The attitudes of children toward unfamiliar peers who use augmentative and alternative communication devices

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SUMMARY

AAC aims at improving the interaction of adults and children with LNFS in their natural daily environments. Despite the considerable research of the past few decades into various aspects of AAC and the concurrent rapid advances in clinical practice during the same period, the social participation of many AAC users remains problematic. The lack of interaction by children who use AAC with their peers has been extensively documented. The potential of technological features of an AAC system to influence the attitudes and interaction of peers forms the basis of this investigation.

The purpose of this research was to determine the impact of voice output, as a characteristic of a child's AAC system, on the attitudes of unfamiliar peers. The effect of the gender of the peers on their attitudes to children with disabilities and LNFS was also of interest as previous studies generally indicated that girls held more favourable attitudes to peers with disabilities. The need to develop a suitable tool to measure the attitudes of peers to a child with disabilities and LNFS was ascertained. The present investigation, therefore, also included an attempt to design a scale, the CADAQ, to measure differences in attitudes toward children who are AAC users, dependent on the output mode of the device.

A descriptive survey design was used and, prior to the main study, the suitability of the attitude scale was tested in a pilot study. Initial attitudes toward the peer with physical disabilities and LNFS were measured by the CADAQ, according to three dimensions: affective/behavioural, cognitive/belief and communication competence. Results reflected more favourable attitudes to the presence of voice output in comparison to the no voice option. Girls were also found to hold more positive attitudes to the peer with disabilities and LNFS. Good internal consistency of the CADAQ was demonstrated through an item analysis.

Clinical implications and recommendations for additional research are discussed.

Key Words: attitude, augmentative and alternative communication (AAC), interaction, voice output, gender, communication, peers, communication competence, stereotyping, attitudinal scales and little or no functional speech (LNFS).

OPSOMMING

AAK is gemik op die verbetering van die interaksie van volwassenes en kinders met min of geen funksionele spraak (MGFS) gedurende daaglikse aktiwiteite in hul natuurlike omgewing. Ten spyte van omvangryke navorsing in verskeie aspekte van AAK die afgelope paar dekades en die gelyktydige verbetering van klieniese praktyke, bly die sosiale deelname van baie AAK gebruikers steeds problematies. Die gebrekkige interaksie tussen kinders wat AAK gebruik en hul portuurgroep, is reeds in diepte gedokumenteer. Die potensiaal wat die tegniese aspekte van 'n AAK sisteem inhou ten einde die houdings en interaksie van die portuur groep te beïnvloed, vorm die basis van hierdie studie.

Die doel van die navorsing was om vas te stel wat die impak is van stemuitset as 'n eienskap van 'n kind se AAK sisteem, op die houding van die portuurgroep wat nie voorheen aan die AAK gebruiker bekend was nie. Die effek van die portuurgroep se geslag rakende hul houding teenoor lede van die portuuurgroep met gestremdhede en MGFS is van belang, aangesien vorige studies aangedui het dat dogters se houding oor die algemeen meer positief is teenoor 'n lid van die portuurgroep met 'n gestremdheid. Die noodsaaklikheid om 'n toepaslike meetinstrument te ontwikkel wat die houding van die portuurgroep teenoor die gestremde kind met MGFS te kan meet, is gedemonstreer. Die huidige studie het dus gepoog om 'n metingskaal, die CADAQ, te ontwerp on sodoende die verskil wat die hulpmiddel se uitset modaliteit op die houding van die portuurgroep teenoor die AAK gebruiker het, te meet.

'n Beskrywende opname ontwerp is gebruik en die toepaslikheid van die houdingskaal is reeds voor die hoofstudie deur middel van loodsstudie getoets. Aanvanklike houdings teenoor die kind met 'n fisiese gestremdheid en MGFS is met behulp van die CADAQ gemeet ten opsigte van drie vlakke: affektief/gedrag, kognitief/beskouing en kommunikasievaardigheid. Die resultate het aangedui dat houdings meer positief was wanneer daar wel stemuitset was as wanneer daar geen stemuitset was nie. Daar is ook gevind dat dogters se houding meer positief is teenoor die kind met

'n gestremdheid en MGFS van dieselfde portuurgroep. Goeie interne konstantheid van die CADAQ is deur 'n itemanalise aangedui.

Kliniese implikasies en aanbevelings vir verdere navorsing word bespreek.

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INTRODUCTION

1.1 INTRODUCTION

Statistics in South Africa have revealed a relatively high incidence of children who have little or no functional speech (LNFS). A survey of children (3 – 12 years) in schools for children with cognitive disabilities in the Pretoria area, indicated that approximately 39% of these children had LNFS. This figure is considerably higher than in other international surveys (Bornman 1995). Possible factors include the lack of early intervention and therapeutic services, limited knowledge and insufficient training of teachers and low teacher and parental expectations of children with LNFS. The high incidence is also a reflection of the numerous primary and secondary socio-economic problems of less developed countries and disadvantaged communities. However, it is the attitudes of members of the community, in particular attitudes of children towards their peers with LNFS, that is the focus of this research.

In this chapter the context of the research, in terms of communication and factors influencing successful communication, is discussed. The key terms that require clarification are then defined, followed by a list of the abbreviations used throughout the study.

1.2 THE CONTEXT AND STATEMENT OF THE PROBLEM

'Without a doubt, my inability to speak has been the single most devastating aspect of my handicap. If I were granted one wish and one wish only, I would not hesitate for an instant to request that I be able to talk, if only for one day, or even one hour' (Sienkewicz-Mercer & Kaplan 1989, pp. 12-13).

The lack or loss of a means to communicate denies us the ability to express our human individuality and dignity. The familiar phrase *'communication is the essence of human life'* highlights how imperative interaction with others is for our very existence. People communicate

because they are social beings. Whether we communicate by talking, writing, waving, smiling, or listening, the process is a dynamic one and takes place between people. The four main purposes of communication as defined by Janice Light (1988) are to express needs and wants, exchange information, conform to expected social etiquette and develop social closeness. Of these four, the latter is considered paramount. Communication is fundamental to the development of relationships of children and adults through the sharing of experiences, emotions, personal secrets, aspirations and dreams - whether or not one is disabled.

The use of Augmentative and Alternative Communication (AAC) systems provides children with LNFS the opportunity to engage in this communicative process. The attitudes of communication partners, particularly peers, are one of the most significant aspects influencing the success of AAC intervention. AAC users have disclosed that they are frequently ignored, often shouted at as if hearing impaired and are seldom addressed directly, and their cognitive ability is underrated. Studies of AAC users interacting with both familiar and unfamiliar partners have revealed the tendency of speaking partners to direct interactions and to alter the form and content of any questions they ask. In addition, speaking partners frequently dominate conversational exchanges, complete the AAC user's message for them and interrupt or even change the content of the AAC user's message. Young AAC users are often described as being passive communicators who seldom initiate communication.

As stated, the outcome of AAC intervention can be significantly influenced by the attitudes of partners, and both clinicians and researchers are realising the importance of programmes to influence partners' attitudes and behaviours toward AAC users (Kraat 1987). The importance of including peers in intervention with the child with LNFS has been recognised for some time. However, peer training has frequently not been implemented, partly due to the lack of knowledge about how peers think and relate to children with disabilities and LNFS.

The need to increase our knowledge, not only of the processes that occur when AAC users interact with speaking partners but also of how features of various AAC systems impact on the interaction, has been highlighted (Light 1988). Evidence that communication device characteristics e.g. voice output, have a significant effect on the attitude and perceptions of partners and their willingness to

interact with the user has been widely described (Gorenflo & Gorenflo 1991; Hoag & Bedrosian 1992; Higginbotham in O'Keefe, Brown & Schuller 1998).

The purpose of this research is to determine whether the attitudes of children, aged 11 – 13 years, to unfamiliar peers who use AAC devices, vary according to whether or not the device used has voice output.

The major hypothesis is that voice output will have a positive effect on the attitudes of peers towards a disabled child using an AAC device. A subordinate hypothesis is that girls will have more favourable attitudes than boys will to the disabled peer using a device.

1.3 OUTLINE OF THE CHAPTERS

In Chapter 1 the motivation for the study is presented and the contents of the chapters briefly described. Key terms are defined and abbreviations used in the study are listed.

Attitudes toward children and adults with disabilities, including people with speech disorders or those with LNFS, are described extensively in Chapter 2. A theoretical model of attitudes is presented followed by a discussion of the influence of attitudes on behaviour. The effects of stereotypical attitudes toward persons with disabilities are described, in addition to strategies to reduce stereotyping. Previous research findings on the impact of the output mode, including speech output, are presented and the attitude scales used by previous researchers are evaluated.

The research methodology is detailed in Chapter 3. The research design is followed by details of the pilot study. The discussion on the main study includes a profile of the sampling strategy used, the criteria for selecting subjects, and a detailed description of the subjects. The rationale for the development of the survey instrument, the CADAQ, and the content of the CADAQ, are explained. The videotapes used as the stimulus material, as well as ethical issues pertaining to the videotaped subjects and the study participants, are discussed. An account of the data collection and statistical procedures concludes chapter 3.

The results of the main study are presented and discussed in Chapter 4. The influence of voice output and the gender of the participants on the results are highlighted. Issues relating to the reliability of the questionnaire are presented. The chapter ends with possible explanations for the relatively high frequency of undecided responses to specific statements in the questionnaire.

Chapter 5 contains discussions of the conclusions and clinical implications of the research. The research is evaluated and recommendations made for possible future research.

1. 4 DEFINITION OF TERMS

The following key terms are frequently used and require clarification:

- **Attitude:** For the purpose of this study the following definition has been used. 'An attitude may be conceptualised as a learned predisposition to respond positively or negatively to certain objects, situations, institutions, concepts, or persons. As implied by this definition, attitudes possess cognitive (beliefs, knowledge, and expectations), affective (motivational and emotional), and performance (behaviour or action) components'. (Aiken 1996, p. 226).

- **Augmentative and Alternative Communication:** '(1) the supplementation or replacement of natural speech and/or writing using aided and/or unaided symbols. The use of aided symbols requires a transmission device whereas the use of unaided symbols requires only the body. (2)The field or area of clinical/educational practice to improve the communication skills of individuals with little or no functional speech' (Lloyd, Fuller & Arvidson 1997, p. 524).

- **Communication:** In this research it is considered to be a multimodal composite of behaviours for the purpose of exchanging thoughts or ideas from one person to another irrespective of the means e.g. speech, gestures, writing or graphic representations. Communication may or may not be linguistic and takes place between people to achieve the communicative functions of the expression of needs, the transfer of information, the promotion of social closeness or to meet social etiquette norms.

- **Interaction:** 'The process that occurs when people come together' (Bullowa in Kraat 1987). It does not necessarily imply that words are spoken but that a cyclical interplay of actions and reactions between two or more people takes place (Kraat 1987).

- **Voice Output:** The output mode of a communication device that utilises either digitised or synthetic speech output. Digitised speech is 'electronically produced when the human voice is recorded and digitised' (Lloyd, Fuller & Arvidson 1997, p. 528). Synthesised speech is 'artificially produced (e.g. by electronic means) rather than by the human vocal tract. It is highly flexible and can use text-to-speech to produce virtually any typed message. There is a wide range of quality depending on the rules/algorithms stored in the computer memory. In general the intelligibility of synthesised speech is not as high as digitized speech' (Lloyd, Fuller & Arvidson 1997, p. 540).

1.5 ABBREVIATIONS

The following abbreviations are used frequently throughout the study:

- AAC — Augmentative and Alternative Communication
- ATDP Scale — Attitude Toward Disabled Persons Scale
- ATNP Scale — Attitudes Toward Nonspeaking Persons Scale
- CADAQ — Communication Aid/Device Attitudinal Questionnaire
- CATCH — Chedoke-McMaster Attitudes Toward Children with Handicaps Scale
- CP — Cerebral Palsy
- LNFS — Little or no functional speech
- SLP — Speech Language Pathologist
- VOCA — Voice output communication aid

1.6 SUMMARY

This chapter briefly highlighted the importance of the attitudes of communication partners in the AAC process. The impact of the output mode of a communication device on peers' attitudes and

their willingness to interact with an AAC user were presented as the basic premise for the study. Key terms and abbreviations were clarified.

CHAPTER 2

THE IMPACT OF VOICE OUTPUT ON THE ATTITUDES OF PEERS

2.1 INTRODUCTION

It is universally accepted that attitudes determine with whom, about what, where and how individuals interact with others. This profound effect of attitudes on interactions highlights the need to determine the attitudes of non-disabled peers to the disabled, including those with LNFS.

In this chapter the important influence of peer attitudes on their behaviour and interaction with disabled children, including those with LNFS, is discussed. A theoretical model of attitudes, the ABC model, is presented. This is followed by a discussion on the negative influence of stereotypical attitudes and on strategies to reduce stereotyping. The significance of communication partners and the interaction patterns of AAC users with peers are discussed.

The research findings on the impact of the output means of AAC devices, including voice output, are described and compared. A summary of conflicting research findings with respect to the influence of the output mode of devices, specifically voice output, is presented. The chapter concludes with an evaluation of the attitude scales used by previous researchers to compare peer attitudes to children using various AAC devices. The necessity for the development of a new measure is highlighted.

2.2 ATTITUDES TO THE DISABLED

Extensive research findings substantiate generally negative attitudes toward disabled persons as well as the modification of the social behaviour of non-disabled when in the presence of disabled peers (Bender 1980; Fiedler & Simpson 1987; King, Rosenbaum, Armstrong & Milner 1989; Warrick 1988). More specifically, negative attitudes of non-disabled children to peers with speech disorders were found to be prevalent (McKinnon, Hess & Landry 1986; Lass, Ruscello, Bradshaw & Blankenship 1991; Kalinowski, Lerman & Watt 1991; Williams & Dietrich 1996). Attitudes of children to the disabled are often culturally derived, therefore, learned and

stereotypic. Modified social behaviours include reduced eye contact, shortened interaction time and decreased verbal communication. These attitudes and resultant behaviours are barriers to peers' communication with children who have disabilities. There is a need to understand how attitudes can be made more positive in order to facilitate positive interaction.

2.3 THE EFFECT OF ATTITUDES ON BEHAVIOUR

Attitudes influence behaviour. They predispose adults and children to respond to a person, object, situation or abstract issue in a favourable or unfavourable way. The ABC model of attitudes provides a theoretical construct appropriate to an understanding of children's attitudes to peers who are users of AAC devices. The model suggests that any attitude has three interrelated elements, namely an affective, a behavioural and a cognitive component (Feldman 1993). The affective component comprises the emotional feeling, whether positive or negative, the behavioural component is the predisposition to act in a way that is relevant to an attitude, and the cognitive component refers to the thoughts and beliefs relative to the attitude. Every attitude an individual has consists of all three components but in varying degrees of prevalence (Feldman 1993). Whereas individuals are always aware of the opinions they hold which are more specific and factually based, attitudes, of which an individual may not be fully conscious, are essentially revealed by behavioural responses to a person, situation or issue (Aitkin 1996).

Although the potency of the link between an attitude and the resultant behaviour does vary, people generally endeavour to maintain consistency between their attitudes and behaviour, which form a logical behavioural framework (Feldman 1993). Researchers in the field of social cognition – the study of the mental processes by which we understand, process information, and make judgements and decisions about our social world – have determined that adults and children develop complex schemas about people and social experiences. These schemas regulate information and memories and provide a framework for categorising and interpreting social stimuli (Feldman 1993).

Individuals typically have schemas for different people in their environment and they organise, recall and even predict what others are like on the basis of relatively little information. Vocal characteristics strongly influence the opinion and reaction of peers to one another (McKinnon *et al.* 1986). Because individuals tend to fit people into schemas even when there is little definite evidence to do so, inaccurate and oversimplified understanding of others results. Unfortunately,

therefore, although schemas can be helpful in assisting individuals to organise their social world, they have a negative side – stereotyping (Feldman 1993).

A stereotype is a schema in which beliefs and expectations about members of a group are held simply on the basis of their membership of that group. Individuals tend to hold less favourable opinions about groups to which they do not belong and more positive opinions about groups to which they do belong. This is referred to as ingroup-outgroup bias. It is for this reason that individuals develop negative attitudes to minority groups, including the disabled (Wilder in Feldman (1993). When individuals act on their stereotypes, negative consequences result including changed social behaviour, prejudice and discrimination. It is widely recognised that society's rejecting attitudes to people with disabilities result in restricted social, educational and vocational opportunities for people with disabilities.

2.4 STRATEGIES TO REDUCE STEREOTYPING

Techniques and strategies to reduce the negative effects of stereotyping and negative attitudes towards the disabled by peers have been extensively researched (Donaldson 1980; Gorenflo & Gorenflo 1991; Horne 1985; Kraat 1986; Towfighy-Hooshyar & Zingle 1984; Voeltz 1980). The following have been found to be effective:

- Increasing the quality and length of contact between the disabled and peers in non-threatening environments. Mere exposure to disabled children is not effective in improving peer attitudes as contact has to be interactive and to extend over a prolonged period (Armstrong, Rosenbaum & King 1987). In a study using an attitudinal questionnaire, non-disabled children attending integrated schools and who were more familiar with disabled children were found to have more positive attitudes towards a disabled peer with LNFS than children going to non-integrated schools (Beck & Dennis 1996).

- Interactions where individuals are of equal status, or are required to co-operate, or are dependent on one another, reduce stereotyping (Feldman 1993). Studies of AAC users seldom describe communication between individuals of equal status. Generally, the partners described were familiar to the AAC user and the social relationships of the dyad were usually asymmetric, with the partner being of a higher status (Light 1988). In the school setting, children using AAC are rarely described interacting with their peers, interactions taking place mainly with teachers (Harris 1982). This contention is confirmed

by Kraat (1987) who stated that in most of the interactive research studies of children using aided systems, the children communicated in a dyad with a staff member or caregiver.

- Providing information about the disabled, including those with LNFS. The results of an investigation into the significance of information and AAC technique on attitudes toward individuals with LNFS revealed that additional information concerning the individuals with LNFS had a positive effect on attitudes towards these individuals (Gorenflo & Gorenflo 1991).

- Enhancing positive values. Research studies have demonstrated that the use of high-technology AAC systems enhanced the image of AAC users who were rated as having higher intellectual functioning than previously judged (McCall, Markova, Moodie & Collins 1997). The use of more complex language (phrases versus single words) by an adult AAC user also resulted in a more favourable rating (Hoag, Bedrosian, Johnson & Molineux 1994).

2.5 CHILDREN'S ATTITUDES TO DISABLED PEERS

Children's attitudes to peers with disabilities are multidimensional with several factors having been identified as influencing these attitudes. The importance of the communication competence of children with disabilities, when status is assigned to them by their peers, has been highlighted (Horne 1985). Evidence that minor communication disorders of children result in negative peer attitudes is widespread. A single articulatory defect resulted in teenagers being regarded by peers as having a number of undesirable attributes as well as poor speech (Silverman & Paulus 1989). Voice disorders adversely affected adolescents' and peers' perceptions of specific physical and personality characteristics of children (Lass *et al.* 1991). Speakers with a lisp or stutter were subjected to negative stereotypical attitudes and behaviours and considered socially undesirable (Kalinowsky *et al.* 1991; McKinnon *et al.* 1986).

As it is evident that peers' attitudes to children with communication deficits are generally negative, information regarding the variables that affect peer perceptions of the communicative competence of children who use AAC is urgently required. These variables need to be experimentally verified in order to develop successful intervention strategies (Bedrosian, Hoag, Calculator & Molineux 1992). There is a need to determine whether peers rate a child who uses

an AAC device that produces speech (voice output) as more competent than a child who uses a low technological device with no voice output.

The role of the gender of the peers is also of interest to this study (Hoag *et al.* 1994). It is important to verify whether the finding that girls hold more favourable attitudes to disabled peers than boys (Fiedler & Simpson 1987; Rosenbaum, Armstrong & King 1986; Voeltz 1980), is also accurate for South African children.

2.6 PEER INTERACTION WITH AAC USERS

The interaction between AAC users and peers in terms of the number of communication partners and the status of the non-disabled individual influences the quality of communication. Insufficient interaction between children who use AAC and their peers is well documented as negatively affecting the formation of attitudes (Beukelman & Mirenda 1992; Goossens 1994; Kraat 1987; Lloyd, Fuller & Arvidson 1997). The majority of interactive research studies have described AAC users in interactions with a single partner as opposed to group interactions and with familiar as opposed to unfamiliar communication partners (Light 1988).

