

Self-Esteem in Children and Adolescents With Hearing Loss

Andrea D. Warner-Czyz^{1,2}, Betty A. Loy^{1,3}, Christine Evans²,
Ashton Wetsel², and Emily A. Tobey^{1,2,3,4}

Trends in Hearing
2015, Vol. 19: 1–12
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DOI: 10.1177/2331216515572615
tia.sagepub.com



Abstract

Children with hearing loss are at risk for lower self-esteem due to differences from hearing peers relative to communication skills, physical appearance, and social maturity. This study examines the influence of generic factors unrelated to hearing loss (e.g., age, gender, temperament) and specific factors associated with hearing loss (e.g., age at identification, communication skills) on how children with hearing loss wearing cochlear implants or hearing aids appraise self-esteem. Fifty children with hearing loss wearing cochlear implants or hearing aids participated (Mean age: 12.88 years; mean duration of device use: 3.43 years). Participants independently completed online questionnaires to assess communication skills, social engagement, self-esteem, and temperament. Children with hearing loss rated global self-esteem significantly more positively than hearing peers, $t = 2.38$, $p = .02$. Self-esteem ratings attained significant positive correlations with affiliation ($r = .42$, $p = .002$) and attention ($r = .45$, $p = .001$) temperaments and a significant negative association with depressive mood ($r = -.60$, $p < .0001$). No significant correlations emerged between self-esteem and demographic factors, communication skills, or social engagement. Because successful communication abilities do not always co-occur with excellent quality of life, clinicians and professionals working with children with hearing loss need to understand components contributing to self-esteem to improve identification, counseling, and external referrals for children in this population.

Keywords

cochlear implant, hearing loss, children, adolescents, self-esteem, quality of life

Introduction

Cochlear implants (CIs) and hearing aids (HAs) influence not only communication skills but also quality of life in children with hearing loss. Children and adolescents with hearing loss rate generic quality of life on par with hearing peers. However, they report difficulties in certain aspects of quality of life such as peer acceptance, social-emotional adjustment, and self-esteem relative to hearing peers (Altshuler, Deming, Vollenveider, Rainer, & Tendler, 1976; Cappelli, Daniels, Durieux-Smith, McGrath, & Neuss, 1995; Davis, Elfenbein, Schum, & Bentler, 1986; Hinderink, Krabbe, & Van Den, 2000; Knutson, Boyd, Reid, Mayne, & Fetrow, 1997; Meadow & Trybus, 1979; Theunissen et al., 2014). Self-esteem, a personal opinion of self and how one values oneself, represents a foundational aspect of quality of life that underlies an individual's thoughts, emotions, and behaviors (Rosenberg, 1965; Sahli & Belgin, 2006). This global self-esteem strongly correlates with mental health, particularly predisposition to depression, anxiety,

loneliness, and peer rejection (Greenberg et al., 1992; Orth, Robins, & Roberts, 2008; Roberts & Monroe, 1992).

Children with significant hearing loss are at risk for lower self-esteem, even after receiving HA or CI, due to differences from the mainstream relative to communication skills, physical appearance, and social maturity. Most studies of self-esteem in children and adolescents with hearing loss include participants with later

¹Dallas Cochlear Implant Program, TX, USA

²Department of Communication Sciences and Disorders, University of Texas at Dallas, TX, USA

³Department of Enterprise Planning, Children's Medical Center, TX, USA

⁴Department of Otolaryngology – Head and Neck Surgery, University of Texas Southwestern Medical Center, TX, USA

Corresponding author:

Andrea D. Warner-Czyz, Department of Communication Sciences and Disorders, The University of Texas at Dallas, Callier Advanced Hearing Research Center, 1966 Inwood Road, Dallas, TX 75235, USA.
Email: warnerczyz@utdallas.edu



identification of hearing loss, later fitting of devices, use of older technology, or no device use (e.g., Huber, 2005; Percy-Smith, Caye-Thomasen, Gudman, Jensen, & Thomsen, 2008; Sahli, Arslan, & Belgin, 2009; Theunissen et al., 2014). The effect of earlier identification of hearing loss, earlier provision of services, and technological advancements in signal processing on self-esteem in a contemporary group of children with hearing loss is unknown. The present study explores the impact of generic factors that affect children regardless of auditory status (e.g., age, gender) and specific factors that only apply to children with auditory deficits (e.g., age at hearing loss identification) on how children and adolescents wearing CIs or HAs appraise their self-esteem.

Generic Factors That Affect Self-Esteem Rating in Children

Chronologic age. Developmental transitions during childhood and adolescence yield not only external physical changes but also internal social-emotional changes that influence psychosocial domains such as self-esteem (Erikson, 1963; Landy, 2009; Waylen & Wolke, 2004). Social interactions spark emergence of pride and self-worth in school-aged children (Erikson, 1963). Children learn appropriate behavioral norms upon school entry at 5 years, seeking approval from peers and teachers via good grades and friendship in the *industry versus inferiority* stage (Erikson, 1963). By 13 years, children become concerned with acceptance by peers and independence from parents in the quest to develop a sense of self in the *identity versus confusion* stage (Erikson, 1963; Harter, 1998). The shift from childhood to adolescence reflects not only global but also specific self-esteem (e.g., separate assessment of self-esteem related to physical appearance vs. academic achievements).

