

Attitudes toward Individuals Who Use Augmentative and Alternative Communication: Research Review

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This paper presents the findings of a review of 13 studies of attitudes toward individuals who use augmentative and alternative communication (AAC). The following factors that influenced attitudes were found: characteristics of typically developing individuals, characteristics of the person using AAC, and characteristics of AAC systems' output. This research base indicates that females reported more positive attitudes than males, and that individuals with previous experience with people with disabilities reported more positive attitudes than did individuals who had no previous experience with people with disabilities. The AAC system and other factors studied did not appear to be influential as single factors; however, data from the studies reviewed provide support for the hypothesis that attitudes are formed by the interaction of many different factors. There has been limited research in techniques to change attitudes toward individuals who use AAC. A recommendation from this review is that future research should focus on strategies to modify both attitudes and behavior in order to reduce barriers to social interaction.

Keywords: Attitudes; Augmentative and alternative communication; Research review

INTRODUCTION

Triandis (1971) defined an attitude as "...an idea charged with emotion which predisposes a class of actions to a particular class of social situations" (p. 2). This definition reflects three components: cognitive (opinions and beliefs), affective (feelings and preferences that are evaluative), and behavioral (actions and statements of intent) (Antonak & Livneh, 1988; Triandis, Adamopoulos, & Brinberg, 1984). Eiser (1986) highlighted three common assumptions about attitudes: (a) they involve some kind of evaluation about something or someone, (b) they can be expressed through language, and (c) they are related to social behavior in a way that is predictable. Attitude research toward individuals who use augmentative and alternative communication (AAC) appears to posit a predictable attitude/behavior relationship in discussions of findings, although reviews offer little support for either a predictable

or an unpredictable correlation (Hegde, 1994; Schlosser, Blischak, & Koul, 2003).

Negative attitudes about individuals who use AAC create barriers that limit opportunities for communication and full participation in society. Negative attitudes, for example, may influence people's willingness to interact with individuals who use AAC, thereby interfering with the formation of meaningful social relationships (McCarthy, Light, & McNaughton, 2002). Negative educator attitudes could lead to low expectations and ultimately to poor academic outcomes for individuals who use AAC (Popich & Alant, 1997). Employers with negative attitudes toward individuals who use AAC may have differential hiring and assignment practices (McNaughton, Light, & Arnold, 2002; McNaughton, Light, & Groszyk, 2001). Finally, negative attitudes of legislators and administrators can lead to discriminatory policies or practices (Beukelman & Mirenda, 1998). An understanding of people's

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attitudes toward individuals who use AAC can help to determine the most effective methods for attitude and behavior change (Triandis et al., 1984). Positive attitudes can help replace barriers with supports, and biases with appropriate expectations.

Goals

Given the potential importance of attitudes, a systematic review of the research was undertaken with the following goals: (a) review studies in which people's attitudes toward individuals who use AAC have been measured; (b) evaluate the strengths and limitations of this evidence; (c) review the research on changing attitudes toward individuals who use AAC; and (d) discuss directions for future research into attitudes and attitude change.

METHODS

Criteria for Inclusion and Exclusion of Studies

Studies included were those that (a) were published or were completed as part of doctoral dissertations between 1980 and 2002; (b) included measures of attitudes toward individuals who use AAC; and (c) were written in English. Studies were excluded that (a) included measures of attitudes toward AAC systems but failed to introduce a person as a referent at any time, (b) included only perceptions of communicative competence and not attitudes, and (c) included measures of attitudes toward facilitated communication. A dissertation was excluded if the results were reported in a peer-reviewed article that was already included in this review. If the aim of a study was to validate a measurement instrument, it was included in the section on measurement, but was not reviewed as a separate study.

