self-evaluation, humiliating rejection and negative affect are associated with both. In support of this 'low self-esteem' hypothesis a small to moderate correlation between low self-esteem and behavioural problems has been found in the majority of the studies reviewed by Walker and Bright (2009). Baumeister, Smart and Boden (1996), however, proposed that behavioural

problems are associated with highly favourable views of the self that are threatened or disputed by others. In support of the 'disputed self' hypothesis, studies among children and adolescents have found strong associations between behavioural problems and overestimation of self-perceived social acceptance, i.e. exaggerated self-appraisal of social acceptance relative to the appraisals by others (eg., David & Kistner, 2000,). The association between overestimation of social acceptance and behavioural problems appeared to be particularly strong in children or adolescents who were rejected by others (Diamantopoulou, Rydell, & Henricsson, 2008).

This study

The present study examined associations of self-esteem and self-perceived social acceptance with emotional and behavioural problems and disorders in a representative sample of deaf adolescents of normal intelligence (i.e. IQ>80). In line with the results of studies in hearing samples, we expected to find negative associations of self-esteem with measures of emotional problems.

Furthermore, this study examined the associations of emotional problems with the deafness characteristics lesser degree of deafness and acquired or otherwise complicated deafness, and with the contextual variable routine contact with hearing people, and the associations of emotional and behavioural problems with peer rejection. We expected to find positive associations.

Most importantly, this study examined whether both the deafness characteristics and the contextual variable moderate the associations between self-esteem and emotional mental health problems, and whether peer rejection moderates the associations between social acceptance and behavioural problems.

Method

Participants

Participants of the study were recruited from a year cohort of the total secondary school population (N = 94) of one of the three large organizations in the Netherlands offering education in special school settings and residential facilities as well as educational counselling for deaf children and adolescents in mainstream schools. Details of the sampling and data collection procedure and the non-response

analysis are described by Van Gent et al. (2007). We obtained informed consent from 70 (74%) of the 94 students and their parents. Because of missing measures (due to scheduling problems) 2 of the 70 participants were excluded. We obtained permission from 18 of the 24 non-responders and their parents to use their school records for non-response analysis. The non-responders were significantly older, showed a lower mean IQ and were more likely to have psychosocial stressors (e.g., family conflicts, penal violation, sexual abuse). Table 1 shows descriptive statistics of the demographic, deafness and physical disorder variables.

Measures

Self-Perception Profile for Adolescents. Self-esteem and self-perceived social acceptance were operationalized by means of the Global Self-worth (GSW) and Social Acceptance (SA) subscales of the Dutch version of Harter's Self-Perception Profile for Adolescents (SPPA; Harter, 1988; Treffers et al., 2002). Treffers et al. (2002) reported Cronbach's α of . 76 for both scales and 3-5 week test-retest correlations of .72 (GS-w) and .67 (SA). A team of deaf and hearing professionals, all fluently signing and experienced in working with deaf adolescents, adapted the instrument by minimizing metaphoric language and difficult words. In the present sample, the internal consistencies were .73 (GSW) and .72 (SA).

Emotional and behavioural problems. The internalizing and externalizing problem scales of the Dutch versions of the well-known Child Behaviour Checklist (CBCL; Achenbach, 1991a; Verhulst, Van der Ende & Koot, 1997a) and Teacher's Report Form (TRF; Achenbach, 1991b; Verhulst, Van der Ende & Koot, 1997b) were used to assess emotional and behavioural problems as reported by parents and teachers respectively. The subscale of Aggressive Behaviour in the Dutch version of the Semi-structured Clinical Interview for Children and Adolescents (SCICA; McConaughy & Achenbach, 1994; Kasius, 1997) was used as a self-report measure of behavioural problems; the sum of the standardized scores on the SCICA-subscales Anxious and Lonely was used as self-report measure of emotional problems. All instruments were adapted for use with deaf adolescents, and good inter-rater agreement was reported, as described by van Gent et al. (2007).

Table 1.