However, the effectiveness of the AAC intervention is determined by the child's ability to interact in natural daily environments. For children these include both the classroom and playground where, although some didactic interactions take place, many interactions are group-based. Children using AAC must function effectively from a social perspective if they are to become productive members of society (Light 1988). Research in this area is essential to determine which strategies and techniques contribute to communicative competence from both a personal and social perspective (Light 1988).

Speech output provides a greater range and increased flexibility of communication (Quist & Blischak 1992). Providing a way for the AAC user to gain attention, address groups, interrupt in a noisy environment, and communicate by phone or with a partner who is not literate, are examples of the ways in which a VOCA contributed to the communication competence of the individual with LNFS (Quist & Blischak 1992; Raghavendra & Allen 1993). Studies have also determined that VOCAs are particularly important to AAC users because they result in increased communication interactions in specific settings (Schepis & Reid 1995).

The use of a VOCA allowed an AAC user with severe disabilities to initiate requests that were clearly understood by personnel (Schepsis & Reid 1995). The increase in interactions was still apparent after a prolonged period (Schepsis & Reid 1995). Additional research is recommended to determine the effect of voice output on the attitudes and interactions of unfamiliar communication partners in various community environments (Schepsis & Reid 1995).

The importance of the communication partner or partners in determining the success or failure of the interactions of AAC users has been emphasised by many researchers (Bedrosian *et al.* 1992; Kraat 1987; Light 1988). In addition, the effects of the communicative behaviours, of both the AAC user and the partner, on the perceptions of 'other peers' in the environment must be considered (Bedrosian *et al.* (1992). This is particularly relevant to how the communicative competence of the AAC user is rated by the 'other peers'.

There is evidence that the communication device itself may have a significant effect on the attitude of the partner and his or her willingness to interact with the user (Bedrosian *et al.* 1992; Gorenflo & Gorenflo 1991; O'Keefe, Brown & Schuller 1998). The manner in which a device improves or diminishes the speaking partner's perception of the user is of special interest (Higginbotham 1989; Schepsis & Reid 1995). The use of computer (high) technology for communication has been found to affect the attitudes of peers positively, and in some way indicated greater intelligence of the user (Alm in Blockberger, Armstrong, O'Connor & Freeman 1993). Results of a study to assess the attitudes of undergraduate college students toward a peer with physical disabilities and LNFS indicated that as the communication technique became more sophisticated, evaluations of the peer with LNFS became more favourable (Gorenflo & Gorenflo 1991). Should the aided message be highly intelligible, reflect the intelligence, age and gender of the user as well as being socially appropriate, the user is more likely to be considered favourably by peers (O'Keefe *et al.* 1998). A high-technological AAC device with suitable voice output is most likely to meet these criteria.

2.7 THE IMPACT OF OUTPUT MEANS OF DEVICES ON ATTITUDES

Research findings on the impact of the output means of devices on the perceptions of speaking partners are contradictory. Careful consideration of the significant influence of output mode on peers is essential as the perceptions of speaking partners directly affect their attitudes to

device users and their intention to engage in conversational interactions with them. Attitude ratings by unfamiliar listeners were significantly lower when print output, as opposed to synthetic speech or LCD display, was used by the AAC users (Coxson & Mathy-Laikko 1983).

In contrast to the latter finding, when individuals with LNFS used communication boards compared to VOCAs, partners rated communication as faster and more readily understood. This was despite the fact that one of the subjects indicated that he preferred the voice output device as it increased his independence (Buzolich cited by Light 1988). It has also been noted that negative perceptions may result when devices that use synthetic speech are first introduced to unfamiliar partners (Mirenda, Eicher & Beukelman 1989). Research has shown that a VOCA allowed an adolescent AAC user more opportunities to interact with unfamiliar partners (Light, Beesley & Collier 1988).

Interaction patterns of adults with LNFS have been shown to vary as a function of the limitations and strengths of the specific AAC devices (Gorenflo & Gorenflo 1991; Light 1988). More favourable attitudes of non-disabled peers to an AAC user who used a VOCA were supported by research that compared three different systems: unaided voice and gestures; an alphabet board; and a VOCA (Gorenflo & Gorenflo 1991). The results of the latter study supported the hypothesis that attitudes were significantly more favourable toward an individual using a high technological device such as a VOCA and the researchers concluded that voice output independently had a positive effect on attitudes to persons with LNFS (Gorenflo & Gorenflo 1991). Researchers suggested that devices with voice output should be selected to increase favourable attitudes to AAC users and that variables such as the quality and type of synthetic voice should be further investigated to establish the effect of these variables on attitudes to AAC device users (Gorenflo & Gorenflo 1991).

Children and adults have also been shown to respond differently to output mode. Whereas children preferred computers with synthesised speech, even if it was less intelligible than recorded speech, adults preferred more natural sounding speech (Mirenda *et al.* 1989). Gender differences are also apparent, as female listeners have been shown to respond differently from male listeners (Mirenda *et al.* 1989). Both adult women and girls considered the gender appropriateness of speech output to be the prime factor for acceptability. Male listeners also favoured female voices for women and girls but were more flexible with respect to gender appropriateness for themselves (Mirenda *et al.* 1989).

Researchers, clinicians and users have shown increasing interest in the intelligibility and other features of the synthetic speech output of VOCAs (Bedrosian *et al.* 1992; Hoag & Bedrosian 1992; Kraat 1986; Mirenda *et al.* 1989). The rate and loudness, gender and age appropriateness of the synthetic speech all have a cumulative impact on the attitudes and reactions of unfamiliar and familiar partners (Mirenda *et al.* 1989). Researchers have also highlighted the importance of additional features of quality, prosody and the naturalness of the voice output in influencing the perceptions of the AAC user by listeners (O'Keefe *et al.* 1998).

2.8 CHILDREN'S ATTITUDES TO PEERS WHO USE AAC DEVICES

It is essential to explore the variables that influence peer attitudes to children with LNFS as results may well differ from those of adults and adolescents. Children's reactions to physical disabilities are reportedly not as differentiated as the reactions of adults (Blockberger *et al.* 1993). Research has indicated that children's attitudes to disabled peers have an age-related sequential pattern (Ryan in Morrison & Ursprung 1990). Children, aged 4 – 6 years, are generally found to be rejecting of peers with physical disabilities whereas older children, 7 – 10 years of age, are less rejecting (Morrison & Ursprung 1990). Different developmental influences, education and experience with disabled peers will affect the attitudes of individual children to disabled peers with LNFS.

The following two studies are closely related to the current study and are therefore presented in greater detail. Blockberger *et al.* (1993) conducted research to explore peer attitudes toward a child with LNFS. The purpose of their study was to ascertain whether the AAC technique used influenced the attitudes of the unfamiliar peers towards the child with disabilities and LNFS (Blockberger *et al.* 1993). The subject of their study, a nine-year old girl, was videotaped having a scripted conversation with a Speech Therapist using unaided AAC techniques, an alphabet board, and a VOCA. Participants, unfamiliar peers from nine different schools, viewed one of the three videotapes in their class groups before they completed the Chedoke-McMaster Attitudes Towards Children with Handicaps Scale (CATCH) (Blockberger *et al.* 1993).

The CATCH was developed in 1986 by Rosenbaum, Armstrong and King to provide a reliable measure for the study of attitudes of children aged 9 – 13 years, toward disabled peers (Rosenbaum *et al.*1987). The researchers expected to find that more favourable attitudes

would be evident towards the child using the more high technological aid, the VOCA, than to the child using the alphabet board or the unaided techniques (Blockberger *et al.* 1993). However, the AAC technique used had no impact on attitudes, as measured by the CATCH Blockberger *et al.* 1993).

The researchers suggested two possible directions for future research on the perceptions and initial attitudes by peers toward the child with LNFS: namely, consideration of the interaction between the AAC technique used and other factors e.g. the physical appearance of the user; and investigation into the effect of the AAC technique used on the actual behaviours of peers when interacting with a child with LNFS in natural settings (Blockberger *et al.* 1993).

Beck and Dennis (1996) investigated the attitudes of non-disabled children toward children who had disabilities and used AAC systems. The main focus of their research was whether self-reported attitudes of children without disabilities towards a child who uses AAC varied according to whether the child used an alphabet board or a VOCA. The participants in their study were randomly assigned to watch a videotape of a disabled child using either the non-electronic alphabet board or the VOCA. Participants then completed the CATCH. The results of the research by Beck and Dennis (1996) indicated that there was no difference in scores on the CATCH between those viewing the child using the alphabet board or the VOCA. Their data did not support the earlier research of Gorenflo & Gorenflo (1991) or their prediction that peers would view a child using a high-technology VOCA more positively than a child using the non-electronic alphabet board.

The results of the research did, however, support their hypothesis that girls would view the disabled peer more positively than boys. One possible explanation Beck & Dennis (1996) suggest for the fact that there was no discernible effect of the different AAC techniques on attitudes was that the CATCH might not be sensitive to these differences. They suggested that future research include the development of a scale designed to measure subtle differences in children's attitudes to AAC users (Beck & Dennis 1996).

2.9 AAC USERS' ATTITUDES TO VOICE OUTPUT

The views of AAC users, on whether voice output has an effect on their interactions with others, were elicited by the researcher through the medium of the ACOLUG listserve on the Internet. Significantly, only responses validating the positive influence of voice output were received. AAC users cited definite advantages of voice output in terms of increased opportunities for interaction as well as positive effects on interactions. They expressed the fact that having a disability and LNFS led to extreme isolation and that voice output provided a natural, typical means of communication that had advantages over other methods of augmented communication such as the use of communication boards (Spivey 1998; Merchen 1998). The disadvantages of using communication boards, without voice output, were that potential communication partners needed to recognise, know, understand and even facilitate the use of the communication system being used (Spivey 1998).

The tendency of people to avoid situations they did not know or understand increased isolation of the person using an unfamiliar AAC system and the lack of voice output of communication boards was reflected as a restriction in communication with peers. Provision of voice output was described as being the most meaningful and functional form of AAC (McMaster 1998; Spivey 1998).

The provision of a voice output device was credited with allowing users to develop deeper, richer relationships with both familiar communication partners and unfamiliar people in the community. Voice output was perceived as allowing the users to express their personalities and their sense of humour (McMaster 1998; Merchen 1998). Additional benefits listed included the ability to communicate with people in another room, with the visually impaired and with the very young. The ease and immediacy of the partner to receive a message via voice output was compared to the effort and time involved in a partner 'reading' a communication board. The latter was felt to result in the loss of time dependent messages (such as quips of humour) which increase the intimacy of the communicative interaction (McMaster 1998). Users argued that the provision of voice output increased their independence and improved their ability to approach strangers and make friends. Additionally, voice output was credited with improving the confidence and self-image of users (Merchen 1998).

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The CATCH scale was based on the theoretical construct of attitudes having an affective, a behavioural and a cognitive (belief) component (Rosenbaum *et al.* 1996). However, factor analysis indicated that a two component model was more appropriate, namely affective/behavioural and cognitive. This is supported by the fact that one's intent to act is synonymous with one's emotion about the action (Rosenbaum *et al.* 1996). Likewise, factor analysis of the ATNP indicated two meaningful attitudinal factors, a *'general evaluation'* corresponding to the cognitive component, and the *'interactive/affective'* factor corresponding to the affective/behavioural component of the CATCH (Gorenflo & Gorenflo 1991).

The CATCH scale was developed to measure children's attitudes to 'handicapped peers' (Beck & Dennis 1996). The sensitivity of the CATCH scale to measure possible differences in peer

attitudes to children who use different AAC devices has been questioned (Beck and Dennis 1996).

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2.11 COMPARISON OF ATTITUDINAL STUDIES TO AAC USERS

For greater clarity and ease of comparison, particular objectives, methodological issues, research findings and recommendations of attitudinal studies toward AAC users are presented in Tables 2.1 and 2.2.

by Kraat (1987) who stated that in most of the interactive research studies of children using aided systems, the children communicated in a dyad with a staff member or caregiver.

- Providing information about the disabled, including those with LNFS. The results of an investigation into the significance of information and AAC technique on attitudes toward individuals with LNFS revealed that additional information concerning the individuals with LNFS had a positive effect on attitudes towards these individuals (Gorenflo & Gorenflo 1991).

- Enhancing positive values. Research studies have demonstrated that the use of high-technology AAC systems enhanced the image of AAC users who were rated as having higher intellectual functioning than previously judged (McCall, Markova, Moodie & Collins 1997). The use of more complex language (phrases versus single words) by an adult AAC user also resulted in a more favourable rating (Hoag, Bedrosian, Johnson & Molineux 1994).

2.5 CHILDREN'S ATTITUDES TO DISABLED PEERS

Children's attitudes to peers with disabilities are multidimensional with several factors having been identified as influencing these attitudes. The importance of the communication competence of children with disabilities, when status is assigned to them by their peers, has been highlighted (Horne 1985). Evidence that minor communication disorders of children result in negative peer attitudes is widespread. A single articulatory defect resulted in teenagers being regarded by peers as having a number of undesirable attributes as well as poor speech (Silverman & Paulus 1989). Voice disorders adversely affected adolescents' and peers' perceptions of specific physical and personality characteristics of children (Lass *et al.* 1991). Speakers with a lisp or stutter were subjected to negative stereotypical attitudes and behaviours and considered socially undesirable (Kalinowsky *et al.* 1991; McKinnon *et al.* 1986).

As it is evident that peers' attitudes to children with communication deficits are generally negative, information regarding the variables that affect peer perceptions of the communicative competence of children who use AAC is urgently required. These variables need to be experimentally verified in order to develop successful intervention strategies (Bedrosian, Hoag, Calculator & Molineux 1992). There is a need to determine whether peers rate a child who uses

an AAC device that produces speech (voice output) as more competent than a child who uses a low technological device with no voice output.

The role of the gender of the peers is also of interest to this study (Hoag *et al.* 1994). It is important to verify whether the finding that girls hold more favourable attitudes to disabled peers than boys (Fiedler & Simpson 1987; Rosenbaum, Armstrong & King 1986; Voeltz 1980), is also accurate for South African children.

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The interaction between AAC users and peers in terms of the number of communication partners and the status of the non-disabled individual influences the quality of communication. Insufficient interaction between children who use AAC and their peers is well documented as negatively affecting the formation of attitudes (Beukelman & Mirenda 1992; Goossens 1994; Kraat 1987; Lloyd, Fuller & Arvidson 1997). The majority of interactive research studies have described AAC users in interactions with a single partner as opposed to group interactions and with familiar as opposed to unfamiliar communication partners (Light 1988).

However, the effectiveness of the AAC intervention is determined by the child's ability to interact in natural daily environments. For children these include both the classroom and playground where, although some didactic interactions take place, many interactions are group-based. Children using AAC must function effectively from a social perspective if they are to become productive members of society (Light 1988). Research in this area is essential to determine which strategies and techniques contribute to communicative competence from both a personal and social perspective (Light 1988).

Speech output provides a greater range and increased flexibility of communication (Quist & Blischak 1992). Providing a way for the AAC user to gain attention, address groups, interrupt in a noisy environment, and communicate by phone or with a partner who is not literate, are examples of the ways in which a VOCA contributed to the communication competence of the individual with LNFS (Quist & Blischak 1992; Raghavendra & Allen 1993). Studies have also determined that VOCAs are particularly important to AAC users because they result in increased communication interactions in specific settings (Schepis & Reid 1995).

The use of a VOCA allowed an AAC user with severe disabilities to initiate requests that were clearly understood by personnel (Schepsis & Reid 1995). The increase in interactions was still apparent after a prolonged period (Schepsis & Reid 1995). Additional research is recommended to determine the effect of voice output on the attitudes and interactions of unfamiliar communication partners in various community environments (Schepsis & Reid 1995).

The importance of the communication partner or partners in determining the success or failure of the interactions of AAC users has been emphasised by many researchers (Bedrosian *et al.* 1992; Kraat 1987; Light 1988). In addition, the effects of the communicative behaviours, of both the AAC user and the partner, on the perceptions of 'other peers' in the environment must be considered (Bedrosian *et al.* (1992). This is particularly relevant to how the communicative competence of the AAC user is rated by the 'other peers'.

There is evidence that the communication device itself may have a significant effect on the attitude of the partner and his or her willingness to interact with the user (Bedrosian *et al.* 1992; Gorenflo & Gorenflo 1991; O'Keefe, Brown & Schuller 1998). The manner in which a device improves or diminishes the speaking partner's perception of the user is of special interest (Higginbotham 1989; Schepsis & Reid 1995). The use of computer (high) technology for communication has been found to affect the attitudes of peers positively, and in some way indicated greater intelligence of the user (Alm in Blockberger, Armstrong, O'Connor & Freeman 1993). Results of a study to assess the attitudes of undergraduate college students toward a peer with physical disabilities and LNFS indicated that as the communication technique became more sophisticated, evaluations of the peer with LNFS became more favourable (Gorenflo & Gorenflo 1991). Should the aided message be highly intelligible, reflect the intelligence, age and gender of the user as well as being socially appropriate, the user is more likely to be considered favourably by peers (O'Keefe *et al.* 1998). A high-technological AAC device with suitable voice output is most likely to meet these criteria.

2.7 THE IMPACT OF OUTPUT MEANS OF DEVICES ON ATTITUDES

Research findings on the impact of the output means of devices on the perceptions of speaking partners are contradictory. Careful consideration of the significant influence of output mode on peers is essential as the perceptions of speaking partners directly affect their attitudes to

device users and their intention to engage in conversational interactions with them. Attitude ratings by unfamiliar listeners were significantly lower when print output, as opposed to synthetic speech or LCD display, was used by the AAC users (Coxson & Mathy-Laikko 1983).

In contrast to the latter finding, when individuals with LNFS used communication boards compared to VOCAs, partners rated communication as faster and more readily understood. This was despite the fact that one of the subjects indicated that he preferred the voice output device as it increased his independence (Buzolich cited by Light 1988). It has also been noted that negative perceptions may result when devices that use synthetic speech are first introduced to unfamiliar partners (Mirenda, Eicher & Beukelman 1989). Research has shown that a VOCA allowed an adolescent AAC user more opportunities to interact with unfamiliar partners (Light, Beesley & Collier 1988).

Interaction patterns of adults with LNFS have been shown to vary as a function of the limitations and strengths of the specific AAC devices (Gorenflo & Gorenflo 1991; Light 1988). More favourable attitudes of non-disabled peers to an AAC user who used a VOCA were supported by research that compared three different systems: unaided voice and gestures; an alphabet board; and a VOCA (Gorenflo & Gorenflo 1991). The results of the latter study supported the hypothesis that attitudes were significantly more favourable toward an individual using a high technological device such as a VOCA and the researchers concluded that voice output independently had a positive effect on attitudes to persons with LNFS (Gorenflo & Gorenflo 1991). Researchers suggested that devices with voice output should be selected to increase favourable attitudes to AAC users and that variables such as the quality and type of synthetic voice should be further investigated to establish the effect of these variables on attitudes to AAC device users (Gorenflo & Gorenflo 1991).

Children and adults have also been shown to respond differently to output mode. Whereas children preferred computers with synthesised speech, even if it was less intelligible than recorded speech, adults preferred more natural sounding speech (Mirenda *et al.* 1989). Gender differences are also apparent, as female listeners have been shown to respond differently from male listeners (Mirenda *et al.* 1989). Both adult women and girls considered the gender appropriateness of speech output to be the prime factor for acceptability. Male listeners also favoured female voices for women and girls but were more flexible with respect to gender appropriateness for themselves (Mirenda *et al.* 1989).

Researchers, clinicians and users have shown increasing interest in the intelligibility and other features of the synthetic speech output of VOCAs (Bedrosian *et al.* 1992; Hoag & Bedrosian 1992; Kraat 1986; Mirenda *et al.* 1989). The rate and loudness, gender and age appropriateness of the synthetic speech all have a cumulative impact on the attitudes and reactions of unfamiliar and familiar partners (Mirenda *et al.* 1989). Researchers have also highlighted the importance of additional features of quality, prosody and the naturalness of the voice output in influencing the perceptions of the AAC user by listeners (O'Keefe *et al.* 1998).

2.8 CHILDREN'S ATTITUDES TO PEERS WHO USE AAC DEVICES

It is essential to explore the variables that influence peer attitudes to children with LNFS as results may well differ from those of adults and adolescents. Children's reactions to physical disabilities are reportedly not as differentiated as the reactions of adults (Blockberger *et al.* 1993). Research has indicated that children's attitudes to disabled peers have an age-related sequential pattern (Ryan in Morrison & Ursprung 1990). Children, aged 4 – 6 years, are generally found to be rejecting of peers with physical disabilities whereas older children, 7 – 10 years of age, are less rejecting (Morrison & Ursprung 1990). Different developmental influences, education and experience with disabled peers will affect the attitudes of individual children to disabled peers with LNFS.