Search Methods

The search procedures to find these studies were: (a) computer literature search of PsycINFO (using keywords "attitudes" and "augmentative communication"), Medline (using key words "attitude" and "communication aid disability", with a search of "related articles" for each hit); Education Resources Information Center (ERIC) (using key words "attitude" and "augmentative communication"); Current Contents (using key words "attitude" and "augmentative communication"); and Dissertation Abstracts International (using "attitudes" and "augmentative" and "communication" as keywords and title search

words); (b) hand search of major peer-reviewed, journals published in English including, all issues from 1985–2002 of *Augmentative and Alternative Communication*, the *Journal of Speech Language and Hearing Research*, the *Journal of Speech and Hearing Disorders*, the *American Journal of Speech Language Pathology*, *Language Speech and Hearing Services in the Schools*, and the *International Journal of Language and Communication Disorders*; and (c) ancestral search of the reference lists of each study meeting any of the above criteria. The search procedures yielded a total of 17 studies; upon further examination, 13 of these studies met the criteria for the current review. The four studies that were excluded were evaluations of the effectiveness of AAC systems or had the aim of measuring attitudes toward AAC systems rather than attitudes toward individuals who used AAC (Hustad, 2001; Lasker & Beukelman, 1999; Raney & Silverman, 1992; Soto, 1997). In two papers, data were reported as two separate studies within the same article (Beck, Fritz, Keller, & Dennis, 2000; Beck et al., 2001); however in both cases, the first study was a validation of the measurement tool.

Review Parameters

The review parameters included the number and ages of participants, independent variables, individual(s) using AAC presented as a reference for participants (including the media used and context provided), dependent variables (instruments/means used to measure attitudes), and the results of the study. The results, including main effects and interactions between variables, were summarized. Although in some studies, factors outside of attitudes were considered in independent analyses (e.g., Gorenflo, Gorenflo, & Santer, 1994), only results pertaining to attitudes toward individuals who use AAC were included in the present review. Information from field testing or validating a new measurement tool was not included in the results of this review, but was considered in reviewing the reliability and validity of each instrument.

RESULTS

A summary of the 13 studies included in this review is presented in Table 1. All of the studies involved groups of typically developing children or undergraduate students who viewed a videotaped interaction of a typically developing partner and an individual using AAC. In general, the

TABLE 1 Summary of studies measuring attitudes toward individuals who use AAC

Study	<i>n</i>	Age	Independent variable(s)	Referent	Instrument	Results
Beck & Dennis (1996)	186	C	AAC system; school inclusion policy; rater gender	Boy with CP	CATCH ^a	Alphabet board no different than high-tech Integrated schools more positive than non-integrated Girls more positive than boys
Beck, Fritz et al. (2000)	128	C	AAC system; referent photo shown; school grade; rater gender	Device + hand of user photo of nondisabled child in/not in wheelchair	AATAAC ^b	Grade 1 boys more positive than Grade 1 girls Grade 3, 5 girls more positive than Grade 3, 5 boys Grade 1 viewing high-tech & child not in wheelchair more positive than grade 1 viewing high-tech & child in wheelchair Grade 1 viewing overlay only & child in wheelchair more positive than Grade 1 viewing overlay only & child not in wheelchair
Beck, Kingsbury et al. (2000)	172	C	Aided message length; school Inclusion policy; rater gender	Device + hand of user	AATAAC ^b	Non-inclusion school viewing 2–4 word messages more positive than non-inclusion school viewing 1 word messages Integrated school + 2–4 word no different than integrated + 1 word Girls more positive than boys
Beck et al. (2001)	188	U	AAC system; disability label; competency	Device + hand of user	PARCCA ^c	Overlay only no different than high-tech; No difference for no label, ID label, physically disabled label “High” competency more positive than “low” competency on cognitive subscale only
Beck et al. (2002)	67	C	AAC system; Competency; School Grade; Rater gender	Device + hand of user	AATAAC ^b	Overlay only no different than high-tech High competence no different than low competence Grade 4 no different than grade 5 Girls more positive than boys
Blockberger et al. (1993)	249	C	AAC system; rater reading level; rater gender	Girl with hemiplegia	CATCH ^a	No difference for unaided, alphabet board, high-tech Rater high reading level more positive than rater low reading level Girls more positive than boys
Dada & Alant (2002)	28	A	AAC system; school inclusion policy	Device + back of boy with CP	TAS ^d	Overlay only no different than high-tech Separate school no different than integrated school
Gorenflo & Gorenflo (1991)	151	U	AAC system; information	Adult male with CP	ATNP ^e	High-tech more positive than alphabet board Alphabet board more positive than unaided With information on user more positive than no information on user- evaluation subscale only
Gorenflo et al. (1994)	284	U	Synthesizer gender; rater gender	Nondisabled adult female in wheelchair	ATNP ^e	Male synthesizer no different than female synthesizer Higher ease of listening more positive than low ease of listening interaction subscale only Female raters more positive than male raters-(evaluation subscale)

