

# Hearing, Deaf and Cochlear Implanted Adolescent Males' Social Confidence (C.I. Males are not Confident in the Presence of Deaf Males)

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**Abstract** We examined differences between Deaf, Cochlear Implanted (CI) and hearing male adolescents in terms of their social confidence levels. 54 Deaf, CI user and hearing male adolescents completed a version of the Deaf Acculturation Scale (DAS) that was specifically designed for adolescents by Maxwell-McCaw and the Jackson Personality Inventory. There was a significant main effect of hearing and deaf environment and hearing environment and general social confidence, but no significant interaction between environment and preferred mode of communication or its effect on social confidence scores. There was no association between age and social confidence scores or a significant correlation between parental hearing status, suggesting that the hearing status of participants' families had no effect on their levels of social confidence. However, CI male users demonstrated lower social confidence out of the three group conditions, particularly when in the company of Deaf individuals.

**Keywords** Adolescents, Social Identity, Deafness, Cochlear Implants

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## 1. Introduction

In the United Kingdom, individuals who have severe difficulty in either hearing or following speech, range from approximately ten million people who are 'hard-of-hearing' (hh) to 800,000 severely/profoundly deaf with more than 45,000 deaf children [3]. However, the introduction of Cochlear Implants (CI) has resulted in spoken language development for young deaf people being more achievable. Children display better participation and engagement in classes compared to those children without implants [4]. In 2009, 71% of Deaf children failed to gain the United Kingdom expected General Certificate of Secondary Education (G.C.S.E.) five grade passes (A-C), the school

leaving grades for sixteen year olds [3,5]). Implants have become part of the normal intervention process for those with severe hearing problems, with evidence to suggest that earlier implantation results in a better outcome in both auditory and verbal development [6]. According to the Food and Drug Administration, as of December 2012, approximately 324,200 people worldwide have received implants. As an aside, it is noted that the Australian Professor Graeme Clark, the designer of the cochlear implant, was awarded the \$500,000 Russ Medal (the Nobel Prize for engineering) in January 2015. The term Deaf<sup>1</sup> is used to identify individuals who belong to the Deaf community (i.e. not audiotically deaf individual in the hearing community).

In the United States, roughly 58,000 adults and 38,000 children have received them [7] with 73% of profoundly deaf children in the United Kingdom having had them fitted [8], with 80% in Australia and Sweden [9,10]). However some Deaf parents have not allowed their Deaf children to have implants as they feel it threatens their cultural values [11]. Over 90% of deaf children are born to hearing parents with minimum experience of deafness, or even knowledge of how to communicate with a deaf individual [12,13]).

Woolfe and Smith [14] argued deaf adolescents with Deaf parents report higher self-esteem than those with hearing parents thus hearing status appear to be an influential factor. Historically, those who develop a stronger Deaf identity tend to enjoy higher self-esteem due to the small gap between their expectations and actual functioning [15]; which raises the issue of how important is cultural identity for young Deaf people, and if this has an impact upon their confidence in communication and social skills.

Austen and Coleman [16] argued the age of onset and degree of hearing loss significantly affects an individual's communication preferences, language acquisition and cultural identity. Those who have been prelingual deaf are more likely to use sign language to communicate and identify within a distinct Deaf<sup>1</sup> culture than those who

acquire postlingual deafness. For Deaf individuals in the local Deaf community in the United Kingdom the preferred mode of communication is British Sign Language (BSL). A technique for communicating to others by use of signs incorporating hands, face and upper body motions and gestures in an ever evolving linguistic modality. Although there are no official figures of users, it is thought that there are between 50,000 and 70,000 people who use BSL [3]), however Powell [17] suggests upwards of 100,000 because of a large census under-reporting.

