

THE RELATIONSHIP BETWEEN COCHLEAR IMPLANTS AND DEAF IDENTITY

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HE DEGREE to which individuals with cochlear implants (CIs) experience communication difficulties has implications for social participation and identity development. However, few studies have examined the relationship between cochlear implantation, identity, and social participation. Using data from a Danish national survey of deaf adults, the authors examined the significance of having (or not having) a CI in regard to identity (categorized as deaf, hearing, bicultural, and marginal) and various related factors concerning social participation and experiences of being deaf. Cochlear implantation was found to be associated with type of identity, type and quality of friendships and social activities, and feelings of limitation attributed to hearing loss. Age was a significant factor: These associations were mainly found among participants older than age 25 years. The authors discuss the results in dialogue with the concept of social identity and the history of the bilingual/bicultural tradition in Denmark.

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Cochlear implant (CI) surgery has been available to profoundly deaf children and adults for about 40 years (Christiansen & Leigh, 2002). In the United States, the National Institute on Deafness and Other Communication Disorders (2016) reported that by the end of 2012 about 324,200 CI devices had been implanted worldwide. Congenitally deaf children are increasingly being implanted at a young age. In the United Kingdom, for example, between 2006 and 2011, 74% of eligible children ages 0–3 years received a CI (Raine, 2013).

The successful outcomes of cochlear implantation in regard to audition and spoken-language development, particularly for those who have CI surgery at a young age, have been widely reported (see, e.g., Niparko & Marlowe, 2010), but research has also drawn attention to the difficulties of communication and social participation that continue to be experienced by children and young people with CIs (e.g., Batchava & Deignan, 2001; Punch & Hyde, 2011). At the same time, policies promoting integrated schooling have resulted in the decline of specialized deaf schools and bilingual/bicultural approaches to deaf education (Swanwick

et al., 2014). The spread of CI technology therefore raises questions about its implications for deaf identity, social participation, and general well-being.

Cochlear Implantation and Well-Being

Attention has been paid to the psychosocial outcomes of having a CI. Many studies, mostly using questionnaire data, have found that children and adolescents with CIs experience levels of psychological well-being, self-esteem, and social adjustment equivalent to those of the general population (Nicholas & Geers, 2003; Percy-Smith, Caye-Tomasen, Gudman, Jensen, & Thomsen, 2008; Rembar, Lind, Romundstad, & Helvik, 2012). However, other studies, often using qualitative or mixed methods, have reported a more varied picture with respect to both the communicative and related psychosocial outcomes of cochlear implantation. Concerns have been raised, for example, that children with CIs often have hearing and communication difficulties in group settings or other situations in which the optimal conditions for hearing or speechreading are absent. For example, Punch and Hyde (2011) drew on both quantitative and qualitative data to report that, notwithstanding generally positive psychosocial development, children with CIs often have enduring problems with social skills and social participation due to ongoing issues of communication in groups. Similar findings of social and pragmatic language difficulties have been reported in other studies (Bat-Chava & Deignan, 2001; Bat-Chava, Martin, & Kosciw, 2005; Dammeyer, 2012; Martin, Bat-Chava, Lalwani, & Waltzman, 2011; Preisler, Tvingstedt, & Ahlstrom, 2005).

Studies concerning psychosocial outcomes among adults with CIs suggest that a range of social factors are involved in supporting well-being

(Chapman & Dammeyer, 2016; Hallberg, Ringdahl, Holmes, & Carver, 2005; Hintermair, 2008). For example, Hallberg et al. (2005) analyzed data from a questionnaire administered to adults with CIs and found that the variables that were most strongly predictive of the level of well-being of adults with CIs were other people's attitudes to their hearing difficulties, degree to which social participation was restricted, level of perceived social support, and age.

The Relationship Between Cochlear Implantation and Identity

Another topic of research that relates to existing findings on the psychosocial outcomes of cochlear implantation is identity. The studies discussed above raise issues related to group communication, social skills, and social participation that resonate with matters of identity. Hyde and Punch (2011) found that while most of the children with CIs in their study saw themselves as deaf in an audiological rather than cultural sense, they often wanted to explore Deaf culture and signed language when they reached adolescence or young adulthood. The children did not evince identity as either deaf or hearing but were somewhere between. Wheeler, Archbold, Gregory, and Skipp (2007) observed from qualitative studies of young people with CIs that they seemed to be "in the position of feeling that they do not belong to either the deaf or the hearing world" (p. 311).

Identity is increasingly recognized as an important factor in psychological well-being and other life outcomes for people who are deaf. Studies of deaf identity often use four categories of identity that reflect research on cultural deaf identity (Bat-Chava, 2000; Glickman, 1996) and are measured with psychometrically validated ques-

tionnaires (Colangelo Fischer & McWhirter, 2001; Glickman, 1996; Glickman & Carey, 1993). These categories of identity are *deaf* (signifying positive identification as deaf and immersion in Deaf culture), *hearing* (signifying positive identification with the hearing majority and likely perception of deafness as a disability), *bicultural* (signifying positive identification with both the deaf and hearing cultures), and *marginal* (signifying lack of identification with both the Deaf and hearing cultures). Both questionnaire and interview-based studies on well-being and other life outcomes among the deaf population have found that those with a marginal identity have poorer outcomes overall, while those with a bicultural or deaf identity outperform the other groups (Bat-Chava, 2000; Cornell & Lyness, 2005; Hintermair, 2008; Maxwell-McCaw, 2001).

While studies have looked at the significance of sign language acquisition (Häfele, 2001) and type of schooling (Häfele, 2001; Nikolarazi & Hadjidakou, 2006) for deaf identity development, few studies have explored how cochlear implantation may affect identity development and, thereby, life outcomes. One such study was done by Mance and Edwards (2012), who reported that, for adolescents with CIs, the more closely they identified with their hearing peers, the greater their overall psychological well-being. Mance and Edwards warned that the corollary of this finding was that those individuals who identified less closely with hearing peers experienced poorer psychological well-being, with nearly half being in the clinical range. Mance and Edwards's call for further research that would address differences and difficulties of social participation informs the present study's attention to the significance of having a CI or not for a range of factors related to identity such as forms of friendship and social activity.