The following two studies are closely related to the current study and are therefore presented in greater detail. Blockberger *et al.* (1993) conducted research to explore peer attitudes toward a child with LNFS. The purpose of their study was to ascertain whether the AAC technique used influenced the attitudes of the unfamiliar peers towards the child with disabilities and LNFS (Blockberger *et al.* 1993). The subject of their study, a nine-year old girl, was videotaped having a scripted conversation with a Speech Therapist using unaided AAC techniques, an alphabet board, and a VOCA. Participants, unfamiliar peers from nine different schools, viewed one of the three videotapes in their class groups before they completed the Chedoke-McMaster Attitudes Towards Children with Handicaps Scale (CATCH) (Blockberger *et al.* 1993).

The CATCH was developed in 1986 by Rosenbaum, Armstrong and King to provide a reliable measure for the study of attitudes of children aged 9 – 13 years, toward disabled peers (Rosenbaum *et al.*1987). The researchers expected to find that more favourable attitudes

would be evident towards the child using the more high technological aid, the VOCA, than to the child using the alphabet board or the unaided techniques (Blockberger *et al.* 1993). However, the AAC technique used had no impact on attitudes, as measured by the CATCH Blockberger *et al.* 1993).

The researchers suggested two possible directions for future research on the perceptions and initial attitudes by peers toward the child with LNFS: namely, consideration of the interaction between the AAC technique used and other factors e.g. the physical appearance of the user; and investigation into the effect of the AAC technique used on the actual behaviours of peers when interacting with a child with LNFS in natural settings (Blockberger *et al.* 1993).

Beck and Dennis (1996) investigated the attitudes of non-disabled children toward children who had disabilities and used AAC systems. The main focus of their research was whether self-reported attitudes of children without disabilities towards a child who uses AAC varied according to whether the child used an alphabet board or a VOCA. The participants in their study were randomly assigned to watch a videotape of a disabled child using either the non-electronic alphabet board or the VOCA. Participants then completed the CATCH. The results of the research by Beck and Dennis (1996) indicated that there was no difference in scores on the CATCH between those viewing the child using the alphabet board or the VOCA. Their data did not support the earlier research of Gorenflo & Gorenflo (1991) or their prediction that peers would view a child using a high-technology VOCA more positively than a child using the non-electronic alphabet board.

The results of the research did, however, support their hypothesis that girls would view the disabled peer more positively than boys. One possible explanation Beck & Dennis (1996) suggest for the fact that there was no discernible effect of the different AAC techniques on attitudes was that the CATCH might not be sensitive to these differences. They suggested that future research include the development of a scale designed to measure subtle differences in children's attitudes to AAC users (Beck & Dennis 1996).

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For greater clarity and ease of comparison, particular objectives, methodological issues, research findings and recommendations of attitudinal studies toward AAC users are presented in Tables 2.1 and 2.2.

2.12 SUMMARY

The anecdotal evidence of users, experience of clinicians and the research of Gorenflo & Gorenflo (1991) as well as Schepsis & Reid (1995) support the hypothesis that voice output will have a positive effect on the attitudes of peers to a disabled child who uses an AAC device.

Conversely, the research of Blockberger *et al.* (1993) and Beck & Dennis (1996) suggests the output mode of the AAC device used by a disabled child with LNFS was not associated with a difference in peer attitudes. Further research is thus required to determine the impact of voice output, as a characteristic of a child's AAC system, on the attitudes of unfamiliar peers.

The questionnaires used to determine adults' attitudes to AAC users (ATNP, the ATDP and the communication competence questionnaire of Bedrosian *et al.* 1992) were not considered to be totally suitable for use by children. Likewise, the sensitivity of the CATCH, which was developed for a more general purpose, was queried in terms of its suitability for differentiating attitudes towards various AAC techniques used by children. Thus, there is a need to develop a suitable tool to measure the attitudes of peers to a child with disabilities including LNFS, including measuring the peers' evaluation of the AAC user's communicative competence.

This investigation, therefore, also included an attempt to design an attitude scale to measure adequately any difference in attitudes toward children who are AAC users, dependent on the output mode of the devices used.

CHAPTER 2

THE IMPACT OF VOICE OUTPUT ON THE ATTITUDES OF PEERS

2.1 INTRODUCTION

It is universally accepted that attitudes determine with whom, about what, where and how individuals interact with others. This profound effect of attitudes on interactions highlights the need to determine the attitudes of non-disabled peers to the disabled, including those with LNFS.

In this chapter the important influence of peer attitudes on their behaviour and interaction with disabled children, including those with LNFS, is discussed. A theoretical model of attitudes, the ABC model, is presented. This is followed by a discussion on the negative influence of stereotypical attitudes and on strategies to reduce stereotyping. The significance of communication partners and the interaction patterns of AAC users with peers are discussed.

The research findings on the impact of the output means of AAC devices, including voice output, are described and compared. A summary of conflicting research findings with respect to the influence of the output mode of devices, specifically voice output, is presented. The chapter concludes with an evaluation of the attitude scales used by previous researchers to compare peer attitudes to children using various AAC devices. The necessity for the development of a new measure is highlighted.

2.2 ATTITUDES TO THE DISABLED

Extensive research findings substantiate generally negative attitudes toward disabled persons as well as the modification of the social behaviour of non-disabled when in the presence of disabled peers (Bender 1980; Fiedler & Simpson 1987; King, Rosenbaum, Armstrong & Milner 1989; Warrick 1988). More specifically, negative attitudes of non-disabled children to peers with speech disorders were found to be prevalent (McKinnon, Hess & Landry 1986; Lass, Ruscello, Bradshaw & Blankenship 1991; Kalinowski, Lerman & Watt 1991; Williams & Dietrich 1996). Attitudes of children to the disabled are often culturally derived, therefore, learned and

stereotypic. Modified social behaviours include reduced eye contact, shortened interaction time and decreased verbal communication. These attitudes and resultant behaviours are barriers to peers' communication with children who have disabilities. There is a need to understand how attitudes can be made more positive in order to facilitate positive interaction.

2.3 THE EFFECT OF ATTITUDES ON BEHAVIOUR

Attitudes influence behaviour. They predispose adults and children to respond to a person, object, situation or abstract issue in a favourable or unfavourable way. The ABC model of attitudes provides a theoretical construct appropriate to an understanding of children's attitudes to peers who are users of AAC devices. The model suggests that any attitude has three interrelated elements, namely an affective, a behavioural and a cognitive component (Feldman 1993). The affective component comprises the emotional feeling, whether positive or negative, the behavioural component is the predisposition to act in a way that is relevant to an attitude, and the cognitive component refers to the thoughts and beliefs relative to the attitude. Every attitude an individual has consists of all three components but in varying degrees of prevalence (Feldman 1993). Whereas individuals are always aware of the opinions they hold which are more specific and factually based, attitudes, of which an individual may not be fully conscious, are essentially revealed by behavioural responses to a person, situation or issue (Aitkin 1996).

Although the potency of the link between an attitude and the resultant behaviour does vary, people generally endeavour to maintain consistency between their attitudes and behaviour, which form a logical behavioural framework (Feldman 1993). Researchers in the field of social cognition – the study of the mental processes by which we understand, process information, and make judgements and decisions about our social world – have determined that adults and children develop complex schemas about people and social experiences. These schemas regulate information and memories and provide a framework for categorising and interpreting social stimuli (Feldman 1993).

Individuals typically have schemas for different people in their environment and they organise, recall and even predict what others are like on the basis of relatively little information. Vocal characteristics strongly influence the opinion and reaction of peers to one another (McKinnon *et al.* 1986). Because individuals tend to fit people into schemas even when there is little definite evidence to do so, inaccurate and oversimplified understanding of others results. Unfortunately,

therefore, although schemas can be helpful in assisting individuals to organise their social world, they have a negative side – stereotyping (Feldman 1993).

A stereotype is a schema in which beliefs and expectations about members of a group are held simply on the basis of their membership of that group. Individuals tend to hold less favourable opinions about groups to which they do not belong and more positive opinions about groups to which they do belong. This is referred to as ingroup-outgroup bias. It is for this reason that individuals develop negative attitudes to minority groups, including the disabled (Wilder in Feldman (1993). When individuals act on their stereotypes, negative consequences result including changed social behaviour, prejudice and discrimination. It is widely recognised that society's rejecting attitudes to people with disabilities result in restricted social, educational and vocational opportunities for people with disabilities.

2.4 STRATEGIES TO REDUCE STEREOTYPING

Techniques and strategies to reduce the negative effects of stereotyping and negative attitudes towards the disabled by peers have been extensively researched (Donaldson 1980; Gorenflo & Gorenflo 1991; Horne 1985; Kraat 1986; Towfighy-Hooshyar & Zingle 1984; Voeltz 1980). The following have been found to be effective:

- Increasing the quality and length of contact between the disabled and peers in non-threatening environments. Mere exposure to disabled children is not effective in improving peer attitudes as contact has to be interactive and to extend over a prolonged period (Armstrong, Rosenbaum & King 1987). In a study using an attitudinal questionnaire, non-disabled children attending integrated schools and who were more familiar with disabled children were found to have more positive attitudes towards a disabled peer with LNFS than children going to non-integrated schools (Beck & Dennis 1996).

- Interactions where individuals are of equal status, or are required to co-operate, or are dependent on one another, reduce stereotyping (Feldman 1993). Studies of AAC users seldom describe communication between individuals of equal status. Generally, the partners described were familiar to the AAC user and the social relationships of the dyad were usually asymmetric, with the partner being of a higher status (Light 1988). In the school setting, children using AAC are rarely described interacting with their peers, interactions taking place mainly with teachers (Harris 1982). This contention is confirmed

by Kraat (1987) who stated that in most of the interactive research studies of children using aided systems, the children communicated in a dyad with a staff member or caregiver.

- Providing information about the disabled, including those with LNFS. The results of an investigation into the significance of information and AAC technique on attitudes toward individuals with LNFS revealed that additional information concerning the individuals with LNFS had a positive effect on attitudes towards these individuals (Gorenflo & Gorenflo 1991).

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The interaction between AAC users and peers in terms of the number of communication partners and the status of the non-disabled individual influences the quality of communication. Insufficient interaction between children who use AAC and their peers is well documented as negatively affecting the formation of attitudes (Beukelman & Mirenda 1992; Goossens 1994; Kraat 1987; Lloyd, Fuller & Arvidson 1997). The majority of interactive research studies have described AAC users in interactions with a single partner as opposed to group interactions and with familiar as opposed to unfamiliar communication partners (Light 1988).

However, the effectiveness of the AAC intervention is determined by the child's ability to interact in natural daily environments. For children these include both the classroom and playground where, although some didactic interactions take place, many interactions are group-based. Children using AAC must function effectively from a social perspective if they are to become productive members of society (Light 1988). Research in this area is essential to determine which strategies and techniques contribute to communicative competence from both a personal and social perspective (Light 1988).

Speech output provides a greater range and increased flexibility of communication (Quist & Blischak 1992). Providing a way for the AAC user to gain attention, address groups, interrupt in a noisy environment, and communicate by phone or with a partner who is not literate, are examples of the ways in which a VOCA contributed to the communication competence of the individual with LNFS (Quist & Blischak 1992; Raghavendra & Allen 1993). Studies have also determined that VOCAs are particularly important to AAC users because they result in increased communication interactions in specific settings (Schepis & Reid 1995).

The use of a VOCA allowed an AAC user with severe disabilities to initiate requests that were clearly understood by personnel (Schepsis & Reid 1995). The increase in interactions was still apparent after a prolonged period (Schepsis & Reid 1995). Additional research is recommended to determine the effect of voice output on the attitudes and interactions of unfamiliar communication partners in various community environments (Schepsis & Reid 1995).

The importance of the communication partner or partners in determining the success or failure of the interactions of AAC users has been emphasised by many researchers (Bedrosian *et al.* 1992; Kraat 1987; Light 1988). In addition, the effects of the communicative behaviours, of both the AAC user and the partner, on the perceptions of 'other peers' in the environment must be considered (Bedrosian *et al.* (1992). This is particularly relevant to how the communicative competence of the AAC user is rated by the 'other peers'.

There is evidence that the communication device itself may have a significant effect on the attitude of the partner and his or her willingness to interact with the user (Bedrosian *et al.* 1992; Gorenflo & Gorenflo 1991; O'Keefe, Brown & Schuller 1998). The manner in which a device improves or diminishes the speaking partner's perception of the user is of special interest (Higginbotham 1989; Schepsis & Reid 1995). The use of computer (high) technology for communication has been found to affect the attitudes of peers positively, and in some way indicated greater intelligence of the user (Alm in Blockberger, Armstrong, O'Connor & Freeman 1993). Results of a study to assess the attitudes of undergraduate college students toward a peer with physical disabilities and LNFS indicated that as the communication technique became more sophisticated, evaluations of the peer with LNFS became more favourable (Gorenflo & Gorenflo 1991). Should the aided message be highly intelligible, reflect the intelligence, age and gender of the user as well as being socially appropriate, the user is more likely to be considered favourably by peers (O'Keefe *et al.* 1998). A high-technological AAC device with suitable voice output is most likely to meet these criteria.

2.7 THE IMPACT OF OUTPUT MEANS OF DEVICES ON ATTITUDES

Research findings on the impact of the output means of devices on the perceptions of speaking partners are contradictory. Careful consideration of the significant influence of output mode on peers is essential as the perceptions of speaking partners directly affect their attitudes to

device users and their intention to engage in conversational interactions with them. Attitude ratings by unfamiliar listeners were significantly lower when print output, as opposed to synthetic speech or LCD display, was used by the AAC users (Coxson & Mathy-Laikko 1983).

In contrast to the latter finding, when individuals with LNFS used communication boards compared to VOCAs, partners rated communication as faster and more readily understood. This was despite the fact that one of the subjects indicated that he preferred the voice output device as it increased his independence (Buzolich cited by Light 1988). It has also been noted that negative perceptions may result when devices that use synthetic speech are first introduced to unfamiliar partners (Mirenda, Eicher & Beukelman 1989). Research has shown that a VOCA allowed an adolescent AAC user more opportunities to interact with unfamiliar partners (Light, Beesley & Collier 1988).

Interaction patterns of adults with LNFS have been shown to vary as a function of the limitations and strengths of the specific AAC devices (Gorenflo & Gorenflo 1991; Light 1988). More favourable attitudes of non-disabled peers to an AAC user who used a VOCA were supported by research that compared three different systems: unaided voice and gestures; an alphabet board; and a VOCA (Gorenflo & Gorenflo 1991). The results of the latter study supported the hypothesis that attitudes were significantly more favourable toward an individual using a high technological device such as a VOCA and the researchers concluded that voice output independently had a positive effect on attitudes to persons with LNFS (Gorenflo & Gorenflo 1991). Researchers suggested that devices with voice output should be selected to increase favourable attitudes to AAC users and that variables such as the quality and type of synthetic voice should be further investigated to establish the effect of these variables on attitudes to AAC device users (Gorenflo & Gorenflo 1991).

Children and adults have also been shown to respond differently to output mode. Whereas children preferred computers with synthesised speech, even if it was less intelligible than recorded speech, adults preferred more natural sounding speech (Mirenda *et al.* 1989). Gender differences are also apparent, as female listeners have been shown to respond differently from male listeners (Mirenda *et al.* 1989). Both adult women and girls considered the gender appropriateness of speech output to be the prime factor for acceptability. Male listeners also favoured female voices for women and girls but were more flexible with respect to gender appropriateness for themselves (Mirenda *et al.* 1989).

Researchers, clinicians and users have shown increasing interest in the intelligibility and other features of the synthetic speech output of VOCAs (Bedrosian *et al.* 1992; Hoag & Bedrosian 1992; Kraat 1986; Mirenda *et al.* 1989). The rate and loudness, gender and age appropriateness of the synthetic speech all have a cumulative impact on the attitudes and reactions of unfamiliar and familiar partners (Mirenda *et al.* 1989). Researchers have also highlighted the importance of additional features of quality, prosody and the naturalness of the voice output in influencing the perceptions of the AAC user by listeners (O'Keefe *et al.* 1998).

2.8 CHILDREN'S ATTITUDES TO PEERS WHO USE AAC DEVICES

It is essential to explore the variables that influence peer attitudes to children with LNFS as results may well differ from those of adults and adolescents. Children's reactions to physical disabilities are reportedly not as differentiated as the reactions of adults (Blockberger *et al.* 1993). Research has indicated that children's attitudes to disabled peers have an age-related sequential pattern (Ryan in Morrison & Ursprung 1990). Children, aged 4 – 6 years, are generally found to be rejecting of peers with physical disabilities whereas older children, 7 – 10 years of age, are less rejecting (Morrison & Ursprung 1990). Different developmental influences, education and experience with disabled peers will affect the attitudes of individual children to disabled peers with LNFS.

The following two studies are closely related to the current study and are therefore presented in greater detail. Blockberger *et al.* (1993) conducted research to explore peer attitudes toward a child with LNFS. The purpose of their study was to ascertain whether the AAC technique used influenced the attitudes of the unfamiliar peers towards the child with disabilities and LNFS (Blockberger *et al.* 1993). The subject of their study, a nine-year old girl, was videotaped having a scripted conversation with a Speech Therapist using unaided AAC techniques, an alphabet board, and a VOCA. Participants, unfamiliar peers from nine different schools, viewed one of the three videotapes in their class groups before they completed the Chedoke-McMaster Attitudes Towards Children with Handicaps Scale (CATCH) (Blockberger *et al.* 1993).

The CATCH was developed in 1986 by Rosenbaum, Armstrong and King to provide a reliable measure for the study of attitudes of children aged 9 – 13 years, toward disabled peers (Rosenbaum *et al.*1987). The researchers expected to find that more favourable attitudes

would be evident towards the child using the more high technological aid, the VOCA, than to the child using the alphabet board or the unaided techniques (Blockberger *et al.* 1993). However, the AAC technique used had no impact on attitudes, as measured by the CATCH Blockberger *et al.* 1993).

The researchers suggested two possible directions for future research on the perceptions and initial attitudes by peers toward the child with LNFS: namely, consideration of the interaction between the AAC technique used and other factors e.g. the physical appearance of the user; and investigation into the effect of the AAC technique used on the actual behaviours of peers when interacting with a child with LNFS in natural settings (Blockberger *et al.* 1993).

Beck and Dennis (1996) investigated the attitudes of non-disabled children toward children who had disabilities and used AAC systems. The main focus of their research was whether self-reported attitudes of children without disabilities towards a child who uses AAC varied according to whether the child used an alphabet board or a VOCA. The participants in their study were randomly assigned to watch a videotape of a disabled child using either the non-electronic alphabet board or the VOCA. Participants then completed the CATCH. The results of the research by Beck and Dennis (1996) indicated that there was no difference in scores on the CATCH between those viewing the child using the alphabet board or the VOCA. Their data did not support the earlier research of Gorenflo & Gorenflo (1991) or their prediction that peers would view a child using a high-technology VOCA more positively than a child using the non-electronic alphabet board.

The results of the research did, however, support their hypothesis that girls would view the disabled peer more positively than boys. One possible explanation Beck & Dennis (1996) suggest for the fact that there was no discernible effect of the different AAC techniques on attitudes was that the CATCH might not be sensitive to these differences. They suggested that future research include the development of a scale designed to measure subtle differences in children's attitudes to AAC users (Beck & Dennis 1996).

2.9 AAC USERS' ATTITUDES TO VOICE OUTPUT

The views of AAC users, on whether voice output has an effect on their interactions with others, were elicited by the researcher through the medium of the ACOLUG listserve on the Internet. Significantly, only responses validating the positive influence of voice output were received. AAC users cited definite advantages of voice output in terms of increased opportunities for interaction as well as positive effects on interactions. They expressed the fact that having a disability and LNFS led to extreme isolation and that voice output provided a natural, typical means of communication that had advantages over other methods of augmented communication such as the use of communication boards (Spivey 1998; Merchen 1998). The disadvantages of using communication boards, without voice output, were that potential communication partners needed to recognise, know, understand and even facilitate the use of the communication system being used (Spivey 1998).

The tendency of people to avoid situations they did not know or understand increased isolation of the person using an unfamiliar AAC system and the lack of voice output of communication boards was reflected as a restriction in communication with peers. Provision of voice output was described as being the most meaningful and functional form of AAC (McMaster 1998; Spivey 1998).

