

**Reasons for the non-use of hearing aids amongst
hearing-impaired children aged 9-14 years who
attend mainstream schools**

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Abstract

The purpose of the present study was to identify the reasons why some hearing-impaired children (aged 9-14 years) do not use their hearing aids. The benefits of hearing aid amplification usage among school-aged children is widely researched and established. However, research investigating why some children with a hearing loss do not wear their hearing aids is limited. Six cases of hearing aid non-usage amongst children aged between 9-14 years were investigated using mixed-methods research. All six participants attend mainstream schools and some of the speech-discrimination tests were conducted in noise to replicate the listening conditions in a 'typical' classroom. The results of this study indicate that the reasons for the non-use of hearing aids are multi-layered. The principal reason for non-use was found to be issues related to the stigma of wearing hearing aids. Alongside stigma, the difficulty of listening with hearing aids in noise was seen to be a significant factor in non-use. Also, the degree of hearing loss, the age when fitted with hearing aids, the comfort and fit of the equipment and the participant's own perception of their need for hearing aids were all factors that influenced the use or non-use of hearing aids. Implications are drawn relating to the need for children to receive on-going counselling regarding their hearing loss, particularly as they begin attending high school. Furthermore, this study recommends that mainstream teachers and the child's hearing peers receive more training to improve their knowledge and understanding of hearing-impairment. In exploring the experiences of older, hearing-impaired children, this study highlights the complexity in the issue of hearing aid non-use amongst this age-group.

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CHAPTER 1 - INTRODUCTION

Rationale for choice of research topic

Hearing loss impacts a child's communication ability and potentially hinders the development of normal progress in school (Yoshinaga-Itano et al, 1998/ Tate-Maltby, 2002). The purpose of hearing aids is to amplify sounds, enabling a hearing-impaired person to make maximum use of their residual hearing. Modern digital hearing aids can be customized for the individual's configuration and degree of hearing loss, with the goals of maximizing audibility, intelligibility, sound quality, satisfaction and listener comfort (Blamey et al, 2010). However, amongst the general population the estimated non-use of hearing aids is approximately 80% (Kochkin, 2000). In my experience as a peripatetic Teacher of the Deaf I have observed that a significant minority of hearing-impaired children reject the use of their hearing aids. The aim of this study is to explore and identify the reasons why hearing-impaired children aged 9-14 years who attend mainstream schools do not use their hearing aids.

Given the benefits of hearing aids and the particular challenge of listening in noisy classrooms, incidents of non-use amongst children merit careful consideration in order that lessons can be learnt. I have noted that other professional and parents often assume that the reason a particular student will not wear their hearing aids is because of the perceived stigma attached to doing so. However, I would suggest that this is a simplistic view as the children themselves often highlight other issues. With regards older children it is to be expected that issues related to stigma will be predominant but I am also interested in exploring other factors that may lead to hearing aid non-use. My suspicion is that for many children with hearing aids the motivation to use them is driven by the overall balance between the advantages and disadvantages of doing so. If the advantages of using hearing aids clearly outweigh the disadvantages then they are more likely to be consistently used. In contrast, if there are several negative issues surrounding the use of hearing aids then these disadvantages may well be greater than the advantages and consequently they will be less likely to be used.

Definition

In this study, the term **hearing aid non-users** can be defined as those hearing-impaired children reporting that they are no longer wearing their prescribed hearing aids at home or at school.

Structure of the dissertation

The next chapter in this study will discuss the relevant academic literature pertaining to the non-use of hearing aids. This review will focus on studies conducted with older children but will also refer to research amongst younger children and with adults when this is applicable. Following the literature review,

the methodology for this study will be outlined. Different research methods will be discussed and the best methodology for my research explained. The test procedures will be clearly described and an explanation given as to how the data generated will be analysed. The next chapter will then systematically present and describe the results generated by the research procedures. In the final chapter, the results from this study will be analysed and compared to the academic findings from the literature review. The limitations of my research will be identified, conclusions related to the research will be stated and specific recommendations made for further research.

CHAPTER 2 - LITERATURE REVIEW

Introduction

The aim of this study is to explore the reasons why hearing-impaired children (aged 9-14) do not use their hearing aids. Modern hearing aids are highly advanced and a large variety of technological and design features is available, yet about 80% (in Western societies) of the persons affected by hearing loss do not use hearing aids (Egbert and Depperman, 2012). New fitting software has been introduced to allow for easy adjustment, flexibility and precision, enabling hearing aids to be programmed to fit a wide range of hearing losses. However, research shows that despite the significant improvement in the technology of hearing aids, many hearing-impaired people do not want to use them (Killion, 2004). This literature review aims to identify the key issues that cause the non-use of hearing aids amongst hearing-impaired children. Publications for this literature review were identified by structured searches in Pubmed, the Oxford Journals, the Hearing Journal, the American Journal of Audiology and by inspecting the reference lists of relevant articles.

To date, there is little research documenting the consistency of hearing aid use in children (Walker et al, 2013). Few studies have explored the family or child-specific factors that influence consistency of hearing aid use. Indeed, there is little research that has examined hearing-impaired children's experiences with hearing technology in mainstream schools. Much of the academic literature focuses on specific aspects of the challenges facing older hearing-impaired children but I would suggest that research of a wider scope is needed to examine why students with a hearing-impairment resist using their hearing aids. Despite the limitations, the literature research does pin-point many factors that cause children to reject their hearing aids.

The literature review is divided into several sections to highlight the relevant literature pertaining to the non-use of hearing aids. The first section explores research on issues related to the stigma of using hearing aids. This includes a number of factors that are inter-related, such as the child's perception of normality, the development of their self-identity, attending a mainstream school and the attitudes of others. The following sections identify the degree of hearing loss, poor benefit in background noise, unrealistic expectations, cosmetic issues and the need for more counselling as significant factors reflected in the literature. Also highlighted in the academic research are the level of support provided by friends and family, the age of being fitted with hearing aids, technological factors and the comfort and fit of the hearing aids.

Stigma

Several studies identify stigma as the key factor affecting many hearing-impaired children's refusal to wear hearing aids (Rekkedal, 2012/Hetu, 1996). Despite technological improvements enhancing the benefits of hearing aids, they are still a visible sign of disability (Scherer, 2002). Children with hearing loss encounter many challenges to their educational, social and emotional development. The negative stigma associated with hearing loss has a significant socio-psychological impact on hearing-impaired individuals (Mourtou and Meis, 2012) and the body of literature suggests that these factors are predominant in the decision of many young people to not wear hearing aids (Kent and Smith, 2006).

Identity and 'normality'

Several studies highlight the issue of identity construction, focussing on the importance for many hearing-impaired students of appearing to be 'normal' within their hearing peer group. A study by Kent and Smith (2006) explored the experience of 16 bilaterally, moderately to severely hearing-impaired adolescents in mainstream education to understand their perceptions of using hearing aids. This research found that 'normality' was the most important issue to these students as those who are able to perceive their use of hearing aids in a given context as 'normal' are more likely to use them. In contrast, when usage of hearing aids is perceived to be 'abnormal' they are likely to be hidden or not used at all. Kent and Smith (2006) found that hearing aid usage amongst children is influenced significantly by their development of an acceptable sense of identity. Most of the students in the research identified themselves with their mainstream hearing peers and reported that by employing various coping strategies they could overcome some of the difficulties caused by their hearing loss. However, Kent and Smith (2006) believe that the students' self-evaluations of their communication were overly optimistic, underlining their need to be perceived as 'normal'. This research also found that the age of diagnosis and the age when fitted with hearing aids are less significant factors than the need to be considered 'normal' with regards predicting hearing aid usage.

The study by Kent and Smith (2006) was based on unstructured interviews, which were then analysed and themes were identified. The interviews were conducted by each child's Teacher of the Deaf and it can be argued that this may have led to inconsistencies of approach. Also, the children in the study were predominantly regular hearing aid users and so a note of caution is required as it would be expected that the children in my study will have a more negative opinion of hearing aids. However, this study does provide an insight into some of the perceptions of adolescent hearing aid users who attend mainstream schools.

A Canadian study by Israelite et al (2002) explored the issue of identity development with seven hearing-impaired high school children (aged 14-17). The construction of identity is an important task for every adolescent and is a particular challenge for hearing-impaired children who must also contend with the impact of hearing loss in their everyday lives. This study used interviews and questionnaires to investigate the views of the children with key topics identified through analysis of the transcripts.

The findings from the study by Israelite et al (2002) agree with Kent and Smith (2006) in that identifying as hearing-impaired marked the children as being different from hearing adolescents who are perceived as 'normal'. For all the children in this study the need for social acceptance within their peer group was important. It was observed that most of the children did not tell their peers that they have a hearing loss as they felt it would alienate them from others. Israelite et al (2002) describe the negative school experiences of the children in the study, in which they felt lonely, rejected, misunderstood and discriminated against. Another factor causing a non-supportive school environment was the mainstream teachers' lack of knowledge and understanding about working with hearing-impaired children. This study highlights the important role in the identity development of hearing-impaired adolescents of interaction with other hearing-impaired peers and the authors recommend the provision of special activities promoting the social groupings of hearing-impaired students.

This research is relevant to my study as it explores issues regarding the experiences of older hearing-impaired children taught in mainstream settings. Alongside this it employs some of the methods used in my study and has a similar proportion of pupils with a moderate hearing loss. This study explains the importance of social acceptance within a peer group for all adolescents and highlights the difficulties faced by hearing-impaired students as they construct their identity during the challenging adolescent period, with hearing loss complicating the situation further. It could be argued that the relevance of the findings by Israelite et al (2002) are undermined by the small sample size and that the interview questions did not focus on the participants' experiences of using hearing aids.

A Norwegian study by Rekkadal (2012) explored the use of and attitudes towards hearing technologies of 153 hearing-impaired students. The children were aged 10-16 years old and all attended mainstream schools. Most children received their first hearing aid between 3 and 5 years of age, but nearly 25% received their first hearing aid after school age. This study highlighted a number of important factors that promote satisfaction with hearing aids amongst this age group. The results found that students with positive self-descriptions tended to be more satisfied with hearing aids, the sound quality of hearing aids is important to the user and that severe hearing loss promotes positive attitudes

towards hearing aids. However, this research is limited in that it did not include factors such as the design and visibility of hearing aids and also the support of families and friends is not measured.

Stinson and Antia (1999) found that hearing-impaired students in mainstream schools often experience difficulties in academic participation and are socially isolated. Deafness is a low incidence disability and the hearing-impaired child will usually be the only pupil with a hearing loss in a classroom and often one of only a few such children in the school. Hearing-impaired children may find difficulty locating the speaker during a classroom discussion and these students may experience feelings of loneliness because they cannot easily participate in social activities with peers due to communication difficulties.

Stinson and Antia (1999) provide an overview of the key issues relating to the inclusive approach to the education of deaf students by reviewing the academic literature on this subject. It could be argued that these findings do not add anything new to the topic and with regards my study it lacks relevance as it has no focus on the children's experience with using hearing aids. Nonetheless, I would suggest that an understanding of the experience of hearing-impaired children in school is vitally important to my research.

Further, Stinson and Antia (1999) observe that hearing-impaired children may characterize themselves as helpless individuals who often avoid participating in school activities. This study found that students with a range of hearing loss report feelings of loneliness and an absence of close friendships, being frequently neglected or rejected by their hearing peers. These findings are supported by Tvingstedt (1993) who found that 70% of older students with mild and moderate hearing loss characterized themselves as 'outsiders' and had very few friends.

Warick (1994) investigated the opinions of 290 mainstreamed hearing-impaired teenagers on issues such as education and adjustment to hearing loss. The results showed that 20% of the students reported feeling discouraged, with a similar number saying they had few friends. The students were reluctant to tell their hearing peers about their hearing problems and Warick suggests this is due to perceived negative reactions. This Canadian study had a considerable sample size making the findings credible and is useful in setting a context to the school experience of the participants in my study.

Bullying

Resistance to identifying as hard of hearing is evident in Kent (2003), a study which revealed few academic differences in surveyed youth with hearing loss, other than higher scores on loneliness. However, over half of the participants who used hearing aids did not self-identify as having a hearing disability when asked. Of the students who did self-identify, more were found to be at-risk physically and psychologically due to teasing and bullying, compared with those who did not. Removing hearing aids was identified as a strategy for dealing with teasing (Kent and Smith, 2006).

The hearing aid effect

A study by Blood (1997) demonstrated that hearing aids often elicit stereotypical assumptions of the characteristics of the wearer. In this research, pictures of school-aged children wearing hearing aids were presented to a group of college students and their responses provided evidence that hearing aid wearers were rated negatively on measures of intelligence and appearance. The negative, stigmatizing effect of hearing aids has been described as the hearing aid effect (Blood, 1997).

Likewise, Dengerink and Porter (1984) found that hearing children have negative attitudes towards their peers wearing hearing aids. The results of this study with 164 hearing children aged between 10 and 12 years indicated that the subjects viewed peers as less attractive due to the presence of a hearing aid. Dengerink and Porter (1984) suggest improved training for teachers and educational programs to educate the hearing-impaired child's peers. In my view there is also a need to measure the impact of this training to analyse the extent to which this intervention can influence hearing aid use in mainstream schools. A study by Zheng, Caissie and Comeau (2003) reported that teachers and hearing peers underestimate the communication difficulties experienced by hearing-impaired adolescents in school. This is a significant finding as it suggests that children with a mild or moderate hearing loss (as with the majority of children in my study) may appear to cope well in school and consequently not receive the support that is required.

Older hearing-impaired students

Further evidence that older hearing-impaired children are less willing to use hearing aids was demonstrated by Winn (2006). Amongst the 60 subjects participating it was found that the use of hearing aids declined progressively starting from primary school and continuing through high school. The majority of children who did not wear their hearing aids stopped using them between the ages of 12 years to 15 years. This is supported by the findings of Clarke and Horvath (1979) who found that rejection of hearing aids most commonly occurs during the early high school years.

DeConde-Johnson (2007) points out that 'fitting in' is vitally important to adolescents and can be described as a dominant (positive or negative) force in their lives. DeConde Johnson (2007) also observes that starting high school is a particularly challenging and volatile time for most children, and so it is not surprising that many hearing-impaired children do not want to be known for their hearing loss or hearing aids. When a hearing-impaired child understands and accepts their hearing loss in the pre-teen years then they are more likely to keep hearing issues separate from 'teen' issues later.

Level of support provided by friends and families

Several studies identify the level of support provided by friends and families as being an important factor in the willingness of young people to use hearing aids. Kent and Smith (2006) found that those children who perceived affirming or accepting attitudes from their family and friends were more comfortable with wearing hearing aids. When parents help their child to accept and 'normalize' their hearing difficulties this encourages consistent hearing aid usage. The significance of family involvement in the personal development and identity formation of hearing-impaired children was also confirmed by Leigh and Stinson (1991). Other studies have shown that many parents of children with hearing loss lack sufficient understanding of hearing aids (Blair, Wright and Pollard, 1981). Haggard and Primus (1999) showed that parents consistently underestimate the impact on a child's development caused by a mild or moderate hearing loss.

However, for many hearing-impaired children interactions with their hearing peers is the key factor in their emotional development. Indeed, Kent and Smith (2006) found that students who had positive relationships with hearing peers who accepted hearing aid usage as normal were often confident about wearing hearing aids and they had a more secure sense of identity. Friendship has been identified as crucial to the happiness of hearing-impaired adolescents in their school experience (Ridsdale and Thompson, 2002). Ita and Friedman (2001) report that hearing-impaired children who are taught in mainstream schools have real concerns about their peer relationships.

The age of onset/fitting

The literature research identifies both the age of onset of hearing loss and the age when the child was fitted with hearing aids as significant factors influencing the use or non-use of hearing aids. DeConde-Johnson (2007) observes that hearing-impaired adolescents are best equipped to self-identify as hearing-impaired if their hearing loss was managed and accepted at an earlier age. Preisler and Tuingstedt (2005) reported that children who are fitted with hearing aids in early childhood are more likely to integrate the aids into their daily lives. Likewise, Gillies (1997) observes that early intervention promotes more frequent

use of hearing aids later in life and Rekkedal (2012) states that children fitted with hearing aids early in life appreciated their use more than those who were fitted with hearing aids later on. Rekkedal (2012) also found that children who were fitted later with hearing aids tended to feel more negatively about their hearing aids. Rekkedal (2012) points out that hearing loss diagnosed later can have particular implications as the child may not adapt as easily to the sound provided by the hearing aid compared with children who are diagnosed early. This is due to the reduced ability of infants to perceive differences among phonetic contrasts that are not used or heard within the first year. In contrast, a study by Vesterager and Parving (1995) did not find a relationship between early interventions with hearing aids and use of hearing aids, among the 76 children participating.

The degree of hearing loss

Several studies have provided evidence that the degree of hearing loss influences the use or non-use of hearing aids. Research by Kochkin (2009) among both hearing-impaired adults and children showed that 1 out of 10 people with mild hearing loss used hearing aids compared to 4 out of 10 with moderate to severe hearing loss. Rekkedal (2012) found that amongst 44 children with mild to moderate hearing loss approximately 44% irregularly or never wore their hearing aids at school. This contrasts with the students who had a severe loss who tended to be more satisfied with their hearing aids. Rekkedal (2012) suggests that this is because students with severe hearing loss are more likely to be dependent on their hearing aids.