Historically, the Deaf community while existing within the wider Society of hearing people has experienced high levels of social exclusion [18]. This difficulty was highlighted by Nunes, Pretzlik and Olsson [19] who reported that Deaf pupils were not disliked but were more likely to be ignored by their peers. Berry and Brown [20] highlighted the criminal vulnerability of Deaf people in the United Kingdom. Communications difficulties occur, which can subject Deaf individuals to an increased risk of not only physical, but also social isolation. It is not clear if deaf adolescents are psychologically affected by this, thus resulting in a change in their social behaviours and confidence in their communication ability.

### Adolescence and Identity Construction

During the adolescence developmental stage, individuals undergo rapid physiological, psychological, and social change [21]. Erikson [22] argued that this was a crucial stage for individuals to establish a strong sense of personal identity. While Weisel [23] identified components such as: gender, age, ethnicity, and hearing status affecting the development of identity. How identity works for those who are Deaf and hh is far more complex, as not only do they have to confront the usual adolescent issues, they must also contend with challenges of being deaf in a sound-dominated environment [24].

Cambra [25] identified marked differences between identity construction and hearing status and found Deaf adolescents construed identity in terms of private ego, personal appearance and interests, but made fewer references than hearing subjects to their peers and social environment. Indicating that Deaf individuals' sense of identity is of a far narrower social make up, due to limited interactions and experiences in the community. Cultural factors are important when distinguishing between Deaf and hh identities, as variables such as the degree of hearing loss, preferred mode of communication, parental hearing status, and social experiences can affect the extent to which individuals identify themselves as hearing, hh, or as Deaf. Israelite, Ower and Goldstein [26] argue that this also influences how Society identifies individuals.

### Cochlear Implant

Implants have greatly improved social relationships as it aids better communication skills, thus resulting in more satisfying interactions with peers [27,28]. Kent [29] indicated that those self-identified as having a hearing disability were more likely to report feeling lonely or

experience being alone than those who did not self-identify. For many mainstream adolescents identifying themselves as hh remains socially undesirable. Punch and Hyde [30] recognised a constant wish amongst adolescents is to be treated 'normally', and not have attention drawn to their 'hearing' status. Thus, it could be concluded that individuals are very aware of their 'marginalised' status due to power differentials between themselves and the 'dominant' hearing culture [26]. Most, Wiesel and Blitzer [31] found that those with better hearing demonstrate greater chances of developing good spoken language, and a cultural identity as a hearing (hh) person, rather than a Deaf identity.

### Social Confidence

Social skills are vital for individuals' capacity to function within social environments, thus social confidence is important, as good social skills are critical for succeeding in Society [32,33]. Elksnin and Elksnin [34] suggest that those who lack social skills are often rejected by others and are at risk of developing mental health problems that persist during adulthood. We would argue that with the declining funding of adolescent mental health, treatment is more limited and this could have some serious implications for deaf and hh adolescents.

Silvestre, Ramspott and Pareto [35] reported a relationship between conversational competence and self-confidence, however for those who are deaf and hh this may not come naturally, thus levels in social confidence may not be as high as for those who are hearing. Deaf and hh adolescents do not always experience positive peer interactions in mainstream schools, due to difficulties in communication access or lack of awareness regarding hearing loss among their hearing peers [36]. Dammeyer [37] reported that poor signing or spoken communication skills were significantly related to psychosocial difficulties. Van Eldik [38] found adolescents in Deaf schools rated themselves as experiencing more frequently withdrawn behaviours and depressed feelings than their deaf mainstreamed peers and hearing schoolchildren. (We note that there has been a decline in the use of Deaf schools in recent years in the U.K.).

Not only does educational environment affect the Deaf students' social interactions, it can in turn influence their social emotional functioning [39]. School environments are crucial to young deaf people's on-going development, particularly as there are notably increasing occurrence of psychosocial difficulties amongst deaf children aged 12-18 years compared to that of 4-11 year old children [40]. Subsequently, our research focused on male adolescents as research has shown Deaf girls show more pro-social orientation compared to Deaf boys [41].