(continued overleaf)

TABLE 1 (continued)

Study	<i>n</i>	Age	Independent variable(s)	Referent	Instrument	Results
Gorenflo & Gorenflo (1997)	95	U	Synthesizer gender; AAC user gender; rater gender	Nondisabled adult female/male in wheelchair	ATNP ^c	Male rating male with high-similarity more positive than male rating male with low-similarity Female rating female with high-similarity more positive than female rating female with low-similarity Female rating male with high similarity more positive than female rating male with low similarity- (evaluation subscale)
Lilienfeld & Alant (2002)	115	C	Voice Output; Rater gender	Boy with CP	CADAQ ^f	Voice output more positive than no voice output (2/3 subscales) Girls more positive than boys
Macke (1992)	146	U	AAC system; AAC user age	Boy with CP Teenage boy with CP	7-pt Likert	High-tech more positive than alphabet board (2/3 subscales) Child user no different than teenage user
O'Keefe (1992)	96	A	AAC system	4 Adult females with CP	ATNP ^c	Different effects with different users viewed Some evidence combined VOCA & visual display ranked highest

Note. C = child, U = undergraduate, A = adult, CP = cerebral palsy, ID = intellectual disability

^aChedoke-McMaster Attitudes Toward Children with Handicaps (Rosenbaum, Armstrong, & King, 1986a). ^bAssessment of Attitudes Toward Augmentative/Alternative Communication (Beck, Fritz et al., 2000). ^cProfessionals' Attitudes Regarding Children who Communicate Augmentatively (Beck et al., 2001). ^dTeacher Attitudinal Scale (Dada & Alant, 2002). ^eAttitudes Toward Nonspeaking Persons (Gorenflo & Gorenflo, 1991). ^fCommunication Aid/Device Attitudinal Questionnaire (Lilienfeld & Alant, 2002).

videotaped interactions followed a pre-determined script and were relatively short. After watching the video, participants self-reported their attitudes on one of several different scales. Studies have varied according to whether or not an individual with a visible physical disability was observed, and to the extent which the person using AAC was seen in the videotape (e.g., in some cases, only the hand of the person using AAC was shown).

In research to date, characteristics of typically developing individuals, the individuals using AAC, and the AAC systems and their influence on the attitudes of typically developing individuals toward people who use AAC, have been investigated. These are explored further in the upcoming sections.

Characteristics of Typically Developing Individuals

The characteristics of the person interacting with or observing an individual using AAC may have an impact on attitudes. In the studies reviewed, the effects of the following variables on attitudes were investigated: age, gender, reading level, experience with individuals with disabilities, and perceived similarity of the rater to the individual using AAC.

Age

Attitudes of both children and adults have been studied in AAC research; however in only two studies was age a factor in the analysis. Beck, Fritz et al. (2000) found that children in Grade 3 reported more positive attitudes than children in Grade 5. The study results indicate that there may be developmental trends; however age may also interact with gender. Beck, Bock, Thompson and Kosuwan (2002) found no difference in children's attitudes in Grades 4 versus 5. Although no causal conclusions could be drawn, Macke (1992) found no correlation between attitudes toward individuals who used AAC and semester rank in an undergraduate program for individuals studying to become special educators.

Gender

In eight studies, the effects of gender on attitudes toward people who use AAC were analyzed. In seven of these studies, females reported more positive attitudes than males (Beck et al., 2002; Beck & Dennis, 1996; Beck et al., 2000; Beck, Kingsbury, Neff, & Dennis, 2000; Blockberger, Armstrong, O'Conner, & Freeman, 1993; Gorenflo et al., 1994; Lilienfeld & Alant, 2002). For children in Grade 1 only, Beck, Fritz et al. (2000)

found that boys reported more positive attitudes than girls.