Walker et al (2013) investigated the hearing aid usage amongst 272 children with mild-severe hearing loss. Using the hearing aid's datalogging program the researchers were able to gather accurate data showing the hearing aid usage of each child. The results indicated that children with milder hearing loss wore their hearing aids less consistently than children with more severe hearing loss. The study also explored parental report measures and found that parents often overestimate the amount of time their children wear hearing aids.

Walker et al (2013) suggests the need for continued counselling – both for the child and their parents – regarding the benefits of hearing aid use in children, particularly for those with milder hearing losses. The limitations of this study are that data on the quality of the hearing aid fitting was not examined to see if this influenced consistency of hearing aid use. The parameters of the study were narrow and it focussed on younger children and so there is a need to be cautious in applying these findings to my study.

Many people with mild to moderate hearing loss do not admit they have hearing loss because they can hear well enough in many situations (Mourtou and Meis,

2012). Kent and Smith (2006) observe that many children do not use their hearing aids because they perceive them to be of little benefit. The most common reason reported reason for non-use was no self-perceived aided benefit (Cameron et al, 2008).

Linssen et al (2013) found that the key factor in hearing aid use is the perceived need for improved hearing. This study explored the beliefs and feelings of adults who never or hardly ever use their hearing aids. This qualitative research highlighted the indifference towards use of hearing aids amongst those people who perceived only a mild handicap from their hearing loss. Despite using the hearing aid for a period of time, the perceived disadvantages of the hearing aids are seen to be greater than the disadvantages of their hearing loss. Linssen et al (2013) observe that this group of people felt that they could manage without hearing aids, particularly as they employed communication strategies to help them. This study also provided evidence that people with a more severe hearing loss did accept the need to improve their hearing but some stopped using hearing aids as they did not help them as much as they hoped.

The limitations of the study by Linssen et al (2013) are that the small number of subjects (11) and the use of one research tool (interview) may have produced unreliable data. While acknowledging that this research explored the views of adults it nonetheless highlights that both the degree of hearing loss and the subjects' perceived need for hearing aids influences their willingness to use hearing aids. In conclusion, Linssen et al (2013) describe how people have different beliefs and feelings about their hearing aid non-use and so a patient-centred approach is needed to provide each non-user with the best help.

Poor benefit in background noise

Digital hearing aids make it possible to program hearing devices to meet individual needs but studies indicate that the sound quality of hearing aids still poses a problem. Poor benefit from hearing aids is a recurring theme in the literature. A particular problem is listening in background noise because the hearing aid user's potential to hear in noisy environments is reduced due to physical changes in the cochlea (Van Vliet, 2003). The performance of hearing aids in background noise is a major reason for the non-use of hearing aids in adults (Kochkin, 2000). This is significant to my study as classroom listening conditions in measurement surveys of schools show that classroom noise levels can be high (Shield and Dockrell, 2003). Van Vliet (2003) observes that people with hearing aids may be frustrated and disappointed at being unable to understand speech in noisy environments.

Unrealistic expectations

Hearing aids do not restore or correct hearing. However, patients often have unrealistic expectations or demands that are well beyond what any hearing aid can deliver (Van Vliet, 2003). Indeed, many hearing-impaired people expect an immediate or optimal result from their hearing aids with some anticipating the restoration of their hearing (Mourtu and Meis, 2012).

Technological factors/comfort and fit

Technical problems in hearing aid use might also be a reason for hearing aid users' withdrawal from using hearing aids. Mourtu and Meis (2012) found that some users have problems handling their hearing aids. Tate-Maltby (2002) noted that difficulty in inserting the ear mould or hearing aid is the most common reason for lack of use.

Cosmetic Issues

A study with four children (aged 8-10 years) by Christensen et al (2004) evaluated the benefit of a new digital hearing aid using open ear moulds with feedback reduction. The results of this research suggested that the children attached more importance to cosmetic issues – such as the hearing aid colour – than the actual performance of the hearing aid. Kent and Smith (2006) observed that some children attempt to reduce the visibility of their hearing aids through the use of transparent moulds, having long hair and having hearing aids that match skin colour. Kent and Smith (2006) also found that the visibility of hearing aids led some children to stop wearing them altogether. Whitson and Whitson (2003) found that many children ask for smaller, invisible hearing aids and adolescents need to be presented with a variety of cosmetic options.

Non-use of hearing aids amongst the general population

There is no statistical data in the literature showing the percentage of children who do not use their hearing aids. Amongst the general population, a consumer survey of hearing aid owners referred to as MarkeTrak (Kochkin, 2000) found that only 20.4% of the total hearing-impaired population use hearing aids. This quantifiable survey of nearly 3000 adults explored the experiences of hearing aid owners and identified 32 reasons for the non-use of hearing aids.

The most common reason given in this survey for not using aids was that they give poor benefit, with many describing the benefit as minimal or non-existent. Some reported that their hearing aids amplified, but they could not understand words. The second most important reason was the performance of hearing aids in background noise. A quarter of respondents indicated that they did not wear their hearing aids because they did not work in difficult listening situations, they amplified loud noises sometimes painfully, or background noise was annoying, distracting, or unacceptable. The fit and comfort of hearing aids was the third

most common reason for non-use. Many complained that their hearing aids did not fit correctly and they hurt their ears, were uncomfortable, or fell out of their ears.

The fourth reason for rejecting hearing aids was negative side effects such as ears that hurt, too much pressure in the ears, blisters/rashes in ears, itching ears, dizziness, makes them nervous, ears that sweat, wax build up in the ear canal, headaches, hair gets caught in hearing aid and infections in the ear. The fifth reason is not relevant to this study as it concerns the price and cost of hearing aids. The next most important reason given for non-use is that many people state that they don't need help with their hearing. For some, surgical procedures have improved their hearing, while others believe that their hearing loss is too mild to necessitate wearing hearing aids. Another significant reason is that the hearing aids are broken or do not work correctly. Others highlight the unacceptable sound quality of the hearing aids, with the lack of clarity, uncomfortable sound, unnatural, distorted, tinny, picks up wind or hollow sound being examples of this. A significant number of people simply reported that they do not use their hearing aids but gave no specific reason. Other reasons given include the hearing aids whistle or feed-back, they are a hassle to wear, do not help their high-frequency loss and the stigma of wearing hearing aids.

The survey by Kochkin (2000) helps identify the key problems that people experience with hearing aids. It provides evidence that for many people hearing aids do not improve speech intelligibility in listening environments important to the user, particularly when listening in background noise. Indeed, the need for improved hearing aid performance in noise is highlighted as one of the key barriers that need to be addressed. It also reports that more could be done to improve customer satisfaction with the fit and comfort of hearing aids. The report recommends that every dispenser should routinely measure the subjective and objective consumer benefit with hearing aids. While this research explores the experiences of adults with hearing aids it does provide a valuable insight into the wide range of problems that people have with hearing aids.

Other studies with the general population confirms that hearing aid satisfaction may depend on a complex combination of severity of hearing loss, perceived handicap or need for assistance, aided sound quality, reliability or dependability of the instrument, and the personality of the wearer (Humes, 1999). Kochkin (2000) concludes that the solution is multi-dimensional, including the application and further evolution of technology, alongside an enhancement of dispenser hearing aid fitting and counselling skills.

SUMMARY

There is a limited amount of research exploring the reasons the non-use of hearing aids amongst children, with no statistical data showing the number of children who reject the use of their hearing aids. The academic studies into this issue generally have a narrow focus, with few studies exploring the reasons for non-use from a broad perspective. Studies into adult non-use of hearing aids is more comprehensive, with the MarkeTrak consumer survey by Kochkin (2000) providing statistical data to identify the different reasons for the rejection of hearing aids.

The review of the academic literature that is relevant to my study identifies a wide range of factors that can cause non-use of hearing aids amongst young people. Issues related to stigma are the most prominent as the literature highlights the particular challenges facing older hearing-impaired children as they contend with developing their self-identity and their perceptions of 'normality'. The degree of hearing loss, poor benefit in background noise, unrealistic expectations, cosmetic issues and the need for more counselling are all significant factors reflected in the literature. The level of support provided by friends and family, the age of being fitted, technological factors and the comfort and fit of the hearing aids are also issues that are highlighted in the reviewed literature.

CHAPTER 3 - METHODOLOGY

Introduction

This study was conducted in Stoke-on-Trent, a city with a population of approximately 250,000. There are approximately 100 children (aged 0-16) in Stoke-on-Trent who have been prescribed hearing aids and the majority of these children (approximately 85%) are taught in mainstream schools (detailed figures can be obtained from Stoke-on-Trent SEND Services Capita One database). The impetus for my study was that in my role as a peripatetic Teacher of the Deaf I have observed that year after year there is always a small group of children who do not use their hearing aids. The aim of this study is to investigate the reasons why these children (aged 9-14 in my study) do not want to wear their hearing aids.

As detailed in the previous chapter, the literature research suggests that there are multiple reasons why people do not use their hearing aids. The purpose of this study is to explore the particular reasons for non-use of hearing aids amongst six children aged 9-14. Given the age group of the participants it is important that this study has a focus on the children's experience of being a hearing aid user in school. Is stigma the main reason for rejecting hearing aids? To be the only child in the class or even the school wearing hearing aids makes that child different, not 'normal'. The particular listening scenarios and challenges found in school need also be examined. How much benefit do the hearing aids provide in difficult listening conditions such as in a classroom? Are there technical problems, uncomfortable ear moulds or cosmetic issues that cause dissatisfaction with the hearing aids? The role of professionals from health and education could be a significant factor in the child's willingness to use hearing aids. Also, the hearing-impaired child's acceptance of hearing aids may be influenced by the attitude of their family or friends. Therefore, the research methods used in this study need to investigate many different possible reasons that may have caused the children in this study to stop using their hearing aids.

Research Methods

A methodology refers to the philosophical framework and the fundamental assumptions of research (van Manen, 1990). Research design refers to the plan of action that links the philosophical assumptions to specific methods (Cresswell, 2003). To determine the best methodology for my research I had to identify the research methods available and consider their suitability in helping me fulfil the aim of my study. As the review of the literature suggests non-use of hearing aids is a multi-faceted issue it was decided that the study needed to take a broad, comprehensive approach.

In this study, a mixed methods (triangulation) approach was used to enable the research questions to be addressed more fully and accurately than the adoption of only a quantitative or qualitative approach would permit. Mixed methods research involves both collecting and analysing quantitative and qualitative data with the intention of combining the advantages of both research methods. Holtzhausen (2001) explains that by following a multi-method research approach (triangulation), a more complete, holistic and contextual portrayal can be captured.

There has been widespread debate regarding the relative merits of quantitative and qualitative strategies for research as each method offers specific advantages as well as disadvantages (Yeasmin and Rahman, 2012). Quantitative research is concerned with the collection and analysis of data in numeric form. The strengths of quantitative research are in the potential for precise, reliable and replicable measurement whilst statistical techniques allow for sophisticated analysis. The limitations of quantitative research lie in its failure to account for people's unique ability to interpret their experiences, construct their own meanings and act on these. The main aim of qualitative data is to discover the perceptions and experiences of the participants so that the researcher can then extract themes. Qualitative research has the aim of understanding experience as nearly as possible as its participants feel it or live it (Ely et al, 1991). The strength of qualitative data is that it wants those who are studied to speak for themselves, to provide their perspectives in words. The limitations of this research include its subjective nature and problems of adequate validity or reliability.

Both quantitative and qualitative methods of research are valid and useful. It is possible for a single investigation to use both methods (Best and Khan, 1989). A 'triangulation' (mixed-methods) approach was chosen for this study as the evaluation of the use/non-use of children's hearing aids requires a process of gathering information in both clinical (lab-based) and real world settings (MCHAS, 2005). This involves the use of objective and subjective measures which provide valuable quantitative data to be analysed alongside the qualitative research that will enable the participants to speak for themselves. 'Triangulation' can increase the validity of a study by incorporating several viewpoints and methods but will only produce a satisfactory outcome if the research is clearly focused theoretically or conceptually. If either quantitative or qualitative methods become mere window dressing for the other, then the design is inadequate.

Internal and external validity

It is also important to consider the internal and external validity of any of the research methods being employed (Leedy, 1997). The internal validity is the extent to which the data obtained allows the researcher to draw accurate

conclusions from it (Leedy and Ormrod, 2001). A controlled test environment - with uniformity in test equipment – needs to be used in order to control for environmental conditions. External validity is the extent to which the results apply to situations beyond the study. However, due to the small sample size the opportunity to generalise the findings of this study to the total population is limited.

Participants

The study involved six hearing-impaired students who are taught in mainstream schools. Selection criteria included children with experience of using hearing aids but currently not using them, aged at least nine years old and having a willingness to be open and honest with their views as well as performing a battery of speech recognition tests. There were other possible candidates but they were not children on my caseload and I decided that it was preferable that all participants in the study had worked with me before as they are more likely to feel comfortable in talking about their experiences. The six children and their families were approached and asked whether they were willing to participate in the study. They were asked to give their informed consent to this study, which essentially means that they were fully informed as to the nature of this research before the data collection procedures took place (see appendix A and B for parent and participant consent letters). The six participants and their families were assured that the child will remain anonymous throughout the study¹. All six children and their parents agreed to take part.

The reason that I selected these six children was principally because I know them all, having regularly visited each one in school in my role as their Teacher of the Deaf. I was confident that they would each provide a valuable contribution to this study as they have all worn hearing aids for a significant period of time in the past but currently are not using them. All the children in this research are old enough to be able to clearly describe their experiences of wearing hearing aids and can explain the reasons why they don't want to use them.

The six participants included two girls and four boys, ages 9-14. The six students in this study included three in the same high school (two were siblings), two in separate high schools with several hearing aid users in their school and one student in a junior school who is the only hearing-impaired pupil in his school. The participants had all developed language primarily through the auditory channel, and all relied on speech and hearing for communication. All six students used oral English as their communication preference. Two students had a mild hearing loss, three moderate and one had a severe loss

(see Table 1 hearing loss classification). A summary of the participants' background information is outlined in Table 1 below:

Table 1: Participants' background information

Child in study	Gender	Age at time of study	Hearing loss classification (all sensori-neural)	Age at diagnosis of hearing loss	Age at hearing aid fitting	Hearing aid details
A	Male	9 years	Moderate mid-frequency	5 years 11 months	6 years 1 month	Danalogic i-FIT 71D
B	Male	12 years	Moderate	8 months	9 months	Danalogic i-FIT 71-D
C	Female	12 years	Mild to moderate	11 years 7 months	11 years 8 months	Danalogic i-FIT 71-D
D	Female	14 years	Moderate high frequency	7 years 5 months	7 years 8 months	Danalogic i-FIT 71-D
E	Male	13 years	Mild in left ear, severe in right	5 years 7 months	5 years 10 months	R: Nathos SP W L: i-FIT 71-D
F	Male	14 years	Severe high frequency	5 years 3 months	5 years 5 months	Phonak Nathos SP

¹ It is possible that the some of my colleagues in the Stoke-on-Trent Send Services hearing-impaired team could identify some of the children in the published information so it is noted that they have all recently received training in data protection and understand the importance of confidentiality.

Child A (age 9) attends a mainstream junior school and is the only hearing-impaired pupil in his school. He has a bilateral mid-frequency hearing loss (see Table 2) of unknown aetiology. When Child A was aged 6 years he was fitted with hearing aids and wore them in school for over a year but was always inconsistent in doing so and subsequently stopped using them altogether. However, his hearing aids are kept in school and as his Teacher of the Deaf I have regularly visited Child A to discuss his hearing loss, check the hearing aids and offer advice to the school.

Table 2: Child A Audiogram

	Frequency (Hz)						
	250	500	1000	2000	3000	4000	6000
Right ear	10	20	45	45	35	20	15
Left ear	10	20	60	40	40	30	20

(Hearing tested at the University Hospital of North Staffordshire on 08/10/13)

Child B was fitted with hearing aids aged 9 months, the only student in this study to be fitted at pre-school age. Currently 12 years old, Child B has an older sister who is hearing-impaired attending the same school. The family did not choose to pursue investigations to ascertain the aetiology of Child B's hearing loss. Child B has a bilateral moderate sensori-neural hearing loss (see Table 3) but insists that he does not need his hearing aids. His hearing aids are kept in school and he receives regular visits from me as his Teacher of the Deaf. Child B's sister consistently uses hearing aids and two other children in the school are reliable hearing aid users.

Table 3: Child B Audiogram

	Frequency (Hz)						
	250	500	1000	2000	3000	4000	6000
Right ear	25	30	45	45	55	60	55
Left ear	25	30	40	50	55	60	65

(Hearing tested at the University Hospital of North Staffordshire on 08/10/13).

Child C is 12 years old and was fitted with hearing aids aged 11 years. She has a mild-moderate sensori-neural loss (see Table 4) of unknown aetiology and has an older sister who is hearing-impaired (Child D) in this study. Child C attends a high school with her older sister and there are also two other children at the school who are hearing-impaired and use hearing aids.

Table 4: Child C Audiogram

	Frequency (Hz)						
	250	500	1000	2000	3000	4000	6000
Right ear	30	35	30	25		25	75
Left ear	55	45	40	50		70	85

(Hearing tested at the University Hospital of North Staffordshire on 12/11/12).

Child D is aged 14 years and is the older sister of Child C in this study. Child D has a bilateral hearing loss following autoimmune diseases and had a bone marrow transplant as a baby. When first fitted with hearing aids Child D regularly wore them in her primary school but she became inconsistent and then stopped using them when in high school.