Deaf boys in mainstream education are less accepted and less popular than their hearing classmates and Deaf peers in special education; however this is not the case for Deaf girls [42]. They reported that deaf adolescents experienced problems in social relationships with hearing peers and that deaf boys were less accepted than deaf girls and hearing peers. While communicative skills, social behaviour and personality predicted acceptance and popularity, however

the predictors vary as a function of hearing status, gender, and educational setting. Friendship between hearing adolescents is generally long-term, whilst the most common pattern of friendship for Deaf students is sporadic [19].

### Aims

The study aimed to explore levels of acculturation of Deaf, CI and hearing males and their level of social confidence. It was anticipated that Deaf and CI males would experience lower levels of social confidence compared to hearing males, due to experiencing more obstacles with regards to their interacting in the social world. The study aimed to explore differences between deaf and hearing male adolescents in terms of social confidence levels amongst three different hearing status groups: Deaf, Cochlear Impaired and hearing.

Deaf identity was measured by the Adolescent Deaf Acculturation Scale [1], and social confidence with the Jackson Personality Inventory [2]. Our aim was to identify levels of acculturation within a small Deaf community and its impacts upon their general level of social confidence.

## 2. Methodology

A quantitative method was adopted to explore the differences in social confidence between hearing, cochlear implant users and Deaf male adolescents.

### Sample

A sample of 60 male adolescents (age range 16-19 years) consisting of: 20 Deaf and 20 CIs users from the local Deaf Centre, with 20 male hearing schoolboys from an opportunistic contact were planned for the research.

### Instruments

The questionnaire consisted of statements and fixed-choice questions with two sections each containing 30 items. In our study, we used a version of the DAS [43] that was specifically designed for adolescents by Maxwell-McCaw [43]; who thought the version would be suit our needs. Although it had not been subject to factor analysis for construct validity tests, the alphas were good.

### Deaf Acculturation Scale (DAS)

To gain insight into the level of Deaf identity amongst Deaf adolescents and cochlear implants users, an adapted questionnaire based upon the original version of the Deaf Acculturation Scale [1] was used. The scale consisted of 30 items which measured acculturation across five dimensions: cultural identification (e.g., 'I identify with deaf people'); cultural enjoyment (e.g. 'Going to deaf events /parties'); cultural preferences (e.g. 'I would prefer my boyfriend/girlfriend to be hearing'), cultural knowledge (e.g. 'Important events in deaf history'); and language competence (e.g. 'How well do you understand other people signing in BSL?'). DAS was developed following the introduction of the Deaf Identity Development Scale [46]; an instrument designed to measure four Deaf identity constructs: hearing, marginal, immersion, and bicultural. As the DAS is

American, certain items were 'anglicised' with Maxwell-McCaw's approval (e.g. American Sign Language {ASL} to British Sign Language {BSL}). A five point Likert scale [47] was used to indicate level of dis/agreements to the statements.

### Social Confidence Scale

The Jackson Personality Inventory [2] was used to assess levels of social confidence. It was a subscale originally based on the Jackson Personality Inventory [2]), a well-established measure used to assess openness, neuroticism, extraversion, trustworthiness and organisation.

This particular scale derived from the extraversion subscale and consists of positive and negative keyed items with a Cronbach's alpha of .87. For this study, it was adapted to be more appropriate for school children age, for example 'Am good at making impromptu speeches' was altered to 'Am good at making speeches in class' to fit three different situations: (1) general/overall feelings of social confidence, (2) social confidence when in the company of hearing impaired and (3) social confidence when in the company of hearing individuals; to identify specifically when individuals felt more socially confident in certain situations than in others. A dichotomous response was required for answering the items, making it suitable for the typically lower reading age of deaf individuals [48]. Data was collected for age, parental hearing status, and preferred mode of communication.

### Procedure

Participants were recruited via purposive sampling (i.e. using individuals with particular characteristics) and consisted of Deaf and CI participants attending the local Deaf Centre, and a control group of hearing schoolboys from a hearing Secondary High school. The same questionnaire was administered to both the Deaf and hearing groups. The directions were signed, voiced and written. The questionnaire took 10-30 minutes to complete, and during this time, any queries about items were answered with the help of an interpreter. The questionnaire was administered to the hearing schoolboys as a group, and participants were individually tested at the Deaf Centre. Sixty questionnaires were distributed.