Reading Level

In one of the studies reviewed, the covariance of reading comprehension level scores with attitudes was analyzed (Blockberger et al., 1993). Results suggested that children with higher reading comprehension level scores reported more positive attitudes than children with lower reading comprehension level scores.

Experience with Individuals with Disabilities

In two studies, children recruited from schools with policies of integrating children with disabilities were compared to those children recruited from schools without integration policies. In these studies, the aim was to investigate the effect of experience with individuals with disabilities (not specifically with individuals who used AAC) on children's attitudes toward individuals who used AAC (Beck & Dennis, 1996; Beck, Kingsbury et al., 2000). In both of these studies it was found that children in integrated schools reported more positive attitudes than those in non-integrated schools. However, Beck, Kingsbury et al. (2000) found that children in non-integrated schools appeared to react differently to observed message lengths than children in integrated schools (this issue is further discussed below in the section on length of message produced by the individual using AAC).

Dada and Alant (2002) compared the attitudes of teachers in schools serving only children with disabilities to those in integrated schools in their attitudes toward a child using AAC. They failed to find any difference in teacher attitudes between the two schools.

Perceived Similarity of the Rater to the Individual Using AAC

Gorenflo and Gorenflo (1997) investigated the effects on attitudes of perceived similarity between the rater and the individual using AAC who was observed. They instructed typically developing participants to rate themselves as either similar or dissimilar to a person using AAC shown in a videotaped conversation. Participants indicated similarity or dissimilarity in general, in values, and in activities of daily living. Individuals who reported high similarity were found to have more positive attitudes than individuals who reported low similarity when the rater was the same gender as the individual using AAC. When rating an individual of the opposite

gender, females who reported high similarity had more positive attitudes than females who reported low similarity on the evaluation subscale of the Attitudes Toward Nonspeaking Persons scale (ATNP), but not the overall instrument. No effect was found for similarity for males who rated a female using AAC.

Characteristics of Individuals who use AAC

In addition to studying the characteristics of typically developing observers, in four studies the effects of different characteristics of a person using AAC on observer attitudes were investigated. Three characteristics were studied: competency of the individual, length of message produced, and age.

Competency of the Individual Using AAC

Beck et al. (2001, 2002) investigated the effect of competency on attitudes. In both studies, competency was dichotomized into either high or low, depending on the time the individual who used AAC took before responding to the conversational partner's statement, and the number of times the partner pointed to the correct picture to prompt a response from the individual using AAC. High competency was generally defined as mean response latency of 1.5 s (maximum of 4.1 s) with no prompts from the conversational partner. Low competency was generally defined as mean response latency of 3 s (maximum of 9 s), with repeated prompts from the conversational partner. According to Beck et al. (2001), preservice professionals reported more positive attitudes when they viewed a person using AAC who was portrayed as having high competency than when they viewed a person using AAC who was portrayed as having low competency on the cognitive subscale of the Professionals' Attitudes Regarding Children who Communicate (PARCCA), but not on the overall attitude scale. Beck et al. (2002) found that children in Grades 4 and 5 demonstrated no difference in reported attitudes when viewing a high competency versus a low competency video.

Length of Message Produced by the Individual Using AAC

Beck, Kingsbury et al. (2000) considered the effect of message length on attitudes. They compared the attitudes of groups of children in Grades 3 and 5 who saw the hand of a person producing single word versus 2–4 word messages. Results indicated that children in non-integrated schools had more positive atti-

tudes when they viewed 2–4 word messages than children in non-integrated schools who viewed single word output. Attitudes of children in integrated schools differed across gender but not across the two message length conditions, so it is possible that message length has more of an impact with individuals who have less experience with individuals with disabilities.

Age of Individual Using AAC

Macke (1992) found no difference in reported attitudes when pre-service professionals rated a child versus an adolescent who used AAC. No specific ages were given, but pre-service professionals rated individuals younger than themselves. In no other attitude studies have differences according to the age of the individual using AAC been investigated.