Psychosocial development influences self-esteem in hearing children. Self-ratings of young children exceed the scale midpoint, suggesting an inflated sense of self (Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). Self-esteem declines in late childhood and adolescence, possibly due to external feedback from teachers, parents, and peers based on academic, athletic, and social comparisons with other children (Eccles, Wigfield, Harold, & Blumenfeld, 1993; Harter, 1993, 1998; Robins et al., 2002). Decreased esteem, especially in adolescence, also reflects maturational changes in puberty (Harter, 1998).

Associations between age and esteem persist in children with hearing loss. Warner-Czyz et al. report more positive self-esteem for younger versus older children using CI. Mean self-esteem ratings decrease by nearly 20% from preschool to older childhood and adolescence (Loy, Warner-Czyz, Tong, Tobey, & Roland, 2010;

Warner-Czyz, Loy, Roland, Tong, & Tobey, 2009). Keilmann, Limberger, and Mann (2007) also found age-related reductions in esteem in children with hearing loss in mainstream educational settings, implying characteristic changes in childhood self-esteem endure across auditory status.

Gender. Boys generally report more positive self-esteem than girls. However, the degree of divergence by gender varies, ranging from a marked difference (e.g., Puskar et al., 2010; Rosenberg & Simmons, 1975; Sung, Puskar, & Sereika, 2006) to little difference (e.g., Kendler, Gardner, & Prescott, 1998; Kling, Hyde, Showers, & Buswell, 1999; Kohr, Coldiron, Skiffington, Master, & Blust, 1988; Mullis, Mullis, & Normandin, 1992).

Gender differences in self-esteem change with age (Kling et al., 1999; Robins & Trzesniewski, 2005; Sung et al., 2006). Boys and girls rate esteem identically until age 12 (Robins et al., 2002). Maturational, emotional, and social changes during puberty mark a decline in self-esteem especially for girls, whose esteem decreases twice that of boys (Erikson, 1963; Robins et al., 2002; Rosenberg & Simmons, 1975). The further reduction in girls' esteem levels, which might stem from higher importance of physical appearance for girls versus boys in preadolescence, continue through age 16 and decrease thereafter (Harter, 1990, 1993; Kling et al., 1999; Usmiani & Daniluk, 1997).

Two studies explore the impact of gender on how children with hearing loss feel about themselves (Huber, 2005; Percy-Smith et al., 2008). Preadolescent girls and boys with CI rate self-esteem equivalently, mirroring identical ratings of self-esteem in peers with normal hearing (Huber, 2005; Robins et al., 2002). In contrast, Percy-Smith et al. (2008) report that female CI recipients rate self-esteem more positively than males, contradicting general trends seen in hearing peers (Kling et al., 1999; Puskar et al., 2010).

Temperament and behavior. Strong correlations exist between temperament, behavior, and self-esteem. Temperament refers to characteristics of an individual's personality regarded as innate versus learned. Ellis and Rothbart (2001) characterize adolescent temperament relative to self-regulation (e.g., attention, frustration, and shyness). Other behaviors like aggression (e.g., hostile actions or reactivity) and depressive mood (e.g., unpleasant affect, lowered enjoyment of activities) afford a way to link temperament to social skills and self-esteem (Ellis & Rothbart, 2001).

Self-esteem correlates with both temperament and behavior in hearing children. Self-conscious shyness (e.g., feelings of discomfort in social situations) stems from negative self-views based on fear of disapproval

(Chan, 2012; Lazarus, 2014). Anxiety in peer interaction by shy children inhibits social skills, making the pursuit of peer acceptance more difficult, especially for those with low self-esteem (Joiner & Metalsky, 1995). The link between shyness and esteem extends to depressive mood. Children who report both shyness and low self-esteem are more susceptible to depressive symptoms (Chan, 2012). Moreover, children with signs of depressive mood rate loneliness higher and self-esteem lower than those without depressive symptoms (Waylen & Wolke, 2004).

Only one study examines the link between temperament or behavior and self-esteem in children with hearing loss (Sahli et al., 2009). Children with more depressive emotions (i.e., internal sadness with strong feelings of hopelessness or helplessness) rate self-esteem less positively, regardless of hearing status (Sahli et al., 2009).

Social acceptance and participation. Friendships provide a way for children to practice and develop social-emotional skills such as conflict resolution, emotional regulation, and co-operation. Additionally, the intimacy, affection, and alliance associated with friendship affect both emotional security and self-esteem (Berndt & Keefe, 1996; Bishop & Inderbitzen, 1995; Buhrmester, 1990; Rose & Asher, 2000). Both number of friends and quality of friendships affect social acceptance in typically developing children and adolescents. Children who report either no friends or low-quality friendships exhibit poor social adjustment and increased loneliness, which often co-occurs with lower self-esteem (Gest, Graham-Bermann, & Hartup, 2001; Kingery, Erdley, & Marshall, 2011; Parker & Asher, 1993).

Children with hearing loss wearing HAs or CIs may exhibit less mature social skills and have fewer quality friendships compared with hearing peers (Rich, Levinger, Werner, & Adelman, 2013). Although studies of typically developing children with normal hearing have linked quantity and quality of friendships to self-esteem, no studies to date have examined the connection in children with hearing loss.