Fifty-four male adolescents were recruited from the North West of England and North Wales, ranging in age from 16 to 19 ( $\bar{x}$ =16.9, s.d.=1.0). The age group were consistent between the age of deaf participants ( $\bar{x}$  =17) and the hearing group ( $\bar{x}$  =16.7). Ten (19%) were Deaf, 24 (44%) were Cochlear Implant users, and 20 (37%) were hearers. A 90% response rate was achieved (100% for hearing, 85% for Deaf/CI users), which we felt was acceptable. It is would appear that most of those attending the Deaf Centre had cochlear implants, or were awaiting surgery for implants but nevertheless perceived themselves as deaf.

### Ethical Considerations

The research fully complied with the British Psychological Society ethical guidelines [49]. Data was

collected at the Deaf Centre and the school, with agreement of the specified gatekeepers.

### 3. Results

#### Internal Reliability

**Table 1.** Item scores of Adolescent Deaf Acculturation Scale 54 participants (range 1-5)

Item	mean	(SD)	Item	mean	(SD)
DASQ1	3.44	(1.5)	DASQ16	2.78	(1.4)
DASQ2	2.39	(1.5)	DASQ17	2.78	(1.4)
DASQ3	3.28	(1.2)	DASQ18	2.52	(1.5)
DASQ4	2.00	(1.2)	DASQ19	3.13	(1.1)
DASQ5	2.63	(1.2)	DASQ20	3.74	(1.4)
DASQ6	2.31	(1.3)	DASQ21	2.65	(1.3)
DASQ7	2.41	(1.2)	DASQ22	1.93	(0.9)
DASQ8	2.91	(1.5)	DASQ23	2.17	(1.1)
DASQ9	3.44	(1.4)	DASQ24	2.85	(1.0)
DASQ10	3.30	(1.2)	DASQ25	2.94	(1.5)
DASQ11	3.20	(1.3)	DASQ26	3.22	(1.5)
DASQ12	3.83	(1.1)	DASQ27	3.13	(1.4)
DASQ13	3.19	(1.3)	DASQ28	3.39	(1.3)
DASQ14	2.93	(1.6)	DASQ29	3.31	(1.3)
DASQ15	2.91	(1.2)	DASQ30	3.52	(1.3)

The Adolescent Deaf Acculturation Scale achieved an overall Cronbach's alpha score of ( $\alpha$ ) = .59 (Cronbach, [50]). Figures of .70+ are generally considered acceptable [51], thus further investigation was conducted by assessing the internal reliability of the subscales. Cronbach's alpha figures of the Deaf Acculturation Scale subscales were cultural identification  $\alpha$  = .5, cultural enjoyment  $\alpha$  = 0.5, cultural preference of  $\alpha$  = -.21, cultural knowledge of  $\alpha$  = .74 and

language competence of  $\alpha$  = -.07. These scores vary greatly, however this may be a result of the scale originating from America, so cross cultural differences may have occurred. Furthermore, a small sample was used therefore possibly attributing to the instability of figures, thus the research will be based on the internal consistency reliability taken from previous literature [1] with the Deaf Acculturation Score for deaf DASd ( $\alpha$  = .83-.96) and the Deaf Acculturation Score for the hearing DASH ( $\alpha$  = .68-.87).

Three sub-scales for social confidence were developed from the Jackson Personality Inventory [2] for the three conditions: (1) overall social confidence, (2) social confidence when in the company of the hearing impaired, (3) social confidence when in the company of the hearing. Individuals rated their social confidence when in these three environments with a good reliability of  $\alpha$  = 0.71, .72, and .87 respectively.