Table 5: Child D Audiogram

	Frequency (Hz)						
	250	500	1000	2000	3000	4000	6000
Right ear	15	15	25	45	60	65	75
Left ear	15	20	25	45	60	70	70

(Hearing tested at the University Hospital of North Staffordshire on 01/04/11).

Child E was diagnosed with hearing loss aged 5 years and was fitted with bilateral hearing aids. He has a moderate-severe loss in the right ear and a mild loss in the left ear (see Table 6). There is a family history of hearing problems as his maternal grandmother is deaf in one ear and his maternal great grandmother had hearing problem from her mid-30s. Child E has never been enthusiastic about using his hearing aids and stopped altogether when he was in his first year at high school. There are other children in his school with hearing aids but he is the only one in his year group.

Table 6: Child E Audiogram

	Frequency (Hz)						
	250	500	1000	2000	3000	4000	6000
Right ear	25	40	75	85	80	75	70
Left ear	20	25	45	20	10	5	5

(Hearing tested at the University Hospital of North Staffordshire on 23/11/12).

Child F has three brothers (aged 10, 18 and 21) with an almost identical, severe high frequency hearing loss, aetiology unknown. Child F was diagnosed with progressive hearing loss and fitted with hearing aids aged 5 years old. His two older brothers do not wear their hearing aids and Child F stopped using them in Year 8 at high school.

Table 7: Child F Audiogram

	Frequency (Hz)						
	250	500	1000	2000	3000	4000	6000
Right ear	25	45	60	90	110	110	
Left ear	10	30	60	90	105	120	

(Hearing tested at the University Hospital of North Staffordshire on 07/10/10).

At the time of the study all 6 participants were not using hearing aids at home or in school. Each pupil received three visits which took place in school. In the first visit open set and closed set speech-discrimination testing in quiet conditions were carried out, the children were interviewed and the LIFE questionnaire was completed in the second visit, while further speech-discrimination testing – this time in noise – was performed in the final visit. All data was collected by me. Also, visiting at school rather than home was important for the interview and questionnaire as it was felt that the children would not be influenced by their parents' presence. The interviews, questionnaires and speech-discrimination testing were all conducted in a quiet, private room at each school.

Tasks and procedures

The tasks used for this research were chosen to provide a mixture of objective and subjective testing, producing sufficient quantitative and qualitative data to help meet the research aim. This broad and balanced approach is important as hearing aid evaluation must consider not only the technical specifications and benefit of the aid but also the subjective opinion of the user (Tate Maltby, 2002). The hearing aid may be providing the required gain according to prescriptive targets, but this may not provide a satisfactory listening experience to the child in everyday situations and/or it may not necessarily produce optimal speech recognition. Therefore, subjective measures such as a semi-structured interview can provide valuable data in understanding the child's needs and priorities in the relation to the use, benefit from and satisfaction with their hearing aids (MCHAS, 2005). The use of 'objective' tests such as speech tests may be considered more reliable as it provides quantitative data that is more likely to be free from the bias that may occur in subjective measures. A combination of quantitative and qualitative approaches was adopted in this study so that together they form a more complete picture of the research problem. More information about each procedure is available in the next section. The three measures used in the study were:

1. The collection and analysis of qualitative data obtained from a semi-structured interview.
2. The collection and analysis of statistical, quantitative data derived from the LIFE UK-IHP (Canning, 1998) questionnaire focusing on listening situations in school.
3. The collection and analysis of statistical, quantitative data obtained from closed-set and open-set speech-discrimination tests, in quiet and noise.

Semi-Structured Interview

Method

A semi-structured format was employed for the interview (Taylor and Bogdan, 1998). This allows for standard questions to be asked of each interviewee whilst the discussion could develop as appropriate in the particular instance to elicit the opinions of the children. In a semi-structured interview a set of prepared questions helps the researcher focus on the main issues around the subject while still giving the participants the opportunity to bring up and discuss factors that they feel are important to the issue.

The development of the interview was based on the review of the literature regarding non-use of hearing aids. In this way, issues were identified that were important to be discussed in the interview to encourage the participants to talk about their experiences and their views that would reveal significant information about their reasons for not using hearing aids. The interview consisted of twenty questions (see appendix G) and an outline of the themes included is shown in Table 8 below:

Table 8: An outline of the questions in the semi-structured interview:

Category	Questions
Understanding of hearing loss	1, 13-14
First fitting	2-7
When and why stopped using HAs	8
Influence of other people	9-11
School	12-13
Performance of hearing aids	14-16
Wearing a hearing aid	17-20

The first question in the interview investigates the participants' understanding and acceptance of their hearing loss. Following this is a set of questions focused on the participants' retrospective experiences of first being fitted with hearing aids and their first impressions of using them; the next question directly asks the student when they stopped using the hearing aids and what was the reason for doing so. The next set of questions refers to the attitudes and influence of other people (specifically their friends, family and any deaf peers) to their hearing aid use. This is followed by questions that focus on educational experiences and then questions that explore the performance of the hearing aids with regards their sound quality. The final questions discuss the appearance and comfort of wearing hearing aids, considering the participant's view of wearing hearing aids in front of other people.

Procedure

Students were interviewed at school so that they were not influenced by their parents' presence. First, it was ascertained that the subjects understood the purpose of the interview and were happy to proceed. A written transcript was taken during the interview. It was decided not to make video recordings of the interviews as it was decided that the participants may be inhibited by the presence of a video camera.

Life-UK IHP Questionnaire

Method

The Listening Inventories for Education UK Individual Hearing Profile (LIFE-UK IHP) questionnaire was conducted to help identify situations in school which present a listening challenge for each pupil in the study. The LIFE-UK IHP questionnaire (Canning, 1998) is designed to isolate issues regarding listening in noise and quiet, with and without lip-reading. This standardised questionnaire of listening ability as perceived by the child can be used for the specific assessment of the benefit of hearing aids for mainstreamed children and is therefore appropriate for this study. The purpose of using this questionnaire is to compare each pupil's perception of how well they can hear in a variety of school-based situations when using hearing aids and when not using hearing aids.

This self-assessment questionnaire is designed to be used with children aged 7 years to 14 years. Self-report questionnaires are extremely useful (Dillon, 2001) as they provide a measure of subjectively evaluating hearing aid performance. The LIFE-UK IHP questionnaire was used by the Modernising Children's Hearing Aid Services (MCHAS) which introduced digital signal processing hearing aid technology into the NHS (2000 – 2005). LIFE-UK was used by MCHAS in 1st wave studies to identify differences in analogue and digital hearing aids.

Procedure

The questionnaire needs to be carried out in a room with good lighting and quiet ambient noise. Using the example on the first page of the LIFE-UK IHP questionnaire the purpose and format of the task is carefully explained. For the purpose of this study the child will be asked to give two answers for each of the 18 listening scenarios. First they will be asked to comment on how well they hear when they are not using their hearing aids and second they will be asked to answer the same question with regards how well they hear when wearing hearing aids in each specific school listening situation. When the child understands the task then the LIFE-UK IHP questionnaire can be conducted. In each of the 18 scenarios there is a brief description and a picture (see Figure 1).

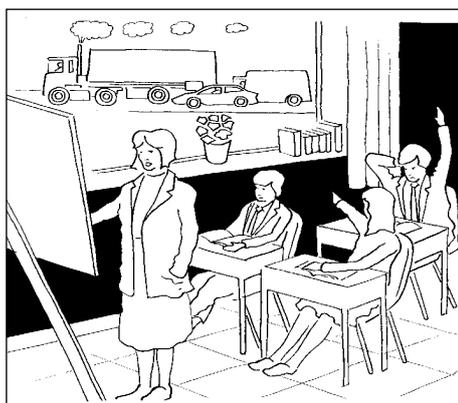
There is a lot of noise outside the classroom.

✓ *Teacher-Child*

✓ *No lip reading*

✓ *Noise*

FM System Yes / No



How well can you hear the words the teacher is saying?

Always easy	Mostly easy	Sometimes difficult	Mostly Difficult	Always difficult
				

Figure 1: Example question from the LIFE-UK IHP questionnaire (Canning, 1998)

To help the child fully understand the question their attention is drawn to the situation described in the picture. The person administering the questionnaire reads the question aloud, presenting each question in a consistent manner. The child should then indicate which response box that most closely reflects their assessment of the listening situation and a response recorded. The mark assigned to each scenario should be scored on a scale of 1 to 5, with 1 being always easy and 5 being always difficult. All of the 18 questions are constructed in the same manner (see appendix C for excerpts).

Speed-Discrimination Tests

Method

The purpose of using speech-discrimination tests in this study was to evaluate listener performance with and without hearing aids. Speech tests are a direct and objective way to measure how much more clearly people can understand speech with their hearing aids than without them (Dillon, 2001). The testing was carried out in a quiet room in each school, with background noise kept to a minimum. The ambient noise level within the test room was measured using a

Cirrus CR: 252B sound level meter with the maximum permissible levels for ambient noise outlined in ISO 8253-2. Initially, the intention was to just conduct speech tests with and without hearing aids in quiet conditions. However, after analyzing the results from the speech tests in quiet it became apparent that to avoid ceiling (child is scoring over 95% correct) it would be necessary to alter the test conditions to make it a more challenging listening situation. Also, the results from speech recognition testing in quiet conditions can be directly compared to testing in background noise.

When considering the appropriate sound level for speech tests in noise it became clear that replicating the listening conditions in a 'typical' classroom will provide valuable data that would complement the other measures used in this study. One cause of the detrimental effect of noise is the degradation of speech intelligibility in the classroom. It has been shown through research with children of differing ages that their understanding of speech in noise and reverberation does not reach an adult level until the late teenage years (Shield and Dockrell, 2003). When hearing aids are being used, a higher signal to noise ratio² is required than with normal hearing. This is probably due to distortion in the hearing aids and loss of information due to hair cell loss in the cochlea (Tate-Maltby, 2002).

Dillon (2001) observed that if specific acoustic conditions can be identified and simulated, speech tests provide a clear assessment of how much the hearing aids change the person's ability to understand speech in this situation. Having identified the need to perform speech tests in listening conditions that the children will experience daily in school I decided to explore the issue of background noise levels in classrooms. This led me to visit a local school (attended by Child B in this study) to measure the background noise in three lessons. Using a sound level meter the average background noise for the three lessons was 66dBA, with the teacher's voice in lesson 1 averaging 74dBA (see appendix D). Shield and Dockrell (2003) reported that teacher's speech levels ranged from 40 to 80dBA, with an average occupied classroom noise level of 72 dBA. A study by Picard and Bradley (2001) compared measured noise levels and teacher's voice levels from a range of studies. Considering the studies they reviewed it was estimated that in reality the signal to noise ratio varies from 3 dB in a kindergarten to almost 7 dB in university classrooms. Therefore, taking into account my findings and the academic research on the subject it was decided that a speech signal of 75dBA and a background noise level of 70dBA would be the appropriate listening conditions for speech testing in noise.

² The signal to noise (S/N) ratio is the ratio between the signal level and the level of the background noise. A positive value indicates that the signal is higher than the background noise (Tate-Maltby, 2002)

Procedures

In this study a 'Parrotplus 2' automated speech discrimination tester was used as this equipment digitally standardizes the presentation of natural speech for each of the speech-discrimination tests. It is important to have standardized conditions as when a test is presented using live voice scores may vary due to uncontrolled changes in voice level (Tate-Maltby, 2002). The use of the Parrotplus 2 automated speech test system means that the participants in the study will not benefit from visual cues such as lip-reading during these tests, adding to the reliability of the results. The speech and background noise levels can be selected and/or altered from the Parrotplus 2 menu system depending on the purpose of the particular test. The testing was performed in quiet with the pupil seated 1 metre from the Parrotplus 2 loudspeaker located at 0 degree azimuth. The testing was administered over two visits (approximately one hour each visit) as there was the possibility that the participants would lose concentration and the reliability of the results affected if all of the tests were attempted in one session. The Manchester Junior Word Lists, the AB Short Word Lists and the CHEAR Auditory Performance Test were each conducted in the following conditions:

- Without hearing aids (unaided) in quiet conditions, with the speech level at 60dB SPL.
- With hearing aids (aided) in quiet conditions, with the speech level at 60dB SPL.
- Without hearing aids (unaided) with significant background noise. The speech level was 75dB SPL and the background noise (class babble) was 70dB SPL.
- With hearing aids (aided) with significant background noise. The speech level was 75dB SPL and the background noise (class babble) was 70dB SPL.

Manchester Junior Word Lists

The Manchester Junior Word Lists (Watson, 1957) were specifically designed for hearing-impaired children from the age of 6 and upwards. This open set test consists of 8 word lists, with each list containing 10 words (see Appendix E). Each word is presented using the Parrotplus 2 automated speech test system and the child should repeat the word exactly as they hear it. If they are not sure of the word they should guess it, and if only part of a word is heard, then they should say that part. All the words in each list are presented at the same sound level and a different word list is used for each of the different test conditions. Dillon (2001) noted that in all open-set testing the child should not have repeated testing with the same material, to prevent them becoming familiar with

the words and thereby maintain the validity of the results. The participant's responses are recorded on the Manchester Junior Word List score sheet. Each word correctly identified is worth one point and the score is expressed as a percentage out of 100.

AB Short Word Lists

The second open set speech recognition test used in this study is the AB Short Word List (Boothroyd, 1968). The Parrotplus 2 automated speech test system contains 8 AB word lists, with each list containing 10 words (see Appendix F). Each list consists of only 10 words but each word is a consonant-vowel-consonant (CVC) composition. The AB lists are isophonemic as the same 30 common phonemes are repeated within each list in different combinations.

The participant is instructed to repeat the word exactly as they hear it and if only part of a word is heard, then they should say that part. The nature of the scoring means that guessing should be encouraged, as single correct sounds can appreciably enhance the overall score. All the words in each list are presented at the same sound level and a different word list is used for each of the different test conditions. The participant's responses are recorded on the AB Short Word List Score sheet, with three points assigned to each word in the AB word lists, one for each phoneme. Dillon (2001) observes that phoneme scoring maximizes the number of scored items per minute of testing time, which therefore maximizes the reliability of the speech score, given the testing time available. For each word list a percentage score is obtained by calculating the points awarded out of 30.

CHEAR Auditory Performance Test

The Chear Auditory Performance Test (APT 1) designed by Marriage (2003) is a closed set speech-discrimination test consisting of ten sets of four monosyllabic words (see Appendix G) chosen to be familiar to most children from age 6 (Marriage, 2003). On each page in the APT 1 stimulus picture book is a four alternative choice format with four pictures of items with similar sounding words. Eight of the pages are for consonant discrimination and two are for vowel discrimination. Each set of four images has six spoken presentations, so that two of the four words are repeated in a single test procedure (see www.chears.co.uk for further details of the Chear APT test). Each word is presented using the Parrotplus 2 automated speech test system and the participant is asked to point to a picture after hearing a word and the responses recorded on the CHEAR APT 1 response sheet. After six presentations, the card is turned to the next page. For each word list a percentage score is obtained by calculating the points awarded for total words correct out of 60.

Analysis of data

Semi-structured Interview

The responses from the semi-structured interview were organised around a thematic outline, based on the Interpretative Phenomenological Analysis (IPA) as developed by Smith et al (1999). In this study, alongside the quantitative data it was important to include qualitative research since the aim was to explore the participant's experience of using/not using hearing aids. When looking at qualitative methods, IPA (Smith et al, 1999) provides an appropriate method for analysing the semi-structured interview as it explores the experience a person has of certain situations or events.

The participants' interviews were transcribed word for word. The transcription became the raw data for analysis. IPA provides a systematic but not prescriptive process for analysing data, based on a thematic analysis (Smith et al, 1999). To analyse the interview transcriptions the ideographic case-study approach was used. This IPA method is suitable for small samples of up to 10 respondents and enables the researcher to write up a single case or an exploration of themes shared between cases. When analysing with IPA, the interviews are transcribed word for word and then the transcription is read through several times. Notes are then made describing any striking issues using a margin down the left-hand side of the transcript (see Appendix G). Once this process has been completed for the whole transcript, further review should enable themes to be identified by a process of abstraction. These themes are inserted in a margin on the right-hand side of the transcript (see Appendix G). The next stage is to look for connections between the themes in order to cluster them together in a meaningful way. This process of analysis is repeated for each participant and then a master list of themes for the group can be drawn up (see Results Table 1).

Life-UK IHP questionnaire

The LIFE-UK IHP questionnaire produces quantitative data that is recorded in the LIFE-UK IHP scoring sheets. Using the LIFE-UK scoring sheet, the marks assigned to each of the 18 listening scenarios - scored on a scale of 1 to 5 (with 1 being always easy and 5 being always difficult) – are collated and a direct statistical comparison can be made between how well the child can hear with and without hearing aids in school. This data gives an insight into each of the participant's perception of their hearing difficulties in school and the benefit that hearing aids may or may not provide. The responses can be further analysed to investigate whether the child is relying on lip reading when listening without hearing aids and also provides data that shows if listening in background noise is more difficult for the child.

Speech-Discrimination Testing

The open-set and closed-set speech-discrimination testing provides quantitative data that is recorded as a percentage of words correct for each word list. A statistical comparison is made between each participant's word recognition scores with and without hearing aids, in conditions of quiet and noise. The total percentage scores for all of the participants are analyzed together to consider the overall pattern of responses.