Condition-Specific Factors That Affect Self-Esteem in Children With Hearing Loss

Children with hearing loss may develop lower self-esteem than hearing peers based on differences in physical appearance (i.e., wearing devices, physical differences related to a syndrome) and communication difficulties. Comparisons of self-esteem by auditory status reveal conflicting results. Some studies report lower self-esteem in children with hearing loss (Bat-Chava, 1993; Bat-Chava & Deignan, 2001; Huber, 2005; Tambs, 2004; Weisel & Kamara, 2005) Others indicate equivalent

esteem ratings across auditory status (Percy-Smith et al., 2008; Sahli & Belgin, 2006). Still others reveal more positive self-esteem in children with hearing loss versus hearing peers (Cates, 1991; Kluwin, 1999; Koelle & Convey, 1982). This section focuses on factors specific to hearing loss (age of identification and communication abilities) that affect how children with hearing loss rate self-esteem.

Age at identification or intervention. Early identification and intervention of hearing loss typically coincides with more successful communication outcomes in children, but its effect on self-esteem has received little attention. Children with earlier identification of hearing loss report more positive school self-esteem than children with later identification of hearing loss (Leigh, Maxwell-McCaw, Bat-Chava, & Christiansen, 2009) However, no significant associations exist between global self-esteem and age at identification or intervention (Leigh et al., 2009; Loy et al., 2010). The sparse, inconsistent literature requires more research to evaluate the association between age at identification and self-esteem.

Communication abilities. The ability to communicate intricately links to self-esteem, exemplified by the discussion of shyness in the previous section on temperament and behavior. Children with hearing loss with speech, language, and perceptual skills on par with hearing peers report more positive self-esteem ratings than those with skills poorer than their peers—similar to studies of children, adolescents, and adults who stutter (Blood, Boyle, Blood, & Nalesnik, 2010; Boyle, 2013; Huber, 2005). The positive association between spoken language communication and self-esteem in children with hearing loss does not depend on whether the child uses CIs or HAs (Huttunen et al., 2009; Leigh et al., 2009). Rather, better communication skills promote higher social competence and increased self-esteem (Leigh et al., 2009). Successful communication allows for active participation in social environments, which likely aids in shaping social relationships outside of the home, thus reinforcing self-esteem (Leigh, 1999; Stinson & Kluwin, 2003).

Research Questions

Professionals working with children and adolescents with hearing loss need to understand factors associated with global self-esteem in this population to develop better tools to identify and counsel children at risk for low self-esteem. The present research study aims to answer the following research questions:

1. How do children and adolescents with sensorineural hearing loss rate their self-esteem relative

- to children and adolescents in the general population?
2. Which factors (e.g., demographic, social engagement, temperament, etc.) correlate significantly with self-esteem ratings?
 3. Do significant intercorrelations exist among demographic, social engagement, and temperament variables?

Methods

Participants

Participants included 50 children and adolescents (25 boys, 24 girls, 1 unreported) with sensorineural hearing loss wearing either CIs ($n=38$) or HAs ($n=12$). Inclusion criteria consisted of hearing loss of at least 40 dB HL in at least one ear; consistent use of at least one auditory prosthesis (i.e., HA or CI); chronologic age between 8 and 18 years; oral mode of communication; and primary exposure to an English-learning home environment. Exclusion criteria specified inability to complete the questionnaire independently, and diagnosed or suspected cognitive, visual, or developmental delay. Recruitment sites included the Callier Center for Communication Disorders in Dallas, TX; Colorado Neurological Institute Cochlear Kids Camp in Estes Park, CO; Rocky Mountain Ear Center in Englewood, CO; local clinicians; online community listservs (e.g., American Academy of Audiology and American Speech-Language-Hearing Association); word of mouth and snowball sampling. This project compiled data from three quality of life research protocols approved by the Institutional Review Board at The University of Texas at Dallas (#11–11, 12–31, and 13–39).

Table 1 displays demographic characteristics of the participants. Age of the entire group ranged from 8 to 18 years with a mean of 12.88 years ($SD=2.32$ years). Age at identification of hearing loss for the CI group extended from birth to 68 months ($n=23$, $M=16.09$ months, $SD=16.07$ months). Most of the CI users received a diagnosis of permanent sensorineural hearing loss by age 12 months (57%) or 24 months (78%). Some children received later diagnoses relative to the acquired versus congenital nature of their hearing loss. The HA group did not report age at hearing loss detection. Age at device fitting spanned from 8 months to 9 years with a mean of 3.43 years ($SD=2.28$). Participants using HAs, on average, received devices younger than those using CIs ($M=2.90$ and 3.61 months for the HA and CI groups, respectively). The discrepancy in age at device fitting primarily relates to the completion of a required HA trial prior to receiving a CI device.

Table 1. Demographic Characteristics of Children with Cochlear Implants.

Demographic variable	<i>n</i>		CI	HA	Total
Chronologic age (years) ^a	49	<i>M</i>	12.74	13.36	12.88
		<i>SD</i>	2.47	1.75	2.3
		Range	8–18	10–15	8–18
Age at device fitting (years) ^b	44	<i>M</i>	3.61	2.9	3.43
		<i>SD</i>	2.39	1.92	2.28
		Range	1–9	0.66–7	.66–9
Duration of device experience (years) ^b	44	<i>M</i>	9.21	10.46	9.52
		<i>SD</i>	2.93	3.31	3.04
		Range	2–13.83	3–14.33	2–14.33

Note. CI = cochlear implant; HA = hearing aid; Total = all participants.