A principal component analysis (PCA) was conducted on the 30 items for the social confidence scale and the 30 items from the Adolescent Deaf Acculturation Scale incorporating orthogonal rotation (varimax), in order to identify how the variables contributed to such components [52]. We are aware of the small sample size, but felt it justified such techniques. As recommended [53], the condition of the distribution of the participants' responses was evaluated through Bartlett's [54] test of sphericity with  $\chi^2 (435) = 965.46, p < .001$ , indicated that correlation between items were sufficiently large for principal component analysis. Eight components had eigen values reaching Kaiser's criterion of >1, which accounted for 72% of the variance with all items with a factor loading of <.4 were discarded [55].

**Table 2.** Rotated component matrix of Social Confidence Scale (JPI: Jackson, 1976)

Components	1	2	3	4
52. I hate being the centre of attention	.862			
55. I am normally quiet	.769			
59. I hate public speaking	.724			
58. I don't like to draw attention to myself	.672			
34. I am not very persuasive	.637			
54. I am not very persuasive	.579			.549
35. I am normally quiet	.407			
51. I feel comfortable around people		.872		
53. I express myself easily		.784		
57. I am able to persuade people to do what I want		.783		
60. I am not bothered by having to make speeches		.623		
37. I have a natural talent for persuading people		.609		
56. I do not mind being the centre of attention		.592		
42. I hate being the centre of attention			.759	
48. I don't like to draw attention to myself			.752	
50. I hate public speaking			.681	
39. I hate public speaking			.597	
32. I hate being the centre of attention			.594	.451
38. I don't like to draw attention to myself			.549	
36. I do not mind being the centre of attention				.790
33. I express myself easily				.680
31. I feel comfortable around people				.458

Table 2 displays the specific items loading onto components 1, 2, 3 and 4. A qualitative approach was taken in order to interpret the underlying dimension that unified the group of variables loading onto the components [53]. The items that cluster on the same components suggest (1) shyness ('I am normally quiet' and 'I hate public speaking'), (2) charisma ('I have a natural talent for persuading people' and 'I am not bothered by having to make speeches'). Component 3 characterised introversion ('I don't like to draw attention to myself' and 'I hate being the centre of attention') and component (4) sociability ('I feel comfortable around people' and 'I express myself easily'). The remaining four components were discharged as representing a very small percentage. This analysis would therefore suggest that the initial questionnaire, in reality, is composed of four discrete constructs measuring shyness, charisma, introversion and sociability with the intention of identifying over arching components for this scale.

A test of normality indicated a non-normal distribution, with the largest skew level being 1.16 on item 4 ('I am comfortable with deaf people'), and the lowest being -.96 on item 20 ('Names of famous hearing people'). Scores for hearing and deaf acculturation for three male groups are as below.

**Table 3.** Participant's score of hearing and deaf acculturation

Status	DASd* mean(SD)	DASH** mean (SD)	overall style
Hearing (20)	2.33 (0.3)	3.24 (0.5)	Hear acculturated
CI user (24)	3.01 (0.7)	2.98 (0.5)	Deaf acculturated
Deaf (10)	3.30 (0.2)	2.94 (0.3)	Deaf acculturated

\* DASd = Deaf Acculturation Score (deaf)

\*\*DASH = Deaf Acculturation Score (hearing)