Summary

A mixed-methods approach was chosen to address the research question in this study. When using mixed methods research it is important to analyze how the obtained data from each method relate to each other. For example, does the evidence provided by speech-discrimination testing support the participant's subjective views expressed in the interview or the questionnaire responses? Or is there evidence that wearing hearing aids is beneficial in helping the children access more speech sounds despite their interview responses or questionnaire answers indicating that they don't need to use them?

CHAPTER 4 - RESULTS

Introduction

The information presented in the results section reflects the three different phases of the data collection. Firstly, each participant in the study was interviewed and the results were analysed using a thematic analysis, based on the Interpretative Phenomenological Analysis (IPA) method (see method section for more detail). The qualitative data from each interview was transcribed (see Appendix G) and organised into themes and sub-themes. This data was then collated giving an overall picture of all of the subjects' experience of using/not using hearing aids (Table 9). A more detailed analysis of each theme and sub-theme then follows with extracts from the interviews included to illustrate the points.

The next set of results was obtained from the LIFE-UK IHP questionnaire providing quantitative data from the participant's responses. This self-reporting questionnaire focuses on listening situations in a school setting and the difficulty that each child faces in a given scenario can be compared between the aided and unaided condition. The results show how many responses each participant gives for the different categories of listening difficulty, with both the aided and unaided scores enabling a direct statistical comparison. The total number of responses in each category is also shown to highlight the overall pattern of the children's answers. The data from the LIFE-UK IHP questionnaire is analysed further to highlight whether the participants find it more difficult to hear in noise (aided and unaided) and if their answers highlight a reliance on lip-reading.

The final set of results show the outcomes of the speech-discrimination testing that was conducted in both quiet conditions and in background noise. The average score of the open-set tests are shown for each child, with the percentage of correct scores when aided and unaided compared statistically. The average of all the participants' open-set results are also shown so that the general trend can be observed. Likewise, the scores from the closed-set speech-discrimination testing are shown with individual and collective results displayed.

Findings from the semi-structured interview:

Table 9: Clusters of themes from all interviews

Themes and sub-themes	Number of references in interview						Total
	Child A	Child B	Child C	Child D	Child E	Child F	
STIGMA	9	3	4	3	6	2	27
Normality	7	1	2	1	1	1	13
Bullying			1		4	1	6
Cosmetic concerns	1	1		2	1		5
Hearing aid effect	1	1	1				3
ATTITUDE	5	5	2	3	1	1	17
Don't need hearing aids	2	1	1				4
Denial of hearing loss	1	2			1		4
Negative view initial fitting	2	2	1	3		1	9
POOR SOUND QUALITY	2	1	4	3	2	1	13
Too loud			3	2	1		6
In background noise/unwanted noise	2	1	1	1	1	1	7
FIT AND COMFORT	1	2	1	4	1	1	10
uncomfortable moulds		1		4			5
feedback/whistling		1	1			1	3
HAs too big/heavy	1				1		2
POOR BENEFIT		2			1		3
NEGATIVE ATTITUDE of friends or family	1				1		2

The information in Table 9 identifies the different themes and sub-themes that emerged when analysing the semi-structured interview responses of the participants in this study. The number of references to a sub-theme was recorded for each of the interviews and these sub-themes were clustered into main themes where appropriate.

The responses for each category are collated to give the total number of responses for each theme and sub-theme for all of the participants in this study.

The data indicates that issues related to stigma are the most commonly mentioned theme in the interview transcripts (a total of 27 responses). Stigma related themes are evident in each of the interviews, with the sub-theme of normality (see Literature Review) being the most significant. The other sub-themes of stigma includes being bullied, cosmetic concerns and 'the hearing aid effect' (see Literature Review).

The next major theme identified related to the participant's attitude to their hearing loss and hearing aids, with 17 references in the transcripts overall. The sub-themes include denial of hearing loss, a negative view since the initial fitting of hearing aids and a belief that hearing aids are not needed.

The third most significant theme was concerning the poor sound quality of hearing aids, with 13 responses overall in the interview transcripts. This included issues of hearing aid sound quality in background noise and the hearing aids being described as too loud.

The fourth major theme was related to the fit and comfort of the hearing aids and/or ear moulds with 10 references in the interviews overall. Uncomfortable ear moulds, feedback/whistling from the hearing aid and the hearing aid being too big and heavy were significant sub-themes in this category.

All of the participants in the study made reference to some extent to each of the four main themes. The two minor themes identified were poor benefit of the hearing aids (3 responses) and the negative attitude of friends or family towards hearing aid use (2 responses)

STIGMA

The data indicates that issues related to stigma are the most commonly mentioned theme in the children's responses. All six participants mentioned stigma in various forms, with three of the children giving stigma of hearing aids as the main reason for their non-use of hearing aids:

Normality

The sub-theme of 'normality' emerges from the interview of each child in the study. In particular, **Child A** is very sensitive to the fact that he is the only child in his school with hearing aids:

'No one else wears them...I want to stay normal.'

Child A complains that wearing hearing aids 'makes me feel different' and that hearing aids look 'weird, like different.' He doesn't want to wear them in front of anyone at school, even his cousin as it makes him feel 'embarrassed.' When asked how well he does at school he responds 'just normal.' Likewise, **Child B** responds to the question about how well he does at school by saying 'same as friends.' **Child C** has never told her friends that she has hearing aids because several times she says 'I'd feel embarrassed' and she fears that 'when you tell someone they will pick on you/they will laugh/say you are deaf and stuff.' **Child D** feels that wearing hearing aids in front of others would be seen as weird/abnormal and 'sometimes I feel they know I've got hearing aids on though I'm wearing a head scarf.' **Child E** also finds the thought of wearing hearing aids in front of other people 'embarrassing.' He wants to be seen as normal:

'I would want to be like other people not wearing them.'

Child F expected that people would laugh at him when he was fitted with hearing aids.

Bullying

Three out of the six participants spoke of being bullied by others for wearing hearing aids. For two of the children in this study bullying was the main reason given why they do not use their hearing aids in school. **Child C** reports that when she wore the hearing aids 'my sister used to pick on me.' **Child E** noticed that when he was in Year 4 at school 'I started getting picked on.' He says that 'no one noticed before Year 4', but once they did 'it seemed to happen a lot people saying things.' He persisted with his hearing aids. However, the problems with bullying intensified when he started high school:

'That's when I really started getting picked on.' Unfortunately his friends did not help: 'They used to pick on me. They started taking the mick saying I'm deaf.' **Child E** does sometimes use the hearing aids at home because 'I don't get picked on.'

Child F experienced bullying by older pupils when at high school and this affected him greatly:

'Some people in Year 10 were calling me deaf and I got angry and started hitting them.'

He says that this incident was the reason that he stopped using hearing aids.

Cosmetic concerns

Four of the six participants raised concerns over the appearance of hearing aids and these cosmetic concerns are also part of the theme of the stigma of hearing aids. **Child A** was told that 'my mum says she will get me some very small hearing aids that you can't see' and he remarks that the ear mould looks too 'big.' **Child B** describes the appearance of the hearing aids as 'weird, ugly.' **Child D** also comments that hearing aids 'look weird', adding that 'I don't like the colour.' **Child E's** view of the hearing aids is also negative:

'I don't like it. Too big and bulky. I want something smaller that no one would notice.'

The hearing aid effect

Half of the children in this study believe that wearing hearing aids makes a person appear less intelligent to other people.

ATTITUDE to their hearing loss and hearing aids

All six participants give examples of issues related to this theme:

Don't need hearing aids

Child A begins the interview by stating unequivocally 'my hearing is alright and I don't need hearing aids.' Later in the interview he again says 'I don't need hearing aids' and do well at school without them. **Child B** says that the reason he stopped using hearing aids is 'because I don't need them.'

Child C admits that there are times when she struggles to hear but 'quite often I don't need the hearing aids.' Later she says:

'I didn't wear it because I didn't need it.'

Denial of hearing loss

Child A did not acknowledge that he has a hearing loss, saying 'my hearing is alright...I think I hear better than some people.' Likewise, **Child B** does not describe himself as having a hearing loss: 'My hearing is fine at the moment.'

Negative view since initial fitting

Five out of the six participants in the study had a negative view of having hearing aids from the time that they were first fitted/or can first remember having them. None of the children were critical of the support they got from the hospital when given hearing aids but none felt that they decided for themselves whether or not they should be fitted with hearing aids, including Child C who was fitted age 12.

For example, **Child A** explains:

'I started taking them off straightaway'. 'I didn't like them. I didn't know if I wanted them but when I put them in I didn't like them.'

Child B was disappointed with the hearing aids because 'They don't help me. I thought they would help a bit.' He also knew straightaway that he didn't like them. **Child C** says that she didn't like the hearing aid from the outset: 'No I didn't like it. My sister used to pick on me.' **Child D** likewise had a negative opinion of hearing aids from the time they were fitted: 'I didn't like the hearing aids....I knew I wasn't going to like them because they look weird and they don't feel comfortable.' **Child E** was the only participant in the study who didn't say that he disliked the hearing aids from the outset. **Child F** got used to using hearing aids but didn't like them at first as he didn't like 'putting them in and taking them out.'

Poor sound quality

The next main theme mentioned by the participants in the study is concerning the sound quality of the hearing aids, particularly with regards sounds being too loud and the hearing aids amplifying unwanted noise and their performance in background noise. All six participants noted issues with poor sound quality from the hearing aids, with one child giving this issue as the main reason for their non-use.

Too loud

Three of the participants describe their hearing aids as being uncomfortably loud at times. **Child C** reported that the main reason that she does not use the hearing aid is that it is too loud:

'It's dead loud. It goes really loud and you can hear even little things. Even when people are talking quiet it seems loud.'

She describes the sound from hearing aids as 'different to normal because it is louder' and says it was different to what she expected as 'the hearing aid is loud.' **Child D** also comments on the loudness of the hearing aids several

times: 'You can hear everything when you've got hearing aids on. Sometimes it is quite loud.' **Child E** comments that:

'When I put it in it just seems that everything is really loud like people screaming at me.'

Listening in background noise/unwanted noise

All six participants make an issue of the poor sound quality produced by the hearing aid in the presence of significant background noise and/or the hearing aid amplifies unwanted noise that is uncomfortable to listen to. For example, **Child A** describes sounds 'like crisps go worse when you crunch them.' **Child B** is frustrated by a 'squeaking noise on the ground' while **Child C** does not like it:

'When people make sounds that irritate you. When crunching something, like a plastic wallet being crunched. And when people do weird sounds.'

Child D notes that 'You can hear everything when you've got hearing aids on' and **Child E** finds that the hearing aids amplify unwanted sounds when outside:

'The wind buzzes in my ear and gives me a headache. Or when cars go past.'

Child F also experiences irritation by the sound of cars going past and also 'can hear teachers walking.'

Fit and comfort of the hearing aid/ ear mould

All six participants give examples of problems with the fit and comfort of either the hearing aid or the ear mould. For one participant, uncomfortable ear moulds are the main reason given for not using hearing aids.

Uncomfortable mould

Child B comments that the moulds 'hurt your ears' but it was **Child D** who had most problems with uncomfortable ear moulds. It seems that she has never been satisfied with the comfort of her ear moulds and notes that from the outset 'they kept on hurting the inside of my ears.' The main reason she gives for stopping using the hearing aids was the discomfort caused by the ear mould:

'I wore them in Year 7 but stopped in Year 8. It just hurts me – the ear mould.'

Feedback/whistling sound

Three of the six participants were irritated by the hearing aids 'whistling.' **Child B** states that: 'They whistle all the time.' **Child C** and **Child F** also noted problems from time to time with whistling hearing aids.

Hearing aids too big/heavy

Two of the children were concerned that the hearing aids were physically too big and/or heavy. One of **Child A**'s first impressions of hearing aids was that 'It was heavy on my ear.' **Child E** describes the hearing aids as 'Too big and bulky.'

Poor benefit of hearing aids

Two of the six children in this study comment that the hearing aid gives them poor benefit. To **Child E** wearing hearing aids did not really help him hear better: 'I couldn't tell the difference. Made me feel my hearing was normal.' Likewise, **Child B** was disappointed with the performance of the hearing aids:

'They don't help. I thought they might help a bit.'

Negative attitude of friends or family

The participants were largely supported and encouraged by their family and friends. However, two of the participants experienced a negative attitude by their friends towards hearing aid use. **Child A** found it hard to deal with his friends asking questions about the hearing aids but it while **Child D** says that he was picked on by friends:

'They used to pick on me. They start taking the mick saying I'm deaf.'

Findings from the LIFE-UK IHP questionnaire:

The LIFE-UK IHP questionnaire (Canning, 1998) was conducted to help identify situations in school which present a listening challenge and to isolate issues regarding listening in noise and quiet, with and without lip-reading (see method section). For each of 18 listening scenarios in this questionnaire the participants gave a response indicating how well they can hear in that situation, when aided and when unaided. The marks assigned to each scenario were scored on scale of 1 to 5, with 1 being always easy and 5 being difficult. The results from the LIFE-UK IHP questionnaire were analysed first with a summary of the responses from all of the children (Figure 2), with the total number of answers for each category of difficulty given. This is followed with a

presentation of the participant's individual responses (Figure 3). Finally, the data is analysed in more detail to examine how well the participants hear (unaided and aided) in teacher-child and child-child exchanges in noise and quiet, with and without lip-reading.

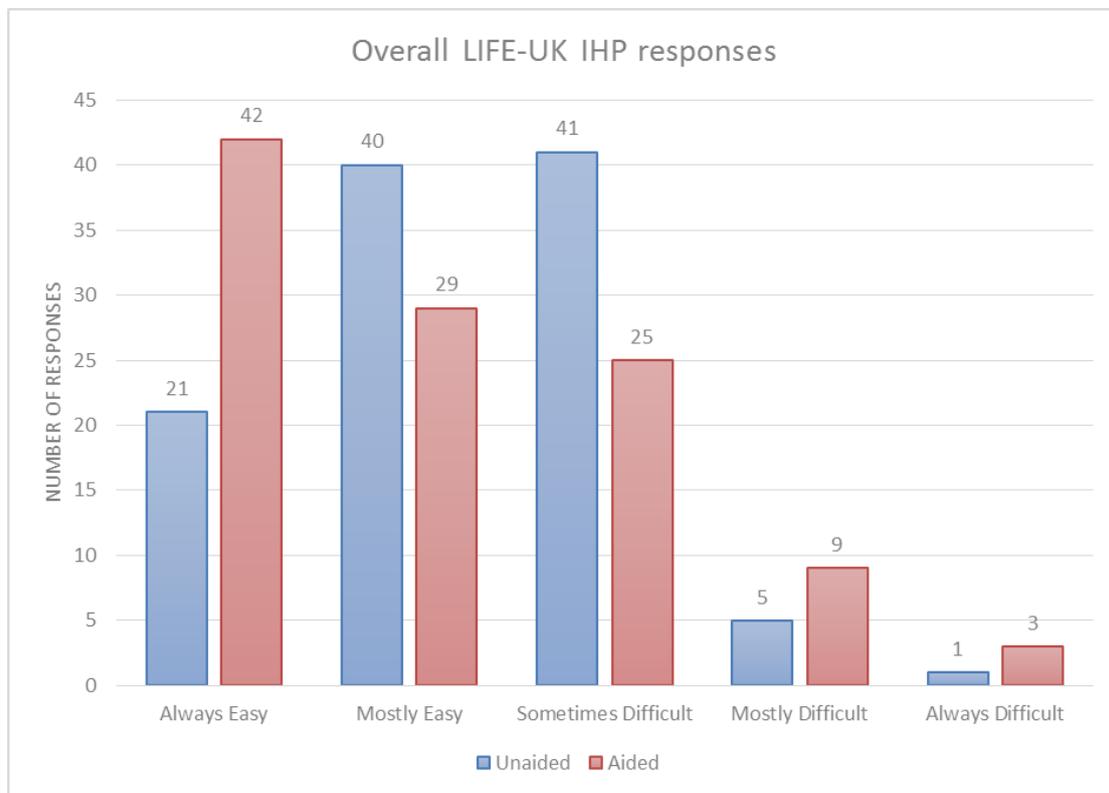


Figure 2: LIFE-UK IHP questionnaire overall results

The overall picture of all the participants' responses (see Figure 2) in the LIFE UK-IHP questionnaire indicates that without hearing aids the children find it difficult to hear in 44% of school listening situations. Hearing aids do provide some benefit as the findings indicate that 34% of listening situations are difficult for the participants. Also, when aided there are twice as many situations that are always easy (42 out of 108) compared to when not using hearing aids. However, overall there are double the number of situations in which the students in this study find listening to be mostly or always difficult (12 out of 108) when wearing hearing aids compared to not using them.