Discrimination, Limitation, and Challenges

Another underexplored matter of interest relating to identity and cochlear implantation concerns the perceived experience of deafness. For example, in a previous study (Chapman & Dammeyer, 2016), we discussed how deaf identity was significantly associated with feeling discriminated against. Specifically, we explored the implications for “positive social identity” (Tajfel, 1978) of our finding that deaf identity was associated with both high levels of psychological well-being overall and relatively high levels of feeling discriminated against (the latter being, however, independently predictive of low psychological well-being). Drawing on social identity theory and research, we argued from this finding that positive deaf identity as culturally distinct is likely constructed both through and against a sense of threatened minority status. From a social identity perspective, the study’s findings imply that differences between perceived experiences of deafness (such as the difference between experiencing deafness in terms of being part of a distinct, discriminated-against minority and experiencing deafness in terms of functional limitation or disability; see Burch & Kafer, 2010) are bound up with identity and related social and psychological outcomes, as other researchers have theorized (e.g. Jones, 2002). This implication regarding perceived experiences of deafness guides the present study’s use of social identity as an explanatory concept and its inclusion of perceived experiences of deafness as a factor in its analysis of how cochlear implantation might influence deaf identity, social participation, and well-being.

National Context of the Study

The present study’s context is Denmark, where, as elsewhere in Scandi-

navia, a bicultural/bilingual approach in deaf education was pursued from the 1980s until the mid-2000s. This approach entailed the recognition and teaching of sign language as the primary language and the immersion of children in Deaf culture (Swanwick et al., 2014). However, since the mid-2000s, the impact of cochlear implantation and the increased focus on spoken language in education have resulted in the general diminishment of the bicultural/bilingual approach in Denmark (Swanwick et al., 2014). This history informs the present study’s interest in the possible effects on identity of age (and thus generational) differences and age of CI surgery.

Aims of the Study

The aim of the present study is to investigate the role of cochlear implantation in the matrix of deaf identity and related factors. In dialogue with existing research findings and the concept of social identity, the study examines the significance of having or not having a CI for deaf identity and experiences of discrimination, limitations and challenges, friendships and social participation, and well-being. Further, the study includes age and age of CI surgery as variables with a view to exploring possible developmental and generational differences as well as their possible effects on identity development and other outcomes of different ages of CI surgery.

Method

Participants and Data Generation

The data for the present study were derived from a nationwide Danish survey of 839 deaf people ages 16–64 years. This online survey was designed specifically for the deaf population and conducted in 2014 by the Danish National Centre for Social Research (Larsen, Sommer, & Bengtsson, 2014).

Recruiting was done through social media sites and contact lists provided by deaf associations, sign language interpreter services, and health service centers for people with hearing loss. Participants were invited to complete the survey online but could request a paper version.

It was estimated that the sample of 839 constituted 25% of the adult population with moderate to severe hearing loss in Denmark (Larsen et al., 2014). A slight majority of participants, 51.6 % ($n = 433$), were women. The mean age of participants was 43.1 years ($SD = 14.23$). About one in three (30.3%, $n = 254$) reported having at least one CI, and the mean age of CI surgery was 36.8 years ($SD = 17.90$). About one in four (23.6%, $n = 198$) reported that they used sign language as their primary mode of communication, and 40.9% (343) reported that they had attended a special school for the deaf in childhood.

Measures

Cochlear Implantation

Variables for cochlear implantation were constructed from the following questions: “Do you have a cochlear implant?” (answered with “Yes” or “No”) and “How old were you when you got your cochlear implant?” (answered with age in years). Of the 839 participants, 801 responded to these two questions.

Identity

A single-item question was used in the survey to capture self-perceived deaf identity. The four deaf identity groups—deaf, hearing, bicultural, and marginal—have been well established by research using psychometrically validated questionnaires such as the Deaf Identity Development Scale (Glickman, 1996; Glickman & Carey, 1993) and the Deaf Acculturation Scale (Maxwell-McCaw, 2001). The

construction of the four deaf identity groups reflects research on the Deaf cultural minority movement and the work on deaf identity by Glickman (1996), Bat-Chava (2000), and others.

The use of a single-item measure of identity here follows an established and validated tradition in psychology, and in particular social psychology, that emphasizes subjective processes of identification with a social group or groups (Hopkins & Reicher, 2011; Postmes, Haslam, & Jans, 2013; Tajfel, 1978). A single-item measure is particularly apt here because of the high consciousness among deaf adults of issues of deaf identity (Kunnen, 2014), which is reflective of social debate about and recognition of the Deaf community as a linguistic-cultural minority (Bagga-Gupta, 2004; Ladd, 2003). The survey question on social deaf identity was “Do you feel you have most in common with deaf or hearing people?” Survey participants could choose one of four responses: “Deaf people,” “Hearing people,” “Both deaf and hearing people,” or “Neither deaf nor hearing people.” The question on whom the participants felt they had “most in common” captures the feelings of commonality and belonging that forge social identity (Chapman & Dammeyer, 2016), and was used in the present study as the recommended measure “for studies designed to tap into the self-investment component of identification” (Postmes et al., 2013, p. 17). The four identity groups of deaf, hearing, bicultural, and marginal were constructed from this item.

Discrimination, Limitation, and Challenges

The survey included three items designed to capture perceived experiences of being deaf: one on the feeling of being discriminated against on account of hearing loss, one on feelings of limitation on account of hearing

loss, and one on the perceived challenges of working with hearing peers. The use of the term “perceived experience” does not deny real experience, such as the experience of discrimination. Rather, it seeks to articulate how, as we have discussed elsewhere (Chapman & Dammeyer, 2016), these experiences are entwined with the construction of social identity and representations of “being deaf” (Gregory, Bishop, & Sheldon, 1995). Therefore, while the item on discrimination aimed to capture the perceived experience of deafness as that of a socially excluded minority, the item on feelings of limitation was aimed more toward capturing the perceived experience of hearing loss as a functional impairment or disability. The third item, on challenges at work, outlined different barriers to working with hearing others and thereby also concerns perceived experiences of being deaf.