Demographic, deafness and physical disorder variables

Characteristics	N	%	Variables	N	%
Gender			*Degree of deafness*[a,b]		
Male	31	46	Severe: 73-95 dB	13	20
Female	37	54	Profound: ≥96 dB	52	80
Age			*Cochlear Implant (CI):*		
Mean 16.5 yrs; s.d. 1.8; range 13-21 yr			Without CI	65	96
Ethnicity			With CI	3	4
Dutch	50	73	*Cause of deafness*		
Other[e]	18	26	Hereditary, non-syndromal	19	28
Highest educational level parents			Hereditary, syndromal	5	7
Low	21	31	Acquired, pre-, peri- or postnatal	22	32
Medium	18	26	Unknown	22	32
High	21	31	*Primary communication mode*		
Unknown	8	12	Spoken language	36	53
Family with:			Signing	32	47
Two biological parents	49	72	*Type of school*		
Other	19	28	Special school for the deaf	50	74
Parental hearing status			Ordinary school	18	26
Hearing impaired parents	3	4	*History of 3 or more physical disorders*[ac]		
Hearing parent(s)	65	96	0-2 different disorders	40	60
Place of residence			3 or more different disorders	27	40
Residential setting	26	38	*History of neurological disorders*[d]		
Parental home	42	62	None	44	65
			One or more	24	35

Note: [a] Missing data with 1-3 cases. [b] Deafness is quantified as the unaided average hearing impairment for the better ear. [c] Cases for which specialist medical care had been provided in the past. [d] Cases with nervous system disorders for which specialist medical care had been provided in the past. [e] The group "Other ethnicity" is very heterogeneous, the highest frequency was found for Moroccan parents (6), followed by Turkish (2) and Surinam (2) parents.

Psychiatric disorder. The procedure to determine the dossier DSM-IV diagnoses using (1) semi-structured interviews with parents and adolescents about the psychological impact of deafness, (2) CBCL, TRF, and SCICA questionnaires without scale scores and (3) school records (demographic, deafness-related, medical and audiological data and IQ), is presented in detail by Van Gent et al. (2007). All primary and concomitant DSM-IV diagnoses with the participants were grouped into (1) emotional disorders, including anxiety and mood disorders, (2) behavioural disorders, including attention-deficit, oppositional defiant disorder and disruptive behaviour disorders, and (3) other disorders (e.g., psychosis, somatoform disorder, and pain disorder).

Peer Rejection (PR). A measure of peer rejection was created by combining the CBCL- and TRF-items 25 ('Not get along'), 34 ('Feels persecuted'), 38 ('Teased') and 48 ('Not liked') of the Social Problems scale (these items are not used in the externalizing or internalizing scales). We imputed CBCL scores if TRF was missing (N=2) and TRF scores if CBCL was missing (N=12). Coefficient alpha of the PR, computed on cases without missing values, was 0.85.

Contacts with Hearing People (CHP) This indicator for daily interaction with meaningful hearing others (parents, peers, teachers; e.g., Harter, 2006) was created by combining place of residence and type of school: 0= living in a residential setting for deaf children and adolescents and attending a special school for the deaf (n=26); 1= living at home with hearing parent(s) and attending a special school for the deaf (n=24); 2= living with hearing parent(s) and attending an ordinary school (n=18).

Stress Inducing Deafness Characteristics (SID). This indicator was created by combining less severe deafness or having a CI and acquired or syndromal deafness, i.e. deafness characteristics that may contribute to the salience of hearing self-standards. Less severe deafness indicating the profitable use of hearing residuals was defined as severe deafness (70-95dB hearing loss, as opposed to profound deafness of more than 95dB loss), or having a CI. In addition to acquired or syndromal deafness, both indicating otherwise complicated deafness, the combination of unknown cause of deafness and present or past neurological disorder was used, as (past) neurological disorder was present in most adolescents

with acquired (64%) or syndromal hereditary deafness (60%) and in a minority (16%) of adolescents with non-syndromal hereditary deafness: χ^2 (2df)= 10.12, p<0.01 We defined SID as: 1(high)= severe deafness *or* with CI *and/or* acquired deafness *or* syndromal hereditary deafness or unknown cause of deafness with [past] neurological disorder (n=40); 0 (low)= remaining cases (n=28).
IQ. : In line with contemporary practice in testing the intelligence of deaf adolescents in The Netherlands, Wechsler performance scales were used.