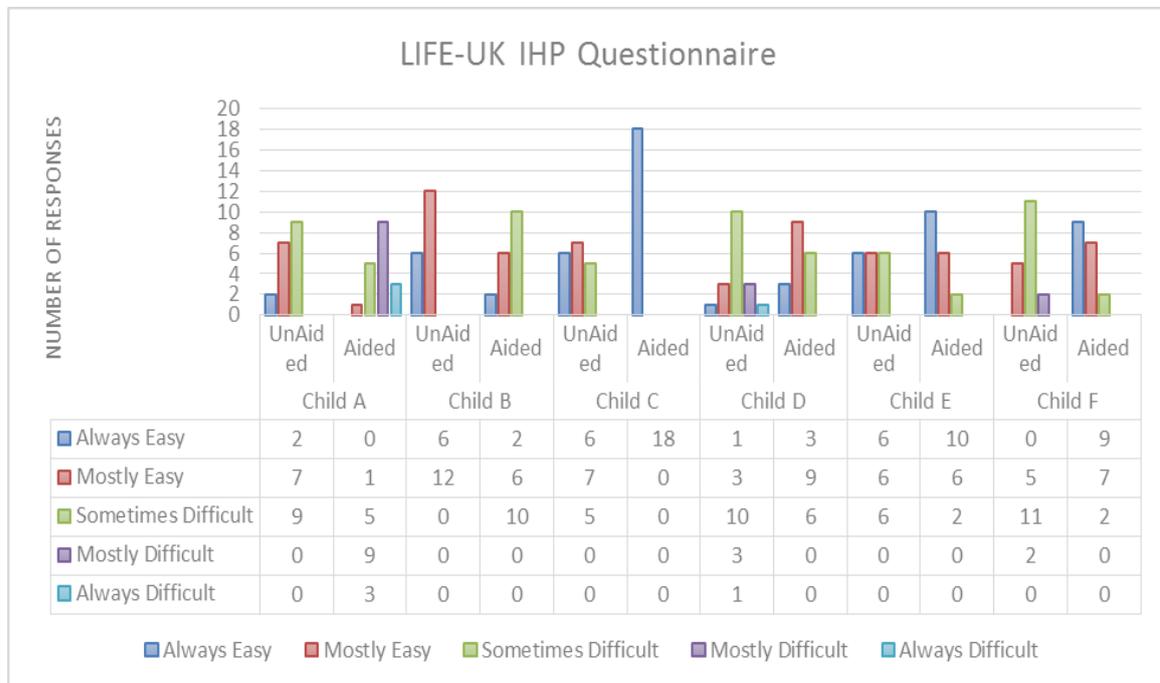


Figure 3: LIFE-UK IHP questionnaire individual results

Child A's responses in the LIFE-UK IHP questionnaire (see Figure 3) indicate that listening without hearing aids is significantly easier than when wearing hearing aids. Without hearing aids Child A finds 50% of listening scenarios always or mostly easy, while 50% of listening situations are sometimes difficult but none are mostly or always difficult. In contrast, Child A gives just one situation in which hearing when wearing hearing aids is easy, with 95% of school listening scenarios being difficult to varying degrees.

Child B's results from the LIFE UK-IHP questionnaire (see Figure 3) indicate that it is significantly much easier to hear in school listening situations without wearing hearing aids compared to wearing them. In all of the scenarios Child B finds it always or mostly easy to hear, with no listening difficulties given. When using hearing aids Child B indicates that in 10 listening situations it is sometimes difficult to hear although there are 8 scenarios when it is easy to hear.

Child C finds it easier to hear in school listening situations when wearing hearing aids, with every scenario given as always easy to hear (see Figure 3). When not using hearing aids, Child C does find hearing more difficult in 5 school listening situations. However, for the majority of the listening scenarios (13 out of 18 responses) Child C finds it always or mostly easy to hear.

Child D's responses in the LIFE-UK IHP questionnaire (see Figure 3) indicate that listening when using hearing aids is easier than when not using hearing

aids. When using hearing aids the majority (12 out of 18) of listening situations are either always or mostly easy to hear in, with 6 situations sometimes difficult to hear. In contrast, without hearing aids the majority of listening situations (14 out of 18) can be difficult, with just 4 results suggesting easy listening conditions.

Child E's results from the LIFE UK-IHP questionnaire (see Figure 3) indicate that he finds the majority of listening situations in school always or mostly easy with or without wearing hearing aids. Using hearing aids does give him improved hearing as in 10 scenarios he finds it always easy to hear and in just 2 situations he experiences some difficulties. When not using hearing aids Child E finds it difficult to hear in 6 listening scenarios yet in the majority of situations (12 out of 18) he is able to hear always or mostly easily.

Child F finds it significantly more difficult to hear in school situations when not using hearing aids, with 13 out of 18 responses indicating that it is sometimes or mostly difficult to hear (see Figure 3). In 5 scenarios he finds it mostly easy to hear without using hearing aids but when using hearing aids Child F is able to hear always or mostly easily in 16 out of the 18 listening situations. In contrast, there are only 2 occasions when he sometimes finds it difficult to hear when using hearing aids.

Table 10: Life UK-IHP Teacher-Child Exchanges when UNAIDED

Comment	Always easy	Mostly Easy	Sometimes Difficult	Mostly Difficult	Always Difficult
Score	1	2	3	4	5

	Lip reading		No lip reading		Reliance on lip-reading Yes/No	More difficult to hear in noise (yes/no)
	Noise	Quiet	Noise	Quiet		
Child A	2	3	2	2	No	No
Child B	2	2	2	1	No	Yes
Child C	2	1	2	2	Yes	Yes
Child D	3	2	3	2	No	Yes
Child E	3	1	1	2	No	Yes
Child F	3	3	3	2	No	Yes

Type totals showing how well each participant can hear when not using hearing aids and using lip reading/no lip reading in noise and quiet (see method section)

The results from the LIFE UK-IHP teacher-child exchanges (see Table 10) show that five out of six of the students in this study do not rely on using lip-reading when listening without wearing hearing aids to the teacher in school situations. In the teacher-child exchanges it is evident that the majority of the students in the study (5 out of 6) reported that it was more difficult to hear the teacher when not using hearing aids in the presence of background noise than in quiet conditions.

Table 11: Life UK-IHP Child-Child Exchanges when UNAIDED

Comment	Always easy	Mostly Easy	Sometimes Difficult	Mostly Difficult	Always Difficult
Score	1	2	3	4	5

	Lip reading		No lip reading		Reliance on lip-reading Yes/No	More difficult to hear in noise (yes/no)
	Noise	Quiet	No ise	Qu iet		
Child A	2	1	3	2	No	Yes
Child B	1	1	1	2	No	Yes
Child C	1	2	1	2	No	Yes
Child D	2	3	2	3	No	No
Child E	2	2	1	2	No	No
Child F	2	2	3	3	Yes	No

Type totals showing how well each participant can hear when not using hearing aids and using lip reading/no lip reading in noise and quiet (see method section)

The results from the LIFE UK-IHP child-child exchanges (see Table 11) show that 5 out of 6 students (not wearing hearing aids) do not rely on lip-reading when trying to hear other children in various school situations. The student who does make significant use of lip-reading in these scenarios is a different participant to the one who makes use of lip-reading in teacher-child situations.

In child-child exchanges 4 out of 6 students in this study comment that the presence of background noise made no difference in their ability to hear other children in school situations. The other 2 children did find it more difficult to hear other children when there is background noise than in quiet conditions. However, one of these children reported no difficulties in hearing the teacher in noisy conditions.

Table 12: Life UK-IHP Teacher-Child Exchanges when AIDED

Comment	Always easy	Mostly Easy	Sometimes Difficult	Mostly Difficult	Always Difficult
Score	1	2	3	4	5

	Lip reading		No lip reading		Reliance on lip-reading Yes/No	More difficult to hear in noise (yes/no)
	Noise	Quiet	Noise	Quiet		
Child A	4	4	3	3	No	No
Child B	2	3	2	2	No	No
Child C	1	1	1	1	No	No
Child D	2	1	2	2	Yes	Yes
Child E	2	1	1	2	No	No
Child F	2	2	2	1	No	Yes

Type totals showing how well each participant can hear when using hearing aids and using lip reading/no lip reading in noise and quiet (see method section)

The results from the LIFE UK-IHP teacher-child exchanges (see Table 12) show that five out of six of the students in this study do not rely on using lip-reading when listening with hearing aids to the teacher in school situations. In the teacher-child exchanges the responses of 2 students indicate that when using hearing aids listening in background noise is more difficult than in quiet conditions.

Table 13: Life UK-IHP Child-Child Exchanges when AIDED

	Lip reading		No lip reading		Reliance on lip-reading Yes/No	More difficult to hear in noise (yes/no)
	Noise	Quiet	Noise	Quiet		
Child A	3	3	4	4	Yes	No
Child B	2	2	2	3	Yes	No
Child C	1	1	1	1	No	No
Child D	2	2	2	2	No	No
Child E	2	1	1	1	No	Yes
Child F	1	1	1	1	No	No

Type totals showing how well each participant can hear when using hearing aids and using lip reading/no lip reading in noise and quiet (see method section)

The results from the LIFE UK-IHP child-child exchanges show that 4 out of 6 students (wearing hearing aids) do not rely on lip-reading when trying to hear other children in various school situations (see Table 13). In child-child exchanges 5 out of 6 students find that the presence of background noise made no difference in their ability to hear other children in school situations.

Overall, the results from the LIFE UK-IHP questionnaire teacher-child and child-child exchanges show no significant reliance on lip-reading in school listening situations but evidence that listening is more difficult when there is significant background noise, particularly when the child is not using hearing aids.

Findings from the speech-discrimination tests:

Listener performance was evaluated using both open-set and closed-set word lists using the Parrotplus 2 automated speech testing equipment. These tests were each conducted in the following conditions:

- Without hearing aids (unaided) in quiet conditions (see method section), with the speech level at 60dB SPL.
- With hearing aids (aided) in quiet conditions, with the speech level at 60dB SPL.
- Without hearing aids (unaided) with significant background noise. The speech level was 75dB SPL and the background noise (class babble) was 70dB SPL.
- With hearing aids (aided) with significant background noise. The speech level was 75dB SPL and the background noise (class babble) was 70dB SPL.

The results from the speech-discrimination tests were analysed first with a summary of the open-set tests of all participants (Figure 4). This is followed with a presentation of the participant's individual open-set results (Figure 5). The overall summary of closed-set speech-discrimination results are shown (Figure 6) and finally the individual participant's closed-set test results are presented (Figure 7).

Manchester Junior Word Lists and AB Short Word Lists

The open-set tests used in this study were the Manchester Junior Word Lists and AB Short Word Lists. These open-set word speech-discrimination tests were conducted with each pupil and the average results from both tests are as follows:

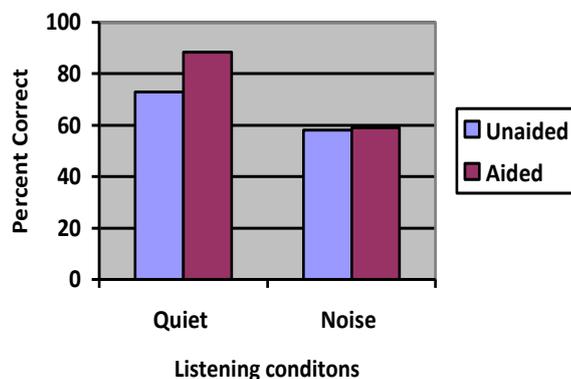


Figure 4: All participants' average open-set speech-discrimination test scores

Overall, the average open-set speech-discrimination scores for all children (see Figure 4) in the study indicate that hearing aids provide significant benefit when listening in quiet conditions with 88.5% correct responses compared to 73% correct when unaided. In contrast, when listening in background noise - similar to most classroom situations - there is no significant benefit in using hearing aids. The number of correct answers decreases sharply when using hearing aids in background noise to 59% correct while the number of correct answers is 58% when unaided.

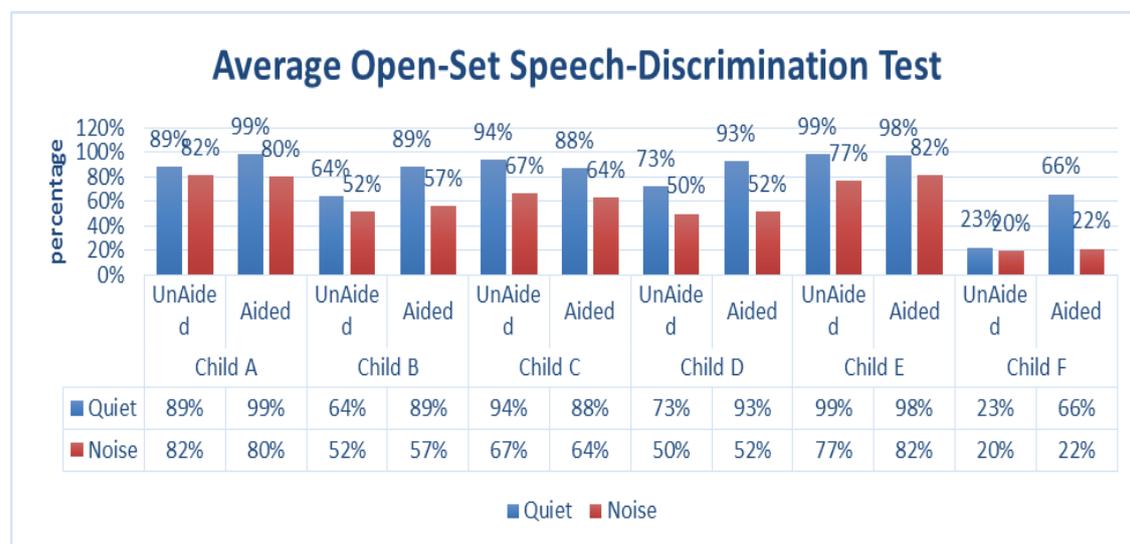


Figure 5: Participant's individual average open-set speech-discrimination test scores

The average open-set speech-discrimination scores for **Child A** (see Figure 5) indicate that hearing aids provide benefit when listening in quiet conditions with 98.5% answers correct when aided compared to 88.5% correct when unaided. However, when listening in noise there is no benefit from the use of hearing aids with 80% correct responses aided compared to 81.5% correct when the pupil is not using the hearing aids.

Child B's results (see Figure 5) indicate significant benefit from using hearing aids in quiet conditions with 88.5% correct answers compared to 64% correct when unaided. However, when listening in significant background noise the benefit of using hearing aids decreases sharply with 56.5% correct answers compared to 51.5% correct when unaided.

The average open-set speech-discrimination scores for **Child C** (see Figure 5) show that in both quiet and background noise the pupil scored more correct answers when unaided compared to being aided. In quiet conditions, Child C answered 94% correct responses wearing hearing aids compared to 87.5% correct when not using hearing aids. When listening in the presence of background noise Child C scored significantly less correct answers with 66.5% when unaided and 63.5% when aided.

Child D's results (see Figure 5) indicate significant benefit using hearing aids when listening in quiet conditions. When aided Child D scored 93% correct answers compared to 72.5% correct answers when not using hearing aids in quiet listening conditions. However, when listening in background noise the benefit of using hearing aids sharply decreases with Child D scoring 51.5% correct answers, being only slightly better than the unaided score of 50% correct answers.

The average open-set speech-discrimination scores for **Child E** (see Figure 5) indicate that the pupil was able to hear most words when listening in quiet conditions, with 99% correct when unaided and 97.5% correct with hearing aids. Listening in background noise is more challenging, with Child E scoring 76.5% correct responses without hearing aids and a 5% benefit when using hearing aids with 81.5% correct.

Child F's average open-set speech-discrimination scores (see Figure 5) show a significant benefit when using hearing aids in quiet conditions with 66% correct scores compared to 22.5% when unaided. However, when listening in background noise the percentage of correct scores when aided sharply decreases to 21.5% of correct answers, with 20% correct when not using hearing aids.

CHEAR Auditory Performance Test

The closed-set speech-discrimination test used in this study was the CHEAR Auditory Performance Test (APT 1). The results for the closed-set speech tests

– conducted in quiet and in noise (see method section) - for each participant were as follows:

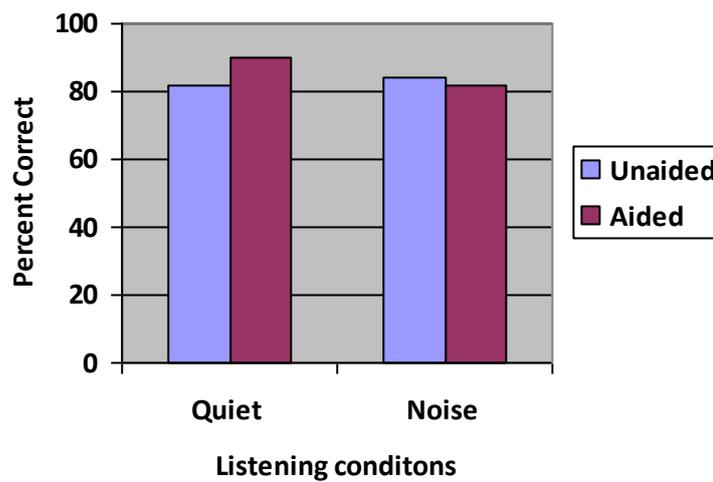


Figure 6: All participants' average closed-set speech-discrimination test scores

Overall, the average CHEAR (APT) closed-set speech-discrimination scores for all children in the study (see Figure 6) indicate that hearing aids provide some benefit when listening in quiet conditions with 90% correct responses compared to 82% correct when unaided. In contrast, when listening in background noise - similar to most classroom situations – the results from this test suggest no benefit in using hearing aids. The number of correct answers decreases when using hearing aids in background noise to 81.5% correct while the number of correct answers is 84% when unaided.