For the question on discrimination, participants were asked, “Do you feel discriminated against because of your hearing loss?” Responses were rated on a 4-point Likert scale ranging from “Always” to “Never.” To measure the experience of hearing loss as limiting, participants were asked, “To what degree do you feel limited by your hearing loss?” The responses were rated on a 4-point Likert scale ranging from “A lot” to “Not at all.” Finally, for the question on challenges at work, participants were asked, “What challenges and issues do you experience when you work with hearing people?” Participants could choose one of seven responses: “Difficulties communicating,” “Difficulties cooperating,” “Cultural differences,” “Feeling of isolation,” “Social issues,” “Other,” or “No problems.”

Friendships and Social Participation

Measures of hearing and deaf friendships and engagement in different

forms of social activity were included. The aim of these measures was to capture how deaf people participate socially with the Deaf and hearing communities. Participants were asked the following questions: “How often do you meet deaf friends socially?” “How often do you meet hearing friends socially?” “How often do you participate in Deaf cultural events?” and “How often do you participate in meetings in mainstream organizations (e.g., unions, sports, political, housing, school, etc.)?” The responses to the question on Deaf cultural events were rated on a 4-point Likert scale, while the responses to all the other items were rated on a 7-point Likert scale.

Psychological Well-Being

We used the 5-item World Health Organization Well-Being Index (WHO-5) as a measure of psychological well-being. The WHO-5 index is one of the most widely used questionnaires for assessing subjective well-being and has been carefully evaluated for reliability and validity (Bonsignore, Barkow, Jessen, & Heun, 2001; Ellervik, Kvetny, Christensen, Vestergaard, & Bech, 2014; Topp, Østergaard, Søndergaard, & Bech, 2015). The index has five positively worded items (e.g., “Over the past two weeks, I have felt cheerful and in good spirits”) rated on a 6-point Likert scale ranging from “All of the time” to “At no time.” A sum score (range: 0–25) was calculated and translated to a 0–100 scale by multiplying by 4. Higher scores indicate greater well-being.

Analysis

Three CI groups were compared: (a) all participants, whether with or without a CI; (b) for participants younger than age 26 years: with CI surgery at an age younger than age 13, with CI surgery at an age older than 12, and

without a CI; (c) for participants older than age 25: with and without a CI. The four identity groups were also compared. The groups were compared for each of the well-being, social participation, discrimination, limitation, and challenges variables. Chi-square statistics were used for the nominal data, Mann-Whitney U statistics were used for the ordinal data, and *t* test statistics were used for the continuous data. SPSS version 22 was used for all analysis. Significance levels of both .05 and .01 were recorded in the tables, and exact values were included in the text in order to inform the interpretation of findings and minimize the risk of Type I and Type II errors (Cabin & Mitchell, 2000).

The rationale for the age group split was that those older than 25 years have lived during the bilingual/bicultural period, whereas those age 25 and under have lived after this period. Cochlear implantation at age 12 and under was considered to be young childhood implantation and implantation at an older age than 12 to be late childhood implantation. Because the youngest age of CI surgery for those older than 25 was 17, this group was not compared with regard to age of cochlear implantation.

Before we started the analysis, we evaluated gender and age differences between the groups. In terms of gender and age, there were no significant differences between participants with a CI and those without. For the identity groups, the only significant difference related to age. Those with a deaf identity ($M = 38.9$, $SD = 13.8$) were significantly younger than those whose identity was hearing ($M = 47.0$, $SD = 14.4$) or bicultural ($M = 45.1$, $SD = 13.4$). Those with a marginal identity ($M = 40.2$, $SD = 13.7$) were significantly younger than those with a hearing identity.

Results

Identity

As shown in Table 1, comparison of participants with and without a CI showed that those without a CI were significantly more likely to have a deaf identity, $\chi^2(1, N = 740) = 22.58$, $p < .001$, while those with a CI were significantly more likely to have a hearing identity, $\chi^2(1, N = 740) = 25.47$, $p < .001$. The analysis within the different age groups showed that the same significant differences for deaf and hearing identity persisted when participants above 25 years of age with a CI were compared to those above age 25 without a CI. Those with a CI were significantly more likely to report a hearing identity, $\chi^2(1, N = 626) = 26.86$, $p < .001$, and less likely to report a deaf identity, than those without a CI, $\chi^2(1, N = 626) = 28.99$, $p < .001$. However, no significant differences were found when participants under 26 were compared.

Discrimination, Limitation, and Challenges

There were no significant differences between the CI groups with regard to feeling discriminated against because of hearing loss (Table 1). However, there were significant differences between the identity groups (Table 2). Those with a marginal identity reported significantly higher levels of feeling discriminated against than all the three other identity groups (marginal and deaf: $U = 5072$, $p = .017$, $r = .14$; marginal and hearing: $U = 2272$, $p < .001$, $r = .39$; marginal and bicultural: $U = 4054$, $p < .001$, $r = .26$). Further, those with a deaf identity reported significantly higher levels of feeling discriminated against than those with a hearing and bicultural identity (deaf and hearing: $U = 15025$, $p < .001$, $r = .32$; deaf and bicultural: $U = 25399$, $p < .001$, $r = .18$). Finally, those with a bicultural

identity reported significantly stronger levels of feelings of discrimination than those with a hearing identity (bicultural and hearing: $U = 20011$, $p = .002$, $r = .15$).