^aOne participant did not report chronologic age.

^bSix participants did not indicate age at device fitting or duration of device experience.

Materials

Communication factors. Children and adolescents evaluated their communication prowess via a visual analog scale. Participants rated abilities on a scale of 1 to 10, with 10 being the best, for the following items: (a) understanding others talking when it is quiet; (b) understanding others talking when it is noisy; and (c) speaking so that others can understand them.

Social engagement. Participants answered two questions regarding social engagement. The first item queried types of activities in which the child or adolescent participated during the school year via an ad hoc questionnaire. Participants selected applicable activities from a list, which included athletic teams (e.g., athletic team at school, athletic team outside of school, spirit groups); fine arts groups (e.g., band, choir, orchestra, or drama); academic clubs (e.g., debate team, honor society, student government); community service (e.g., peer mediators, ecology); and other activities. Participants also could select *I do not participate in activities either in or out of school*.

The second item of social engagement centered on friendships. The authors adapted this item from the *Playmate Questionnaire*. Participants indicated presence of friendships based on a 4-point scale that included the following response choices: *I have no friends*, *I have one close friend*, *I have several friends*, and *I have lots of friends*.

Self-esteem. The *Rosenberg Self-Esteem Scale (RSES)*, a well-established, reliable, and valid measure of self-esteem, contains 10 items about self-perception of worth (Rosenberg, 1965). The scale includes five items

with positively focused wording (e.g., *On the whole, I am satisfied with myself*) and five items with negatively focused wording (e.g., *At times I think I am no good at all*).

Participants rated agreement with each statement on a 4-point Likert scale ranging from *Strongly Disagree* (score = 0) to *Strongly Agree* (score = 3) (Rosenberg, 1965). Negatively worded items were reversed, so higher scores indicated more positive self-esteem. The global self-esteem score represents the sum of scores for the 10 individual items, resulting in a possible global self-esteem rating ranging from 0 to 30. Scores between 15 and 25 represent the normal range for self-esteem. Scores exceeding 25 indicate high self-esteem, and scores less than 15 suggest low self-esteem (Rosenberg, 1965). Reliability of the *RSES* in adolescents extends across gender, race, ethnicity, and nationalities, with Cronbach's alpha values ranging from .45 to .90 across countries and .88 for the United States (Dukes & Martinez, 1994; Schmitt & Allik, 2005). Dukes and Martinez (1994), who transformed *RSES* scores to a scale of 10 to 40, reported a grand mean of 30.75 ($SD = 5.06$) for 18,612 junior high and high school students. This grand mean transforms to a mean score of 20.75 ($SD = 5.06$) on a scale ranging from 0 to 30.

Temperament and behavior. The *Early Adolescent Temperament Questionnaire-Revised (EATQ-R)* measures temperament in children and adolescents between 9 and 15 years of age (Capaldi & Rothbart, 1992; Ellis & Rothbart, 2001). The full version includes 65 items grouped into 10 temperament and 2 behavior domains. The present study focused on five areas most likely affected by hearing loss or most likely to affect self-esteem: four temperament domains (affiliation, attention, shyness, and frustration) and one behavior domain (depressive mood) (see Table 2 for definitions, sample items, and normative data based on Ellis and Rothbart (2001)). Each domain included between four and seven items.

Participants rated each statement on a 5-point Likert scale (i.e., *Almost always untrue, usually untrue, sometimes true/sometimes untrue, usually true, or almost always true*). Items were evaluated and reversed according to Ellis and Rothbart (2001). Temperament and behavior domain scores reflect a domain mean, a grand mean of all ratings across all items in that domain. A grand mean affords maintenance of equal emphasis on all domains without concern for number of items per domain. The *EATQ-R* has high internal consistency estimates for each domain, with Cronbach's coefficient alpha ranging from .69 to .80 across temperament domains (Ellis & Rothbart, 2001).

Table 2. Early Adolescent Temperament Questionnaire-Revised Domains.

Domain	n	Definition	Example item	Normative data	
				Mean (SD)	Range
Affiliation	5	Desire for warm and close connections with others	It is important for me to have relationships with other people.	3.55 (0.62)	2.2–5.0
Attention	6	Capacity to focus and shift attention	I pay close attention when someone tells me how to do something.	3.34 (0.59)	2.2–4.8
Depressive mood	6	Sadness and/or negative affect	I get sad more than other people realize.	2.47 (0.59)	1.0–4.0
Shyness	4	Behavioral discomfort to novelty and challenge, particularly in social situations	I feel shy about meeting new people.	2.93 (0.89)	1.0–5.0
Frustration	7	Feelings of anger or annoyance related to inability to do something	It really annoys me to wait in long lines.	3.22 (0.68)	1.0–5.0

Note. Normative data for the Early Adolescent Temperament Questionnaire-Revised (EATQ-R) comes from Ellis and Rothbart (2001).

Procedure

Children and adolescents independently completed all questionnaires via Qualtrics, an online survey generator.