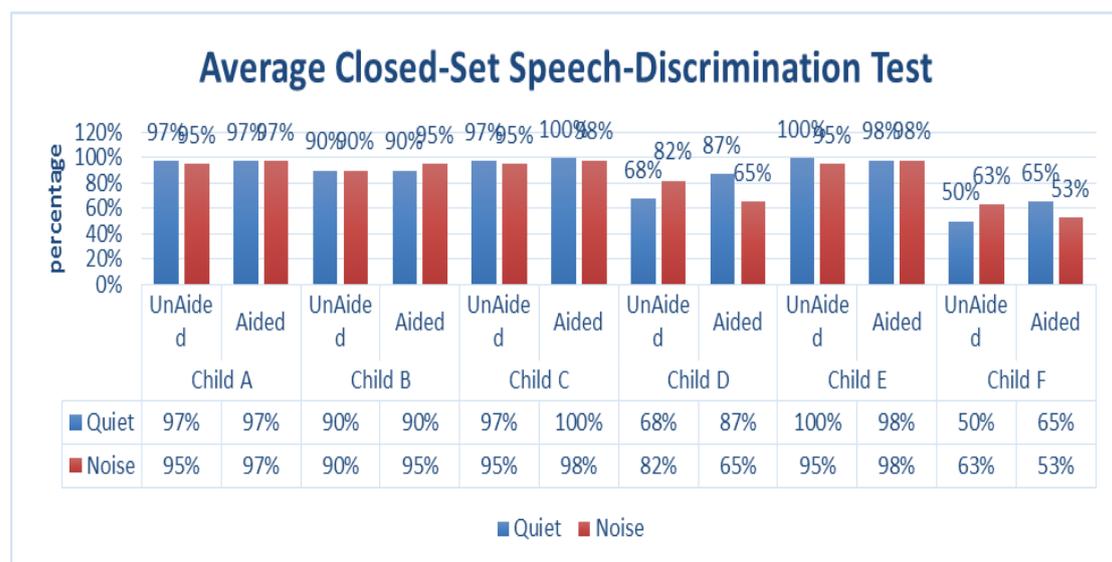


Figure 7: Participant's individual average closed-set speech-discrimination test scores

Child A's results for the closed-set speech test (see Figure 7) indicates no significant difference in scores between aided and unaided usage whether listening in quiet conditions or when there is background noise. In quiet conditions Child A achieved 97% correct answers when both aided and unaided. In background noise the percentage of correct responses stayed the same at 97% and decreased marginally when unaided to 95%.

Child B's closed-set speech-discrimination scores (see Figure 7) show no significant difference between aided and unaided usage whether listening in quiet conditions or when there is background noise. When listening in quiet both the aided and unaided condition results in 90% correct responses, with the unaided response the same (90%) in noise with a slight improvement when using hearing aids in background noise (95% correct).

The closed-set speech-discrimination scores for **Child C** (see Figure 7) suggest a slight benefit using hearing aids although this benefit is not statistically significant. When listening in quiet conditions Child C achieved 100% correct responses when aided and 97% when unaided. When listening in the presence of background noise Child C answered 98% correct when aided and 95% correct when unaided.

These results indicate that **Child D** benefits from using hearing aids when in quiet conditions as 87% of answers are correct when aided compared to 68% correct when unaided (see Figure 7). However, when in background noise Child D recognises more words correctly without using hearing aids (82%) and is less successful when using hearing aids (65% correct) in these conditions.

Child E's results for the closed-set speech tests (see Figure 7) indicate no significant difference in correct answers between aided and unaided usage whether listening in quiet conditions or when there is background noise. In quiet conditions Child E achieved 100% correct answers without using hearing aids and 98% correct when aided. In background noise the percentage of correct responses stayed the same at 98% when aided and decreased when unaided to 95% correct.

Child F's speech-discrimination test results (see Figure 7) indicate a significant benefit when using hearing aids in quiet conditions (65% correct when aided compared to 50% correct when unaided). However, when listening in background noise Child F scored a lower percentage of correct responses when using hearing aids (53%) compared to 63% correct when unaided in noise.

SUMMARY

The qualitative data produced through analysis of the interview transcripts highlighted many different reasons why the children in the study do not want to wear their hearing aids. Emerging from this data were four main themes, with issues related to the stigma of wearing hearing aids being the most prominent theme. Other significant themes were surrounding the children's attitude to their hearing loss, concerns about the sound quality produced by the hearing aids and issues regarding the comfort and fit of the hearing aid or ear mould.

The results from the LIFE-UK IHP questionnaire provided quantitative data allowing a statistical comparison of the children's perceived difficulty in school based listening situations when aided and unaided. This data indicated that when not using hearing aids the children find it mostly or always easy to hear in over half of all school-based listening situations. However, it is notable that in 38% of scenarios the students in this study find that listening in school situations can sometimes be difficult. The comparison with listening with hearing aids produces some surprising results. When wearing hearing aids the students find that there are twice as many listening situations that are always easy but double the number of listening situations in which they find listening to be mostly or always difficult. Further analysis of the questionnaire results suggests listening is more difficult when there is significant background noise.

The quantitative data obtained by the speech-discrimination testing show that hearing aids provide clear benefit (compared to being unaided) when listening in quiet conditions. However, when listening in background noise the benefit of using hearing aids decreases sharply with no significant difference between aided and unaided scores. This is a key finding in the study as the participants will experience noisy listening conditions every day when in school (Picard and Bradley, 2001).

CHAPTER 5- DISCUSSIONS AND CONCLUSIONS

Introduction

The overall aim of this study is to explore the reasons for the non-use of hearing aids amongst hearing-impaired children aged 9-14. In this section the key findings will be summarised and then the research results will be systematically compared to the findings in the literature review. Conclusions will be drawn through this analysis, with the limitations of my research identified and recommendations made in relation to this study.

Summary of key findings

The most significant reason for the non-use of hearing aids was found to be issues related to stigma. All 6 participants highlighted the stigma of wearing hearing aids, with negative experiences in school being particularly prominent. These findings help underline the value of using semi-structured interviews because this method allowed me to gain a deeper understanding of my participants, providing valuable qualitative data. The validity of this data is strong because the data collected came directly from the children who were talking about their personal experiences with hearing aids.

The benefit of using hearing aids is vastly reduced when listening in noisy environments. The quantitative data obtained through speech-discrimination testing indicates that hearing aids provide significant benefit (compared to unaided) when the participants were listening in quiet conditions. The participants' average open-set speech-discrimination test scores show that when using hearing aids in quiet conditions they gave 88.5% correct responses compared to 73% when unaided. However, when listening in background noise the benefit of using hearing aids decreases sharply with no significant difference between aided (59%) and unaided (58%) scores.

Listening conditions in school are often difficult for hearing-impaired children, whether or not they are using hearing aids. The quantitative data provided by the LIFE-UK IHP questionnaire indicates that in 44% of school listening situations the participants experience difficulty in hearing when not using hearing aids, compared to 34% when aided. Therefore, hearing aids provide some benefit to the participants but it is a concern that there is still such a significant percentage of difficulty when listening in school.

Each participant cited numerous reasons for rejecting the use of their hearing aids. The qualitative data highlights the wide range of themes that emerged from the semi-structured interviews (see Table 9, page 39). As previously

mentioned, the stigma of wearing hearing aids and their poor benefit in noise were the predominant issues. However, each participant also stated other reasons for their dissatisfaction with hearing aids, with the comfort and fit of the aids and the children's personal attitude and beliefs regarding their hearing loss and hearing aids being significant factors among others.

Comparison with the Reviewed Literature

The findings from this study are broadly in line with previous studies (see Literature Review). Confirming the findings in the literature, my study identifies issues related to the **stigma** of wearing hearing aids to be the principal reason for non-use. The semi-structured interview transcripts provided evidence that all six participants in this study were affected by the negative stigma associated with hearing aids, with three children indicating that this is the main reason for not using the aids. A predominant theme in the literature was the hearing-impaired child's perception of 'normality' (Smith and Kent, 2006) and the development of their identity within the context of attending a mainstream school as a hearing aid user (Israelite et al, 2002). This is reflected in my study as the importance of not wanting to appear different from their peers emerges clearly from the transcripts of each participant. Further, 3 out of 6 participants reported that they had experienced teasing or bullying because they were wearing hearing aids. For two of the participants this would appear to be the main reason why they rejected the use of hearing aids. It could be argued that bullying is an aspect of the stigma of hearing aids, as is the negative attitude of hearing peers towards hearing aid users, which been described as 'the hearing aid effect' (Blood, 1997), with 3 out of 6 participants in this study affirming this view.

All six participants reported difficulty in listening with hearing aids in the presence of significant background noise. Here, the qualitative data produced by the speech-discrimination testing provided evidence that hearing aids give **poor benefit in background noise**, in contrast to the significant benefit of using hearing aids in quiet conditions. It is perhaps surprising that the link between poor benefit of hearing aids in noise impacting the use of hearing aids amongst children has not been investigated more clearly. The MarkeTrak survey (Kochkin, 2000) surveyed nearly 3000 adults and found that the performance of hearing aids in background noise was the second most common reason given for non-use.

Previous studies have demonstrated that the **age of diagnosis and fitting with hearing aids** are significant indicators of non-use. Rekkedal (2012) and Gillies (1997) found that children who were diagnosed with hearing loss and fitted with hearing aids early in life appreciated their use more than those who were fitted with hearing aids later on. This is reflected in my study as 5 of the 6 children

were diagnosed and fitted with hearing aids after they were aged 5 years old (see Table 1, page 25).

The **degree of hearing loss** was also identified as a possible indicator of hearing aid non-use (Rekkedal, 2012/Walker et al, 2013). Rekkedal (2012) found that amongst 44 children with mild to moderate hearing loss approximately 44% irregularly or never wore their hearing aids. Therefore, it is significant to note that in my study five of the six participants have either a mild or moderate hearing loss (see Table 1, page 25). Since completion of the testing for this study, it is perhaps significant that the only participant with a severe hearing loss (Child F) has expressed an intention to use hearing aids again.

Issues related to the **comfort and fit** of hearing aids and ear moulds were found to be an important factor for all 6 participants in my study. The significance of this finding is not confirmed in other studies with hearing-impaired children as the impact of this theme on the use of hearing aids has not been investigated in previous research. Kochkin (2000) found that amongst adult non-users, the comfort and fit of hearing aids was reported to be the third most significant reason for not using hearing aids.

Cosmetic concerns are highlighted by Christensen et al (2004) as being the more important to children than the performance of the hearing aid. This issue was also identified by Kent and Smith (2006) and Whitsun (2003) as a significant issue, particularly for adolescents. This is reflected in the findings of my study, with 4 out of 6 participants expressing cosmetic concerns about the hearing aids.

DISCUSSION

The findings from my study are in line with the reviewed literature with regards the reasons for hearing aid non-use amongst older children being a multi-layered issue. Indeed, all 6 participants in my study highlighted numerous factors that have caused them to reject the use of hearing aids. This confirms my original suspicion/hypothesis (see Introduction) that for each individual child there are a number of reasons that lead to their decision to stop using hearing aids, as the disadvantages of wearing aids are perceived to outweigh the advantages.

In my study, the predominant cause of non-use would appear to be the stigma associated with hearing aids. This supports the findings in previous studies (Rekkedal 2012/Hetu,1996) and further suggests that stigma is in itself a

complex issue, involving the hearing-impaired child's identity development, their concept of 'normality' and the attitude and understanding of other people. This is particularly significant within the context of being a hearing-impaired child (aged 9-14) who attends a mainstream school, with negative attitudes from many hearing peers (Blood, 1997) and teachers often lacking sufficient training in understanding how to meet the needs of deaf students (Dengerink and Porter, 1984).

Hearing-impaired children with a mild or moderate hearing loss are a particular concern as previous studies show that these students are less likely to use their hearing aids (Rekkedal, 2012) and this is reflected in my study as 5 out of the 6 participants have either a mild or moderate hearing loss (see Table 1). My findings show that 3 of the 6 participants report that they do not need hearing aids and either downplayed or underestimated their hearing loss. Yet, the participants' responses in the LIFE-UK IHP questionnaire showed that they experience difficulty in hearing in a significant number of school based listening situations, whether aided (34%) or unaided (44%). Moreover, teachers and hearing peers often underestimate the communication difficulties experienced by hearing-impaired adolescents in school (Zheng, Caissie and Comeau, 2003). This again indicates a need to improve teacher deaf awareness training and also to educate the hearing-impaired child's peers (Dengerink and Porter, 1984).

The findings in my study that I perhaps found most surprising were obtained through the speech-discrimination testing in both quiet and noisy conditions (see Methodology section). With regards testing in noise I attempted to replicate a 'typical' classroom by measuring the background noise in three high school lessons (see Appendix D) and reviewing previous studies (Picard and Bradley, 2001/Shield and Dockrell, 2003) to decide an appropriate level of background noise. The speech-discrimination testing showed that hearing aids provide significant benefit when listening in 'quiet' conditions but when listening in background noise the benefit of using hearing aids is greatly reduced (see Figures 4-7). This finding has a huge implication for all hearing-impaired children attending mainstream schools as they will experience difficult listening conditions in classrooms on a daily basis. It suggests that more needs to be done to improve room acoustics in schools and should also encourage professionals working with hearing-impaired children to introduce and establish the use of FM systems at an early age.

This study also shows that problems with the comfort and fit of hearing aids and ear moulds is a significant factor, with all 6 participants reporting concerns with this issue. This is not highlighted in any depth in previous studies with regards hearing aid non-use amongst children, although Kochkin (2000) found this to be an important reason for the non-use of hearing aids with adults. My findings

also suggest that cosmetic issues are important to older children (aged 9-14), with 4 of the 6 participants raising concerns over the appearance of their hearing aids. The literature does identify this as an issue to be addressed (Christensen, 2004/Kent and Smith, 2006) but does not measure the impact of cosmetic concerns with relation to non-use of hearing aids amongst children of this age-group.

RECOMMENDATIONS

This research has considered the views of 6 children (aged 9-14) who have been diagnosed with a hearing loss, fitted with hearing aids and have previously worn the hearing aids but are currently not using them. The findings from this study raise some important points that need to be addressed. The three principal ones raised are:

1. More counseling and support for hearing-impaired children
2. Establish the use of FM systems at an early age
3. Improve Deaf Awareness training for teachers and hearing peers

1. More counseling and support for hearing-impaired children

There needs to be more support and counselling for children of this age-group and professionals involved with supporting hearing-impaired children need a comprehensive understanding of the factors affecting the utilization of hearing aids so that rehabilitation interventions can be improved. A particular emphasis needs to be on psychosocial support focused on promoting their identity as a hearing-impaired young person and normalizing the use of hearing aids (Kent and Smith, 2006). Professionals need to pay closer attention to the social context and relationships of the young people.

In my experience as a Teacher of the Deaf, professionals from health and education spend insufficient time in talking directly to the hearing-impaired child to elicit their views about issues related to their hearing loss. The literature research shows that few studies have examined how hearing-impaired children taught in mainstream schools view their hearing technology. Alongside listening to the children, more could be done to help them understand the implications of their hearing loss and the potential benefit that they may gain from their hearing aids.

Some of the issues with non-use could possibly be overcome if, for example, the hearing aid fitting process is adequately accompanied by counselling and continuous support from health and education. This suggests the need for improved co-operation between audiologists, Teachers of the Deaf, parents and

school to help optimize the support for the young hearing aid wearer. Children of this age-group should be offered more cosmetic options, such as discreet ear moulds or in-the-ear (ITE) hearing aids if appropriate. Technical problems such as uncomfortable ear moulds need to be more vigorously addressed.

2. Establish the use of FM systems at an early age

The results from this study and the academic literature show that the poor performance of hearing aids in noise is a significant factor in the non-use of hearing aids. Therefore, there needs to be a greater emphasis on establishing the use of FM systems at an early age so that the children will appreciate the benefit of an improved signal-to-noise ratio in the classroom.

3. Improve training for teachers and hearing peers

The results from my research are in line with previous studies in showing that negative attitudes from hearing peers in school have a detrimental effect on the willingness of hearing-impaired children to use hearing aids. This is particularly prominent in high school settings where it has been seen that the social pressures are significantly increased (DeConde-Johnson, 2007). Therefore, there needs to be a strong focus on helping the child in school and in their relationships within the social context. Moreover, non-use of the hearing aids may well be indicative of the fact that interventions should be focused on teachers and hearing peers rather than to the hearing-impaired child (Kent and Smith, 2006), with improved training about hearing-impairment a priority.

LIMITATIONS

A limitation with this study is the small sample size, which was inevitable given the small number of children who have been prescribed hearing aids, a minority of which are non-users. A larger sample size would also allow for more statistical manipulation of data.

Another limitation is that the participants' subjective responses in the interview/questionnaire are likely to have been biased against hearings as they are all non-users. In a qualitative interview, the participants can also adapt their answers to what they think the interviewer wants to hear (Linssen et al, 2013). Also, as the children don't know use hearing aids they may have difficulty in remembering how well they could hear with hearing aids.

Also, the level of support from the participants' families needed to be explored with more depth as the literature shows that this is an important factor influencing children's acceptance of hearing aids. This issue was touched upon

in the semi-structured interview but perhaps a separate interview with the parents would have provided more insight into the role that parent's play.

FURTHER RESEARCH NEEDED

More research is needed with a much larger sample of hearing-impaired children to reveal the number of hearing aid non-users in this age-group. To date there is no statistical information to demonstrate the extent of hearing aid non-use amongst children.

Further research is needed to determine how counselling with hearing-impaired children can be presented more effectively. This study has highlighted the need for more support and counselling for hearing-impaired children of this age-group but careful consideration must be given to the best way to implement this.

Also, this topic would benefit from research that carefully examines the non-users speech-discrimination test results to identify the particular speech sounds that are not well perceived when using hearing aids. This could then be analysed in relation to their audiogram, real-ear measurements and the hearing aid settings to consider the benefit that the hearing aids will provide.