Significant differences between the CI groups were found with regard to feeling limited because of hearing loss (Table 1). Overall, those with a CI reported significantly higher levels of feeling limited than those without a CI ($U = 63189$, $p = .048$, $r = .07$). In the comparison of the CI age groups, the analysis showed that participants above age 25 years with a CI reported significantly higher levels of feeling limited than those without a CI ($U = 41316$, $p = .022$, $r = .09$). However, there were no significant differences among those under age 26, neither with respect to age of CI surgery nor to having a CI or not. Significant differences were found between the identity groups with regard to feeling limited (Table 2). Those with hearing and marginal identities reported significantly higher levels of feeling limited than those with deaf and bicultural identity (hearing and deaf: $U = 20292$, $p = .016$, $r = .12$; hearing and bicultural, $U = 21535$, $p = .039$, $r = .10$; marginal and deaf: $U = 4635$, $p = .002$, $r = .18$; marginal and bicultural: $U = 4894$, $p = .003$, $r = .17$).

With respect to the challenges of working with hearing people, there were two significant differences for the CI groups. When all participants were compared, it was found that those without a CI were significantly more likely than those with a CI to report cultural differences as a challenge: $\chi^2(1, N = 601) = 4.18$, $p = .041$ (Table 1). When the CI age groups were compared, this significant difference was also found for those above age 25 years, $\chi^2(1, N = 540) = 4.42$, $p = .035$, but not for those below 26. A comparison of the identity groups with respect to this item (Table 2) showed

Table 1
 Characteristics and Comparisons of Participants With Regard to Cochlear Implantation, Age, and Age of Cochlear Implant (CI) Surgery

Variable	All participants		Participants younger than 26 years			Participants older than 25 years	
	With cochlear implant (N = 254)	Without cochlear implant (N = 547)	With CI, age < 26, age of CI < 13 (N = 37)	Without CI, age < 26 (n = 67)	With CI, age < 26, age of CI > 12 (N = 24)	With CI, age > 25 (N = 193)	Without CI, age > 25 (N = 480)
	% (n)		% (n)			% (n)	
Identity							
Deaf	17.0 (41)	40.9 (204)**	31.0 (9)	54.1 (33)	41.7 (10)	11.7 (22)	39.0 (171)**
Hearing	41.1 (99)**	18.0 (90)	20.7 (6)	18.0 (11)	25.0 (6)	46.3 (87)**	18.0 (79)
Bicultural	33.6 (81)	34.9 (174)	34.5 (10)	21.3 (13)	20.8 (5)	35.1 (66)	36.8 (161)
Marginal	8.3 (20)	6.2 (31)	13.8 (4)	6.6 (4)	12.5 (3)	6.9 (13)	6.2 (27)
Discrimination, limitation, and challenges							
<i>Discrimination</i>							
Always	9.2 (23)	9.1 (49)	5.7 (2)	10.8 (7)	4.3 (1)	10.5 (20)	8.9 (42)
Now and then	45.8 (114)	46.6 (251)	60.0 (21)	52.3 (34)	69.6 (16)	40.3 (77)	45.8 (217)
Rarely	32.5 (81)	28.0 (151)	20.0 (7)	18.5 (12)	26.1 (6)	35.6 (68)	29.3 (139)
Never	12.4 (31)	16.3 (88)	14.3 (5)	18.5 (12)	0.0 (0)	13.6 (26)	16.0 (76)
<i>Feel limited</i>							
A lot	19.7 (50)	21.1 (115)	16.2 (6)	14.9 (10)	16.7 (4)	20.7 (40)	21.9 (105)
Quite a lot	52.0 (132)	41.8 (228)	45.9 (17)	50.7 (34)	50.0 (12)	53.4 (103)	40.5 (194)
A little	24.8 (63)	25.8 (141)	29.7 (11)	25.4 (17)	25.0 (6)	23.8 (46)	25.9 (124)
Not at all	3.5 (9)	11.4 (62)	8.1 (3)	9.0 (6)	8.3 (2)	2.1 (4)	11.7 (56)
<i>Challenges at work</i>							
Communication	24.7 (48)	23.3 (95)	35.7 (5)	28.6 (10)	50.0 (6)	22.0 (37)	22.8 (85)
Cooperation	2.1 (4)	2.7 (11)	0.0 (0)	2.9 (1)	0.0 (0)	2.4 (4)	2.7 (10)
Cultural	3.1 (6)	7.6 (31)*	7.1 (1)	2.9 (1)	0.0 (0)	3.0 (5)	8.1 (30)*
Isolation	2.6 (5)	2.2 (9)	0.0 (0)	5.7 (2)	0.0 (0)	3.0 (5)	1.9 (7)
Social issues	19.6 (38)	14.3 (58)	21.4 (3)	20.0 (7)	16.7 (2)	19.6 (33)	13.7 (51)
Other	12.9 (25)	9.8 (40)	14.3 (2)	0.0 (0)	16.7 (2)	12.5 (21)	10.8 (40)
No problems	35.1 (68)	40.0 (163)	21.4 (3)	40.0 (14)	16.7 (2)	37.5 (63)	40.1 (149)
Friendships and social participation							
<i>Deaf friends</i>							
Every day	1.6 (3)	5.6 (25)	3.6 (1)	11.1 (6)	5.3 (1)	0.7 (1)	4.9 (19)
Several times a week	9.6 (18)	19.6 (87)	28.6 (8)	27.8 (15)	10.5 (2)	5.7 (8)	18.5 (72)
Once a week	5.9 (11)	13.8 (61)	3.6 (1)	22.2 (12)	5.3 (1)	6.4 (9)	12.6 (49)
Several times/month	21.3 (40)	22.1 (98)	21.4 (6)	13.0 (7)	31.6 (6)	19.9 (28)	23.4 (91)
Once a month	13.8 (26)	12.6 (56)	10.7 (3)	5.6 (3)	10.5 (2)	14.9 (21)	13.6 (53)
Rarely	35.6 (67)	19.0 (84)	25.0 (7)	13.0 (7)	31.6 (6)	38.3 (54)	19.8 (77)
Never	12.2 (23)	7.2 (32)	7.1 (2)	7.4 (4)	5.3 (1)	14.2 (20)	7.2 (28)