The provision of a voice output device was credited with allowing users to develop deeper, richer relationships with both familiar communication partners and unfamiliar people in the community. Voice output was perceived as allowing the users to express their personalities and their sense of humour (McMaster 1998; Merchen 1998). Additional benefits listed included the ability to communicate with people in another room, with the visually impaired and with the very young. The ease and immediacy of the partner to receive a message via voice output was compared to the effort and time involved in a partner 'reading' a communication board. The latter was felt to result in the loss of time dependent messages (such as quips of humour) which increase the intimacy of the communicative interaction (McMaster 1998). Users argued that the provision of voice output increased their independence and improved their ability to approach strangers and make friends. Additionally, voice output was credited with improving the confidence and self-image of users (Merchen 1998).

2.10 THE MEASUREMENT OF ATTITUDES

Attitudes are difficult to measure accurately and researchers have developed and employed many different techniques in attempting to quantify attitudinal responses. Semantic differential scales composed of a varied number of bipolar adjective pairs have been used extensively in research related to speech and communication (McKinnon *et al.* 1986; Lass, Ruscello & Lakawitcz 1988; Lass *et al.* 1991; Kalinowski *et al.* 1991; Silverman & Paulus 1996 and Williams & Dietrich 1996). With sequential differential scales, research participants mark one of an unequal number of points along an assumed equal-interval scale to best describe a trait of the subject under evaluation. This involves a strongly judgmental process to elicit connotative evaluations of participants. Numbers of items included in scales varied from as few as nine trait pairs in the Williams & Dietrich (1996) study to as many as 81 in the Silverman & Paulus (1989) study. Wording of adjective pairs varied from simple e.g. dirty-clean, sad-happy, poor-rich, bad-good to complex e.g. soothing-aggravating, realistic-idealistic, dominant-submissive (Lass *et al.* 1991; Silverman & Paulus 1989).

Researchers studying the perceptions and attitudes of adults and children toward AAC users have used Likert-type attitudinal questionnaires and rating scales. (Hoag *et al.* 1994; Bedrosian *et al.* 1992; Beck & Dennis 199; Gorenflo & Gorenflo 1991; Gorenflo & Gorenflo 1997). The following two attitudinal scales were used with adults: The Attitudes Toward Nonspeaking Persons Scale (ATNP) and The Attitudes Towards Disabled Persons Scale (ATDP), while the CATCH scale was used with children.

The CATCH scale was based on the theoretical construct of attitudes having an affective, a behavioural and a cognitive (belief) component (Rosenbaum *et al.* 1996). However, factor analysis indicated that a two component model was more appropriate, namely affective/behavioural and cognitive. This is supported by the fact that one's intent to act is synonymous with one's emotion about the action (Rosenbaum *et al.* 1996). Likewise, factor analysis of the ATNP indicated two meaningful attitudinal factors, a *'general evaluation'* corresponding to the cognitive component, and the *'interactive/affective'* factor corresponding to the affective/behavioural component of the CATCH (Gorenflo & Gorenflo 1991).

The CATCH scale was developed to measure children's attitudes to 'handicapped peers' (Beck & Dennis 1996). The sensitivity of the CATCH scale to measure possible differences in peer

attitudes to children who use different AAC devices has been questioned (Beck and Dennis 1996).

The questionnaire used by Bedrosian *et al.* (1992) was developed specifically to assess the perceived communicative competence of AAC users. The final questionnaire, a Likert-type scale, consisted of 30 items which was used with adults (Bedrosian *et al.* 1992; Hoag & Bedrosian 1992; Hoag *et al.* 1994).

2.11 COMPARISON OF ATTITUDINAL STUDIES TO AAC USERS

For greater clarity and ease of comparison, particular objectives, methodological issues, research findings and recommendations of attitudinal studies toward AAC users are presented in Tables 2.1 and 2.2.

Table 2.1 Comparison of Objectives, Participants and Research Subjects of Attitudinal Studies to AAC users.

STUDIES	OBJECTIVES	VIDEOTAPE PARTICIPANTS	RESEARCH SUBJECTS
The effects of Information and AAC technique on attitudes toward Non-speaking Individuals. **Gorenflo & Gorenflo (1991).**	1. To determine the effect of 3 communication techniques viz. unaided, alphabet board & VOCA on the attitudes of nondisabled to disabled 2. To measure the effects of information on attitudes of nondisabled to disabled	1. Male, 22 year old, CP quadriplegic with LNFS 2. Female 23 year old SLP graduate student	151 undergraduate psychology students: 78 male and 73 female
Variables Influencing Perceptions of communicative competence of an adult AAC user. **Bedrosian *et al.* (1992).**	1. To examine effect of aided message length on perceptions of communicative competence 2. To assess the effect of re-auditorization on perceptions of communicative competence 3. To determine the effect of observer background on perceptions of communicative competence.	1. Male actor played part of a C.P. adult AAC user 2. Male actor played part of nondisabled friend of AAC user.	Group 1- 24 naïve adults, aged 22 -65 yrs 9 male 15 female Group 2 - 24 SLP's aged 24 -47yrs 4 male 20 female
Effects of Speech Output Type, Message Length and Reauditorization on perceptions of communicative competence of an Adult AAC user. **Hoag & Bedrosian (1992).**	1. To examine the effect of speech output type on perceptions of communicative competence 2. To determine the effect of aided message length on perceptions of communicative competence. 3.To assess the effect of re-auditorization by the partner on perceptions of communicative competence.	1. Male actor, in wheelchair played role of AAC user 2. Male actor played role of nondisabled friend of AAC user. (As for above study)	48 naïve non-disabled adults, aged 20 - 65 yrs 19 male 29 female
Variables affecting perceptions of Social aspects of the communicative competence of an adult AAC user. **Hoag *et al.* (1994).**	1. To examine the effect of aided message length on perceptions of social aspects of communicative competence 2. To determine the effect of re-auditorization by partner on perceptions of social aspects of communicative competence 3. Assess the effect of observer experience with AAC users on perceptions of social aspects of communicative competence	1. Male actor, in wheelchair played role of AAC user 2. Male actor played role of nondisabled friend of AAC user. (As for Bedrosian *et al.* 1992 study)	Group 1- 24 naïve adults, aged 22 -65, 9 male 15 female Group 2 - 24 SLP's aged 24 -47years, 4 male 20 female (As for Bedrosian *et al.* 1992 study)
Children's attitudes toward a nonspeaking child using various AAC techniques. **Blockberger *et al.* (1993).**	1. To determine if children's attitudes to a peer varied depending on whether the disabled peer used an unaided system, alphabet board or VOCA.	1. A 9 year 1month old girl who is CP and uses AAC 2. Adult female SLP	249 Grade 4 pupils, aged 9.06 - 10.89 yrs., 124 male 125 female
Attitudes of Children toward a similar-aged child who uses augmentative communication. **Beck & Dennis (1996).**	1. To determine if peer attitudes to a disabled AAC user differ depending on whether the school attended integrates disabled pupils 2. To determine whether peer attitudes differ depending on whether a alphabet board or VOCA are used by the AAC user. 3. To assess whether attitudes differ as a function of the gender of the peers	1. A 13 year old boy who is C.P. and an AAC user 2. An adult female SLP	186 Fifth Grade pupils, 106 boys 80 girls

Table 2.2 Comparison of Attitude Scales, Research Findings and Recommendations of Attitudinal Studies to AAC users.

STUDIES	MEASURING INSTRUMENTS	RESEARCH FINDINGS AND RECOMMENDATIONS
The effects of Information and AAC technique on attitudes toward Non-speaking Individuals. **Gorenflo & Gorenflo (1991).**	ATNP- Attitude Toward Non-speaking Persons Scale. 29 items 5 point Likert-type scale	1. Attitudes are significantly more positive towards a disabled person using a VOCA. 2. Additonal information on the AAC user effected more favourable attitudes. 3. Information & technique both affected general evaluative attitudes but technique alone positively affected atitudes toward interaction with the user. 4. Future research to determine which AAC device variables affect attitudes.
Variables Influencing Perceptions of communicative competence of an adult AAC user. **Bedrosian *et al.* (1992).**	Devised own questionnaire 30 items 5 point Likert-type scale	1. The use of phrases (as opposed to words) had a positive effect on the ratings of the SLPs but not the naïve viewers. 2.The partner conversational variable of re-auditorization failed to influence perceptions of communicative competence. 3. Naïve adults rated the AAC users as being more competent than did the SLPs who used more stringent criteria due to their experience with AAC.
Effects of Speech Output Type, Message Length and Reauditorization on Perceptions of the Communicative Competence of an Adult AAC user. **Hoag & Bedrosian (1992).**	Questionnaire as for above study. 30 items 5 point Likert-type scale	1. Regardless of speech output type (digitised/synthetic) or re-auditorization naïve observers rated the AAC user more competent when he used phrases as opposed to words. 2. Aided message length thus resulted in a simple main effect of a more favourable rating of communicative competence by naïve viewers. 3. Utterance intelligibility contributes positively to an assessment of communicative competence, but is not equivalent to it, or assessed in the same way.
Variables affecting perceptions of Social aspects of the communicative competence of an adult AAC user. **Hoag *et al.* (1994).**	13 selected items from the questionnaire of the Bedrosian *et al* .study 1992 5 point Likert-type scale	1. Longer message length by the AAC user resulted in a more favourable rating of social competence by the naïve viewers 2. Reauditoization failed to have an impact on subjects ratings 3. The SLPs rated the user lower on certain aspects such as attention management, conversational breakdown and his level of participation. 4. The interpretation of 3rd party evaluations on AAC interactions must be viewed with caution. Attitudes obtained in this way may indicate an appreciation of the AAC user's abilities without the willingness to engage an AAC user in conversational interaction.
Children's attitudes toward a nonspeaking child using various AAC techniques. **Blockberger *et al.* (1993).**	Chedoke-McMaster Attitudes toward Children with Handicaps Scale (CATCH) 36 items 5 point Likert-type scale	1. The AAC technique had no discernible immediate impact on attitudes. 2. The researchers suggested the cause for the above finding was that children's reactions to disabilities are less differentiated than those of adults. 3. Girls had more positive attitudes to the AAC user than boys. 4. Subject s who reported that they interact with disabled peers had more favourable attitudes to the disabled AAC user. 5. Subjects with higher reading comprehension ability also had more positive attitudes to the AAC user.
Attitudes of Children toward a similar-aged child who uses augmentative communication. **Beck and Dennis (1996).**	CATCH scale.	1. The type of AAC aid showed no effect on attitude scores. 2. Girls had more favourable attitudes to the AAC user than boys. 3. Children attending schools where disabled were integrated had more positive attitudes. 4. Researchers suggest the CATCH may not be sensitive to differences in children's responses to the type of aid used. 5. Researchers recommend the development of an attitude scale designed to detect differences in peer attitudes to AAC users. 6.Design and evaluation of programmes to facilitate peer/AAC user interaction.

2.12 SUMMARY

The anecdotal evidence of users, experience of clinicians and the research of Gorenflo & Gorenflo (1991) as well as Schepsis & Reid (1995) support the hypothesis that voice output will have a positive effect on the attitudes of peers to a disabled child who uses an AAC device.

Conversely, the research of Blockberger *et al.* (1993) and Beck & Dennis (1996) suggests the output mode of the AAC device used by a disabled child with LNFS was not associated with a difference in peer attitudes. Further research is thus required to determine the impact of voice output, as a characteristic of a child's AAC system, on the attitudes of unfamiliar peers.

The questionnaires used to determine adults' attitudes to AAC users (ATNP, the ATDP and the communication competence questionnaire of Bedrosian *et al.* 1992) were not considered to be totally suitable for use by children. Likewise, the sensitivity of the CATCH, which was developed for a more general purpose, was queried in terms of its suitability for differentiating attitudes towards various AAC techniques used by children. Thus, there is a need to develop a suitable tool to measure the attitudes of peers to a child with disabilities including LNFS, including measuring the peers' evaluation of the AAC user's communicative competence.

This investigation, therefore, also included an attempt to design an attitude scale to measure adequately any difference in attitudes toward children who are AAC users, dependent on the output mode of the devices used.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

The focus of this study has been the question of whether the variable of speech output, as a feature of the output mode of a communication device, has an effect on the attitudes of unfamiliar peers. In this chapter the research methodology used in the study is discussed. The aims of the study are identified first, followed by an analysis of the research design. A brief description of the pilot study, including the results and recommendations, is presented. Finally, the main study is described according to the subjects, the material and equipment used, the ethical issues, the data collection procedures and the data analysis and statistical procedures utilised. The Communication aid/Device Attitude Questionnaire (CADAQ) scale developed by the researcher is discussed in detail within the description of materials and equipment used.

3.2 AIMS

3.2.1 Primary aim

The primary aim of the study was to investigate whether the type of augmentative communication output technique, specifically voice output, had an effect on the attitudes of children, 11 – 13 years years of age, toward disabled peers with LNFS.

3.2.2 Sub-aims

The sub-aims of this study were:

- To determine the attitudes of children to a peer with physical disabilities and LNFS who uses an alphabet board without voice output.
- To determine the attitudes of children to a peer with physical disabilities and LNFS who uses a communication device with voice output.
- To determine whether the attitudes of boys differed from girls towards a peer with physical disabilities and LNFS who uses an AAC system.
- To establish the internal consistency of the measurement scale, the CADAQ.

3.3 RESEARCH DESIGN

A descriptive survey design was used to compare children's responses to a peer, with physical disabilities and LNFS, depending on whether the peer used an AAC device with voice output or not. The research participants were divided into two groups and exposed to different videotapes of the child with LNFS. Group 1 viewed videotape A in which the child used the device with voice output and Group 2 viewed videotape B in which there was no voice output.

The research procedure required the careful preparation of videotaped recordings of a sample of conversational interaction between a child with physical disabilities and LNFS and a friend. Videotape A showed the child using a VOCA, adapted to resemble an alphabet communication board and with synthetic speech output. Videotape B was a copy of Videotape A, without the synthetic speech output. This strategy resulted in identical visual and conversational content, which effectively eliminated many possible variables.

The research participants, unfamiliar peers aged 11 – 13 years, were considered a homogenous group and class groups were randomly assigned to either Group A or Group B. This was to ensure that the groups were comparable in terms of age, gender, academic achievement and exposure to children with disabilities including LNFS. The groups needed to be comparable in terms of these variables as previous research into attitudes of children to peers with disabilities had shown that these factors influenced children's attitudes to peers with disabilities.

A second requirement of the research was the development of a questionnaire, the CADAQ, to measure the attitudes of unfamiliar peers aged 11 – 13 years, toward a child with disabilities and LNFS. The questionnaire was structured to be sensitive to differences in children's attitudinal responses to different types of AAC devices. Forty items were selected to be field tested in the pilot study. Items that were problematic were deleted and the final questionnaire consisted of 37 items. The research participants completed the questionnaires after they had viewed the designated videotape for their group.

3.4 PILOT STUDY

3.4.1 Objective of the pilot study

The objective of the pilot study was to identify any potential problems in terms of the practicality or feasibility of the proposed research, including:

- any difficulties the participants may have with the language or vocabulary of the questionnaire statements
- any difficulties experienced by the participants in understanding the instructions
- whether the estimated time was adequate
- the suitability of the videotapes
- the coding and scoring of the questionnaires.

3.4.2 Pilot study subjects

Participants consisted of equal numbers of boys and girls aged between 11 years 0 months and 13 years 6 months from Grades 6 and 7 at a co-educational (girls and boys) English medium, Senior Primary school situated in the Inner West Municipal area of Durban, KwaZulu-Natal, South Africa. These subjects were selected to ensure similar educational, home language, socio-economic and geographical status as the main study subjects. This was done to facilitate the identification of possible difficulties, as the pilot study subjects would have a similar understanding of questionnaire statements to the research participants.

3.4.3. Pilot study procedures

The procedures as given for the main study were followed.

3.4.4 Pilot study results and recommendations

The results and recommendations following completion of the pilot study are presented in Table 3.1, in addition to the objectives, materials used and procedures.

Table 3.1: Objectives, Materials Used, Procedures, Results and Recommendations of the Pilot Study

OBJECTIVES	MATERIALS USED	PROCEDURES	RESULTS	RECOMMENDATIONS
1. To identify any difficulties with the language or vocabulary.	CADAQ	Subjects were encouraged to question any word they did not understand. Teachers were requested to check whether language and vocabulary were appropriate.	No questions were raised during the presentation. In discussion pupils were able correctly to define terms such as communication & frustration.	That the wording of the statements not be altered for the main study. No changes of vocabulary were indicated.
2. To determine if instructions were readily understood especially by the second language learners.	Instructions prior to screening of videotape. Instructions prior to completing CADAQ.	The Principal introduced the researcher and stressed the importance of correct answers. Subjects had to confirm whether instructions were understood.	Possible influence on pupil to give socially correct answer rather than their own view. Subjects understood instructions.	That a short introduction be prepared to achieve conformity between groups and to ensure participants give own views. No change to instructions. Researcher to memorise these to avoid reading them.
3. To determine whether estimated time was adequate.	Videotapes CADAQ	Researcher to time each phase of the procedure. Careful observation of subjects to determine time required for completing each statement. Determine time required for discussion and question time.	Initial trial items took longer than expected. It was necessary to proceed at the pace of the slower subjects. Some subjects noted to proceed ahead. Far exceeded time allocated for discussion and questions at end.	That more time be allocated to allow for clarity on trial items. Main study subjects to be requested not to work on ahead. Two questions (paraphrased items) to be eliminated to shorten questionnaire. In discussion with teachers the discussion time was extended.
4. To evaluate the suitability of the videotapes.	Videotapes	Observation of pilot study subjects during viewing. Evaluate pupils' questions. Discussion with teachers.	Background noises on tapes was evident and distracting. All letters not clearly in focus. Conversation lacked flow. Pupils questioned whether child in video was "real".	That videotape be re-filmed in quieter environment to prevent extraneous noises and to ensure all letters in focus. Film continuous extract of conversation to prevent disruptive effects of editing. Video to include short introductory view of child from front so that pupils would not doubt the existence of the child
5. To evaluate the coding of the CADAQ.	CADAC	The questionnaires were scored.	There were two possible interpretations for responses to the statement "I feel sorry for Alan" in that the agree or disagree could both indicate positive attitudes.	That this statement be eliminated from the final questionnaire.

3.4.5 Summary

Following the pilot study the videotapes were re-filmed, and three statements deleted from the questionnaire. The order of some of the statements was changed to ensure that rephrased pairs were widely spaced. (See Appendix A for the questionnaire as used in the pilot study).

3.5 MAIN STUDY

3.5.1 Sampling strategy

Purposive sampling, a non-probability sampling procedure, was utilised by the study (Dooley 1995) as the subjects were selected according to their age and grade level as well as for reasons of geographical convenience. This was in accordance with the characteristic of a descriptive survey that the population must be deliberately chosen, precisely defined and explicitly circumscribed to ensure precise parameters (Leedy 1985).

Four class groups, two Grade 6 and two Grade 7 classes, were selected by the Head of the Grade 7 Department at the school to take part in the study. One Grade 6 and one Grade 7 class were combined to form Group 1. The remaining classes (the other Grade 6 and Grade 7 class) were combined to form Group 2 of the study. The two groups were considered by the teachers and Head of Grade 7 to be comparable in terms of the range of ages, academic performance and understanding of spoken English. Classes also consisted of near equal numbers of girls and boys.

Although the pupils in these groups were not randomly selected from the total population of all the Grade 6 and 7 pupils in the school, the teachers and the head of Grade 7 considered them to be sufficiently representative of the Grade 6 and 7 pupils for the purpose of this study.

3.5.2. Subject selection criteria

The subjects were selected according to the following criteria:

- Age: Pupils aged between 11 years 0 months and 13 years 6 months. This age was chosen as the child with disabilities and LNFS in the videotape was 13 years 1 month at

the time of filming. Other pupils, also unfamiliar peers, had rated a photograph of this child as being between 11 – 12 years of age. He would, therefore, be accepted as a peer.

- Grade Level: Pupils in Grades 6 or 7. Pupils in these grades would normally fall within the selected age criteria.

- Parental Consent: Only pupils who had submitted a signed consent form from their parents to take part in the study were included. This constituted 96% of possible participants as 5 male pupils of the total of 127 pupils had failed to return consent forms. No forms were returned withholding permission for pupils to participate.