Characteristics of the AAC System

In the majority of studies reviewed ($n = 12$), the effect of AAC systems on the self-reported attitudes of typically developing individuals was been investigated. Specifically, attitudes toward the use of light-tech (e.g., alphabet boards, printed copies of overlays) and high-tech (e.g., voice output communication aids) systems were compared. In two studies, the effect of different synthesizers on listener attitudes toward an individual using AAC was examined. In one study, the effect of the presence or absence of voice output on observer attitudes was studied.

Light-Tech Versus High-Tech Comparisons

In nine of the studies, light-tech systems (e.g., alphabet boards, printed copies of overlays) were compared to voice output communication aids (Beck et al., 2002; Beck & Dennis, 1996; Beck, Fritz et al., 2000; Beck et al., 2001; Blockberger et al., 1993; Dada & Alant, 2002; Gorenflo & Gorenflo, 1991; Macke, 1992; O'Keefe, 1992). In two of these studies, an unaided condition (e.g., either natural speech or manual sign or gesture) was also included (Blockberger et al., 1993; Gorenflo & Gorenflo, 1991). In seven of the nine studies no effect for light-tech versus high-tech AAC systems on listeners' overall attitudes was found. The evidence suggests that an AAC system is probably not a single controlling factor in attitudes toward individuals who use AAC. Of the nine studies, in only one was it reported that a high-tech option elicited more positive attitudes than light-tech systems on all subscales of the attitude instrument (Gorenflo & Gorenflo, 1991).

Macke (1992) indicated pre-service teachers reported more positive attitudes toward two different individuals using high-tech systems than toward the same two individuals using an alphabet board on two out of three subscales (academic achievement and social acceptance) of her attitude instrument.

Children were participants in all of the studies in which no differences in attitudes were found across high-tech versus light-tech conditions. Lilienfeld and Alant (2002) found that children aged 11 to 13 reported more positive attitudes toward an individual using AAC with the presence of voice output than without voice output on two out of three subscales (affective-behavioral and communicative competence). There are two possible explanations for the different findings: First, the synthesized voice was edited out for the non-voice output condition, which makes Lilienfeld and Alant's (2002) study different than the other studies of high-tech versus light-tech AAC. Furthermore, statistical analyses revealed that the participants who observed the no voice-output condition displayed "less consistent responding" than those who observed the voice-output condition (Lilienfeld & Alant, 2002, p. 95).

There are several possible explanations for the attitude differences in light-tech and high-tech conditions that were identified in the studies by Gorenflo and Gorenflo (1991) and Macke (1992). First, because both studies involved adults, it is possible that older individuals' attitudes were more influenced by high-tech versus light-tech systems. Furthermore, in two reviews of the role of speech output on listener attitudes (Schlosser, 2003a; Schlosser et al., 2003), the authors suggested that differences in the script, independent variable, and the attitude scale used could have accounted for differences in the Gorenflo and Gorenflo (1991) study. Methodological differences were also present in the study by Macke (1992) in comparison to the Gorenflo and Gorenflo (1991) study.

Different Synthesizers

Gorenflo et al. (1994) investigated the effect of different synthesizers on attitudes. They found that listener attitudes toward individuals using AAC were more positive when the person was using a synthesizer that was rated as "easier to listen to." Gorenflo et al. (1994) and Gorenflo and Gorenflo (1997) found no difference in attitudes according to whether or not there was a match between the gender of the synthesized voice and the gender of the communicator.

Gorenflo et al. (1994) found that female raters' attitudes were more positively influenced by increases in ease of listening than were male raters' attitudes on the evaluation subscale of the attitude instrument used. Given that all of the studies regarding different synthesizers focused on undergraduate students, the generality of these results is not yet certain (Schlosser et al., 2003).

Summary

The results suggest individuals who use AAC may be more at risk for encountering negative attitudes from males than from females and from individuals without previous experience with people with disabilities than from individuals with previous experience with people with disabilities. In most studies reviewed, the use of a high-tech system rather than a light-tech system did not seem to have an effect on listener attitudes.

DISCUSSION

Strengths and Limitations of Attitude Research in AAC

The research to date has made a significant contribution by defining factors that may serve to put individuals who use AAC at risk for encountering negative attitudes. There are a number of issues that should be considered in interpreting the results. These are issues related to stimuli and procedures, and issues related to measurement of attitudes.