Table 1 (continued)

Characteristics and Comparisons of Participants With Regard to Cochlear Implantation, Age, and Age of Cochlear Implant (CI) Surgery

Variable	All participants		Participants younger than 26 years			Participants older than 25 years	
	With cochlear implant (N = 254)	Without cochlear implant (N = 547)	With CI, age < 26, age of CI < 13 (N = 37)	Without CI, age < 26 (n = 67)	With CI, age < 26, age of CI > 12 (N = 24)	With CI, age > 25 (N = 193)	Without CI, age > 25 (N = 480)
	% (n)		% (n)			% (n)	
Hearing friends	**		*			**	
Every day	11.8 (27)	10.0 (45)	17.9 (5)	13.7 (7)	27.3 (6)	8.9 (16)	9.5 (38)
Several times a week	25.8 (59)	15.6 (70)	35.7 (10)	19.6 (10)	18.2 (4)	25.1 (45)	15.1 (60)
Once a week	8.7 (20)	8.7 (39)	10.7 (3)	5.9 (3)	4.5 (1)	8.9 (16)	9.0 (36)
Several times/month	19.7 (45)	14.3 (64)	7.1 (2)	9.8 (5)	13.6 (3)	22.3 (40)	14.8 (59)
Once a month	10.5 (24)	13.1 (59)	7.1 (2)	11.8 (6)	9.1 (2)	11.2 (20)	13.3 (53)
Rarely	20.1 (46)	27.2 (122)	21.4 (6)	27.5 (14)	22.7 (5)	19.6 (35)	27.1 (108)
Never	3.5 (8)	11.1 (50)	0.0 (0)	11.8 (6)	4.5 (1)	3.9 (7)	11.1 (44)
Deaf activities	**					**	
Often as possible	6.2 (15)	10.2 (51)	13.8 (4)	16.4 (10)	12.5 (3)	4.3 (8)	9.3 (41)
Sometimes	14.1 (34)	22.3 (112)	20.7 (6)	23.0 (14)	8.3 (2)	13.8 (26)	22.2 (98)
Rarely	29.0 (70)	35.1 (176)	27.6 (8)	27.9 (17)	37.5 (9)	28.2 (53)	36.1 (159)
Never	50.6 (122)	32.5 (163)	37.9 (11)	32.8 (20)	41.7 (10)	53.7 (101)	32.4 (143)
Mainstream organizations	*		**				
Every day	0.0 (0)	0.6 (3)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.7 (3)
Several times week	0.4 (1)	1.4 (7)	0.0 (0)	4.9 (3)	0.0 (0)	0.5 (1)	0.9 (4)
Once a week	1.3 (3)	2.2 (11)	0.0 (0)	1.6 (1)	0.0 (0)	1.6 (3)	2.3 (10)
Several times/month	5.5 (13)	7.0 (35)	0.0 (0)	4.9 (3)	4.3 (1)	6.5 (12)	7.3 (32)
Once a month	7.6 (18)	11.0 (55)	10.3 (3)	16.4 (10)	4.3 (1)	7.5 (14)	10.3 (45)
Rarely	29.4 (70)	27.9 (139)	20.7 (6)	24.6 (15)	17.4 (4)	32.3 (60)	28.3 (124)
Never	55.9 (133)	49.9 (249)	69.0 (20)	47.5 (29)	73.9 (17)	51.6 (96)	50.2 (220)
Well-being							
<i>M</i>	64.8	64.9	62.9	65.0	65.5	65.0	64.9
<i>(SD)</i>	(18.9)	(19.2)	(18.3)	(19.5)	(18.6)	(19.1)	(19.2)
(Higher scores equate to lower well-being.)							
<i>Note.</i> In many instances, totals for each variable do not equal <i>N</i> because some participants did not respond to every item on the questionnaire.							
** Highly significant ($p < .01$), higher than a comparison group.							
* Significant ($p < .05$), higher than a comparison group.							

Table 2
 Characteristics and Comparisons of Participants With Regard to Identity

<i>Variable</i>	<i>Deaf</i> (N = 246)	<i>Hearing</i> (N = 189)	<i>Bicultural</i> (N = 256)	<i>Marginal</i> (n = 51)
% (n)				
Discrimination, limitation, and challenges				
<i>Discrimination</i>	bb		cc	bb, c
Always	13.0 (32)	4.3 (8)	6.7 (17)	19.6 (10)
Now and then	53.3 (131)	32.6 (61)	44.7 (114)	62.7 (32)
Rarely	25.6 (63)	38.0 (71)	31.4 (80)	15.7 (8)
Never	8.1 (20)	25.1 (47)	17.3 (44)	2.0 (1)
Feel limited				
<i>Feel limited</i>		b		bb
A lot	19.5 (48)	23.3 (44)	17.3 (44)	39.2 (20)
Quite a lot	41.5 (102)	47.6 (90)	48.2 (123)	35.3 (18)
A little	26.4 (65)	25.9 (49)	23.1 (59)	25.5 (13)
Not at all	12.6 (31)	3.2 (6)	11.4 (29)	0 (0)
Challenges at work				
Communication	24.4 (44)	25.6 (42)	21.2 (44)	27.5 (11)
Cooperation	1.7 (3)	0.6 (1)	4.8 (10) ^c	2.5 (1)
Cultural differences	13.3 (24) ^{bb}	1.2 (2)	4.3 (9)	5.0 (2)
Isolation	3.9 (7) ^c	1.8 (3)	0.5 (1)	7.5 (3) ^c
Social issues	14.4 (26)	18.9 (31)	11.5 (24)	32.5 (13) ^{c, cc}
Other	10.0 (18)	10.4 (17)	11.5 (24)	12.5 (5)
No problems	32.2 (58)	41.5 (68) ^c	46.2 (96) ^{cc}	12.5 (5)
Friendships and social participation				
<i>Deaf friends</i>	aa		bb	cc
Every day	8.2 (20)	0.0 (0)	3.8 (9)	0.0 (0)
Several times a week	27.0 (66)	0.9 (1)	15.3 (36)	4.9 (2)
Once a week	16.4 (40)	1.9 (2)	11.0 (26)	9.8 (4)
Several times a month	29.1 (71)	3.7 (4)	23.3 (55)	17.1 (7)
Once a month	9.4 (23)	9.3 (10)	16.9 (40)	22.0 (9)
Rarely	9.4 (23)	52.8 (57)	23.7 (56)	36.6 (15)
Never	0.4 (1)	31.5 (34)	5.9 (14)	9.8 (4)
Hearing friends				
<i>Hearing friends</i>		aa	c, cc	cc
Every day	5.0 (10)	18.4 (34)	11.2 (27)	2.1 (1)
Several times a week	4.0 (8)	32.4 (60)	21.5 (52)	19.1 (9)
Once a week	4.5 (9)	9.7 (18)	12.0 (29)	6.4 (3)
Several times a month	6.4 (13)	21.6 (40)	18.2 (44)	25.5 (12)
Once a month	13.4 (27)	9.7 (18)	13.6 (33)	10.6 (5)
Rarely	47.5 (96)	8.1 (15)	17.4 (42)	29.8 (14)
Never	19.3 (39)	0.0 (0)	6.2 (15)	6.4 (3)