Statistical Analysis

Means and standard deviations were calculated for all variables of interest. An independent one-sample *t* test was conducted to compare self-esteem rating in our sample with hearing loss with ratings from a general population of children and adolescents (Dukes & Martinez, 1994). An alpha value of .05 was used to determine statistical significance for the one-sample *t* test. Spearman correlation coefficients (ρ) were computed to assess associations between self-esteem ratings and continuous demographic variables (i.e., age, age at device fitting, duration of device use); communication factors (i.e., self-assessed perception in quiet, perception in noise, and intelligibility); social engagement (i.e., number of activities, number of friends); as well as temperament and behavior domains (i.e., affiliation, attention, depressive mood, frustration, and shyness). A point bi-serial correlation was used to calculate the association between global self-esteem rating and dichotomous demographic variables (i.e., gender). A conservative *p* value with Bonferroni's correction ($p < .004$) was used to reduce likelihood of Type I error due to multiple comparisons. All statistical analyses were completed using SAS statistical software, version 9.3 (Cary, NC).

Results

Effect of Hearing Loss on Self-Esteem

The first analysis compared rating of global self-esteem in children and adolescents with sensorineural hearing loss to children and adolescents in the general population. Figure 1 displays ratings of self-esteem, as measured by the RSES, of individual children and adolescents with hearing loss. Each column along the *x* axis represents the response of an individual participant, organized from the least positive rating of self-esteem (11 of a possible 30 on the *y* axis) to the most positive rating of self-esteem (30 of a possible 30 on the *y* axis). Scores on the RSES fall into one of three categories: high self-esteem (scores greater than 25), normal self-esteem (scores between 15 and 25), and low self-esteem (scores less than 15). The mean score for children and adolescents in the general population (M_{GEN}), represented by the black dashed line, is 20.75 out of 30 (Dukes & Martinez, 1994). The mean score for the present sample of children with hearing loss (M_{HL}), represented by the solid gray line, is 22.52. Children and

adolescents with hearing loss ($M = 22.52$, $SD = 5.26$) rated global self-esteem significantly more positively than peers in the general population, as published by Dukes and Martinez (1994) ($M = 20.75$, $SD = 5.06$), $t = 2.38$, $p = .02$.

Factors Affecting Self-Esteem in Adolescents With Hearing Loss

Self-perceived ratings of communication abilities revealed a broad range of functionality. Perceived understanding in quiet received the most positive communication ratings ($M = 8.33$, $SD = 1.85$, Range: 1–10). Participants generally perceived themselves as intelligible speakers ($M = 7.90$, $SD = 2.46$, Range: 1–10). Self-assessed perception in noise earned the least positive ratings ($M = 5.35$, $SD = 2.12$, Range: 1–9).

Social engagement, assessed by participation in organized activities and presence of friendships, varied. Three participants reported no engagement in organized activities, either within or outside of school. The remaining 47 children and adolescents recounted a mean of 2.77 activities ($SD = 1.55$, Range: 1–7), including reports of one activity ($n = 9$), two activities ($n = 16$), and more than two activities ($n = 22$). One child elected not to answer the item inquiring about the presence of friendships, so the data reflect a sample size of 49 participants. Most children and adolescents indicated they had either some friends (41%) or lots of friends (43%). Six participants (10%) reported they had one friend, and two participants (4%) indicated they did not have any friends.

Mean scores for the *EATQ-R* temperament and behavior scales generally exceeded the midpoint of the Likert scale. Participants assigned the highest mean ratings to the affiliation ($M = 3.79$, $SD = 0.69$, Range: 1.00–4.80) and attention scales ($M = 3.64$, $SD = 0.54$, Range: 2.50–4.67). The frustration ($M = 3.01$, $SD = 0.70$, Range: 1.00–4.43) and shyness scales ($M = 2.86$, $SD = 0.93$, Range: 1.00–4.75) received the next highest scores. Depressive mood received the lowest mean score ($M = 2.38$, $SD = 0.63$, Range: 1.00–3.67). Mean scores in the attention domain for children and adolescents with hearing loss significantly exceeded scores from hearing peers, $t(225) = 4.58$, $p < .0001$. No other mean scores for temperament and behavior domains in the group of children and adolescents with hearing loss differed significantly from mean scores in children and adolescents without hearing loss (Ellis & Rothbart, 2001).

Association between self-esteem and other factors. Spearman correlation coefficients (ρ) were computed to assess associations between self-esteem ratings and demographic, communication, social engagement, and temperament variables. No correlations between self-esteem and demographic factors (i.e., age, age at