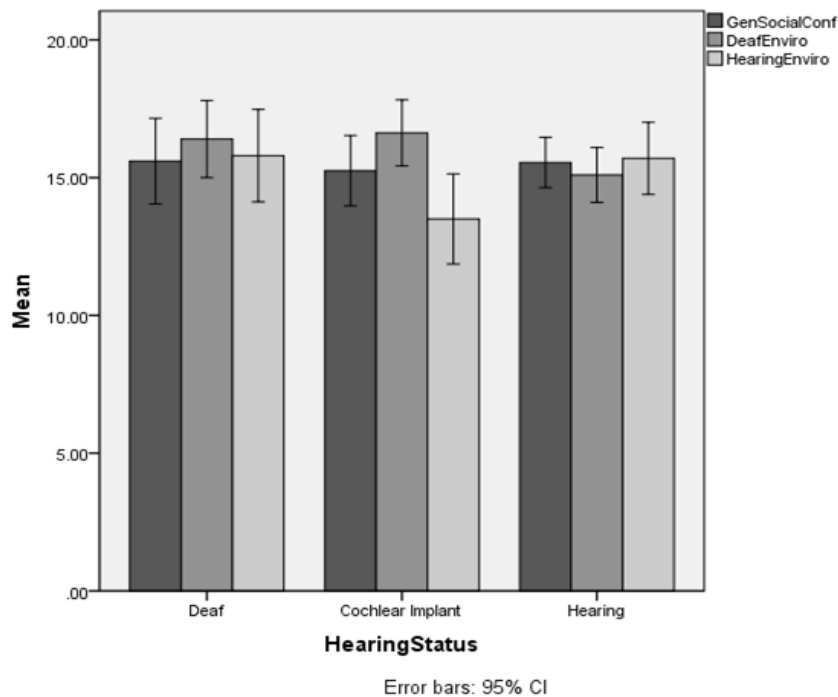
The mean DASd score for hearing males was 2.33, which combined with a mean DASH score of 3.24, resulted in an overall hearing acculturation style, whilst both cochlear implant users and deaf groups obtained the deaf acculturated style.

There was no association between age and social confidence scores or a correlation between deaf environment and general social confidence, however there was a strong correlation ( $r+0.64$   $p<.001$ ) between hearing environment and general social confidence. No significant correlation was found between parental hearing status and the levels of social confidence, suggesting that the hearing status of participant's families had no effect on their levels of social confidence. A 3x3 mixed ANOVA, consisting of a within-subject variable of the three environmental conditions, the between-subject variable-hearing status of participant, and the dependent variable-social confidence score was undertaken.

**Table 4.** Hearing Status Groups and Social Confidence scores

Subscale	Status	Mean	SD	Participants
Total Social Confidence	Deaf	47.8	5.3	10
	C.Implant	45.4	6.2	24
	Hearing	46.4	5.9	20

The Jackson Personality Inventory [2], defined the average score of social confidence as 45. Deaf participants attained an above average levels of social confidence of 47.8, the hearing group with 46.4 and the CI users group with a mean score of 45.4 Deaf adolescents scored marginally higher in general social confidence ( $\bar{x} = 15.6$ ) and the hearing environment ( $\bar{x} = 15.8$ ).



**Figure 1.** Social confidence scores for each hearing status group

As the Mauchly's test ( $p < .05$ ) indicated a violation of sphericity, the Greenhouse-Geisser test was used, a significance test adjusted for violation of the assumption [56]. There were non-significant main effects of environment on social confidence scores,  $F(1.51, 76.85) = 2.27, p > .05$ , and hearing status on social confidence scores,  $F(2, 51) = .599, p > .05$ . Indicating that the three different hearing statuses: hearing, Deaf and cochlear implant, did not affect ratings of social confidence. A significant interaction was observed between environment and hearing status,  $F(3.01, 76.85) = 3.60, p < .05$ . Post-hoc tests of hearing status and environment indicated a significant interaction in the group condition, cochlear implant,  $F(2, 46) = 6.09, p < .05$ . There was a significant interaction  $t(23) = 14.53, p < .05$  between cochlear implant and the hearing environment, specifically when in the company of Deaf individuals. It would appear that different environmental conditions are not significant on some male adolescent's social confidence scores; however, there was an interaction between the hearing status, cochlear implant, and environment. A second mixed 3x3 ANOVA was conducted on the data. The within-subject variable with three environmental conditions, the between-subject variable was mode of communication, and the dependent variable was social confidence score as seen in Table 5.