Table 2 (continued)
 Characteristics and Comparisons of Participants With Regard to Identity

Variable	Deaf (N = 246)	Hearing (N = 189)	Bicultural (N = 256)	Marginal (n = 51)
	% (n)			
<i>Deaf activities</i>	aa			
As often as possible	21.2 (52)	1.6 (3)	4.3 (11)	0.0 (0)
Sometimes	34.7 (85)	4.8 (9)	19.1 (49)	7.8 (4)
Rarely	35.9 (88)	16.9 (32)	41.4 (106)	35.3 (18)
Never	8.2 (20)	76.7 (145)	35.2 (90)	56.9 (29)
<i>Mainstream organizations</i>	c			
Every day	0.0 (0)	0.5 (1)	0.8 (2)	0.0 (0)
Several times week	1.6 (4)	1.1 (2)	0.8 (2)	0.0 (0)
Once a week	1.2 (3)	1.1 (2)	3.5 (9)	0.0 (0)
Several times a month	5.8 (14)	8.0 (15)	6.7 (17)	3.9 (2)
Once a month	8.6 (21)	10.7 (20)	11.8 (30)	3.9 (2)
Rarely	28.8 (70)	32.6 (61)	24.3 (62)	33.3 (17)
Never	53.9 (131)	46.0 (86)	52.2 (133)	58.8 (30)
Well-being				
<i>M (SD)</i>	65.5 (18.4)	66.0 (18.1)	66.9 (18.6)	46.9 (16.9) ^{aa}
(Higher scores equate to lower well-being.)				
<i>Note.</i> In many instances, totals for each variable do not equal <i>N</i> because some participants did not respond to every item on the questionnaire. ^{aa} Highly significant ($p < .01$) / ^a significant ($p < .05$) higher than the other three groups. ^{bb} Highly significant ($p < .01$) / ^b significant ($p < .05$) higher than two other groups. ^{cc} Highly significant ($p < .01$) / ^c significant ($p < .05$) higher than one other group.				

that those with a deaf identity were significantly more likely than those with a hearing and bicultural identity to report cultural differences. Those with a hearing and bicultural identity were significantly more likely than those with a marginal identity to report no problems: hearing and marginal: $\chi^2(1, N = 204) = 6.43, p = .011$; bicultural and marginal: $\chi^2(1, N = 248) = 7.99, p = .005$. Those with a bicultural identity reported more challenges with regard to cooperation than those with a hearing identity, $\chi^2(1, N = 372) = 5.34, p = .021$. Finally, those with a marginal identity reported more social issues than those with a deaf and bicultural identity: marginal and deaf: $\chi^2(1, N = 220) = 4.67, p = .031$; marginal and bicultural: $\chi^2(1, N = 248) = 7.68, p = .006$.

Friendships and Social Participation

Significant differences with respect to friendships and social participation were found for the CI groups (Table 1). Overall, those without a CI were significantly more likely than those with a CI to report socializing with deaf friends ($U = 29248, p < .001, r = .24$) and taking part in Deaf cultural activities ($U = 48090, p < .001, r = .18$). In line with this finding, those with a CI were significantly more likely to socialize with hearing friends than those without a CI ($U = 41268, p < .001, r = .16$). In a comparison of the CI age groups, the analysis showed the same pattern for participants above age 25 years (deaf friends: $U = 17843, p < .001, r = .27$; deaf activities: $U = 31504, p < .001, r = .20$; hearing friends: $U = 29282,$

$p = .001, r = .14$). Comparing the CI groups for participants under 26, those without a CI were significantly more likely to socialize with deaf friends than those who had had CI surgery when they were older than 12 years old ($U = 336, p = .024, r = .26$). In line with this finding, those without a CI were significantly less likely to socialize with hearing friends than those who had had CI surgery when they were younger than age 13 ($U = 522, p = .045, r = .23$).

With respect to participation in mainstream organizational activities, those without a CI were significantly more likely than those with a CI to report participation ($U = 54262, p = .038, r = .08$). Among the participants younger than age 26 years, those without a CI were significantly more likely to participate in mainstream

organizational activities than both groups of young participants with a CI (age of CI < 13: $U = 656, p = .030, r = .23$; age of CI > 12: $U = 497, p = .024, r = .25$).