- Language: Only pupils receiving their education in English were included. This criterion included children of different home languages: 94.49% of the pupils were from families whose mother-tongue was English, 7 pupils (5.51%) were from families where the mother tongue was not English. Of these, 5 pupils came from Zulu speaking families, 1 from an Afrikaans speaking family and 1 from a family where Polish was the home language.

- Academic Performance: The class teachers and head of department for Grade 7 had rated these children as having an adequate knowledge of language and vocabulary to understand the questionnaire statements. These criteria excluded pupils from remedial classes. However, children with reading difficulties were not excluded, as each statement was read to the group. No additional criteria, such as behaviour or emotional status, were considered as the study was aimed at describing the responses of an average peer group.

3.5.3 Description of subjects

The participants of both groups were from a co-educational (girls and boys) Senior Primary school in the Inner West Area of Durban, KwaZulu-Natal, South Africa. The medium of instruction at the school was English. Pupils were encouraged to ask questions if a statement was not understood in order to accommodate those pupils whose home language was not English. The pupils were generally from a middle class socio-economic background. The school was a mainstream school where children with severe disabilities were not integrated.

3.5.4 Subjects' biographical data

The total number of participants was 115. Fifty-seven participants comprised Group 1 and these pupils watched Videotape A of the child with LNFS using the device with voice output. The fifty-eight participants of Group 2 watched Videotape B of the child with LNFS using the device without voice output. The composition of the two groups was very similar as represented in Figure 3.1 and Figure 3.2 below.

Figure 3.1: Gender distribution of the groups.

Figure 3.1 indicates that in Group 1, of a total of 57, 31 participants (54%) were girls and 26 (46%) were boys and that of the 58 participants in Group 2, 32 (55%) were girls and 26 (45%) were boys.

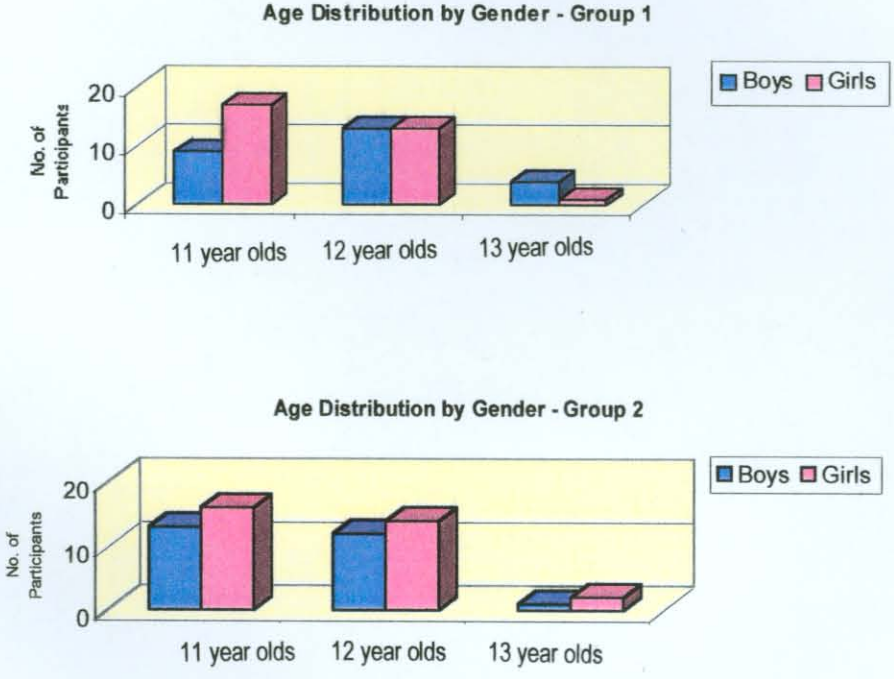

Figure 3.2: Age distribution by gender of the main study participants.

Figure 3.2 reveals that in Group 1, 26 participants were eleven years old (17 girls and 9 boys); 26 subjects were twelve years old (13 girls and 13 boys); and 5 subjects were thirteen years old (1 girl and 4 boys). The age distribution of Group 2 included 29 eleven-year-old subjects (16 girls and 13 boys); 26 twelve-year-old subjects (14 girls and 12 boys); and 3 thirteen-year-old subjects (2 girls and 1 boy).

3.5.5 Materials and equipment

The measuring instrument and the videotapes used in the main study are discussed in detail.

3.5.5.1 Rationale for the development of the survey instrument: the CADAQ

The need to develop a questionnaire to survey the attitudes of peers to a disabled child with LNFS who uses an AAC device was briefly discussed in the literature survey. Relevance to the research objective was the guiding principle in the development of the questionnaire. The questionnaire was based partly on the CATCH, developed by Rosenbaum *et al.* (1986) and partly on a questionnaire of communicative competence, developed by Bedrosian *et al.* (1992).

The CATCH was developed for children aged 9 to 13 years and consists of 36 items with equal numbers of positively and negatively worded statements (Rosenbaum *et al.* 1986). The CATCH was based on the three-dimensional model of attitude formation, namely that attitudes consist of interrelated affective, behavioural intent and cognitive components (Rosenbaum *et al.* 1986).

Construct validity was demonstrated by the confirmation of several hypotheses (Rosenbaum *et al.* 1986). Statistical procedures including factor analysis, coefficient alpha calculations and analysis of variance confirmed that the psychometric properties of the CATCH included acceptable internal consistency, reliability and test-retest reliability (Rosenbaum *et al.* 1986). In addition, good variability of total and factor scores was demonstrated for the CATCH (Rosenbaum *et al.* 1986).

However, the sensitivity of the CATCH to measure the differences in attitudes of peers dependent on the type of AAC aid used by the disabled peer was questioned by Beck and Dennis (1996). The CATCH is a generalised scale in that all the statements refer to a

'handicapped child' (Rosenbaum *et al.* 1986 p. 524). As children's attitudes to disabilities are considered to be less differentiated than those of adults, a generalised scale may not be sufficiently discriminating of the more subtle divergences in attitudes due to minor differences of the disability or the AAC aid used (Beck & Dennis 1996).

The significance of a child's communicative competence and the negative attitudes toward children with communication difficulties in the formation of initial peer attitudes have been highlighted. At the time of this study no valid questionnaires for evaluating peers' perceptions of the communicative competence of children using AAC devices were available. Questions were, therefore, specifically formulated for inclusion in the CADAQ to assess the communicative competence of the child with disabilities and LNFS. Many of these questions were based on the questionnaire designed by Bedrosian and Hoag, to measure the communicative competence of an adult AAC system user (Bedrosian *et al.* 1992).

The above study had proposed to verify the effect of three variables on perceptions of communicative competence in adult AAC users (Bedrosian *et al.* 1992). The variables selected were the length of the aided message, partner reauditorization and the background of the observer e.g. familiarity with AAC users (Bedrosian *et al.* 1992). Content validity was confirmed by a third author of the study, Stephen Calculator (Bedrosian *et al.* 1992). The preliminary questionnaire, consisting of 32 items, was field tested and redundant and inappropriate items were deleted (Bedrosian *et al.* 1992). The final questionnaire consisted of 30 items which were rated on a 5 point Likert-type scale. Results of estimating the reliability in terms of the internal consistency of the questionnaire were cited as a Cronbach alpha of .94 (Bedrosian *et al.* 1992).

The development of an attitude scale designed to detect differences in children's attitudes to AAC users has been recommended (Beck & Dennis 1996). The development of the CADAQ was an attempt to meet this need.

3.5.5.2 The structure of the CADAQ

The CADAQ was designed for children, aged 11 – 13 years. Teachers of Grades 6 and 7 rated the statements as applicable and relevant to the experiences of children of that age group. The teachers also rated the vocabulary and grammar as appropriate but suggested that the

statements be read to the participants by the researcher due to fact that children with specific reading difficulties may be present in Grade 6 and 7 classes.

In the CADAQ, belief statements were written so that agreement represented either a favourable or unfavourable attitude with respect to the variable being assessed. (Likert in Soto 1997). To prevent the acquiescence type of response, half of the questions in the attitude scale were worded in a positive form and half in a negative form. Closed questions were formulated to facilitate ease of completion and to encourage greater co-operation from the participants. For the same reasons individual statements were kept short and checked for ambiguity. The items were arranged in a random order and participants were asked to tick one of the following five response options with respect to each item on the questionnaire: I strongly agree, I agree, I can't decide, I disagree, I strongly disagree.

The survey was also structured to measure the biographic (demographic) differences in age and gender of the participants. Participants were required to complete questions regarding these biographical data to facilitate ease of analysis.

3.5.5.3 The content of the CADAQ

The questionnaire consisted of 37 statements to measure the following three dimensions:

- The affective/behavioural component of attitudes (i.e. the feelings and intent to take action on feelings by peers about a child with disabilities including LNFS), which is referred to by Gorenflo & Gorenflo (1991) as the interactive/affective factor of attitudes.
- The cognitive component of attitudes (i.e. the beliefs of the peers about a child with disabilities including LNFS), which is referred to by Gorenflo & Gorenflo (1991) as a general evaluation of the person with LNFS.
- The communicative competence evaluation.

(See Appendix B for the CADAQ as used in the main study).

The thirteen statements that make up the affective/behavioural dimension are presented in Table 3.2. Statements 6, 9, 13, and 15 are considered to reflect a strong affective response, while statements 10, 12, 16, 18, 21, 28, 31 and 37 have a stronger behavioural connotation.

Table 3.2 **The affective/behavioural dimension of the CADAQ.**

Affective/Behavioural Components		
No.	**Questionnaire Statement**	**Rationale for Inclusion**
6	I would worry if Alan sat next to me in class.	Pupils, aged 11 – 13 years, consider who sits next to them as being an important and emotive issue. They want to be seated next to friends or a popular member of the class.
9	I would be scared to talk to Alan.	Included to measure the overall emotive response to communicating with a peer with disabilities and LNFS.
13	I would be embarrassed to communicate like Alan does.	Including to elicit the peers' affective response to the AAC technique used by the video subject.
15	It would be fun to talk to Alan.	Similar to No. 9 but stated in a positive way.
26	I feel upset when I see how Alan has to 'talk'.	Included to determine the peers' emotional response to the video subject based on the AAC system used.
10	I would like to talk to Alan.	Included to measure the willingness (behavioural aspect) of the peer to interact with the child with disabilities and LNFS.
12	I would tell my secrets to Alan.	Sharing secrets is considered an important social transaction by children of this age group. Being prepared to tell secrets to the peer with LNFS indicates both an affective and behavioural aspect.
16	Alan would be unwelcome at my birthday party.	The peer pressures of the social groups within a class frequently determine whom a child feels he or she should invite to a birthday party. In this age group the invitation list is a powerful social tool.
18	If Alan was in my class I would like to do a project with him.	Grade 6 & 7 pupils choose peers of ' high social status' (pupils they consider popular and/or clever) to do a project with – thus this topic elicits both an emotional and behavioural response.
21	I would try to stay away from Alan if he came to my school.	This statement allows for a negative behavioural response indicating a negative affective response to the child with LNFS.
28	Alan would not be my best friend.	The 'best friend' issue is again an extremely important one for peers of this age group and the statement is, therefore, a valuable reflection of their response to the child with LNFS.
31	I would like to go to 'The Spur' with Alan.	Going out with or being seen in public with the popular peer group members is highly significant to this age group. Conversely, it is most important not to be seen with peers considered 'not socially in' – this statement therefore measures the behavioural intent of the peer to an emotionally evocative situation.
37	I would like Alan to sit next to me in class.	Positively worded paraphrase of No. 6

The eleven statements that make up the cognitive (belief) dimension, with the rationale for including each statement in the CADAQ, are presented in Table 3.3.

Table 3.3 The cognitive dimension of the CADAQ.

Cognitive Components		
No.	**Questionnaire Statement**	**Rationale for Inclusion**
2	Our class works too quickly for Alan.	In Grades 4& 5 pressure is put on pupils to finish academic tasks quickly so this becomes an important aspect by which peers judge performance. This statement, therefore, reflects a valuable belief about the ability of the child with disabilities and LNFS to function.
4	Alan would find it difficult to make friends at my school.	This will indicate the peers' belief in the ability of the child with LNFS to be able to meet the socially important function of making friends. It may also reflect the individual's own or perceived difficulty of making friends at his or her particular school.
8	I think Alan has many friends.	This reveals the peers' general belief about the ability of a child with disabilities and LNFS to make friends.
17	Alan would get teased in our class.	'Teasing ' is an issue to a greater or lesser degree in Grade 6 & 7 classes due to perceived differences of peers and is, therefore, a meaningful measure of the belief of peers about the AAC user.
20	Alan would be popular with the girls.	At puberty (11 – 13 years) popularity with peers of the opposite gender becomes an immensely important issue and this statement is important to elicit the peers belief about the social ability of the child with LNFS to relate to the opposite gender.
25	Alan would need lots of help in the classroom.	Independence in academic and class activities is a crucial goal & outcome of Grade 6 & 7 and this statement reveals the peers' belief about how dependent 'Alan' would be in their classroom.
29	Alan had interesting things to say.	As the videotaped conversation is very short this statement reflects the peers' beliefs of what was said as well as about whether a child with LNFS has topics of interest to discuss with them.
32	Alan most likely comes last in class.	This statement was included to get an idea of the peers' beliefs about the overall functioning of the child with LNFS in the classroom.
33	Alan should be good with computers.	As the topic of the conversation in the videotape was largely about computers this statement will reflect the peers' beliefs about 'Alan's' functioning with regard to computers based on what was discussed.
34	I do not think Alan has much fun.	This statement was included to give an indication of the beliefs of the peers about whether children with physical disabilities and LNFS are able to have fun.
36	Alan needs lots of help to tell a story.	This statement provides a measure of how well the peers believe that the child with LNFS can express himself.

The thirteen statements of the communicative competence dimension are presented in Table 3.4.

Table 3.4: The communicative competence dimension of the CADAQ.

Communicative Competence Components		
No.	**Questionnaire Statement**	**Rationale for Inclusion**
1	Alan took an active part in the conversation.	To give an overall impression of how the peers rated the communicative competence of the child with LNFS.
3	Kim understood everything Alan said.	To determine the peers' perspective on the competence of the child with LNFS to express himself well enough to be understood as well as the competence of the partner to understand the message.
5	If I couldn't speak I would like to communicate like this.	To elicit an evaluative response on how effective the peers rate the AAC system used.
7	I found it easy to understand what Alan meant.	To establish how well peers had understood the conversation, given the output mode of the technique used.
11	There must be better ways for Alan to communicate.	As a further measure of the peer's evaluation of the proficiency of the AAC system used by the child with LNFS.
14	It was easy to understand what Alan was 'saying'.	A paraphrased version of statement No. 7.
19	Alan could not communicate quickly enough.	AAC is always slower than normal speech. This gives an indication of the peers' rating in terms of communication speed achieved by the AAC technique used.
22	Alan was frustrated communicating like that.	To give an indication of the peers' determination of how the child using the AAC system experienced communication.
23	Alan was unable to say what he really wanted to.	To give an idea of the peers' appraisal of the accuracy of the system used to express what the child with LNFS wanted to say.
24	Alan could answer Kim's questions quickly enough.	This determined how well the peers felt the child with LNFS could respond to a communication partner.
27	Kim did not always understand what Alan wanted to say.	A negatively paraphrased version of No. 3.
30	The way Alan communicated with Kim resulted in some misunderstanding.	A rephrased account of statement No. 27.
35	Alan could say exactly what he wanted to.	A positively phrased form of No. 23.

To establish whether the participants were consistent in their attitudes, several questions were worded in both positive and negative statements e.g. *I would worry if Alan sat next to me in class* vs. *I would like Alan to sit next to me in class.* Other statements were paraphrased e.g. *I found it easy to understand what Alan meant* and *It was easy to understand what Alan was 'saying'.*

The CADAQ scale consisted of a 37 item self-report measure using responses on a five point Likert scale. The five point Likert scale of attitude measurement allowed the researcher to study possible patterns of attitude that may exist (Oppenheim 1973).

Scores from 1 to 5 were assigned for each item. As high scores on the scale indicated more positive attitudes and low scores more negative attitudes, positive responses to positive items as well as negative responses to negative items were assigned higher scores, as suggested by Oppenheim (1973). Examples are shown in Table 3.5 below.

Table 3.5: An example of the scoring of positive and negative items on the CADAQ.

Scoring Examples					
	I strongly agree	I agree	I can't decide	I disagree	I strongly disagree
It would be fun to talk to Alan.	5	4	3	2	1
I would not like Alan to be my best friend.	1	2	3	4	5

(See Appendix C for the allocation of scores for all the CADAQ statements.)

3.5.5.4 The rationale of the development of the stimuli material: videotapes

In using a videotape of a child with LNFS the participants were allowed to observe physical and other differences (sanctioned staring) without violating cultural norms against staring at people who are different, and this may have resulted in more positive attitudes due to reducing the discomfort factor (Donaldson 1980).

The rationale behind the development of the videotapes included:

- The isolation of the variable of voice output.

To achieve this only one conversation was filmed. It was filmed with voice output and was nominated as Videotape A. A copy of this videotape was made but the voice output of the DeltaTalker™ was edited out, and this was used as Videotape B. Videotapes A and B are, therefore, identical with the exception that the voice output of the Talker is edited out of

Videotape B. This ensured that the variable of output mode, namely voice output, was isolated and constituted the only difference between the two tapes. This method eliminated additional variables such as differences in conversational content, percentage of time involving aided messages, average length of aided messages etc. The VOCA used is a DeltaTalker™, manufactured by Prentke Romich Co. utilising synthetic speech output in Videotape A.

- Conformity between using an alphabet board and a VOCA.

This was achieved by using the DeltaTalker ™ in spell mode for closer comparison with using an alphabet board and to eliminate the variable of message encoding rate. Furthermore, a special overlay showing only the letters of the alphabet in QWERTY arrangement was used. The letters were printed in upper case, 11mm in height, black on a white background, and were clearly visible on the videotape. The perspex grid of the DeltaTalker™ is also visible and the method of selection used by the AAC user is by direct selection using a headpointer.
(See Appendix D for the overlay used on the DeltaTalker ™.)

3.5.5.5 Description of the videotaped subjects

The child with physical disabilities and LNFS was a thirteen year old male. Cognitively intact, cerebral palsied (severe athetoid) and unable to walk, he was seated in a manual wheelchair during the videotaping. He was from an English-speaking home and as he attended a special school, he was not known to the research participants. He was very familiar with the Delta Talker™. As he had used an alphabet board for several years prior to acquiring his device, and as he had continued to use an alphabet board as an alternative to his device, he was proficient at spelling out his messages.

Kim, the peer, was a slightly older female teenager who had previously met the AAC user on several occasions. Her role on the videotape was that of a conversational partner and she is not seen on the videotape. Only her voice is heard. This strategy maintained the focus on the AAC user and further reduced any possible variables due to her appearance.

3.5.5.6 The process of making the videotapes

The videotape was of a conversation between 'Alan', the thirteen-year-old AAC user, and Kim. At the beginning of the videotape 'Alan' is viewed from the front. He was not wearing his

headpointer and smiled briefly at the camera. This view was included because during the pilot study pupils queried whether the subject of the videotape was 'real'. For the remainder of the videotape the camera was positioned above and behind 'Alan's' left shoulder. In the videotape 'Alan's' shoulder, the left side of his head and helmet, as well as the headpointer and the communication device, were visible. The letters he accessed were clearly visible. (See Appendix E for a transcript of the videotaped conversation.) The videotape was filmed using a NS5 SVHS Panasonic™ camera on a Techoni™ Super High Grade Videotape. It was copied and the voice output of the talker edited out on a non-linear digital edit system.

3.5.6 Ethical issues

Informed voluntary consent was obtained from both the disabled subject and the peer who were videotaped. The identity of the AAC user was protected, as he is only referred to by a pseudonym. The purpose of the research, the exact procedures involved in making the videotapes, the use of the tapes and who would see the tapes were carefully explained to the AAC user and the peer. In addition, written consent was obtained from their parents, principal of the school and the KwaZulu-Natal Educational Department. (See Appendix F for the letter of consent from the principal.)

In addition the disabled subject, his parents and the peer viewed the edited videotapes before they were used in the research and had the right to withdraw their permission at any stage of the research. The videotapes were used only for the purpose of the research and a signed release was obtained from the parents of the subjects.

The privacy and confidentiality of both the videotape subjects and research study participants were strictly maintained. The face of the AAC user was visible but he was not known to the participants. Written consent for the participants who took part in the pilot and final studies was solicited and obtained from their parents, the principals of their schools, and the Kwa-Zulu Natal Educational authority. (See Appendix G for a copy of the letter sent to the principal of the School and Appendix H for the parental consent letter and reply form.)