CONCLUSION

In spite of the limitations, the value of the study lies in the fact that it addresses the need for research that comprehensively considers a full range of factors associated with the non-use of hearing aids amongst children of this age-group. Many of the existing studies have been conducted on clinical-based samples of older adults, which may be less representative of research with children. Consequently, this study focused on a very relevant issue in the field of paediatric hearing aid use. This study has demonstrated that even though there has been great progress in technology, there are numerous barriers that hinder hearing aid usage. This requires an understanding of the multiple reasons for rejecting hearing aids and matter for the whole process of supporting hearing-impaired children.

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Appendix A – Parental Consent Form

Date: 21 October 2013

city of
stoke-on-trent



People's Services

The Mount Education Support Centre
Mount Avenue
Penkhull
Stoke-on-Trent
ST4 7JU

Dear Parent/Guardian

I am conducting a research project as part of my MSc studies in Educational Audiology with Oxford Brookes University. The focus of the study is to explore the reasons why some hearing-impaired children do not use their hearing aids. To carry out this research I will be using a number of testing procedures to gather information. This will include an interview, a questionnaire and word recognition testing in conditions of quiet and in noise. The research results provided by each participant will be confidential and used only as part of the project outlined above, and the child or their school will not be named. Hopefully, this research will provide a valuable insight into the reasons why many children do not want to use their hearing aids. If you have any questions or concerns about the research, please feel free to contact me.

Consent for participation

This is to confirm that I have been given an explanation regarding the reason why information about my child is needed. I give consent that any assessment results, observations or comments relating to my child's hearing loss may be used as part of an academic dissertation. I understand that this information will only be shared by the academic personnel involved and that, at no time, will my child's name be used, or any reference made which may breach confidentiality.

Name of Parent (print): _____
Signature: _____
Date: _____

Will Potts

Teacher of the Deaf, Children and Young People's Services

Email: will.potts@stoke.gov.uk

Telephone 01782 234464

Appendix B - Participant Consent Form

Date: 21 October 2013



People's Services

The Mount Education Support Centre
Mount Avenue
Penkhull
Stoke-on-Trent
ST4 7JU

Dear Participant

As part of my studies in Educational Audiology with Oxford Brookes University, I am doing a research project on the reasons why some hearing-impaired children do not use their hearing aids. Therefore, I am interested in finding out more about your experiences of using hearing aids and why you no longer want to use them. This will involve being interviewed by me in school, a questionnaire and some word recognition tests to compare how well you can hear with and without your hearing aids. All of the results will be confidential and used only as part of the project outlined above. You can choose to stop participating at any time.

Consent for participation

This is to confirm that I have been given an explanation regarding the reason why information about my hearing loss is needed. I give consent that any assessment results, observations or comments relating to my hearing loss may be used as part of an academic dissertation. I understand that this information will only be shared by the academic personnel involved and that, at no time, will my name be used, or any reference made which may breach confidentiality.

Name of Parent (print): _____
Signature: _____
Date: _____

Will Potts

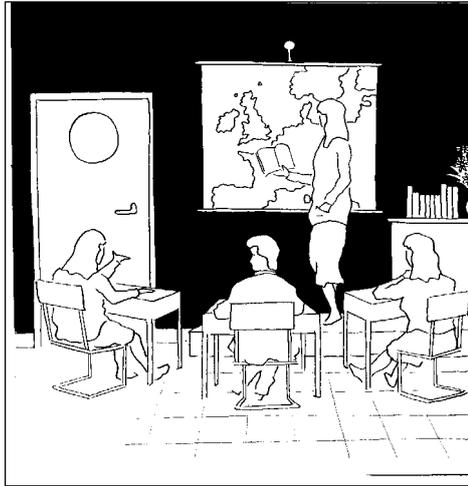
Teacher of the Deaf, Children and Young People's Services

Email: will.potts@stoke.gov.uk

Telephone 01782 234464

Appendix C - LIFE-UK IHP questionnaire excerpts

The teacher is talking but you cannot see her face.



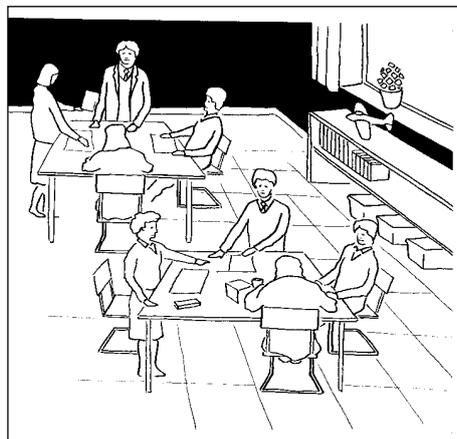
- ✓ Teacher-Child
- ✓ No Lip-reading
- ✓ Noise

FM System Yes / No

How well can you hear the words the teacher is saying?

Always easy	Mostly easy	Sometimes difficult	Mostly difficult	Always difficult
😊	😊	😐	😞	😞

You are all working in groups.



- ✓ Child-Child
- ✓ Lip-reading
- ✓ Noise

FM System Yes / No

How well can you hear the words of other children in your group?

Always easy	Mostly easy	Sometimes difficult	Mostly difficult	Always difficult
😊	😊	😐	😞	😞

Appendix D - Classroom Background Noise Measurements

Minutes lesson	Lesson 1	Lesson 2	Lesson 3
	Sound level meter reading dBA		
5	68.2	61.6	76.0
10	51.9	64.5	68.2
15	45.6	70.0	64.2
20	67.8	69.5	51.2
25	66.4	70.1	64.7
30	61.9	73.8	56.0
35	70.9	67.6	63.8
40	71.3	78.4	64.4
45	67.6	71.6	69.1
50	71.5	75.6	69.1
55	69.6	68.9	67.7
Average dBA	64.8	70.1	64.5
	Overall average 66.5dBA		

Appendix E - Manchester Junior Word Lists

List 1	List 2	List 3	List 4	List 3	List 6	List 7	List 8
Red	Some	Dog	Bus	Knock	Cold	Gate	Spoon
Snow	Not	Head	Side	Spin	Tent	Nice	Queen
Wood	Tin	Sit	Ring	Front	Run	Stick	That
Lid	Hat	Plant	Dress	Room	Sky	Man	Milk
Cat	Gold	Smoke	Green	Drive	Thing	Cot	Road
Sweet	This	Good	Lost	Hole	End	His	Net
Dig	Sail	Feet	Can	Start	Hill	Set	Salt
Night	Bed	Dish	Brick	Meat	Tap	Nose	Name
Pond	Moon	Sun	Coat	Fell	Mouse	Done	Pin
Push	Knife	Time	Pain	Hit	Same	Blue	Ride

Appendix F - AB Short Word Lists

List 1 (2)	List 2 (5)	List 3 (6)	List 4 (8)	List 5 (11)	List 6 (13)	List 7 (14)	List 8 (15)
Fish	Fib	Fill	Bath	Man	Kiss	Wish	Hug
Duck	Thatch	Catch	Hum	Hip	Buzz	Dutch	Dish
Gap	Sum	Thumb	Dip	Thug	Hash	Jam	Ban
Cheese	Heel	Heap	Five	Ride	Thieve	Heath	Rage
Rail	Wide	Wise	Ways	Siege	Gate	Laze	Chief
Hive	Rake	Rave	Reach	Veil	Wife	Bike	Pies
Bone	Goes	Goat	Joke	Chose	Pole	Rove	Wet
Wedge	Shop	Shone	Noose	Shoot	Wretch	Pet	Cove
Moss	Vet	Bed	Got	Web	Dodge	Fog	Loose
Tooth	June	Juice	Shell	Cough	Moon	Soon	Moth

Appendix G - CHEAR Auditory Performance Test

CHEAR APT Word Lists

Page 1	Page 2	Page 3	Page 4	Page 5	Page 6	Page 7	Page 8	Page 9	Page 10
boat	ship	cart	train	snail	stick	path	bead	clown	ref
coat	shape	car	rain	nail	sick	pass	bird	loud	red
goat	shop	card	chain	tail	tick	park	bed	cloud	wet
note	sheep	calf	lane	sail	pick	palm	beard	crowd	yes

Example from the CHEAR APT Test Booklet



Appendix H - Semi-structured interview transcripts and analysis

Child A: Interview transcript and analysis

Initial analysis of the transcript	Transcription of the interview questions and answers	Themes
<p>Defensive attitude from the outset. Compares his hearing favourably with some others.</p> <p>Associates hearing aids with the hospital.</p> <p>Does recall some support from the hospital and appreciates his need for that.</p> <p>Hearing aids felt heavy and uncomfortable. Negative experience of using an FM system in school.</p> <p>Never liked having hearing aids.</p> <p>Reason he stopped use hearing aids: only child at school with hearing aids/other children asking questions.</p> <p>Not necessarily being bullied but HAs noticed by friends who ask questions about them.</p>	<p>1. How would you describe your hearing loss?</p> <p><i>My hearing is alright and I don't need hearing aids. I think I hear better than some people.</i></p> <p>2. Who decided you would have hearing aids? If other: did they ask you if you would like hearing aids?</p> <p><i>The hospital. Can't remember.</i></p> <p>3. What did the hospital tell you about the hearing aids when they were fitted?</p> <p><i>Told me about the hearing aids, how to change the batteries.</i></p> <p>4. After being fitted did you feel confident about how to operate the hearing aids (changing batteries, switching on and off, putting the ear mould in your ear)?</p> <p><i>I needed a bit of help.</i></p> <p>5. Was using hearing aids as you expected it to be or different?</p> <p><i>Different. It was heavy on my ear. Didn't like the big thing (FM receiver).</i></p> <p>6. Did you like the hearing aids at first or not?</p> <p><i>No, I started taking them off straightaway.</i></p> <p>7. Did you try to get used to them or did you know straightaway that you were not going to like them?</p> <p><i>No. I didn't like them. I didn't know if I wanted them but when I put them in I didn't like them.</i></p> <p>8. When did you stop using your hearing aids? What was the reason that you decided to stop using them?</p> <p><i>When I was in Year 4 (in Y5 now). No one else wears them. Everyone goes 'What's that in your ear?' They just ask some questions.</i></p> <p>9. What did your friends think of your hearing aids?</p> <p><i>Every time they go like 'What's that in your ear?' They just ask some questions.</i></p> <p>10. What did you family think of your hearing aids?</p> <p><i>I don't wear them at home. My mum says she will get me some very small hearing aids that you can't see.</i></p>	<p>Attitude: denial of hearing loss</p> <p>Fit and Comfort</p> <p>Negative initial view after being fitted with HAs</p> <p>Stigma: normality</p> <p>Stigma: normality</p> <p>Stigma: cosmetic concerns</p>

<p>Only child in school with hearing aids. Isolation. No role model.</p> <p>Mentions 'normal'. Doesn't see need for hearing aids helping him in school.</p> <p>Does acknowledge that there are times when it is difficult to hear in class.</p> <p>Not a direct answer to the question but admits sounds are louder with hearing aids.</p> <p>Does not like hearing aids picking up loud noises. Again linked to 'normal'.</p> <p>Again mentions being different/not normal. Example of type of noise that is irritating when amplified by hearing aid.</p> <p>Not uncomfortable but big/visible.</p> <p>Embarrassed by hearing aids, even in front of his cousin.</p> <p>Does not elaborate but negative view.</p>	<p>11. Do you know anyone else who has hearing aids? How do they get on with their hearing aids?</p> <p><i>No, only Lewis who came to this school. Don't know, he wasn't in my class.</i></p> <p>12. Do you think you do well at school?</p> <p><i>Yes, just normal. I don't need hearing aids.</i></p> <p>13. Are there times when you struggle to hear in class?</p> <p><i>Only when it is very noisy, when everyone shouting but I still can hear the teacher because I sit at the front.</i></p> <p>14. Do your hearing aids reduce the number of times you have to ask people to repeat what they are saying?</p> <p><i>It's a bit louder.</i></p> <p>15. Are you frustrated when your hearing aids pick up sounds that keep you from hearing what you want to hear?</p> <p><i>Yes, like loud noises. I want to stay normal.</i></p> <p>16. How natural is the sound from your hearing aids?</p> <p><i>Makes me feel different. Like crisps go worses when you crunch them.</i></p> <p>17. Do you find the ear mould comfortable to wear?</p> <p><i>No, because it is big.</i></p> <p>18. What do you think about the appearance of your hearing aids?</p> <p><i>Weird, like different.</i></p> <p>19. How do you feel about wearing your hearing aids in front of other people?</p> <p><i>Embarrassed even in front of my cousin who goes this school.</i></p> <p>20. Do you think wearing your hearing aids makes you seem less capable/ intelligent?</p> <p><i>Yes, a bit like less intelligent.</i></p>	<p>Stigma: normality</p> <p>Attitude: don't need hearing aids</p> <p>Poor sound quality: unwanted noise</p> <p>Stigma: normality</p> <p>Stigma: normality</p> <p>Poor sound quality: unwanted noise</p> <p>Stigma: cosmetic concern</p> <p>Stigma: normality</p> <p>Stigma: normality</p> <p>Stigma: hearing aid effect</p>
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Child B: Interview transcript and analysis

Initial analysis of the transcript	Transcription of the interview questions and answers	Themes
<p>Believes hearing to have improved?</p> <p>No negative view of hospital</p> <p>Hearing aids not met expectations. No perceived benefit.</p> <p>Never liked the hearing aids.</p> <p>Stopped using them when in high school.</p> <p>No negative experience from friends and family.</p>	<ol style="list-style-type: none"> 1. How would you describe your hearing loss? <i>My hearing is fine at the moment.</i> 2. Who decided you would have hearing aids? If other: did they ask you if you would like hearing aids? <i>The hospital. No one asked me.</i> 3. What did the hospital tell you about the hearing aids when they were fitted? <i>They make you hear better and helps you hear words.</i> 4. After being fitted did you feel confident about how to operate the hearing aids (changing batteries, switching on and off, putting the ear mould in your ear)? <i>It was alright, easy.</i> 5. Was using hearing aids as you expected it to be or different? <i>They don't help me. I thought they would help a bit.</i> 6. Did you like the hearing aids at first or not? <i>No, I've never liked them.</i> 7. Did you try to get used to them or did you know straightaway that you were not going to like them? <i>Straightaway didn't like them.</i> 8. When did you stop using your hearing aids? What was the reason that you decided to stop using them? <i>In Year 7. Because I don't need them.</i> 9. What did your friends think of your hearing aids? <i>Nothing. Never said anything.</i> 10. What did you family think of your hearing aids? <i>Dad never talks about them. Mum says if you wear them it will help.</i> 	<p>Denial of hearing loss</p> <p>Poor benefit</p> <p>Negative initial view after being fitted with HAs</p> <p>Attitude: no need for HAs</p>

<p>Several peers at school with hearing aids (including sister).</p> <p>Judging who needs hearing aids and who doesn't</p> <p>Not willing to contemplate/accept difficulties hearing in school.</p> <p>Issues with unwanted noise, sound quality of hearing aids.</p> <p>Uncomfortable moulds</p> <p>Strong negative view on appearance of hearing aids.</p> <p>Not concerned with stigma of hearing aids.</p>	<p>11. Do you know anyone else who has hearing aids? How do they get on with their hearing aids?</p> <p><i>Usman (same year at school). Usman needs them. Kiran (older sister) she's alright – doesn't need them anymore.</i></p> <p>12. Do you think you do well at school?</p> <p><i>Yes obviously. Same as friends.</i></p> <p>13. Are there times when you struggle to hear in class?</p> <p><i>Never.</i></p> <p>14. Do your hearing aids reduce the number of times you have to ask people to repeat what they are saying?</p> <p><i>Not really.</i></p> <p>15. Are you frustrated when your hearing aids pick up sounds that keep you from hearing what you want to hear?</p> <p><i>They whistle all the time. Squeaking noise on the ground.</i></p> <p>16. How natural is the sound from your hearing aids?</p> <p><i>I don't like the sound of them. Makes everyone have a squeaky voice.</i></p> <p>17. Do you find the ear mould comfortable to wear?</p> <p><i>No. Hurts your ears.</i></p> <p>18. What do you think about the appearance of your hearing aids?</p> <p><i>They look weird. Ugly.</i></p> <p>19. How do you feel about wearing your hearing aids in front of other people?</p> <p><i>Nothing. Not bothered.</i></p> <p>20. Do you think wearing your hearing aids makes you seem less capable/ intelligent?</p> <p><i>Yes I think that is true.</i></p>	<p>Stigma: normality</p> <p>Attitude: denial of hearing loss</p> <p>Poor benefit</p> <p>Poor sound quality: unwanted noise.</p> <p>Fit and comfort: whistling</p> <p>Poor sound quality</p> <p>Fit and comfort: uncomfortable</p> <p>Stigma: cosmetic concerns</p> <p>Stigma: hearing aid effect</p>
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Child C: Interview transcript and analysis