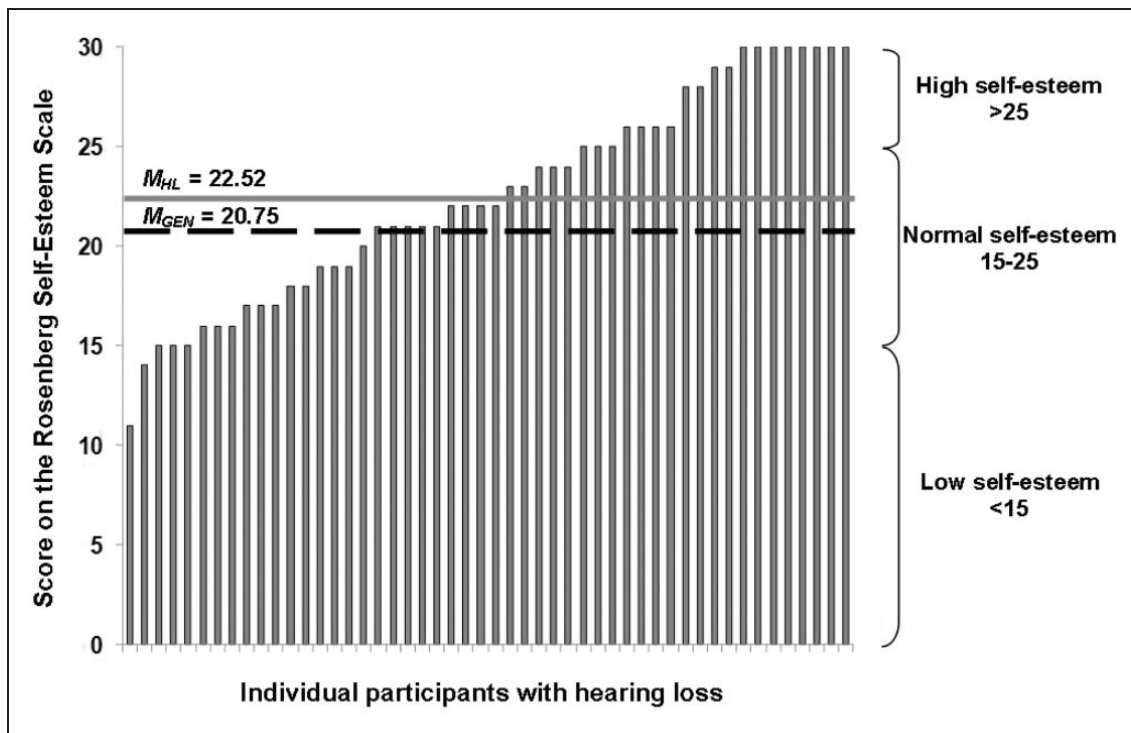


Figure 1. Effect of hearing loss on self-esteem. The y axis displays ratings of self-esteem, as measured by the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) of individual children and adolescents with hearing loss, represented on the x axis.

device fitting, duration of device use), self-perceived communication prowess (i.e., perception in quiet, perception in noise, or intelligibility), or social engagement (i.e., number of organized activities, presence of friendships) reached statistical significance.

Ratings of self-esteem significantly correlated with two temperament variables and one behavior domain: affiliation, attention, and depressive mood (see Figures 2, 3, and 4). Figures 2 to 4 show temperament or behavior domains from the EATQ-R on the x axis and self-esteem from the RSES on the y axis. Affiliation correlated significantly with self-esteem scores such that children and adolescents with greater desire for warmth and closeness reported higher self-esteem, $r = .42$, $p = .002$ (Figure 2). This correlation remained moderately strong and significant even after removing the apparent outlier in Figure 2 from the correlation analysis, $r = .39$, $p = .006$. Children with higher attention domain scores also had more positive self-esteem scores, suggesting higher self-esteem in children with a greater capacity to focus and shift attention versus those who cannot, $r = .45$, $p = .001$ (Figure 3). Finally, ratings of self-esteem varied indirectly with depressive mood. Children and adolescents who reported unpleasant affect and decreased joy were significantly more likely to report lower global self-esteem compared with participants with lower depressive mood scores, $r = -.60$, $p < .0001$ (Figure 4). No other correlations between

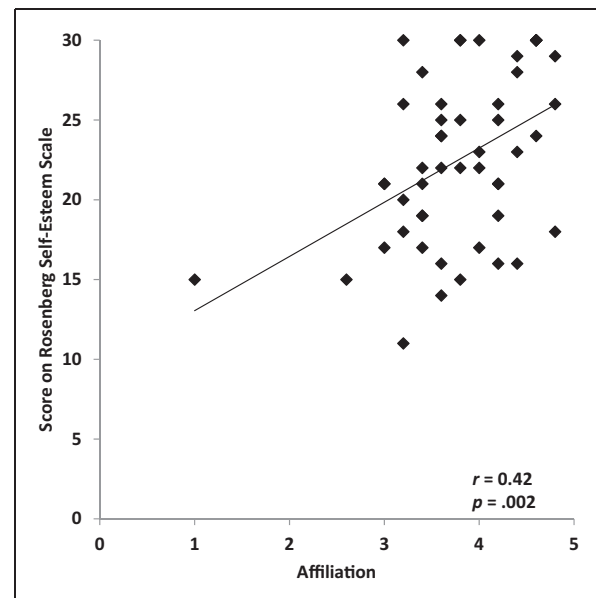


Figure 2. Relationship between affiliation and self-esteem. The affiliation temperament, as measured by the Early Adolescent Temperament Questionnaire-Revised (EATQ-R), is displayed on the x axis, and self-esteem, as measured by the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), is displayed on the y axis. A higher score on the affiliation domain indicates a greater desire for warmth and closeness with others.