3.5.7 Data collection procedures

3.5.7.1 Environment

The video was screened and the questionnaires completed in the school's group teaching facility. This facility was familiar to the pupils and highly suitable for the purpose as:

- it easily accommodated the two classes making up each study group

- the tiered seating and large screen of the episcope meant that all the pupils had an excellent view of the videotape

- the controlled environment meant the room was well ventilated but background noise and visual distractions were minimal

- the pupils were comfortably seated and had a suitable writing surface immediately in front of them on which to complete the questionnaires.

3.5.7.2 Data collection

- Four class groups, two Grade 6 and two Grade 7 classes from the same school, were selected by the Head of Department for Grade 7 to take part in the study. One Grade 6 and one Grade 7 class were randomly assigned to form Group 1. This group consisted of 60 pupils.

- A second Grade 6 and a second Grade 7 class were combined to form Group 2 of the study. Group 2 consisted of 62 pupils.

- Both groups completed the study on the same day to ensure no discussion took place between the participants.

- Both groups were seen in the morning before recess to minimise possible fatigue by other activities. Group 1 was seen from 8:45am to 9:45am and Group 2 from 10:00am to 11am.

- The study was carried out by the researcher who was introduced to each group by the Head of Department for Grade 7 at the school. The following short introduction was

identical for both groups: 'I would like to welcome Margi Lilienfeld to our school. She is a therapist at the Browns' School and is presently doing a research project. You are going to assist in this research by answering a questionnaire after you have watched a video'.

- The researcher then gave the following instructions to each group of participants: 'As part of your theme on disability awareness you are about to watch a 5 minute video of Alan, a physically disabled boy who is in Grade 6 at the school where I work. In the video, Alan is chatting to his new friend, Kim. Due to his disability Alan is not able to speak clearly and he communicates in other ways. All I ask is that you do not discuss the video with your friends while we are watching it and remember to watch it carefully as you are going to answer some questions when we have finished watching it'.

- The videotape was then screened. Group 1 watched Videotape A whereas Group 2 watched Videotape B.

- The participants were then given the following instructions: 'I am now going to hand out the questionnaires and pencils. Please don't chat about the video until all the questions have been answered. You will then be able to ask me any questions you want to about Alan. In the meantime you can tick the block next to your age and whether you are a boy or girl. Please don't write your name on the questionnaires and neither your teachers nor I will know which one is your questionnaire. Remember, there are no right or wrong answers and this is not for marks. I want you to think about the video while you answer the questions. I will read each question and you must tick the answer that best shows how you feel. Please make only one tick per question and don't leave any questions out. Let's start with the first example....'

- The two trial items were then presented and the participants indicated they understood what was required. One trial item was positively stated and one negatively stated.

- The researcher then read each of the 37 statements of the questionnaire aloud.

- At the completion of reading the last statement the researcher requested that the children check that all questions had been responded to before the questionnaires were collected. This was to minimise the problem of incomplete questionnaires.

- The participants were then thanked and their questions regarding AAC or the issues of peers with disabilities involving LNFS were addressed.

- The introduction, videotape screening and administration of the questionnaire took 35 minutes and the remaining 25 minutes was used for discussion of the participants' questions.

- During the completion of the questionnaire the researcher observed the children. No instances of collaboration or copying were noted.

- After scoring the data, the results were analysed according to aims and objectives of the study.

3.5.8 Statistical analysis

The procedures used and the motivation for their selection are presented in Table 3.6.

Table 3.6: Statistical procedures selected

STATISTICAL PROCEDURES SELECTED		
STATISTICAL PROCEDURE	**MOTIVATION FOR SELECTION**	**TO ADDRESS:**
1. Mean score: The mean of the total scores on the CADAQ and for each of the 3 dimensions of the CADAQ was calculated for each group as well as the mean for the total of the girls' and the boys' scores within each group.	As the least variable measure of central tendency the mean was selected above the mode or median to give an estimate of the population mean. To allow comparison between the mean of the total and dimension scores for Group 1 as compared to Group 2 as well as comparison between the mean of the total scores of girls compared to boys.	Sub-aim 1 Sub-aim 2
2. Standard Deviation: Standard deviations for the total and 3 dimensions were computed for both groups as well as for girls' and boys' scores.	To give an idea of the degree of variance from the mean and to allow for an additional descriptive statistical method of comparing the scores of the two groups as well as the boys and girls with respect to total and dimension scores of the CADAQ.	Sub-aim 1 Sub-aim 2
3. Frequencies: Frequencies for each scoring category (1-5) were calculated for each individual variable.	This allowed for comparison between the two groups for each individual variable according to the actual number and percentage of participants scoring 1, 2, 3, 4 or 5. To allow for comparison of responses to rephrased items as a measure of reliability of participants' responses.	Sub-aim 1 Sub-aim 2
4. Analysis of Variance: An analysis of variance of the total scores and the 3 dimension scores of the CADAQ as well as between the means of the boys and girls. The level of significance $\alpha = 0.05$	To determine if there were differences between the means of the groups (Voice or No-voice) and between the means of the boys and girls as well as to determine if there was any interaction between the independent variables of group and gender.	The primary aim. Sub-aim 3
5. Cronbach Alpha's and scale intercorrelations between the 3 dimensions of the CADAQ	To determine the internal consistency of the scale. To determine the correlations between the 3 sub-divisions (dimensions) of the CADAQ.	Sub-aim 4.
6. Item Analysis:	To determine the internal consistency of the scale.	Sub-aim 4

3.6 SUMMARY

This chapter presented the methodology used in the study. The brief description of the research design was followed by an account of the pilot study, including recommendations for changes in the main study. The main study was discussed according to the sampling strategy, subjects and materials and equipment used in the study. The latter included a detailed description of the development and content of the CADAQ. Finally, the ethical issues, data collection and analysis were reported.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 INTRODUCTION

The purpose of this study has been to determine whether the output mode, i.e. voice output, had any effect on the attitudes of peers to a child with disabilities who used a communication device. In this chapter the response rate is discussed, followed by the results of the CADAQ with respect to the significance of the output mode as well as the significance of the gender of the participants.

As the questionnaire (CADAQ) measured three different dimensions of peer attitudes toward the child with LNFS, the results for each of these factors are evaluated in terms of each group and possible reasons for between-group differences are promulgated. The results of item analysis are presented and discussed with reference to the reliability of the questionnaire. The consistency of the participants' responses to paraphrased statement pairs and positively and negatively worded pairs are evaluated. The additional factor of a high rate of *"I can't decide"* responses to certain statements is considered.

4.2 OVERALL RATE OF PARTICIPATION

Of the total number of Grade 6 and Grade 7 pupils, four classes were selected to participate. Of these 127 pupils, 122 completed questionnaires. Seven questionnaires from the total of 122 were rejected, so the overall rate of participation was 90.55%. The reasons for rejection were:

- three respondents failed to complete the biographical data required of age and gender
- four respondents each omitted to complete one question.

Two children failed to complete question 24; one child failed to complete question 34 and another omitted to answer question 10.

4.3 ANALYSIS OF VARIANCE

An analysis of variance (SAS Statistical package) was conducted with the total scores and the 3 dimension (the affective/behavioural component of attitude; the cognitive component of attitude and the communicative competence evaluation) scores of the CADAQ as dependent variables. The group (voice output or no voice output) and the gender (male or female) were the independent variables. The level of significance $\alpha = 0.05$.

The primary aim of the study (See 3.2.1) was to investigate whether the specific augmentative communication output technique of voice output had an effect on the attitudes of children, 11 – 13 years of age, toward a peer with a physical disability and LNFS. Results of the analysis of variance with respect to group and gender are reflected in Table 4.1 where a difference is significant when the p value is less than 0.05. Significant results are highlighted.

Table 4.1: Analysis of variance results for group (output mode) and gender

Analysis of Variance	Group					Gender				
	Group 1 – Voice Output 57 in Group		Group 2 – No Voice Output 58 in Group			GIRLS 63 in Group		BOYS 52 in Group		
	Mean	Standard Deviation	Mean	Standard Deviation	p-value	Mean	Standard Deviation	Mean	Standard Deviation	p-value
Total Scores on CADAQ	116.438596	20.506983	104.913793	16.293670	0.0008	115.571429	16.154208	104.634615	16.154211	0.0013
Affective/ Behavioural	45.280702	8.676229	41.672414	7.484224	0.0132	45.460318	6.798542	41.038462	9.246009	0.0031
Cognitive/Belief Component	31.543860	6.824599	30.637931	5.978612	0.4577	32.587302	5.749151	29.269231	6.724597	0.0052
Communicative Competence	39.614035	7.338145	32.603448	6.014426	0.0001	37.523809	6.534912	34.326923	8.344826	0.0092

4.3.1 The effect of output mode

The results as reflected in Table 4.1 indicate a marked difference between Group 1 and Group 2 in comparing the mean of total scores on the CADAQ, between Group 1 (voice output) and group 2 (no voice output). On the component scores the greatest difference is evident in the results measuring the evaluation of the communicative competence dimension. The affective/behavioural components of attitude reflect less difference and the cognitive component of attitude sub-score the least difference in total mean scores. These differences are statistically significant (p-value is less than 0.05) when comparing total scores as well as scores on the affective and communicative competence dimensions between Groups 1 and 2. Although not significant, the same tendency is reflected on the cognitive dimension scores. A possible explanation for the lesser difference on the cognitive dimension is that the factual support for beliefs is stronger than for affective responses and beliefs are more pervasive and resistant to change (Aiken 1996). The total and all the component (dimension) scores thus reflect more favourable attitudes to the presence of voice output in comparison to the no voice option.

These results support the hypothesis that the attitudes of children to peers with physical disabilities who have LNFS are significantly more positive when the communication device used has voice output.

This result correlates with the findings of Gorenflo & Gorenflo (1991) who investigated the effects of various communication techniques on the attitudes of peers toward an adult with physical disabilities who had LNFS. Using a 5 point Likert-type scale, the subjects completed the ATNP (Attitudes Toward Nonspeaking Persons) and an adapted ATDP (Attitudes Toward Disabled Persons) questionnaires. The researchers found that when the VOCA was used, peer evaluations were more favourable than when unaided or alphabet board techniques were used (Gorenflo & Gorenflo 1991).

The current findings are contrary to those of an investigation by Blockberger *et al.* (1993) into children's attitudes toward a peer who used an unaided technique, an alphabet board and a VOCA. They found that the AAC technique used had no perceivable impact on the attitudes of the fourth

graders in their study (Blockberger *et al.* 1993). As in the current study, classes of children viewed videotapes of a peer with physical disabilities who had LNFS. The peers' attitudes were measured using the CATCH scale and results indicated that the difference in scores between techniques was not significant (Blockberger *et al.* 1993). Similarly, Beck & Dennis (1996) in their research into the attitudes of 5th Graders towards a peer with physical disabilities and LNFS who used AAC found no difference in CATCH scores between those who viewed the videotape showing the nonelectronic or the VOCA system. The videotape subject in their study, a boy, used a combination of gestures, verbalisations and pointing to an alphabet board in the nonelectronic (low technological) option and a combination of gestures, verbalisations and a Touch Talker™ in the high technological option.

It is difficult to substantiate the precise reason for the difference in outcomes between the current and former studies, as there are several methodological and other differences. Besides the disparity of the subjects there are differences in the disabilities of the videotaped subjects, in their videotaped conversations, in the VOCAs and synthetic speech used. In the studies by both Blockberger *et al.* (1993) and Beck & Dennis (1996) different conversational extracts were used in the videotapes for the various AAC techniques, with possible influence from variables such as content, length and rate of aided messages, number of conversational turns etcetera. This was not so in the current study where the videotapes were, apart from the voice output, identical.

The outcome measure used was a major difference between this study and the studies of Blockberger *et al.* (1993) and Beck & Dennis (1996). The CATCH scale used by both Blockberger *et al.* (1993) and Beck & Dennis (1996) is a generalised attitude scale designed to assess children's responses to various types of disabilities. It may not be sensitive to differences in children's responses to different AAC techniques used by a peer with disabilities (Beck & Dennis 1996). Unlike the CADAQ, the CATCH does not include statements to measure the peers' evaluation of the AAC user's communicative competence which, as discussed in the literature review, is an important factor in children's initial attitudes to peers. In agreement with the studies of both Blockberger *et al.* (1993) and Beck & Dennis (1996) is the finding that girls' attitudes to a peer with disabilities and LNFS are generally more favourable than those of boys.

4.3.2 The effect of gender

A sub-aim of the study (See 3.2.2) was to determine whether the attitudes of boys differed from those of girls towards a peer with physical disabilities and LNFS. Results of the analysis of variance with respect to gender are reflected in Table 4.1 where the level of significance α = 0.05. Significant results are highlighted.

The results, as reflected in Table 4.1, indicated a significant difference between boys and girls, with girls having more favourable attitudes. The more positive attitudes of girls are reflected in the means of total scores of the CADAQ as well as in each of the three attitude dimensions of affective/ behavioural component, cognitive component, and communication competence evaluation. The results, therefore, support the hypothesis that girls have more positive attitudes than boys toward a peer with physical disabilities and LNFS. This finding is supported by the previous research of Voettz (1980), Rosenbaum *et al.* (1986), Fiedler & Simpson (1987), King *et al.* (1989), Blockberger *et al.* (1993) and Beck & Dennis (1996). An exception is the research findings of Wisely & Morgan (1981). In a study of children's ratings of peers presented as mentally retarded and physically handicapped, Wisely & Morgan (1981) reported that boys gave more favourable ratings than did girls.

The interaction between gender and group was also investigated but was nowhere found to be significant.

4.4 RELIABILITY

Reliability implies consistency in differentiating among persons and, accordingly, the reliability of an attitude scale increases with the age of respondents (Aiken 1996). To facilitate reliability in determining the attitudes of 6th and 7th graders, the environment, administration and presentation of the study and questionnaires to both groups were uniform. In addition, only fully completed questionnaires were scored. The ITEMAN programme (Assessment Systems Corporation) was used to compute Cronbach alpha's and to do an item analysis to determine the internal consistency of the questionnaire. Coefficient alpha for the affective/behavioural dimension was .892 for the

voice option and .0853 for the no voice group. Coefficient alpha for the cognitive dimension was .811 and .774 for voice and no voice groups respectively. Coefficient alpha for the communicative competence dimension was .845 for the voice group and .764 for the no voice group. The deletion of item 26 (I feel upset when I see how Alan has to 'talk') in the affective/behavioural dimension would improve the reliability coefficient of this dimension as the item scale correlation for this statement was -.13 for the voice group and .17 for the no voice option group.

The Cronbach alpha's and intercorrelations between the three dimensions of the questionnaire are presented in table 4.2.

Table 4.2: Comparison of Cronbach Alpha's and dimension intercorrelations.

In this table, 1 = Affective/behavioural dimension of attitudes, 2 = Cognitive/belief dimension of attitudes and 3 = Communicative competence dimension.

Comparison of Cronbach Alpha's and the component intercorrelations.						
	VOICE 57 in Group 1			NO VOICE 58 in Group 2		
	1	2	3	1	2	3
Alpha	0.892	0.811	0.845	0.853	0.774	0.764
	Dimension Intercorrelations			Dimension Intercorrelations		
	1	2	3	1	2	3
1	1.000	0.727	0.666	1.000	0.591	0.491
2	0.727	1.000	0.739	0.591	1.000	0.562
3	0.666	0.739	1.000	0.491	0.562	1.000

Although high enough, Cronbach alpha's >0.6, and the correlations being significant on the 5% level, both are lower for the no voice than the voice group (Owen & Taljaard 1995). This, together with the greater diversity in frequencies, would suggest some inconsistency in the responses of the participants in the no voice group. (See Appendix I for the response frequencies of the affective/behavioural dimension, Appendix J for the response frequencies of the cognitive

dimension and Appendix K for the response frequencies of the communicative competence dimension). This suggests that the subjects of the no voice group were uncertain of how they felt.

The close correlations between the various dimensions (1,2 & 3) are positive as these dimensions are closely related and form integral sections of the same attitudinal scale. Notably, the correlations between the various dimensions are not as high for the no voice option as for the voice option, again indicating less consistency in the responses of the participants who watched the no voice option.

The item scale analysis for the affective/behavioural component statements that make up the affective/behavioural dimension of the CADAQ are presented in Table 4.3.

Table 4.3: Item analysis for the affective/behavioural dimension

1.	Affective/Behavioural Components		
		VOICE	NO VOICE
		Item/scale Correlation	Item/scale Correlation
6	I would worry if Alan sat next to me in class.	.48	.51
9	I would be scared to talk to Alan.	.66	.73
13	I would be embarrassed to communicate like Alan does.	.58	.67
15	It would be fun to talk to Alan.	.86	.50
26	I feel upset when I see how Alan has to 'talk'.	-.13	.17
10	I would like to talk to Alan.	.84	.52
12	I would tell my secrets to Alan.	.66	.45
16	Alan would be unwelcome at my birthday party.	.73	.73
18	If Alan was in my class I would like to do a project with him.	.73	.61
21	I would try to stay away from Alan if he came to my school.	.76	.72
28	Alan would not be my best friend.	.75	.74
31	I would like to go to 'The Spur' with Alan.	.74	.78
37	I would like Alan to sit next to me in class.	.81	.75

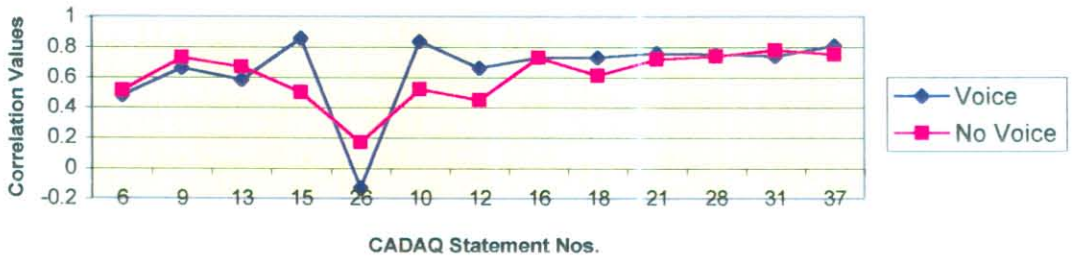

Figure 4.1: Item/scale correlations of the affective/behavioural dimension.

Item scale correlations reflect good internal consistency apart from item 26. Item scale correlations of .27 or above are acceptable for 13 items. This statement 'I feel upset when I see how Alan has to talk' is ambiguous in that agreeing with 'feeling sorry' could indicate a positive connotation of empathy but disagreeing with this statement could also indicate a positive attitude. If a peer responded that he or she disagreed with the statement, this could indicate 'I don't feel upset when I see how Alan has to talk as he is able to communicate very well with his AAC system'. For this reason this statement should have been eliminated after the pilot study. It offers the same scoring dilemma as the statement 'I feel sorry for Alan' which was eliminated after the pilot study.

The item scale analysis for the cognitive (belief) statements that make up the cognitive dimension of the CADAQ are presented in Table 4.4. (See Appendix J for the response frequencies of the cognitive dimension.)

Table 4.4: Item Analysis for the cognitive/belief dimension.

2. Cognitive Components			
		VOICE	NO VOICE
		Item/scale Correlation	Item/scale Correlation
2	Our class works too quickly for Alan.	.42	.51
4	Alan would find it difficult to make friends at my school.	.64	.47
8	I think Alan has many friends.	.70	.62
17	Alan would get teased in our class.	.43	.47
20	Alan would be popular with the girls.	.63	.55
25	Alan would need lots of help in the classroom.	.67	.56
29	Alan had interesting things to say.	.55	.44
32	Alan most likely comes last in class.	.64	.61
33	Alan should be good with computers.	.33	.55
34	I do not think Alan has much fun.	.76	.67
36	Alan needs lots of help to tell a story.	.69	.71

Figure 4.2: Item scale correlations of cognitive dimension

As there are 11 items the item scale correlation should be 0.3 or higher. All the items of the cognitive (belief) dimension, therefore, have an acceptable item scale correlation indicating good internal consistency.

The item scale analysis for the communicative competence statements that make up the evaluation of communicative competence dimension of the CADAQ are presented in Table 4.5 (See Appendix K for the response frequencies of the communicative competence dimension.)

Table 4.5: Item analysis for the communicative competence dimension.