Initial analysis of the transcript	Transcription of the interview questions and answers	Themes
<p>Needs hearing aids when teacher is speaking quietly but most of the time feels she copes well without them.</p> <p>Parental decision despite student being high school age.</p> <p>Not prepared for hearing aid to be so loud?</p> <p>Negative comments/attitude of sister towards hearing aid use.</p> <p>Again mentions that sometimes she does not need to wear the hearing aids.</p> <p>Main reason: hearing aids uncomfortably loud.</p>	<ol style="list-style-type: none"> 1. How would you describe your hearing loss? <i>My hearing is a bit down in lessons but I know what I'm doing. Sometimes I need the hearing aids when the teacher is quiet but quite often I don't need the hearing aids.</i> 2. Who decided you would have hearing aids? If other: did they ask you if you would like hearing aids? <i>My mum decided. They did ask me and I said I don't mind.</i> 3. What did the hospital tell you about the hearing aids when they were fitted? <i>Told me how to put them in but I don't know that much and they gave me a case.</i> 4. After being fitted did you feel confident about how to operate the hearing aids (changing batteries, switching on and off, putting the ear mould in your ear)? <i>Sometimes I don't know how to put the mould in so I ask my mum for help. It whistles.</i> 5. Was using hearing aids as you expected it to be or different? <i>No it sounds different. The hearing aid is loud.</i> 6. Did you like the hearing aids at first or not? <i>No I didn't like it. My sister used to pick on me.</i> 7. Did you try to get used to them or did you know straightaway that you were not going to like them? <i>I did wear it but sometimes I didn't wear it because I didn't need to wear it.</i> 8. When did you stop using your hearing aids? What was the reason that you decided to stop using them? <i>It's dead loud. It goes really loud and you can hear even little things. Even when people talking quiet it seems loud.</i> 	<p>Attitude: don't need hearing aids</p> <p>Fit and Comfort: whistling</p> <p>Poor sound quality: too loud</p> <p>Negative initial view after being fitted with HAs.</p> <p>Stigma: bullying</p> <p>Attitude: don't need hearing aids</p> <p>Poor sound quality: too loud/unwanted</p>

<p>Sister (in this study) also non-user of hearing aids.</p> <p>She does recognise the difficulties of hearing when at a distance from the teacher and when the teacher is speaking quietly.</p> <p>Hearing aids do benefit</p> <p>This issue of unpleasant sounds being picked up by the hearing aids seems significant to this student.</p> <p>Again mentions the loudness of the hearing aids.</p> <p>Seems to accept the appearance of the hearing aids.</p> <p>However, does not want others to see them as she fears being picked on.</p>	<p>11. Do you know anyone else who has hearing aids? How do they get on with their hearing aids?</p> <p><i>Sister. She knows how to put them in but don't know if she wears them or not.</i></p> <p>12. Do you think you do well at school?</p> <p><i>I try my best. I did go up in English. My Maths level has gone up.</i></p> <p>13. Are there times when you struggle to hear in class?</p> <p><i>I don't really think so, no. Sometimes we have supply teachers and they don't talk loud or when I'm right at the back it is hard to hear.</i></p> <p>14. Do your hearing aids reduce the number of times you have to ask people to repeat what they are saying?</p> <p><i>When I've got my hearing aid in I think I can hear people better.</i></p> <p>15. Are you frustrated when your hearing aids pick up sounds that keep you from hearing what you want to hear?</p> <p><i>Yes. People make sounds that irritate you. When crunching something, like a plastic wallet being crunched. And when people do weird sounds.</i></p> <p>16. How natural is the sound from your hearing aids?</p> <p><i>It feels different to normal because it is louder.</i></p> <p>17. Do you find the ear mould comfortable to wear?</p> <p><i>It's soft. It is ok.</i></p> <p>18. What do you think about the appearance of your hearing aids?</p> <p><i>You can't change the look because it fits around the ear.</i></p> <p>19. How do you feel about wearing your hearing aids in front of other people?</p> <p><i>Embarrassed. They will laugh and pick on you. Say you are deaf and stuff.</i></p> <p>20. Do you think wearing your hearing aids makes you seem less capable/ intelligent?</p> <p><i>Yes. People would say you're not clever.</i></p>	<p>Poor sound quality: in background noise /unwanted noise</p> <p>Poor sound quality: too loud</p> <p>Stigma: normality</p> <p>Stigma: hearing aid effect</p>
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Child D: Interview transcript and analysis

Initial analysis of the transcript	Transcription of the interview questions and answers	Themes
<p>Acknowledges hearing problems, particularly when there is background noise.</p> <p>Did not want hearing aids.</p> <p>Friends were positive about hearing aids.</p> <p>Not disappointed by unrealistic expectations but did not have positive hopes that they would help.</p> <p>Negative view linked to uncomfortable ear moulds.</p> <p>Didn't like the way they looked and found them uncomfortable to wear.</p> <p>Stopped wearing them at high school having done so in Y7. Main reason given is that the moulds are uncomfortable.</p> <p>Friends are supportive.</p> <p>Parents are supportive towards hearing aid use.</p>	<p>1. How would you describe your hearing loss?</p> <p><i>Sometimes when I talk to my parents I may hear something wrong. When it's noisy I can't hear properly.</i></p> <p>2. Who decided you would have hearing aids? If other: did they ask you if you would like hearing aids?</p> <p><i>I think it was my parents. I can't remember. I didn't want them.</i></p> <p>3. What did the hospital tell you about the hearing aids when they were fitted?</p> <p><i>I can remember I went to the hospital but can't remember what they said to me.</i></p> <p>4. After being fitted did you feel confident about how to operate the hearing aids (changing batteries, switching on and off, putting the ear mould in your ear)?</p> <p><i>Yes, because I had my friends to help me.</i></p> <p>5. Was using hearing aids as you expected it to be or different?</p> <p><i>I knew what it would be like.</i></p> <p>6. Did you like the hearing aids at first or not?</p> <p><i>I didn't like the hearing aids. They kept on hurting inside my ears.</i></p> <p>7. Did you try to get used to them or did you know straightaway that you were not going to like them?</p> <p><i>I knew I wasn't going to like them because they look weird and they don't feel comfortable.</i></p> <p>8. When did you stop using your hearing aids? What was the reason that you decided to stop using them?</p> <p><i>When I came to high school. I wore them in when I came to high school. I wore them in Year 7 but stopped in Year 8. It just hurts me – the ear mould.</i></p> <p>9. What did your friends think of your hearing aids?</p> <p><i>They never say anything. They all stick up for me and help me.</i></p> <p>10. What did your family think of your hearing aids?</p> <p><i>They think it was good because at least you can hear properly. They tell me I need to wear the hearing aids at home and school</i></p>	<p>Negative initial view after being fitted with HAs.</p> <p>Negative initial view after being fitted with HAs.</p> <p>Fit and comfort: uncomfortable mould.</p> <p>Stigma: appearance. Fit and comfort: uncomfortable mould.</p> <p>Fit and comfort: uncomfortable mould.</p>

<p>Other children in school (including sister) have hearing aids.</p> <p>Uses other strategies to compensate for hearing problems.</p> <p>Difficult to hear in class when significant background noise.</p> <p>Difficult to hear in class when significant background noise.</p> <p>Hearing aids do help but mentions that they are loud.</p> <p>Again, mixed opinions? Sometimes clear, sometimes not clear.</p> <p>Issues with uncomfortable moulds.</p> <p>Weird as in not normal.</p> <p>Very much self-conscious about using the hearing aids at school, even though they are not visible.</p>	<p>11. Do you know anyone else who has hearing aids? How do they get on with their hearing aids?</p> <p><i>My sister, Eihsan in my form, Courtney. I don't know. My sister says she can hear properly.</i></p> <p>12. Do you think you do well at school?</p> <p><i>Yes sometimes. Even though I haven't got hearing aids I can put my hand up and they will help me. There is a Special Needs teacher in every lesson who will help me.</i></p> <p>13. Are there times when you struggle to hear in class?</p> <p><i>Sometimes. When people are noisy I can't hear the teacher. Only reason is when there is noise. Sometimes it is noisy when naughty students there.</i></p> <p>14. Do your hearing aids reduce the number of times you have to ask people to repeat what they are saying?</p> <p><i>Yes but if it is noisy it can still be hard to hear.</i></p> <p>15. Are you frustrated when your hearing aids pick up sounds that keep you from hearing what you want to hear?</p> <p><i>Yes because you can hear everything when you've got hearing aids on.</i></p> <p><i>Sometimes it is quite loud.</i></p> <p>16. How natural is the sound from your hearing aids?</p> <p><i>It sounds loud. Sometimes it feels clear, sometimes it doesn't.</i></p> <p>17. Do you find the ear mould comfortable to wear?</p> <p><i>Sometimes but if you wear them too long it hurts your ear.</i></p> <p>18. What do you think about the appearance of your hearing aids?</p> <p><i>They look weird. I don't like the colour.</i></p> <p>19. How do you feel about wearing your hearing aids in front of other people?</p> <p><i>Weird. Sometimes I feel they know I've got hearing aids on even though I'm wearing a head scarf.</i></p> <p>20. Do you think wearing your hearing aids makes you seem less</p>	<p>Poor sound quality: in background noise</p> <p>Poor sound quality: too loud</p> <p>Poor sound quality: too loud</p> <p>Comfort and fit: uncomfortable mould</p> <p>Stigma: cosmetic concerns</p> <p>Stigma: normality</p>
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Child E: Interview transcript and analysis

Initial analysis of the transcript	Transcription of the interview questions and answers	Themes
<p>Accepts hearing problems in one ear but says hears ok in other ear.</p> <p>Got used to using hearing aids after initial fitting.</p> <p>Used the hearing aids but could not see obvious benefit from them.</p> <p>Turning point seems to be in Y4 when other children started to comment on the hearing aids.</p> <p>At start of high school stopped using the hearing aids.</p> <p>Very concerned about being noticed by others.</p> <p>Parents are supportive towards hearing aid use.</p>	<p>1. How would you describe your hearing loss?</p> <p><i>I can't hear that much but I can hear just as well. My right ear is deaf but my left is fine.</i></p> <p>2. Who decided you would have hearing aids? If other: did they ask you if you would like hearing aids?</p> <p><i>It was the hospital when I was 6 or 7. Can't remember.</i></p> <p>3. What did the hospital tell you about the hearing aids when they were fitted?</p> <p><i>All I can remember was don't lose them and keep away from water.</i></p> <p>4. After being fitted did you feel confident about how to operate the hearing aids (changing batteries, switching on and off, putting the ear mould in your ear)?</p> <p><i>I can remember putting the batteries in was easy.</i></p> <p>5. Was using hearing aids as you expected it to be or different?</p> <p><i>It felt different at first I was used to it. Felt like I had someone pulling on my ear, like a weight, then I got used to it.</i></p> <p>6. Did you like the hearing aids at first or not?</p> <p><i>I couldn't tell the difference. Made me feel my hearing was normal.</i></p> <p>7. Did you try to get used to them or did you know straightaway that you were not going to like them?</p> <p><i>I wore them from Reception to Year 3 then took them out because I didn't like them. When I took them out I felt better without them. Plus I started getting picked on Year 4 for wearing them. No one noticed before Year 4. It seemed to happen a lot people saying things.</i></p> <p>8. When did you stop using your hearing aids? What was the reason that you decided to stop using them?</p> <p><i>I stop using them in Year 7. That's when I really started getting picked on. And I just don't like the hearing aids anymore.</i></p> <p>9. What did your friends think of your hearing aids?</p> <p><i>They used to pick on me. They start taking the mick saying I'm deaf. Now (Year 9) if I put hearing aids in they probably wouldn't say anything but would stare at them.</i></p> <p>10. What did you family think of your hearing aids?</p> <p><i>Mum and dad think I should wear them. They think it will benefit my life and help me in the future. Every now and then they tell me to wear them. Sometimes I wear them around the house because I don't get picked on.</i></p>	<p>Attitude: denial of hearing loss</p> <p>Poor benefit</p> <p>Stigma: bullying</p> <p>Stigma: bullying</p> <p>Stigma: bullying</p> <p>Stigma: bullying</p>

<p>Difficult to hear in noisy situations.</p> <p>Avoids answering whether or not the hearing aids are of benefit in this situation.</p> <p>Hearing aids pick up unwanted noise.</p> <p>Again uncomfortable sounds being picked up.</p> <p>Doesn't want people to see the hearing aids.</p> <p>Main issue not wanting to look different to other people.</p>	<p>11. Do you know anyone else who has hearing aids? How do they get on with their hearing aids?</p> <p><i>No. Some other children at school but not my friends.</i></p> <p>12. Do you think you do well at school?</p> <p><i>Yes. I cope well and nearly getting straight As.</i></p> <p>13. Are there times when you struggle to hear in class?</p> <p><i>Yes but that's when everyone's shouting when there is loads of noise.</i></p> <p>14. Do your hearing aids reduce the number of times you have to ask people to repeat what they are saying?</p> <p><i>Don't know because I rarely ask people what they said.</i></p> <p>15. Are you frustrated when your hearing aids pick up sounds that keep you from hearing what you want to hear?</p> <p><i>Sometimes. The wind buzzes in my ear and gives me a headache. Or when cars go past.</i></p> <p>16. How natural is the sound from your hearing aids?</p> <p><i>When I put it in it just seems that everything is really loud like people are screaming at me and it puts me off balance when just wearing one hearing aid.</i></p> <p>17. Do you find the ear mould comfortable to wear?</p> <p><i>Sometimes makes my ear itchy but it is all right.</i></p> <p>18. What do you think about the appearance of your hearing aids?</p> <p><i>I don't like it. Too big and bulky. I want something smaller that no one could notice.</i></p> <p>19. How do you feel about wearing your hearing aids in front of other people?</p> <p><i>Embarrassing. I would want to be like other people not wearing them.</i></p> <p>20. Do you think wearing your hearing aids makes you seem less capable/ intelligent?</p> <p><i>I don't know really. Never felt that way before.</i></p>	<p>Poor sound quality: unwanted noise</p> <p>Poor sound quality: too loud</p> <p>Stigma: cosmetic concerns</p> <p>Stigma: normality</p>
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Child F: Interview transcript and analysis

Initial analysis of the transcript	Transcription of the interview questions and answers	Themes
<p>Difficulty hearing in class when at a distance from the teacher.</p> <p>Concerned about how others would react.</p> <p>Didn't like the hearing aids from the outset.</p> <p>He did use hearing aids for a consistent period when in primary school.</p> <p>When at high school had a bad experience of older children making comments about his hearing aids that obviously upset him.</p> <p>Friends and parents are supportive towards hearing aid use.</p>	<p>1. How would you describe your hearing loss?</p> <p><i>If the teacher is far away I can't hear them.</i></p> <p>2. Who decided you would have hearing aids? If other: did they ask you if you would like hearing aids?</p> <p><i>My mum took me to the hospital. They said I need hearing aids. I was just given them.</i></p> <p>3. What did the hospital tell you about the hearing aids when they were fitted?</p> <p><i>Make sure you wear them all the time so you can hear better.</i></p> <p>4. After being fitted did you feel confident about how to operate the hearing aids (changing batteries, switching on and off, putting the ear mould in your ear)?</p> <p><i>No, I used to ask the teacher. When I was 7 or 8 I could put the batteries in.</i></p> <p>5. Was using hearing aids as you expected it to be or different?</p> <p><i>I thought people would laugh.</i></p> <p>6. Did you like the hearing aids at first or not?</p> <p><i>I didn't like them. Don't like putting them in and taking them out.</i></p> <p>7. Did you try to get used to them or did you know straightaway that you were not going to like them?</p> <p><i>Yes I got used to them.</i></p> <p>8. When did you stop using your hearing aids? What was the reason that you decided to stop using them?</p> <p><i>In Year 8/Year 9. Some people in Year 10 were calling me deaf and I got angry and started hitting them.</i></p> <p>9. What did your friends think of your hearing aids?</p> <p><i>Nothing. They just help me. They tell me to wear them.</i></p> <p>10. What did you family think of your hearing aids?</p> <p><i>They think it is good because I can hear properly.</i></p>	<p>Stigma: normality</p> <p>Negative initial view after being fitted with HAS.</p> <p>Stigma: bullying</p>

<p>Older brothers also hearing aid non-users. Younger brother does use hearing aids consistently.</p> <p>Does accept that he struggles to hear in class without hearing aids.</p> <p>Positive benefit of hearing aids.</p> <p>Was updated to Phonak Nathos hearing aids last year which provide improved sound quality.</p> <p>Since participating in this study he has expressed a willingness to try using his hearing aids again</p>	<p>11. Do you know anyone else who has hearing aids? How do they get on with their hearing aids?</p> <p><i>My three brothers. Two of them don't wear them anymore. I don't know why.</i></p> <p>12. Do you think you do well at school?</p> <p><i>It's all right. Don't like it much. Getting up early.</i></p> <p>13. Are there times when you struggle to hear in class?</p> <p><i>I told the teacher and sat at the front.</i></p> <p>14. Do your hearing aids reduce the number of times you have to ask people to repeat what they are saying?</p> <p><i>Yes.</i></p> <p>15. Are you frustrated when your hearing aids pick up sounds that keep you from hearing what you want to hear?</p> <p><i>Can hear teachers walking or cars going past.</i></p> <p>16. How natural is the sound from your hearing aids?</p> <p><i>Yes, these hearing aids are better. The other ones made sounds whistle, these sound normal.</i></p> <p>17. Do you find the ear mould comfortable to wear?</p> <p><i>Yes. Had infection but fine now.</i></p> <p>18. What do you think about the appearance of your hearing aids?</p> <p><i>Ok. Happy with moulds (skeleton). They are different.</i></p> <p>19. How do you feel about wearing your hearing aids in front of other people?</p> <p><i>Happy. Just take them off at break and lunchtime.</i></p> <p>20. Do you think wearing your hearing aids makes you seem less capable/ intelligent?</p> <p><i>No.</i></p>	<p>Poor sound quality: unwanted noise</p> <p>Fit and comfort: whistling</p>
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