Procedures
Participants were administered the SPPA individually following the SCICA interview. At the start of each individual assessment session, the participants were consulted to determine their preferred mode of communication with the interviewer, i.e. signing or spoken language, and to decide on the assistance of a sign-language interpreter during the session. Parents were asked to complete the CBCL at home. Due to practical reasons 12 parental couples did not complete the CBCL. TRF's were gathered for 66 of the participating adolescents.

Statistical Methods
Bivariate Spearman correlations were calculated to analyse univariate associations between the measures of mental health problems and the remaining study variables. In examining moderator effects, we used the three conditions for moderators proposed by Kraemer, Stice, Kazdin, Offord and Kupfer (2001), where A moderates B if (1) A precedes B, (2) A and B are not correlated, and (3) A and B co-dominate in the prediction of the dependent variable. Spearman correlations were used to examine the second condition. The third moderator condition was examined by testing improvement in the prediction of the dependent variable after entering the interaction term A*B as second step in hierarchical regression analysis . In the first step of the hierarchical regression analyses we entered the focal predictor (i.e. Global Self-worth or Social Acceptance), the potential moderator variable(s) and control variables (i.e. study variables that showed a significant correlation with one of the measures of emotional or behavioural problems respectively). The improvement in the prediction of the dependent variable after entering one of

the interaction terms was tested using the $\Delta\chi^2$ –test with logistic regression and the F-test for the significance of ΔR^2 with multiple regression. Global Self-worth, Social Acceptance and Peer Rejection were standardized prior to the regression analyses.

Results

Univariate analyses.

Spearman correlations showed the expected negative correlations between Global Self-worth and the measures of emotional problems except TRF internalizing (see Table 2). Social Acceptance was not associated with any measure of emotional problems but showed positive correlations with the DSM diagnosis behavioural disorder and TRF externalizing. It may be noted that Global Self-worth and Social Acceptance were not associated.

Stress Inducing Deafness Characteristics and Contacts with Hearing People were not associated with Global Self-worth, and Peer Rejection was not associated with Social Acceptance, i.e. these measures fulfilled the second moderator condition proposed by Kraemer et al. (2002). From the variables presented in Table 1, only gender, IQ and history of three or more physical disorders showed correlations with measures of emotional or behavioural problems. Stress Inducing Deafness Characteristics, Contacts with Hearing People and Peer Rejection were added to the control variables in the prediction of behavioural and emotional problems respectively, as they showed significant associations with these measures (see Table 2).

Predicting emotional problems.

The results of moderated logistic and multiple regression analyses with measures of emotional problems as dependent variables are presented in Table 3. Contrary to our hypothesis, the interaction between Global Self-worth and Contacts with Hearing People did not improve the prediction of any measure of emotional problems. The interaction term Global Self-worth x Stress Inducing Deafness Characteristics was significant in the prediction of emotional disorder and the combined anxious/lonely scale of the SCICA. We probed the nature of the

Table 2.

Means and standard deviations or percentage of cases in the specified category and bivariate Spearman correlations of study variables.