There were significant differences between the identity groups with respect to friendships and social participation (Table 2). Those with a deaf identity were significantly more likely than all of the other groups to socialize with deaf friends (deaf and hearing: $U = 1882, p < .001, r = .69$; deaf and bicultural: $U = 19235, p < .001, r = .29$; deaf and marginal: $U = 2021, p < .001, r = .37$). Those with a bicultural identity were significantly more likely than those with a hearing and marginal identity to socialize with deaf friends (bicultural and hearing: $U = 4647, p < .001, r = .52$; bicultural and marginal: $U = 3561, p = .006, r = .17$). Finally, those with a marginal identity were significantly more likely than those with a hearing identity to socialize with deaf friends ($U = 1199, p < .001, r = .38$). The same pattern of significant differences was found with respect to participation in Deaf cultural activities (deaf and hearing: $U = 5510, p < .001, r = .68$; deaf and bicultural: $U = 17468, p < .001, r = .40$; deaf and marginal: $U = 2044, p < .001, r = .46$; bicultural and hearing: $U = 13837, p < .001, r = .40$; bicultural and marginal: $U = 4761, p = .001, r = .19$; marginal and hearing: $U = 3913, p = .008, r = .17$). Further, the findings for socializing with hearing friends corresponded to this pattern. That is, those with a hearing identity were significantly more likely than all the other groups to socialize with hearing friends (hearing and deaf: $U = 5443, p < .001, r = .62$; hearing and bicultural: $U = 16645, p < .001, r = .22$; hearing and marginal: $U = 2364, p < .001, r = .32$); those with a bicultural identity were more likely to socialize with hearing friends than those with a deaf and marginal identity (bi-

cultural and deaf: $U = 12322, p < .001, r = .44$; bicultural and marginal: $U = 4613, p = .038, r = .12$); and those with a marginal identity were more likely to socialize with hearing friends than those with a deaf identity ($U = 3026, p < .001, r = .26$). There was one significant difference between the identity groups with regard to participation in mainstream organizational activities. Those with a hearing identity were significantly more likely to participate than those with a marginal identity ($U = 3934, p = .037, r = .13$).

Psychological Well-Being

There were no significant differences for well-being with respect to the CI groups (Table 1). Identity was, however, significant for well-being (Table 2). Those with a marginal identity scored significantly lower on psychological well-being than the other three groups: marginal and deaf: $t(295) = 6.648, p < .001, 95\% \text{ CI } (13.08, 24.08)$; marginal and hearing: $t(238) = 6.776, p < .001, 95\% \text{ CI } (13.57, 24.69)$; marginal and bicultural: $t(305) = 7.119, p < .001, 95\% \text{ CI } (14.50, 25.57)$. Further, the mean score was below the cutoff level of 50, which is deemed to signify low psychological well-being overall (Topp et al., 2015). There were no significant differences between the other three groups, whose mean scores were above the cutoff level; this signified good psychological well-being overall.

Discussion

Limitations of the Study

The present study has some limitations that should be addressed before the findings are discussed. First, even though this study included a relatively large sample of deaf adults, breaking down the sample into CI age groups reduced the number of participants in each group. This may have resulted in issues of power, particularly with re-

spect to participants under age 26 years. Second, the survey design might have been at risk for participation biases in that some deaf individuals, for instance those with low literacy skills, might have been less likely to participate, despite the support offered to them. Third, this study used a cross-sectional design, which makes it difficult to draw conclusions regarding causal links and identity development. Any plausible interpretations of results remain provisional because of this and because the conditions around having a CI (such as age of implantation, rehabilitation support, technological improvements, and cultural changes) are constantly developing.

Further to the above, while recruitment was achieved through a variety of means (e.g., through social media sites and health service centers) with the aim of reaching those beyond deaf stakeholder groups, it may be that younger CI users in the mainstream were relatively less represented in the sample than other groups. As we urge below, further research on identity among this group specifically would be very helpful. A bias might also have arisen from the fact that some participants received support in completing the questionnaire. It was not possible to control for this potential bias, although, as already outlined, staff were provided with careful instructions regarding the support provided and the survey items were prepared for translation to ensure consistency. Finally, we recommend that future studies include information about ethnicity and additional disabilities, and use an instrument validated on the deaf population.

Findings

The results show that, among all participants, having or not having a CI was, overall, highly significant for forms of identity, friendship, and social activity. However, age was also a signif-

ificant factor: Cochlear implantation was significant for identity, friendships, and social activity for the older participants (above 25 years old) but, surprisingly, only partly for the younger participants. One explanation of these results might be that they reflect the bicultural/bilingual deaf tradition in Denmark. More of the participants in the older group (age above 25) than those in the younger group (age below 26) either would have participated directly in this educational approach or been influenced by the context, and for a longer time. A plausible outcome of this educational approach might be a certain polarization of identity dynamics among a certain generation between those who identify as deaf and with the Deaf cultural movement (and would not choose to have a CI) and those who have chosen to have a CI and identify as hearing in distinction from the former. It may also be, relatedly, that the decision in adulthood to have a CI (as opposed to having a CI in childhood) is particularly weighted with significance for identity.

Also, surprisingly, age of cochlear implantation was not significant for identity, friendships, and social activity. (No significant differences were found between those having CI surgery at an age younger than 13 years and those having CI surgery at an age older than 12). One might have expected that children implanted at a young age would have developed spoken language early and would therefore be more likely to identify as hearing. As we discussed above under "Limitations," it may be the case that despite varied means of recruitment, the sample did not represent younger CI users in the mainstream and outside Deaf communities as fully as other groups. If so, this could explain why age of CI was not found to be significant here.

However, the present findings might also speak to the possibility that

significant patterns of deaf identification will emerge as young people with and without CIs grow older. This would accord with previous research indicating that children and young adults with a CI are ambiguous about their deaf identity (Hyde & Punch, 2011; Wheeler et al., 2007). It would be interesting if future research investigated deaf identity in older adulthood of those who had CI surgery in childhood. Also helpful would be qualitative research on the specific processes by which young people with CIs negotiate deaf identity and move (or not) from an ambiguous to a more settled identity or develop a sense of marginality. Specifically, it would be interesting to explore the factors affecting how and why young people with a CI who feel they "do not belong to either the deaf or the hearing world" (Wheeler et al., 2007, p. 311) may move toward a particular identity (e.g., hearing) rather than another (e.g., bicultural). Influencing factors could, for example, be different positions toward the use of sign language among professionals (Hyde & Punch, 2011).