3. Communicative Competence			
		VOICE	NO VOICE
		Item/scale Correlation	Item/scale Correlation
1	Alan took an active part in the conversation.	.34	.52
3	Kim understood everything Alan said.	.49	.57
5	If I couldn't speak I would like to communicate like this.	.58	.52
7	I found it easy to understand what Alan meant.	.69	.53
11	There must be better ways for Alan to communicate.	.51	.26
14	It was easy to understand what Alan was 'saying'.	.67	.46
19	Alan could not communicate quickly enough.	.60	.60
22	Alan was frustrated communicating like that.	.67	.44
23	Alan was unable to say what he really wanted to.	.62	.62
24	Alan could answer Kim's questions quickly enough.	.76	.57
27	Kim did not always understand what Alan wanted to say.	.52	.54
30	The way Alan communicated with Kim resulted in some misunderstanding.	.64	.31
35	Alan could say exactly what he wanted to.	.58	.65

Figure 4.3: Item scale correlations of the communicative competence dimension

As all items on the communicative competence dimension have item scale correlations above 0.27 this sub scale shows acceptable internal consistency.

4.5 CONSISTENCY OF PARTICIPANTS' RESPONSES TO PARAPHRASED ITEMS

Several statements were paraphrased in the questionnaire to establish how consistently the participants responded. Certain statements were merely rephrased and other statements were worded in the negative form.

In Table 4.6 participants' responses to paraphrased items are compared in terms of consistency. For ease of comparison the frequency of participants scoring 1 or 2 was totalled, as was the frequency of those scoring 4 or 5. Particularly when the pattern of responses between the voice and no voice options are compared, it is apparent that there is an association between the paired variables. Participants were thus consistent in how they responded to the pairs of paraphrased statements in the CADAQ. The high frequency of negative responses (scoring 1-2) for the no voice group to statements such as item 27: *Kim did not always understand what Alan wanted to say* and item 7: *I found it easy to understand what Kim was saying,* reflect the difficulty the participants experienced in understanding the messages the AAC user communicated in the absence of the synthetic voice output. The uncertainty of the participants who viewed the videotape of the no voice option is also reflected in the high ratio of undecided responses (scoring 3) to specific questionnaire statements. This is discussed in greater detail following table 4.6, the comparison of frequencies of paraphrased items.

Table 4.6: **Comparison of frequencies of paraphrased items.**

COMPARISON OF FREQUENCIES OF PARAPHRASED ITEMS

		Item 27: Kim did not always understand what Alan wanted to say.					
		VOICE			NO VOICE		
		Agree (1-2)	Can't decide	Disagree (4-5)	Agree (1-2)	Can't decide	Disagree (4-5)
Item 30: The way Alan communicated with Kim resulted in some misunderstandings.	Agree	11	11	1	31	1	3
	(1-2)	19.30%	19.30%	1.75%	53.45%	1.72%	5.17%
	Can't	6	13	1	10	7	0
	decide	10.53%	22.01%	1.75%	17.24%	12.07%	0.00%
	Disagree	6	1	7	3	2	1
	(4-5)	10.53%	1.75%	12.28%	5.17%	3.45%	1.72%

		Item 23: Alan was unable to say what he really wanted to.					
		VOICE			NO VOICE		
		Agree (1-2)	Can't Decide	Disagree (4-5)	Agree (1-2)	Can't Decide	Disagree (4-5)
Item 35: Alan could say exactly what he wanted to.	Disagree	15	2	6	22	3	2
	(1-2)	26.32%	3.51%	10.53%	37.93%	5.17%	3.45%
	Can't	7	3	8	6	2	5
	Decide	12.28%	5.26%	14.04%	10.34%	3.45%	8.62%
	Agree	2	3	1	8	4	6
	(4-5)	3.51%	5.26%	19.30%	13.79%	6.90%	10.34%

		Item 6: I would worry if Alan sat next to me in class.					
		VOICE			NO VOICE		
		Agree (1-2)	Can't Decide	Disagree (4-5)	Agree (1-2)	Can't Decide	Disagree (4-5)
Item 37: I would like Alan to sit next to me in class.	Disagree	5	2	3	8	0	2
	(1-2)	8.77%	3.51%	5.26%	13.79%	0.00%	3.45%
	Can't	6	6	4	6	5	0
	Decide	10.53%	10.53%	7.02%	10.34%	8.62%	0.00%
	Agree	0	11	20	10	17	10
	(4-5)	0.00%	19.30%	35.09%	17.24%	29.31%	17.24%

		Item 7: I found it easy to understand what Alan meant.					
		VOICE			NO VOICE		
		Disagree (1-2)	Can't Decide	Agree (4-5)	Disagree (1-2)	Can't Decide	Agree (4-5)
Item 14: It was easy to understand what Alan was saying.	Disagree	15	2	4	54	1	1
	(1-2)	26.32%	3.51%	7.02%	93.10%	1.72%	1.72%
	Can't	7	10	1	0	1	0
	Decide	12.28%	17.54%	1.75%	0.00%	1.72%	0.00%
	Agree	1	5	12	0	1	0
	(4-5)	1.75%	8.77%	21.05%	0.00%	1.72%	0.00%

4.6 THE MEANING OF A HIGH RATIO OF UNDECIDED RESPONSES

The incidence of a high percentage of subjects (above 40%) within a group giving the response of 'I can't decide' to specific questionnaire statements is presented in Table 4.7.

Table 4.7 Incidence of a high percentage of 'I can't decide' responses

FREQUENCY OF 'I CAN'T DECIDE' RESPONSES TO CADAQ STATEMENTS				
Question Number	Dimension	Questionnaire Statement	Group 1 Voice	Group 2 No Voice
3	Comm. Competence	Kim understood everything Alan said.		48.28
12	Behavioural	I would tell my secrets to Alan.		43.10
22	Comm. Competence	Alan was frustrated communicating like that.	42.11	
29	Cognitive	Alan had interesting things to say.		50.00
30	Communicative Competence	The way Alan communicated with Kim resulted in some misunderstanding.	43.85	
31	Behavioural	I would like to go to 'The Spur' with Alan.		43.10

The CADAQ scale lacks a neutral point, as when participants mark the 'I can't decide' option it is not known whether their attitudes are mildly positive or mildly negative (Oppenheim 1992). Scores in this middle region could be due to a number of factors, including an indifferent response, a lack of knowledge or a lack of perspective i.e. an uncertain attitude on the part of the respondent to the questionnaire statement (Oppenheim 1992).

Further confirmation of the degree of uncertainty of the respondents who watched the video with no voice output was the fact that there were four statements to which over 40% of this group responded with indecision as opposed to two statements for Group 1.

Of interest, too, was that both groups did not respond with a high percentage of indecision to the same statements. Furthermore, the above statements represent all three dimensions of peers' attitudes to a child with LNFS. There are two behavioural components from the affective/behavioural dimension. It is possible that the lack of previous experience with a peer who

has physical disabilities and LNFS resulted in uncertainty to these particular statements (Towfighy-Hooshyar & Zingle1984). Participants may not have been able to visualise how they would react to, for example, going to the 'Spur' with such a child. Studies have also shown that peers, feeling uncertain about how to interact, may choose not to interact (Kraat 1987). These questions may also have caused some uneasiness or uncertainty on the part of participants due to anxiety about how to behave towards a peer with physical disabilities and LNFS (Kraat 1987 and Donaldson 1980).

It is understandable that many participants who viewed the option without voice output were uncertain whether 'Kim understood everything Alan said' as her responses may well have seemed arbitrary as they could not hear his questions or previous responses to her questions. Their uncertainty is, therefore, an expected response. The fourth statement to which there was a great degree of uncertainty in those respondents who viewed the videotape in which the device had no voice output was from the cognitive dimension and related to the fact that 'Alan had interesting things to say'. The participants would have had to judge this from the comments of the conversational partner as it would have been most difficult for them to follow what he said from viewing his access of letters on the overlay.

4.7 SUMMARY

This chapter focussed on the findings of the research which were discussed in relation to other attitudinal studies toward adults and children with disabilities and LNFS. Analysis of variance indicated that attitudes of children toward a peer with LNFS were significantly more favourable when the AAC device used by the peer had voice output than when there was no voice output. Also reflected in the analysis of variance was a significant difference between the attitudes of girls and boys, with the former having more positive attitudes toward a peer with disabilities and LNFS.

In addition, Cronbach alpha's and an item analysis of the CADAQ were presented and discussed with relevance to confirming the internal consistency of the questionnaire. The responses of participants to paraphrased items were compared and discussed as a function of how consistently

participants responded to the CADAQ. The chapter ended with a discussion of possible reasons for a relatively high frequency of undecided responses to specific statements of the CADAQ.

CHAPTER 5

CONCLUSIONS AND CLINICAL IMPLICATIONS

5.1 INTRODUCTION

In this chapter the conclusions, based on the results of this study, are discussed. The possible resultant clinical implications are then described. The study is evaluated in terms of its strengths and limitations. Finally, potential directions for further research are recommended.

5.2 CONCLUSIONS

The purpose of this study was to determine the effect of voice output on the attitudes of peers to a child with physical disabilities and LNFS using an AAC device. The research results confirmed the hypothesis that the provision of voice output would result in more favourable attitudes of unfamiliar peers to a child with physical disabilities and LNFS. The hypothesis that girls would have more positive attitudes than boys toward a peer with disabilities and LNFS was also confirmed.

Initial attitudes toward the peer with physical disabilities and LNFS were measured according to three dimensions: affective/behavioural, cognitive/belief and communication competence. Attitudes were more positive towards the child with LNFS who used the device with voice output across all three dimensions. The greatest variance was noted in participants' responses to statements in the communication competence dimension and the least variance noted in the cognitive/belief dimension.

The CADAQ questionnaire represents an attempt to devise a new measure for the study of peers' attitudes to a child with physical disabilities and LNFS. The CADAQ is based on the theoretical constructs of attitude formation and the importance of peers' evaluations of the communicative competence in their initial appraisal of a child with LNFS. It was devised with careful consideration of similar measures and the requirements of devising a Likert-type scale. The CADAQ proved to be sensitive to differences in peers' attitudes towards a child with

disabilities using an AAC device and, with refinement, may be a useful aid to determine the effect of clinical programmes to improve children's attitudes to peers with disabilities and LNFS.

5.3 CLINICAL IMPLICATIONS

5.3.1 Voice output on initial attitudes

The results of this study support the provision of a device with voice output as a means of promoting more favourable initial peer attitudes towards a child with disabilities and LNFS. The AAC team should, therefore, motivate for appropriate devices with voice output as part of their AAC system to be provided to children with disabilities and LNFS. A device, however, is only part of the equation to promote the interaction of a child with disabilities and LNFS with peers. The peers need to be made aware of what it is like to have LNFS and should be informed of how to interact and communicate with the child using an AAC system. Peers should be taught technical and communicative strategies to facilitate successful interactions and be encouraged to allow sufficient time for the AAC user to formulate messages. Likewise, the AAC user needs to be taught strategies for effective social interaction. Facilitation of interaction between peers and the AAC user should be continued until spontaneous, functional and independent communication readily takes place.

The AAC user should always use the most effective mode (i.e. the most efficient, including fastest rate and most accurate as well as being the most appropriate means of expression) dependent on the situation, the communication partner, the environment and the message. Voice output not only has the advantages of attracting the targeted listener's attention and of generally being intelligible even to unfamiliar partners, but also promotes more favourable initial attitudes of peers to a child with physical disabilities and LNFS.

5.3.2 Accommodation of gender differences in initial attitudes

The study supported the finding that girls have more positive attitudes toward peers with disabilities and LNFS. Boys, having less favourable attitudes towards peers with disabilities and LNFS, should receive a more intensive disability awareness programme and receive greater facilitation and increased support in their attempts to interact with peers with disabilities and LNFS.

Consideration of the participation model of communication should focus on strategies to allow children with LNFS, especially boys, to meet the participation patterns of male peers. This can be facilitated by providing appropriate colloquial vocabulary and making provision for interactions, for example joke telling, that constitute the expected communication patterns of boys of this age group by the AAC user.

5.3.3 Programmes to reduce stereotyping

The findings of the current study reinforce the need to promote understanding of peers and reduce stereotyping of children with LNFS. Negative attitudes towards children with LNFS will result in distinct disadvantages with respect to educational, vocational and community-based opportunities (Ruscello *et al.* 1988). Peer perceptions and attitudes are important to the personal and educational progress of all students and negative attitudes may have an adverse effect on the educational progress of pupils with disabilities and LNFS. The crucial role that peers can assume in the education of all pupils, disabled or not, through peer tutoring and support strategies is increasingly recognised (Uditsky 1993). Intervention strategies to improve peers' attitudes are thus essential.

5.3.4 Facilitation of integration and inclusion

The research participants were allocated time to ask questions after they had completed the questionnaires. Their questions revealed extremely limited exposure to peers with disabilities and, consequently, a great deal of ignorance as is typical of children in segregated educational systems. However, the research participants also evidenced a tremendous interest in the lives and experiences of peers with disabilities and LNFS. Their questions, related to the vocational, procreational and social implications of the disability of the child with LNFS, demonstrated a depth of concern not expected by the researcher. The pupils wished to know whether the child with disabilities and LNFS could follow a normal educational programme and were interested in what types of employment were possible for adult AAC users. They inquired about the videotaped subject's social life, relationship to friends and his recreational pursuits. Numerous issues, including whether he would be able to marry and father a normal child, were also raised.

Some of the research participants indicated an interest in meeting with the videotaped subject and the need for additional exposure to peers with disabilities was clearly evident. The research participants have not had the opportunity of experiencing friendships with peers with disabilities. Inclusive education has the potential of enriching children's lives and contributing to positive change resulting in youth that are more caring, responsible and accepting of diversity. These outcomes are not automatic, however, and can only be achieved with effort and the implementation of effective strategies to facilitate interaction and solve problems that may arise. Fundamental is the acceptance of an educational policy based on the rights of all to be included in a values based education.

5.4 CRITICAL EVALUATION OF THE STUDY

Both positive and negative aspects of the study are presented.

5.4.1 The isolation of the voice output variable

The manner in which the methodology was structured, to result in the isolation of the output mode variable, was considered a strength. This was achieved by using only one videotaped conversational extract, which was then copied and the voice output edited out. Furthermore, the VOCA was adapted more closely to resemble an alphabet board by the use of an overlay and by using it in spell mode. In this way, variables such as message length, conversational turns, conversational content and message encoding were eliminated.

The disadvantages included possible confusion of participants in following a message letter by letter when the AAC user corrected a placement error. Conversant with the DeltaTalker™ keyboard, he automatically corrected any errors by touching the 'delete last selection key' which appeared as a blank area on the overlay. In addition the 'space key' was activated between each word spelt and this too was not marked on the overlay. In observing the participants while they viewed the videotape, none showed evidence of confusion. Being unfamiliar with AAC methods, the participants merely seemed to note that the user spelt out his messages and they did not tend to follow each keystroke.

5.4.2 The development of the questionnaire

A second strength of the study was the development of the attitudinal scale. The questionnaire (CADAQ) was based on well-recognised theoretical constructs of attitude formation and communicative competence in addition to previous measures designed to determine peers' attitudes toward children with disabilities. Consideration was also given to scales designed to measure adults' attitudes towards persons with disabilities and other adults with LNFS. The advantage of the CADAQ over previous measures such as the CATCH was the addition of the communicative competence dimension in addition to the attitudinal dimensions. It was designed with children aged 11 years 0 months to 13 years 6 months in mind and was readily understood by the research participants, who were from this age range. The participants found it easy to complete and identified with the questions asked in it, and their involvement was obvious from the questions they posed after completing the questionnaires.

5.4.3 Limitations of the study

Several limitations of this study are apparent:

- The participants were from a limited urban geographical area and represented a narrow socio-economic group. Accordingly, results can only be generalised to this group.

- The study used only one child with physical disabilities and LNFS and quite different results toward a different AAC user may possibly have been revealed. Initial attitudes are influenced by factors such as physical attractiveness, gender and attire. In addition, the degree of severity of the disability of the child could influence initial peer attitudes.

- The small number of research participants (N=115) was a limitation of the study and, in addition, limited the statistical procedures that could be applied, e.g. it was not possible to do a factor analysis of the items of the questionnaire.

- The use of a questionnaire as a method of data collection had limitations and whether stated attitudes as determined by the CADAQ would be translated into overt behaviour is questionable (Fiedler & Simpson 1987).

- The internal consistency could be improved by the deletion of statement 26, which is ambiguous. Reliability could also be substantiated by correlation with an accepted attitudinal scale and by factor analysis using larger samples. Test, retest reliability has not been established.

- The voice output lacked intelligibility and also had a marked American accent. The VOCA used was a DeltaTalker™, which utilised synthesised speech, namely Dectalk (Perfect Paul voice option). The lack of intelligibility was especially apparent with respect to words such as 'webpages' and 'Frontpage'. This lack of intelligibility, as well as the American accent of the synthesised speech, may have influenced the attitudes of the peers who watched the video with speech output.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

Directions for further research include the following:

- A study of the actual interactive behaviours of peers to children with physical disabilities and LNFS using various AAC devices in various community environments including natural settings.

- The design and evaluation of a programme aimed at increasing peers' awareness of the communication difficulties experienced by children with LNFS. The programme would include strategies to modify the interactive behaviours of peers towards children with disabilities and LNFS and to compare the effectiveness of applied strategies.

- An investigation to compare the effect of various types of voice output of VOCAs on the attitudes of peers with the aim of facilitating the development of improved synthetic speech options. The study would need to include evaluations by VOCA users.

- The interaction of the AAC device used with other factors that are known to be important in the formation of initial attitudes to peers related to communicative competence factors.

- Additional studies with a larger group of participants to evaluate the psychometric properties of the CADAQ and with correlation to the CATCH in order further to validate the CADAQ.

5.6 SUMMARY

The conclusions of the research with respect to the aims of the study were presented at the beginning of this chapter. The clinical implications of these conclusions were then discussed, followed by a critical evaluation of the study leading to recommendations for additional research.

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Questionnaire

Please use ticks to indicate your answer

Respondent number

V1 [ ][ ][ ] 1-3

How old are you?

11 years [ ]
12 years [ ]
13 years [ ]

V2 [ ] 4

Are you

a boy [ ]
a girl [ ]

V3 [ ] 5

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree		
	Bubblegum tastes great							
	School pupils don't enjoy icecream							
1	Alan took an active part in the conversation						V4	6
2	Kim understood everything Alan said						V5	7
3	Our class works too quickly for Alan						V6	8
4	Alan would find it difficult to make friends at my school						V7	9
5	I feel sorry for Alan						V8	10
6	If I couldn't speak I would like to communicate like this						V9	11

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree		
7	I would worry if Alan sat next to me in class						V10	12
8	I found it easy to understand what Alan meant						V11	13
9	I think Alan has many friends						V12	14
10	It was easy to understand what Alan was "saying".						V13	15
11	I would like to talk to Alan						V14	16
12	Alan had interesting things to say						V15	17
13	I would tell my secrets to Alan						V16	18
14	Alan needs lots of help to do things						V17	19
15	I would be scared to talk to Alan						V18	20
16	I would be embarrassed to communicate like Alan does						V19	21
17	It would be fun to talk to Alan						V20	22
18	I would like to go to "The Spur" with Alan						V21	23
19	Alan would get teased in our class						V22	24
20	Alan could not communicate quickly enough						V23	25
21	Alan would be popular with the girls						V24	26
22	If Alan was in my class I would like to do a project with him						V25	27
23	I would try to stay away from Alan if he came to my school						V26	28

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree		
24	Alan was frustrated communicating like that.						V27	29
25	Alan was unable to say what he really wanted to						V28	30
26	Alan would need lots of help in the classroom						V29	31
27	Alan enjoyed communicating like this						V30	32
28	Alan could answer Kim's questions quickly enough						V31	33
29	I feel upset when I see how Alan has to "talk"						V32	34
30	Kim did not always understand what Alan wanted to say						V33	35
31	~~Alan would not be my best friend~~						V34	36
32	There must be better ways for Alan to communicate						V35	37
33	The way Alan communicated with Kim resulted in some misunderstanding						V36	38
34	Alan would be unwelcome at my birthday party						V37	39
35	Alan most likely comes last in class						V38	40
36	Alan should be good with computers						V39	41
37	I do not think Alan has much fun						V40	42
38	Alan could say exactly what he wanted to						V41	43
39	Alan needs lots of help to tell a story						V42	44
40	I would like Alan to sit next to me in class						V43	45

Questionnaire

Please use ticks to indicate your answer

Respondent number

For office use only

V1 [ ][ ][ ] 1-3

How old are you?