**Table 5.** Modes of preferred communication and social confidence scores

Subscale	communication	mean	SD
<b>General Social Confidence</b>	BSL (23)	15.83	2.5
	Speech (20)	15.55	2.0
	Both (11)	14.36	2.0
	<b>Total (54)</b>	15.43	2.5
<b>Deaf Environment</b>	BSL (23)	16.70	2.3
	Speech (20)	15.10	2.1
	Both (11)	16.27	3.2
	<b>Total (54)</b>	16.02	2.5
<b>Hearing Environment</b>	BSL (23)	14.57	3.5
	Speech (20)	15.70	2.8
	Both (11)	13.36	4.0
	<b>Total (54)</b>	14.74	3.4

Preferred to use BSL to communicate consisted of a mixture of Deaf and CI users (i.e. some CI users also use BSL). A significant main effect of environment was found on social confidence scores,  $F(1.5, 76.68) = 4.59, p < .05$ , indicating when in different environmental conditions, participants obtained different levels of social confidence. There was a significant main effect of hearing and deaf environment  $t(53) = 2.12, p < .05$ ; however there were no significant interactions between environment and preferred mode of communication  $F(3, 76.68) = 2.6, p > .05$  or the effect of the preferred mode of communication on social confidence scores,  $F(2, 51) = 1.03, p > .05$ .

## 4. Discussion

An overall 90% response rate was achieved with 100% of the hearing schoolboys and 85% from the Deaf/CI users groups, which is fairly representative of the small population.

A sample of 34 was good for the 16-19 age group from a Deaf centre. Cochlear implant users achieved the lowest score ( $\bar{x} = 45.4$ ) on social confidence scores, fulfilling the hypothesis. As to the significant interaction between individuals with implants and the environment, particularly when in the company of Deaf individuals may be due to experiencing feelings of guilt, as they were previously deaf prior to cochlear implantation and so may now feel uncomfortable in the company of the Deaf individuals. As adolescents with implants tend to have hearing parents, they are more likely to have greater social identification with the hearing rather than the Deaf community [57]. Consequently, this may have an effect upon their levels of social confidence in Deaf environments, as they are exposed to largely hearing home and social environments rather than the Deaf Community. It was not clear why so many CI users attended the Deaf Centre.

Further qualitative analysis of attitudes and experiences of those with implants would be useful in order to understand why there is a difference in levels of social confidence when in the company of Deaf individuals. The majority of previous research on implantations has mainly focused on narratives taken from parents and family members, thus an opportunity to assess the implant users would provide a more insightful explanation.

In overall social confidence, Deaf adolescents did score marginally higher ( $\bar{x} = 47.8$ ) than the other two hearing statuses as those with a stronger Deaf identity tend to enjoy higher self-esteem, due to the small gap between their expectations and actual functioning [15]. In hearing environments only, there were no significant differences between Deaf adolescents ( $\bar{x} = 15.8$ ) and control group, hearing ( $\bar{x} = 15.7$ ); which did not necessarily support the hypothesis that deaf individuals scoring lower on the social confidence scale. Possibly due to mainstream schooling, as Van Eldik [40] proposed Deaf adolescents in Deaf schools rated themselves as experiencing more frequently withdrawn behaviours than their deaf mainstreamed and hearing peers. Subsequently, having regular interaction in a hearing environment (e.g. mainstream school) is likely to be a contributory factor of social confidence.

There was no significant association between age and social confidence scores in the three environments or between Deaf environment and general social confidence. However, a strong positive correlation was found between hearing environment and general social confidence,  $r = .64, p < .001$ . This suggests that deaf individuals are confident in the hearing world, indicating that social confidence is not entirely affected by hearing status, raising the question as to what stage individuals do become confident.

No significant correlation was found between parental hearing status and social confidence, suggesting that the hearing status of participants' families had little effect on their levels of social confidence, which challenges previous arguments that Deaf children of hearing parents are more isolated, have lower acceptance, poorer communications and more psychological and behavioural disorders than Deaf

children of Deaf parents [58]. We argue that it signifies that Society has changed since 1977, thus hearing status would not appear to be an influential factor in a Deaf individual's ability to become part of, and enjoy, the wider hearing community compared to the more restricted 1970s.