The finding that having a CI or not was not significant for psychological well-being is in line with existing research, including studies showing that individuals with CIs experience similar levels of self-esteem and well-being to those experienced by the general population (Filipo, Bosco, Barchetta, & Mancini, 1999; Percy-Smith et al., 2008; Rembar et al., 2012). By contrast, the results for the identity groups revealed significant differences. In line with previous studies (Bat-Chava, 2000; Cornell & Lyness, 2005; Hintermair, 2008; Maxwell-McCaw, 2001), the results showed that those with a marginal identity had significantly lower levels of well-being than the other groups and a mean score that indicated poor well-being. This finding may have implications for the support offered to

young people with CIs who demonstrate ambiguity about identity and have ongoing communication difficulties. Specifically, it may be important to support social inclusion and participation so that these young people do not lack positive social identification opportunities or risk developing a marginal identity. As other studies have reported, young people with CIs have varied experiences of communication and social participation (Hyde & Punch, 2011; Mance & Edwards, 2012; Wheeler et al., 2007). In their study on the social participation of children and adolescents with CIs, Hyde and Punch (2011) observed that contact with deaf others and use of sign communication could be an important part of the process of social development for many individuals. They reported that parents of children with CIs generally perceived that their children benefited from contact with others who were deaf, and that some parents "saw the use of signed communication as beneficial to children's social and identity development" despite discouragement by early intervention centers (p. 543).

Of interest here is the finding that significantly more participants with CIs than those without reported feeling limited by their hearing loss. Age was also a significant factor: Having a CI and feeling limited was significant for the older participants (above 25 years of age) but not for the younger. It may be, therefore, that this finding reflects the greater difficulties with spoken communication skills that are associated with getting a CI at an older age. However, the result tallies with the finding that participants with a hearing identity reported significantly greater feelings of limitation than those with a deaf or bicultural identity. These findings point to a risk that individuals with CIs who develop a hearing identity come not to experience being deaf as culturally positive but to perceive it more in terms of

limitation and disability. This may not have negative psychosocial implications for those with a CI who can fully socially participate and identify with the hearing community, but it may for those who have enduring difficulties with spoken communication and participation, as Mance & Edwards (2012) warned.

Also resonant here are the findings on participation in mainstream organizational activities. Those with a CI were significantly less likely to report participation than those without a CI. Age was a factor: Among those under age 26 years, those with a CI were significantly less likely to report participation than those without a CI, but there were no significant differences among the older age group. Again, there are implications for the psychosocial and identity support of young people with CIs who have ongoing difficulties with communication and social participation. Developing a more flexible or bicultural identity, rather than a hearing identity, might benefit these individuals with respect to feelings of limitation and enduring difficulties and anxieties related to auditory-oral communication and participation in groups.

The findings on feeling limited, together with the findings on participation, flag issues of concern that cast some shadow on the findings for psychological well-being and demand more in-depth research. As already mooted, the results suggest that a subgroup of those with a CI may be at risk of low levels of well-being due to the combined factors of communication difficulties, a negative conception of deafness, and the lack of a distinct social identity. Future research would do well to investigate well-being with respect to these combined factors.

The findings on discrimination were what might be expected of a variable that, in contrast to the variable on feel-

ings of limitation, explores the perceived experience of social barriers to inclusion. We posit that, together, these two items provide an indication not only of the prevalence of experiences of discrimination but also, relatedly, of contrasting perceptions of deafness. While one foregrounds the exclusionary effects of social barriers and attitudes (a more social model of deafness), the other understands deafness as a functional disability and impairment (a more medical model of deafness; Burch & Kafer, 2010). While there were no significant findings for CI and discrimination, the analysis showed that identity was highly significant for feelings of discrimination. Specifically, those with a deaf identity reported significantly higher levels than those with either a bicultural or hearing identity, in line with social modeling of deafness. As we have discussed elsewhere (Chapman & Dammeyer, 2016), even though participants with a deaf identity reported relatively high levels of feeling discriminated against—which was found to be an independent predictor of negative well-being—having a deaf identity was associated with a high level of well-being overall. This finding supports an account of the importance for psychological well-being of developing a positively distinct social identity, regardless of its elaboration through a sense of threatened minority status (Reynolds & Turner, 2001; Tajfel, 1978; Tajfel & Turner, 1979). The sense of distinctive social identity among those with a deaf identity is suggested here by the results for the item “What challenges and issues do you experience when you work with hearing people?” Those with a deaf identity were significantly more likely to report “cultural differences” than those with a hearing or bicultural identity. Similarly, those without a CI were significantly more likely to report “cultural differ-

ences” than those with a CI. These findings are in line with the theorization of strategies of response to threatened social identity, encompassing processes of developing cultural distinctiveness. (For a discussion of threatened deaf identity, see Chapman & Dammeyer, 2016).

To sum up, the present study adds to previous research on the significance of cochlear implantation as a factor in identity development and related matters of social participation and self-perception. The mediating effect of age calls for further research on the processes by which identity among young people with CIs becomes settled in a particular direction, or not. The findings that people with CIs are more likely to feel limited by their hearing loss and less likely to participate in mainstream organizational activities raise some concerns—specifically, concerns about negative aspects of self-perception and enduring problems related to communication and social participation for some of those with CIs, as other studies have flagged (Hyde & Punch, 2011; Punch & Hyde, 2011; Wheeler et al., 2007). It may be tentatively suggested that, taken together, the present findings have implications for clinical recommendations regarding language modality use and cultural support for some children with CIs. Future research would do well to dig deeper into the interrelating factors of communication, social participation, identity, and self-perception that affect life outcomes for people with CIs. For example, it may be the case that support for a flexible bicultural identity would benefit young people with CIs who have persistent difficulties with spoken language, auditory input, and social participation.

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