11 years [ ]
12 years [ ]
13 years [ ]

V2 [ ] 4

Are you

a boy [ ]
a girl [ ]

V3 [ ] 5

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree	
	Bubblegum tastes great						
	School pupils don't enjoy icecream						
1	Alan took an active part in the conversation						V4 [ ] 6
2	Our class works too quickly for Alan						V5 [ ] 7
3	Kim understood everything Alan said						V6 [ ] 8
4	Alan would find it difficult to make friends at my school						V7 [ ] 9
5	If I couldn't speak I would like to communicate like this						V9 [ ] 11

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree	For office use only	
6	I would worry if Alan sat next to me in class						V10	12
7	I found it easy to understand what Alan meant						V11	13
8	I think Alan has many friends						V12	14
9	I would be scared to talk to Alan						V13	15
10	I would like to talk to Alan						V14	16
11	There must be better ways for Alan to communicate						V15	17
12	I would tell my secrets to Alan						V16	18
13	I would be embarrassed to communicate like Alan does						V18	20
14	It was easy to understand what Alan was "saying".						V19	21
15	It would be fun to talk to Alan						V20	22
16	Alan would be unwelcome at my birthday party						V21	23
17	Alan would get teased in our class						V22	24
18	If Alan was in my class I would like to do a project with him						V23	25
19	Alan could not communicate quickly enough						V24	26
20	Alan would be popular with the girls						V25	27
21	I would try to stay away from Alan if he came to my school						V26	28

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree	For office use only	
22	Alan was frustrated communicating like that.						V27	29
23	Alan was unable to say what he really wanted to						V28	30
24	Alan could answer Kim's questions quickly enough						V29	31
25	Alan would need lots of help in the classroom						V31	33
26	I feel upset when I see how Alan has to "talk"						V32	34
27	Kim did not always understand what Alan wanted to say						V33	35
28	Alan would not be my best friend						V34	36
29	Alan had interesting things to say						V35	37
30	The way Alan communicated with Kim resulted in some misunderstanding						V36	38
31	I would like to go to "The Spur" with Alan						V37	39
32	Alan most likely comes last in class						V38	40
33	Alan should be good with computers						V39	41
34	I do not think Alan has much fun						V40	42
35	Alan could say exactly what he wanted to						V41	43
36	Alan needs lots of help to tell a story						V42	44
37	I would like Alan to sit next to me in class						V43	45

Questionnaire

Please use ticks to indicate your answer

Respondent number

How old are you?

11 years	
12 years	
13 years	

Are you

a boy	
a girl	

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree
	Bubblegum tastes great					
	School pupils don't enjoy icecream					
1	Alan took an active part in the conversation	5	4	3	2	1
2	Our class works too quickly for Alan	1	2	3	4	5
3	Kim understood everything Alan said	5	4	3	2	1
4	Alan would find it difficult to make friends at my school	1	2	3	4	5
5	If I couldn't speak I would like to communicate like this	5	4	3	2	1

For office use only

V1		1-3
V2		4
V3		5
V4		6
V5		7
V6		8
V7		9
V9		11

APPENDIX C – Scoring of the CADAQ

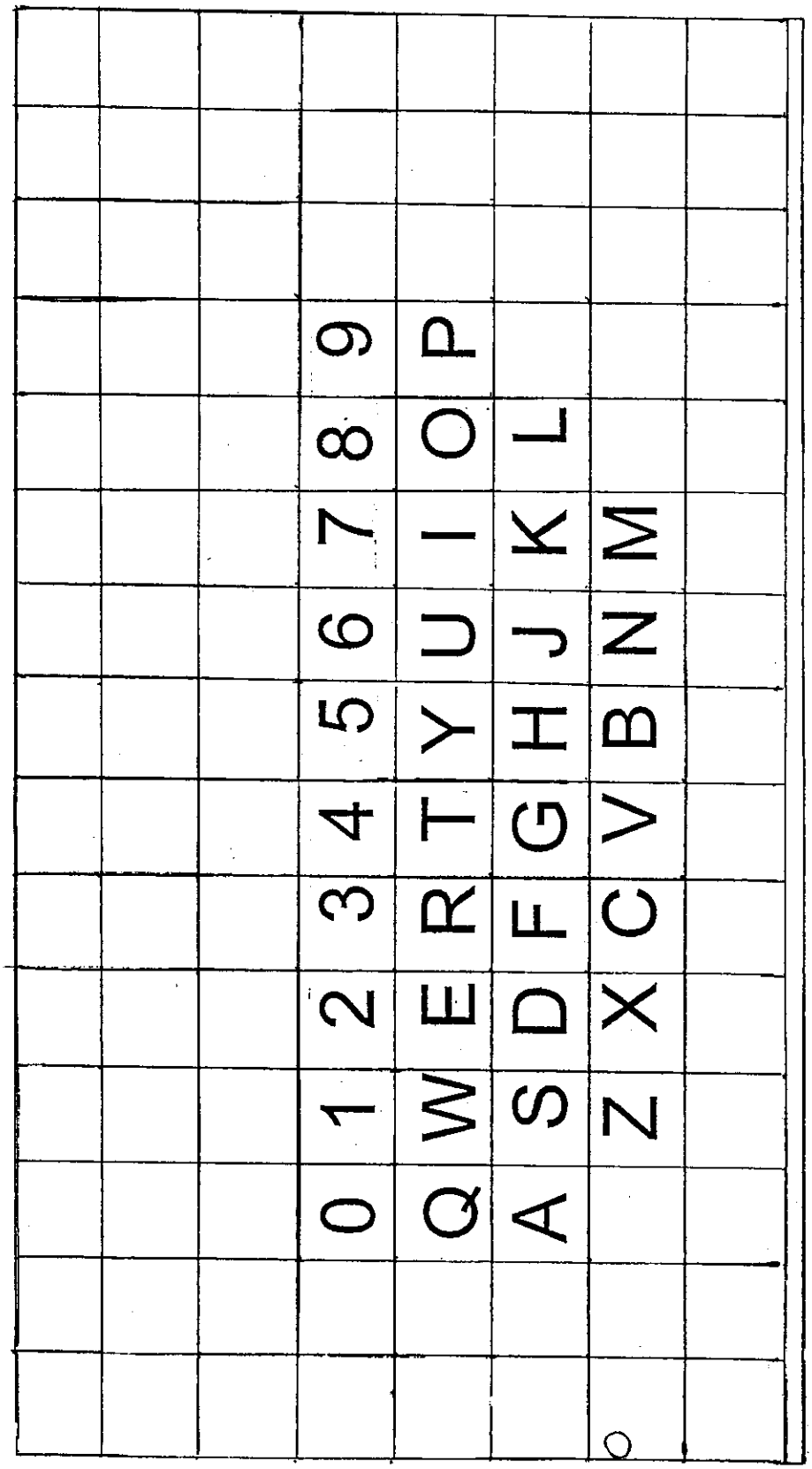
		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree
6	I would worry if Alan sat next to me in class	1	2	3	4	5
7	I found it easy to understand what Alan meant	5	4	3	2	1
8	I think Alan has many friends	5	4	3	2	1
9	I would be scared to talk to Alan	1	2	3	4	5
10	I would like to talk to Alan	5	4	3	2	1
11	There must be better ways for Alan to communicate	1	2	3	4	5
12	I would tell my secrets to Alan	5	4	3	2	1
13	I would be embarrassed to communicate like Alan does	1	2	3	4	5
14	It was easy to understand what Alan was "saying".	5	4	3	2	1
15	It would be fun to talk to Alan	5	4	3	2	1
16	Alan would be unwelcome at my birthday party	1	2	3	4	5
17	Alan would get teased in our class	1	2	3	4	5
18	If Alan was in my class I would like to do a project with him	5	4	3	2	1
19	Alan could not communicate quickly enough	1	2	3	4	5
20	Alan would be popular with the girls	5	4	3	2	1
21	I would try to stay away from Alan if he came to my school	1	2	3	4	5

For office use only

V10		12
V11		13
V12		14
V13		15
V14		16
V15		17
V16		18
V18		20
V19		21
V20		22
V21		23
V22		24
V23		25
V24		26
V25		27
V26		28

		I strongly agree	I agree	I can't decide	I disagree	I strongly disagree	For office use only		
22	Alan was frustrated communicating like that.	1	2	3	4	5	V27		29
23	Alan was unable to say what he really wanted to	1	2	3	4	5	V28		30
24	Alan could answer Kim's questions quickly enough	5	4	3	2	1	V29		31
25	Alan would need lots of help in the classroom	1	2	3	4	5	V31		33
26	I feel upset when I see how Alan has to "talk"	1	2	3	4	5	V32		34
27	Kim did not always understand what Alan wanted to say	1	2	3	4	5	V33		35
28	Alan would not be my best friend	1	2	3	4	5	V34		36
29	Alan had interesting things to say	5	4	3	2	1	V35		37
30	The way Alan communicated with Kim resulted in some misunderstanding	1	2	3	4	5	V36		38
31	I would like to go to "The Spur" with Alan	5	4	3	2	1	V37		39
32	Alan most likely comes last in class	1	2	3	4	5	V38		40
33	Alan should be good with computers	5	4	3	2	1	V39		41
34	I do not think Alan has much fun	1	2	3	4	5	V40		42
35	Alan could say exactly what he wanted to	5	4	3	2	1	V41		43
36	Alan needs lots of help to tell a story	1	2	3	4	5	V42		44
37	I would like Alan to sit next to me in class	5	4	3	2	1	V43		45

APPENDIX D – Overlay for DeltaTalker™ (Reduced)



APPENDIX E - Transcript of videotaped conversational extract

The following is a transcript of their conversation:

Kim: Hello Alan
Alan: Hi, Kim
Kim: What have you been doing on your computer lately?
Alan: Making webpages
Kim: What programme do you use?
Alan: Frontpage
Alan: What do you look up on Internet?
Kim: I look up information for school projects
Kim: How has school been lately?
Alan: O.K. But very busy
Kim: What have you been busy with?
Alan: Work

APPENDIX F – Letter of consent from principal of AAC user

114 Blair Atholl Road
WESTVILLE
12TH March 1999.

The Principal
Browns School
Pvt. Bag X04
ASHWOOD,
3604.

Dear Mr Griessel,

I would like to confirm that I have your permission for Christopher Engels, a pupil at the Browns School to be videotaped for a research project. The purpose of research is to establish whether there is a difference in peer attitudes to a child using an AAC device, depending on whether voice output is utilised. The research is being completed in partial fulfilment of the requirements for the M. Communication Pathology Degree, University of Pretoria.

Christopher will be filmed having a conversation using his DeltaTalker in spell mode with Kim Lilienfeld. Although his face will be visible he will be referred to by the pseudonym of Alan. The videotape will be shown to pupils in Grades 6 and 7 at the Pinetown and Westville Senior Primary Schools.

I have explained the purpose and format of the project to both Christopher and his parents and Christopher is most willing to assist. The completed videotape will be shown to Christopher and his parents before it is used for the research and they have the right to withdraw their permission at any stage of the research.

Yours faithfully,

M. S. Lilienfeld
Occupational Therapist.

Please sign below to acknowledge your permission.

Permission granted

J. S. Griessel
Principal

Date: 17/3/1999

APPENDIX G – Letter of consent from principal of research subjects

114 Blair Atholl Road
WESTVILLE
20TH March 1999.

The Principal
Westville Senior Primary School
Westville Road
WESTVILLE
3630.

Dear Mr De Bruyn

I would like to request your permission for approximately 100 pupils from Grade 6 and Grade 7 to participate in a research project. The purpose of the research is to establish whether there is a difference in peer attitudes to a child using an AAC device, depending on whether voice output is utilised. The pupils will be required to complete a questionnaire having watched a video of a child with a disability communicating with an alphabet board. The research is being completed in partial fulfilment of the requirements for the M. Communication Pathology Degree, University of Pretoria.

Parental permission will be solicited and only those pupils whose parents have granted permission will be included in the study. The pupils will not be required to write their names on the questionnaire and their anonymity is assured. Attached is the form which will be sent to the parents requesting permission for their child to participate in the research study.

The video and questionnaire can be utilised in the class theme on disability and I am willing to respond to any questions the pupils may have immediately following the completion of the questionnaires. Permission has been granted by the KZN Education department for the research to take place and I will be happy to provide a copy of the completed dissertation for your school.

Yours faithfully,

Margi Lilienfeld.

M. S. Lilienfeld
Occupational Therapist.

Please sign below to acknowledge your permission.

Mr E. de Bruyn
Principal

Date: 30/03/99.

APPENDIX H– Parental consent letter

114 Blair Atholl Road
WESTVILLE
13rd May 1999.

Dear Parents,

Mrs M. Lilienfeld, an occupational therapist, is undertaking a study of children's attitudes to peers with disabilities.

Permission is requested to allow your son/daughter ..... to participate in the research project. Following a short video of a disabled child your child will be requested to complete a short questionnaire. Your child's name will not appear on the questionnaire and his/her anonymity is assured.

The research is being completed in partial fulfilment of the requirements for the M. Communication Pathology Degree, University of Pretoria.

The video and questionnaire will form part of the class theme on disability awareness and will not result in your child missing academic school time.

Please complete the section below and return it to the class teacher on or before

7th May 1999.

✂ ----------

I, ...give/ withhold my permission for my child

..... to take part in the research project on attitudes

to disabled peers.

Signed: ..... Date:

Parent/Guardian

APPENDIX I – Table of frequencies and item/scale correlations of the affective/behavioural dimension

	1. Affective/Behavioural Components						
	Voice						
		1	2	3	4	5	Item/scale Correlation
6	I would worry if Alan sat next to me in class	5%	12%	28%	30%	25%	.48
9	I would be scared to talk to Alan	0%	11%	18%	42%	30%	.66
13	I would be embarrassed to communicate like Alan does	4%	11%	23%	37%	26%	.58
15	It would be fun to talk to Alan	4%	16%	23%	46%	12%	.86
26	I feel upset when I see how Alan has to "talk"	44%	44%	9%	4%	0%	-.13
10	I would like to talk to Alan	2%	9%	25%	35%	30%	.84
12	I would tell my secrets to Alan	5%	21%	33%	33%	7%	.66
16	Alan would be unwelcome at my birthday party	0%	4%	21%	28%	47%	.73
18	If Alan was in my class I would like to do a project with him	2%	21%	30%	37%	11%	.73
21	I would try to stay away from Alan if he came to my school	0%	2%	19%	21%	58%	.76
28	Alan would not be my best friend	4%	19%	32%	23%	23%	.75
31	I would like to go to "The Spur" with Alan	5%	16%	42%	26%	11%	.74
37	I would like Alan to sit next to me in class	7%	12%	33%	28%	19%	.81
	Affective/Behavioural Components						
	NO VOICE						
		1	2	3	4	5	Item/scale Correlation
6	I would worry if Alan sat next to me in class	2%	16%	19%	48%	16%	.51
9	I would be scared to talk to Alan	0%	10%	17%	45%	28%	.73
13	I would be embarrassed to communicate like Alan does	9%	26%	26%	33%	7%	.67
15	It would be fun to talk to Alan	3%	14%	31%	47%	5%	.50
26	I feel upset when I see how Alan has to "talk"	45%	38%	7%	5%	5%	.17
10	I would like to talk to Alan	0%	5%	19%	62%	14%	.52
12	I would tell my secrets to Alan	7%	24%	43%	22%	3%	.45
16	Alan would be unwelcome at my birthday party	2%	10%	31%	38%	19%	.73
18	If Alan was in my class I would like to do a project with him	3%	29%	41%	22%	3%	.61
21	I would try to stay away from Alan if he came to my school	0%	9%	12%	40%	40%	.72
28	Alan would not be my best friend	7%	36%	29%	22%	5%	.74
31	I would like to go to "The Spur" with Alan	7%	26%	43%	21%	3%	.78
37	I would like Alan to sit next to me in class	5%	36%	38%	17%	3%	.75

APPENDIX J – Table of frequencies and item/scale correlations of the cognitive/belief dimension

2. Cognitive Components							
	VOICE						
		1	2	3	4	5	Item/scale Correlation
2	Our class works too quickly for Alan	25%	39%	16%	19%	2%	.42
4	Alan would find it difficult to make friends at my school	11%	30%	30%	23%	7%	.64
8	I think Alan has many friends	2%	16%	39%	33%	11%	.70
17	Alan would get teased in our class	14%	40%	18%	19%	9%	.43
20	Alan would be popular with the girls	28%	30%	35%	4%	4%	.63
25	Alan would need lots of help in the classroom	39%	39%	9%	14%	0%	.67
29	Alan had interesting things to say	2%	18%	25%	46%	11%	.55
32	Alan most likely comes last in class	5%	9%	30%	42%	14%	.64
33	Alan should be good with computers	2%	2%	16%	53%	28%	.33
34	I do not think Alan has much fun	14%	35%	18%	25%	9%	.76
36	Alan needs lots of help to tell a story	23%	49%	11%	12%	5%	.69
Cognitive Components							
	NO VOICE						
		1	2	3	4	5	Item/scale Correlation
2	Our class works too quickly for Alan	45%	40%	10%	5%	0%	.51
4	Alan would find it difficult to make friends at my school	9%	41%	22%	24%	3%	.47
8	I think Alan has many friends	2%	16%	60%	22%	0%	.62
17	Alan would get teased in our class	14%	31%	17%	29%	9%	.47
20	Alan would be popular with the girls	16%	48%	36%	0%	0%	.55
25	Alan would need lots of help in the classroom	40%	50%	3%	7%	0%	.56
29	Alan had interesting things to say	2%	16%	50%	31%	2%	.44
32	Alan most likely comes last in class	2%	7%	34%	28%	29%	.61
33	Alan should be good with computers	2%	3%	21%	48%	26%	.55
34	I do not think Alan has much fun	16%	31%	9%	31%	14%	.67
36	Alan needs lots of help to tell a story	24%	36%	17%	16%	7%	.71

APPENDIX K – Table of frequencies and item/scale correlations of the communicative competence dimension

3. Communicative Competence Components							
	VOICE	1	2	3	4	5	Item/scale Correlation
1	Alan took an active part in the conversation	0%	0%	14%	49%	37%	.34
3	Kim understood everything Alan said	0%	5%	26%	46%	23%	.49
5	If I couldn't speak I would like to communicate like this	4%	19%	23%	37%	18%	.58
7	I found it easy to understand what Alan meant	2%	35%	32%	32%	0%	.69
11	There must be better ways for Alan to communicate	18%	40%	28%	11%	4%	.51
14	It was easy to understand what Alan was "saying".	4%	37%	30%	28%	2%	.67
19	Alan could not communicate quickly enough	9%	46%	23%	19%	4%	.60
22	Alan was frustrated communicating like that.	4%	28%	42%	14%	12%	.67
23	Alan was unable to say what he really wanted to	9%	32%	32%	23%	5%	.62
24	Alan could answer Kim's questions quickly enough	11%	33%	32%	23%	2%	.76
27	Kim did not always understand what Alan wanted to say	4%	37%	35%	25%	0%	.52
30	The way Alan communicated with Kim resulted in some misunderstanding	4%	37%	44%	12%	4%	.64
35	Alan could say exactly what he wanted to	4%	39%	14%	37%	7%	.58
Communicative Competence Components							
	NO VOICE	1	2	3	4	5	Item/scale Correlation
1	Alan took an active part in the conversation	0%	12%	7%	59%	22%	.52
3	Kim understood everything Alan said	2%	22%	48%	22%	5%	.57
5	If I couldn't speak I would like to communicate like this	7%	26%	36%	21%	10%	.52
7	I found it easy to understand what Alan meant	40%	57%	2%	2%	0%	.53
11	There must be better ways for Alan to communicate	14%	71%	10%	5%	0%	.26
14	It was easy to understand what Alan was "saying".	47%	47%	5%	2%	0%	.46
19	Alan could not communicate quickly enough	14%	47%	21%	175	2%	.60
22	Alan was frustrated communicating like that.	17%	31%	38%	12%	2%	.44
23	Alan was unable to say what he really wanted to	10%	36%	22%	22%	9%	.62
24	Alan could answer Kim's questions quickly enough	19%	475	17%	17%	0%	.57
27	Kim did not always understand what Alan wanted to say	12%	48%	29%	10%	0%	.54
30	The way Alan communicated with Kim resulted in some misunderstanding	9%	67%	17%	7%	0%	.31
35	Alan could say exactly what he wanted to	14%	48%	165	16%	7%	.65