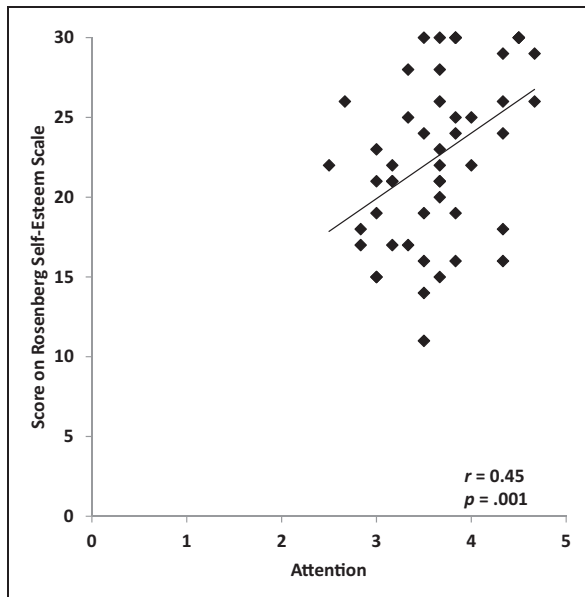


Figure 3. Relationship between attention and self-esteem. The attention temperament, as measured by the Early Adolescent Temperament Questionnaire-Revised (EATQ-R), is displayed on the x axis, and self-esteem, as measured by the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), is displayed on the y axis. A higher score on the attention domain reflects a greater capacity to focus or shift attention.

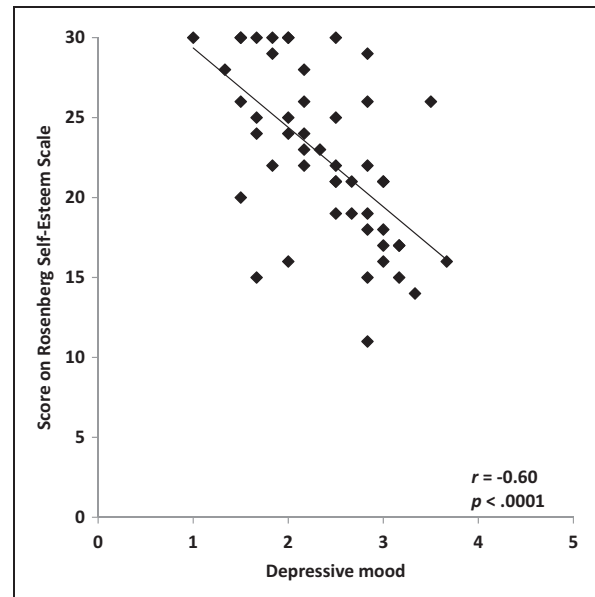


Figure 4. Relationship between depressive mood and self-esteem. The depressive mood behavior, as measured by the Early Adolescent Temperament Questionnaire-Revised (EATQ-R), is displayed on the x axis, and self-esteem, as measured by the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), is displayed on the y axis. A higher score on the depressive mood domain corresponds to a more unpleasant, unhappy affect.

self-esteem, temperament, and behavior reached statistical significance.

Associations among demographic, communication, social engagement, and temperament variables. Significant correlations emerged among the demographic, communication, social engagement, and temperament variables. Self-rated perception in noise significantly associated with self-rated intelligibility, $r = .56$, $p < .0001$. Depressive mood reached statistical significance with frustration, $r = .51$, $p = .0002$, and shyness, $r = .43$, $p = .0017$, indicating individuals with more negative affect exhibited higher levels of frustration and greater resistance to novelty and challenge.

Discussion

Children and adolescents with hearing loss wearing CIs or HAs rated self-esteem slightly but significantly more positively than typically developing children. Appraisal of self-esteem did not vary by demographic or hearing-related factors, self-perceived communication abilities, or social engagement but did significantly correlate with temperament and behavior characteristics. More positive self-esteem scores corresponded to higher scores in the affiliation and attention domains and lower scores in the depressive mood domain.

Descriptive profiling of participants reporting high self-esteem (i.e., RSES > 25) revealed little differences in social, communication, and temperament realms relative to the entire group. However, children and adolescents with high self-esteem reported more social activities, slightly more friends, higher affiliation and attention scores, and lower depressive mood and shyness scores.

Our finding that children and adolescents with hearing loss report more positive self-esteem than hearing peers mirrors some published reports (Cates, 1991; Koelle & Convey, 1982) but differs from others finding less positive self-esteem in children with hearing loss (Bat-Chava & Deignan, 2001; Huber, 2005; Tambs, 2004; Weisel & Kamara, 2005) or no differences based on hearing status (Kluwin, 1999; Sahli & Belgin, 2006; Sahli et al., 2009). Several reasons may explain the generally high level of self-esteem in our cohort. Most of these children received relatively early intervention for their hearing loss. One third underwent device fittings by 2 years, one third received devices between 2 and 5 years of age, and one third began wearing a device after age 5 years. The majority of participants rated understanding in quiet and speech intelligibility favorably, indicating these participants performed well with their devices. Also, over half of our participants were recruited from CI summer camps, which could influence our outcomes in two primary ways. First, data collected during

the summer may reflect pediatric perspectives from care-free, vacationing individuals involved in an enriched environment with other peers with hearing loss versus focused, intellectually challenged children engaged in academic and extracurricular activities among hearing peers. Second, children who attend CI camps typically belong to families with increased parental involvement, a separate factor that positively impacts outcomes after implantation.