Study variables	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender (%female)	54%	---														
2. Performance IQ	109.9 (13.0)	-.15	---													
3. History of 3(+) phys.dis.[1] (% present)	40%	.09	-.12	---												
4. SID[2]	59%[2]	.01	-.07	.08	---											
5. CHP[3]	38/36/26%[3]	.24*	.24*	-.20	.07	---										
6. PR[4]	2.3 (3.1)	-.07	-.06	.19	.03	-.18	---									
7. Global Self-worth	14.5 (3.3)	-.22	.23	-.03	.02	.03	-.09	---								
8. Social Acceptance	13.6 (3.1)	.09	-.21	.07	-.17	-.28*	-.17	.08	---							
9. DSM Emotional Disorder[a] (% present)	26%	.22	-.09	.39**	.03	-.07	.33*	-.34**	-21	---						
10. CBCL Internalizing (n=56) T-scores	55.2 (14.4)	.05	-.21	.12	.10	-.29*	.67**	-.29*	-.14	.41**	---					
11. TRF Internalizing (n=66) T-scores	55.4 (13.9)	.07	-.13	.15	-.28*	-.18	.55**	.02	.07	.09	.34*	---				
12. SCICA Anx./Lonely[5] (sum z-scores)	0.0 (1.8)	.41**	-.12	.10	-.12	.08	.23	-.28*	-.23	.63**	.33*	.18	---			
13. DSM Behavioural Disorder[a] (%present)	15%	-.12	-.29*	-.01	-.16	-.30*	.40**	-.05	.41**	-.06	.42**	.42**	-.19	---		
14. CBCL Externalizing (n=56) T-scores	51.9 (13.1)	-.03	-.21	.01	.10	-.28*	.38**	-.22	.14	.19	.61**	.02	.00	.47**	---	
15. TRF Externalizing (n=66) T-scores	54.0 (14.0)	.03	-.45**	.15	-.26*	-.48**	.21	-.10	.38**	.09	.32*	.44**	-.02	.55**	.45**	---
16. SCICA Aggression	4.2 (4.2)	-.01	-.26*	.21	.08	-.32**	.25*	-.12	.15	.01	.21	.09	.03	.39**	.27*	.40**

Notes. [1] History of 3(+) phys. dys.= History of 3 or more physical disorders; [2] SID= Stress Inducing Deafness Characteristics: % cases with severe deafness or CI *and/or* acquired deafness or syndromal hereditary deafness or (past) neurological disorder present in cases of unknown cause of deafness; [3] CHP=Contacts with Hearing People: % low, medium and high; [4] PR = Peer Rejection; [5] SCICA Anx./Lonely= SCICA Anxious and Lonely. [a]: Including 2 cases with both emotional and behavioural disorder. *: $p<0.05$; **: $p<0.01$.

interaction effects by estimating the conditional effect of Global Self-worth at the two values of Stress Inducing Deafness Characteristics (Hayes & Matthes, 2009). Global Self-worth was not associated with emotional problems in the absence of Stress Inducing Deafness Characteristics. In the presence of Stress Inducing Deafness Characteristics, lower scores on Global Self-worth were associated with a significantly higher risk of emotional disorder: OR=0.11 ($p<0.005$; 95%CI 0.02-0.50), and with higher scores on the combined anxious and lonely scales of the SCICA: b=-0.70, se=-.24, $p<0.005$.

We further explored this result by computing Spearman correlations of Global Self-worth with emotional disorder and the combined SCICA anxious/lonely scale for the presence and absence of each component of Stress Inducing Deafness Characteristics separately. Strong negative correlations ($r<-0.50$) were found in the presence of (1) severe deafness *or* with CI, (2) acquired deafness *or* syndromal hereditary deafness and (3) (past) neurological disorder. No significant correlations were found in the absence of each component. These findings indicated that each component modifies the associations of Global Self-worth with emotional disorder and self-reported emotional problems.

Predicting behavioural mental health problems.

Table 4 presents the results of the moderated regressions on behavioural mental health problems. In support of our hypotheses, the interaction term Social Acceptance x Peer Rejection was significant in the prediction of all measures of behavioural problems except SCICA aggression.

The nature of each Social Acceptance x Peer Rejection interaction effect was probed using the Johnson–Neyman technique (Hayes & Matthes, 2009). This technique identifies regions of Peer Rejection where the association between Social Acceptance and measures of behavioural mental health problems is statistically significant and non significant, respectively. For behavioural disorder, non-significant associations with Social Acceptance were found up to Peer Rejection= 1.6 (i.e. < 2), while significant associations were found at all higher levels for Peer Rejection. For CBCL and TRF externalizing, non-significant associations with Social Acceptance were found for Peer Rejection < 5 and < 2 respectively, while

Table 3.

Hierarchical moderated regressions on measures of emotional problems.