No type of communication achieved better scores overall, inferring that social confidence is not based upon preferred mode of delivery. It has been suggested that most children who attend mainstreamed schools have good oral communication skills [59]. Consequently, better conversational skills are more likely to impact upon one's level of social confidence rather than the method of delivery. This supports Dammeyer's [37] findings that poor signing or spoken communication skills are significantly related to psychosocial difficulties.

## 5. Limitations

The obvious limitation within the present research is the sample size due to the investigation requiring a purposive sample, only a small number could be recruited within the limited age (16-19) criterion, however, a 90% response rate was achieved, thus successful in relation to the available sample size. The small number of Deaf participants reflects on the larger number of CI individuals in Society as 73% of deaf children had implants fitted [8]. Another limitation is that the DAS is American, therefore cross-cultural differences may have had an impact upon findings.

The current research did not fully support existing findings that Deaf and CI users tend to possess lower social confidence levels; however, there was an indication that individuals with implants demonstrated lower social confidence than the Deaf and hearing groups. This was particularly relevant when in the company of Deaf individuals. It would be useful to explore whether this occurs across both males and females, and in older generations. Implants have been found to greatly improve social relations with others [27], yet in this study, Deaf participants self-reported similar, if not better, levels to that of cochlear implant users. We argue that it is essential to undertake further research as for some time Deaf and hh people have had a 40% lifetime prevalence of mental health problems, compared with 25% of hearing people [60]. Thus, identifying areas in which hh adolescents feel less confident socially is important, as attempting to make changes at this age will be beneficial long-term. Especially as young males constitute a high suicide risk.

Our findings possibly challenge previous conceptions that being deaf affects social confidence. However, face-to-face communication is becoming less common in today's Society, and social interactions have become increasingly based on mobile phones and the Internet. Some time ago, 'Tagdeaf' [61] was launched as a social network site specifically created for those who are deaf or hh, thus being socially confident is not purely based on face-to-face situations. Instead, factors such as physical appearance may be more likely to be a contributory factor. Langlois et al. [62] reported

that attractive individuals have a higher level of confidence, and tend to be more extraverted than less attractive people. We would argue there is no reason why this should be different in the D/deaf world.

## 6. Conclusions

Small yet significant findings were obtained, as differences were found in levels of social confidence scores, although not entirely in agreement with previous research that deaf/hh males would experience lower levels of social confidence than that of hearing males. Fellingner et al.[63] argued that Deaf people appear to have higher levels of emotional, physical, and psychological problems than hearing individuals. However, the current study found a significant interaction between the cochlear implant users' levels of social confidence when in a Deaf environment. As previously mentioned, mental health problems are increasing an issue in adolescents and more so in the Deaf community and this needs further attention. Research in adolescents' confidence in forming emotional attachments with those of the opposite or same sex would be useful, in order to identify any challenges to their social confidence in this respect. It would be valuable to investigate levels of social confidence in a working environment, as this requires individuals to behave in ways they may not normally act with others.

Those who lack social skills are often rejected by others and are at risk for developing mental health problems that persist during adulthood [34], subsequently, we argue continuing research into the Deaf community is essential, as much more can be done to prevent such mental health issues from occurring. We feel that this area of research is often isolated and ignored by the larger hearing population. While Geers, Tobey, Moog and Brenner [6] suggest that earlier cochlear implantation results in a better outcome in both auditory and verbal development, it is rather reassuring to note that Zwolan et al. [64], reported on a study including over 65s that irrespective of age individuals benefit from cochlear implants.

## Conflict of Interest

No conflicts of interest were reported

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<sup>i</sup>"D"eaf refers to a group of deaf people who share a common language (BSL) and culture, 'deaf' indicates the audiological condition of being unable to hear.  
<sup>ii</sup> Our statistical expert had no explanation why the two ANOVAs produced different main effects with regards to environment.