Rating of self-esteem attained significant positive correlations with two temperament domains (affiliation and attention) and a significant negative correlation with one behavior domain (depressive mood). Depressive behaviors correlated strongly and inversely with self-esteem, convergent with previous reports of children and adolescents regardless of hearing status (Sahli et al., 2009; Waylen & Wolke, 2004). The consistent relationship between depressive symptoms and appraisal of self-esteem across hearing status highlights the universality of factors associated with self-esteem. Mean depressive mood scores for our contemporary sample of children with hearing loss seems very similar to published scores from hearing adolescents and better than scores for adolescents using CI (Sahli et al., 2009). We should pay attention not only to the mean value for depressive mood but also to the relative proportion of participants expressing less joy and interest in activities. Eleven participants (22%) in the present study indicated higher levels of depressive mood (grand mean scores exceeding 3.0 on a 5-point Likert scale). Currently, no comparison exists for a typical population of age-matched peers. Establishing the prevalence of depressive symptoms based on auditory status would alert clinicians to the potential for depression, loneliness, and lower self-esteem—or co-occurrence of these characteristics—in different populations.

No demographic, communication, or social variables significantly correlated with self-esteem. The lack of a significant association between age and self-esteem diverged from established reports of age-related differences in self-esteem in children with normal hearing and those with hearing loss (e.g., Eccles et al., 1993; Harter, 1993, 1998; Keilmann et al., 2007; Kling et al., 1999; Robins et al., 2002; Warner-Czyz et al., 2009). The age distribution of our sample potentially contributes to the nonsignificant relationship between age and self-esteem. Our children ranged in age from 8 to 18 years, but over 60% of the group fell between 11 and 14 years. The uneven distribution by age, in combination with a smaller sample size, perhaps did not allow for true assessment of the connection between age and self-esteem.

Gender did not significantly influence self-esteem, contrary to established literature suggesting boys appraise self-esteem more positively than girls (Kling

et al., 1999; Puskar et al., 2010; Rosenberg & Simmons, 1975; Sung et al., 2006). Age could serve as an underlying factor to explain the lack of association between gender and self-esteem, but the two groups had the same mean age. Additionally, each gender group had similar distribution of children 12 years and younger, classified in the *industry versus inferiority* psychosocial phase, and children 13 years or older, categorized in the *identity versus confusion* psychosocial phase (Erikson, 1963). It is possible that our data reflect a select sample of children and adolescents with hearing loss, the majority of whom perform well with their devices and have generous support from their families. Thus, the nonsignificance may indicate neither age nor gender effects due to lack of diversity within the sample.

Examination of participants with high self-esteem revealed persistent effects of temperament—particularly affiliation, depressive mood, and attention—on self-esteem scores, strengthening the argument that self-esteem arises from global personality and behavior characteristics. Children in the high self-esteem group reported more activities and more friends than the group as a whole. The connection between greater social engagement and self-esteem in children with hearing loss parallels typical developmental patterns seen in the general adolescent population. More popular children and adolescents interact more frequently with peers, who enhance their self-perceived internal value. In contrast, those who withdraw from frequent social interaction may question their self-worth relative to their peer community (Kluwin, 1999; Kluwin, Stinson, & Colarossi, 2002).

This study marked one of the first examinations of multiple factors affecting self-esteem in children with hearing loss. Inclusion of both generic and condition-specific variables affecting self-esteem reiterates the universal impact on self-esteem. Another strength is use of a reliable, valid measure versus ad hoc questions or a domain score, which allowed comparison with a larger population of adolescents.

This study is not without limitations. Homogeneity of the population and selection bias may represent the best case scenario for self-esteem in children and adolescents with hearing loss. Our sample represented a consistent group with respect to age, communication mode (i.e., oral vs. total communication), and educational setting (i.e., mainstream public vs. private or special education). Most data came from participants at summer camps created for children with CIs, which may yield more positive ratings of self-esteem based on a carefree summer versus focused school-based attitude.

Future studies should include a balanced sample to enhance generalizability across a broad population of children with hearing loss. Additionally, future studies should focus on social participation and friendships to

determine not only if the child interacts with peers but also the quality and partners of those friendships. Anecdotal report from parents suggests that children with hearing loss often exhibit less mature social skills such that they interact more easily with chronologically younger children or that they do not form true, equivalent relationships with peers.

Professionals working with children and adolescents with hearing loss place primary importance on communication performance, but quality of life also deserves attention. Clinicians and professionals cannot assume that successful communication abilities co-occur with excellent quality of life (Punch & Hyde, 2011). Simultaneous examination of not only demographic characteristics and communication outcomes, but also social, temperament, and self-esteem factors will help clinicians identify children with hearing loss at risk for low self-esteem. Such identification will help generate referrals to mental health professionals to enhance quality of life beyond communication skills in children with significant hearing loss.

Author Note

Portions of this article were presented at the Hearing Across the Lifespan conference in Cernobbio, Lake Como, Italy, June 5–7, 2014.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: We appreciate support for this project from the E. Rhodes and Leona B. Carpenter Foundation (to B. A. L. and A. D. W.).

Acknowledgments

The authors are grateful for the support from the Colorado Neurological Institute Cochlear Kids Summer Camps, Estes Park, CO; Rocky Mountain Ear Associates, Denver, CO; Dallas Cochlear Implant Program and the Callier Center for Communication Disorders, Dallas, TX; and clinicians, listservs, and families who helped recruit participants. The authors also appreciate the children and adolescents who took the time to answer the questionnaire to help us learn more about self-esteem in this population.

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