	DSM-diagnosis Emotional Disorder		SCICA Anxious/ Lonely		CBCL Internalizing		TRF Internalizing	
	OR (95% CI)	$\Delta\chi^2(df)$ / Nagelk. $R^{2\,a}$	β	Δ R^2	β	Δ R^2	β	Δ R^2
Step 1		27.95 (*1*)*** / .50		.31**		.35**		.45***
Gender	2.49 (0.51 – 12.05)		0.30*		-0.03		0.15	
History of 3 or more physical disorders	10.48** (2.13 – 51.57)		0.09		0.03		0.03	
PR[1]	2.49* (1.20 – 5.16)		0.31**		0.50***		0.53***	
Global Self-worth	0.37* (0.17 – 0.82)		-0.20		-0.16		0.10	
SID[2]	1.09 (0.26 – 4.55)		-0.14		0.05		-0.33**	
CHP[3]	0.96 (0.33 – 2.82)		-0.09		-0.13		-0.13	
Step 2a		8.85(*1*)**/ .61		.06*		.00		.00
Global Self-worth x SID[2]	0.07** (0.01 – 0.48)		-0.44*		-0.03		-0.07	
Step 2b		1.03 (*1*) / .51		.02		.02		.02
Global Self-worth x CHP[3]	0.61 (0.23 – 1.66)		-0.23		0.23		0.22	

Note: [a] Nagelk. R^2: Nagelkerke R^2; [1] PR = Peer Rejection; [2] SID=Stress Inducing Deafness Characteristics; [3] CHP=Contacts with Hearing People.

*: p<0.05; **: p<0.01; ***: p<0.001; Global Self-worth and Peer Rejection are standardized.

significant positive associations were found at all higher levels. These findings indicate that positively biased Social Acceptance, i.e. the combination of high levels of Social Acceptance and peer rejection and humiliation according to parent and teacher reports is associated with behavioural problems in deaf adolescents .

Table 4.

Hierarchical moderated regressions on measures of behavioural problems.

	DSM-diagnosis Behavioural Disorder		SCICA Aggression		CBCL Externalizing		TRF Externalizing	
	OR (95% CI)	$\Delta\chi^2(df)$ / Nagelk. R^2 [a]	β	Δ R^2	β	Δ R^2	β	Δ R^2
Step 1		31.99(5)***/.66		.21*		.30**		.47***
Performal IQ	0.92 (0.84–1.02)		-0.19		-0.05		-0.28**	
CHP[1]	0.42 (0.05–3.73)		-0.16		-0.17		-0.02	
SID[2]	0.29 (0.03–2.70)		.13		-.10		-.27**	
Social Acceptance	10.77**(1.82–63.68)		0.22		0.20		0.34**	
PR[3]	5.83**(1.63–20.91)		0.16		0.42**		0.43***	
Step 2		7.21(*1*)**/.77		.01		.06*		.08**
Social Acceptance x PR[3]	15.82+(0.98–279.79)		0.10		0.28*		0.30**	

Note: [a] Nagelk. R^2: Nagelkerke R^2; [1] CHP=Contacts with Hearing People; [2] SID=Stress Inducing Deafness Characteristics; [3] PR = Peer Rejection.

+: p<0.10; *: p<0.05; **: p<0.01; ***: p<0.001; Social Acceptance and Peer Rejection are standardized.

Discussion

Some major findings emerge from this study. Similar to previous studies in samples of hearing adolescents (e.g., Harter, 2006), moderate negative correlations were found between Global Self-worth and DSM-IV emotional disorder and the combined SCICA anxious and lonely scales. Stress inducing deafness characteristics were shown to moderate these correlations. Specifically: Global

Self-worth appeared to be a risk factor for an emotional disorder in adolescents with severe deafness or acquired or syndromal deafness or (a history of) one or more neurological disorders, but not in profoundly deaf adolescents with an uncomplicated genetic cause of deafness and no (history of) neurological disorder. Peer Rejection moderated the positive associations of Social Acceptance with behavioural disorder and the CBCL and TRF externalizing scales.

The finding that the *combination* of low self-esteem and Stress Inducing Deafness Characteristics is associated with a high risk of emotional disorder, extends the view that being deaf does not in itself contribute to psychopathology (Van Gent et al, 2007). The stress inducing deafness characteristics identified in this study may contribute to unconstructive repetitive thought on negative discrepancies with hearing and healthy people in several ways. Firstly, adolescents with CI or lesser severe deafness may be challenged more intensively to adapt to communicative and cultural values in the hearing oriented world, and perceive their limited capacities in spoken language as an ''incorrigible" personal shortcoming. Secondly, deaf adolescents with acquired deafness usually grow up in a hearing family unfamiliar with deafness, and, like deaf children with a syndromal cause of deafness or a history of neurological disorder, they often have to cope with additional physical handicap or illness and its interpersonal consequences. Thirdly, deaf adolescents with a history of neurological disorder are at risk of experiencing disabilities in motor function, coordination, cognition or executive functioning, all of which may affect visual communication and social interaction. Moreover, the invisible and hidden character of many of such minor disabilities may contribute to significant interactional misunderstandings, emotional insecurity, and negative self-evaluations (Miyahara & Piek, 2006).

Contrary to our expectations, the amount of contact with significant hearing people did not affect the association between Global Self-worth and measures of emotional problems. This may suggest that even deaf adolescents with low self-esteem have the capacity to protect the self from threatening social comparisons and unattainable hearing-related standards. This hypothesis may be supported by the finding that a higher level of contacts with hearing people was associated with lower Social Acceptance but not with lower Global Self-worth, which might

indicate a discounting of social acceptance in hearing contexts, i.e. degrading the importance of the social domain with higher levels of contacts with hearing people.

The finding that Peer Rejection moderated the positive associations of Social Acceptance with behavioural disorder and the CBCL and TRF externalizing scales, adds to the evidence of a link between positively biased self-perceptions and aggression. As suggested by Diamantopoulou et al. (2008), this connection may be explained by poor social information processing that is shown in positively biased self-perceptions and is characteristic of aggressive youth. Deaf children may be at a greater risk of misinterpreting important social information such as nuances in behaviour or beliefs, which is normally learned through passive exposure to events witnessed or overheard in the process of incidental learning (Calderon et al., 2003).

A strength of this study is the use of multiple informants of problems and the expert diagnosis of psychiatric disorder integrating reports from these informants plus additional information. Use of multiple informants provides information on contextual aspects of disorder and informer related perspectives. Clinical expert ratings synthesizing multi-source information is probably the most reliable estimate of disorder in deaf adolescents, while adolescents and teachers may be the most reliable single informants of emotional and behavioural problems respectively (van Gent et al., 2007). The majority of hearing parents and teachers may have problems in recognizing emotions of deaf children and discussing these with them. As a result they may be less capable of judging their self-esteem.

There are some limitations that must be considered. Firstly, as there are no Dutch multidimensional self-concept measures specifically developed for using with deaf children and adolescents, existing instruments were adapted for this specific population. However, the possible matter of limited understanding of the language used in the self-report questionnaires was addressed by encouraging the participants to seek assistance in their preferred mode of communication. Secondly, due to the small sample size, the analysis of this study should be replicated before firm conclusions can be drawn. Thirdly, the cross-sectional nature of this study does not allow for strong causal conclusions. Longitudinal studies with larger

samples are needed to further examine relations between protective intrapersonal characteristics, such as self-concept and socio-cognitive maturity, and stress-inducing conditions like restricted language abilities irrespective of modality (e.g., Dammeyer, 2009) with mental health problems within deaf populations.

The findings from this study increase our knowledge of specific intrapersonal and environmental factors that might be a significant focus for preventive and therapeutic strategies with deaf children and adolescents. For instance, the moderating effects found in this study indicate that low self-esteem is only a risk factor for emotional problems among deaf adolescents when combined with specific deafness- and physical illness related attributes.

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Key Points

- Previous research in deaf adolescents has found increased rates of psychopathology, but effects of self-concept, deafness- and context- related factors on emotional and behavioural disorders are unknown.
- The present study indicates that (1) self-esteem buffers the negative influence of a lesser degree of deafness, acquired or syndromal deafness and (past) neurological disorders on the vulnerability for emotional disorders, (2) peer rejection moderates the positive associations of self-perceived social acceptance with behavioural disorder, and (3) the amount of contact with hearing people does not have a comparable moderator effect.
- These findings emphasise the importance of considering self-concept dimensions and factors related to degree and cause of deafness and physical disorder when assessing and treating deaf adolescents.