Stimuli and Procedures

Most researchers have asked people without disabilities to view videos and report their attitudes toward individuals who use AAC. Attitudes reported may have been influenced by these stimuli and procedures, specifically by the individuals who used AAC, the contexts presented, and the media used.

Individuals Using AAC

In most studies, observers watched videos that showed an individual who used AAC. In some cases, the individual was actually a person who genuinely required and used AAC (e.g., Beck & Dennis, 1996; Blockberger et al., 1993). In other cases, a person without disabilities was used to represent a person who used AAC (e.g., Gorenflo & Gorenflo, 1997; Gorenflo et al., 1994). In four studies the individual using AAC was not shown in the video, but rather a hand selecting items on a

display was shown (Beck et al., 2002; Beck, Fritz et al., 2000; Beck, Kingsbury et al., 2000; Beck et al., 2001). In all of the studies, whether the individual was in view or not, the AAC system was in view.

Seeing only a device makes it difficult for participants to report on their attitudes toward an individual or group of individuals. Given the heterogeneity of the AAC population, it is difficult to generalize the results to all individuals who use AAC when observers have viewed only one individual who uses AAC (or only her or his hand). In only two studies were participants asked to rate their attitudes toward more than one individual who actually used AAC (Macke, 1992; O'Keefe, 1992). O'Keefe (1992) found that reported attitudes varied toward four different individuals who were shown using AAC, while Macke (1992) found no reported differences in attitudes toward a child and a teenage boy who used AAC. To be sure, challenges in generalization with individuals who use AAC are not limited to attitude studies.

Context of Interaction

In all of the attitude studies in AAC, individuals who rated their attitudes toward a total stranger who used AAC via direct selection were investigated. To date, there has been no research into the attitudes of people in different relationships with individuals who use AAC. In schools, for example, children who use AAC may be present in class everyday, but rarely interact with their classmates (Calculator, 1996). In employment settings, co-workers may interact often or very little and have different relationships with individuals who use AAC. The potential for prolonged contact between individuals without disabilities and those who use AAC was ignored in all studies, in which only short videotaped interactions were presented to participants. Conversational topics were used in the studies to provide a context for the interaction. Different topics of conversation across interactions, however, may influence attitudes. When comparing groups, it is important that group differences are not affected by differences in the conversations they view. In eight of the studies, identical scripted conversations were used to ensure experimental control across conditions. Researchers in four of the studies who did not report using identical scripted interactions used either conversations with very similar topics (Beck & Dennis, 1996; Dada & Alant, 2002; O'Keefe, 1992), or two very similar scripts (Beck, Kingsbury et al., 2000). Topics of conversation ranged from social exchanges, to content-area questions in a classroom (Macke, 1992), to simulated job interviews (O'Keefe, 1992). In 12 of the studies

variations in partner behavior were controlled by using the same university student or adult as the conversational partner in each condition. Dada and Alant (2002) included a 15 year-old peer rather than an adult in their study.

Media

In all of the studies a video was used to present an interaction between an individual using AAC and a conversational partner. The use of videotapes allowed for construction of stimuli that differed only in the variable of interest to the researcher. O'Keefe (1992) tested the validity of using video by asking eight typically developing individuals to rate their attitudes toward a person without disability simulating the use of AAC in three different conditions: participating in a live conversation, viewing a conversation in the same room (but not participating), or viewing an interaction via videotape. No statistically significant differences in attitudes among the three conditions were found. The results suggest that the use of video may be a viable medium for assessing attitudes toward individuals who use AAC; however, O'Keefe's (1992) study included only a small number of participants. Observation of video-taped interactions is only one of several methods that have been used to study attitudes. Other methods have included interviews following extended live interactions, and rank order preference tasks completed after multiple interactions (Antonak & Livneh, 1988).

Measurement

In all of the studies, self-report Likert-type scales were used to measure attitudes. In Table 2, the instruments used are listed, along with their psychometric properties. Two issues are of fundamental importance in ensuring appropriate measures of attitudes: reliability and validity.

Reliability

It is important to establish that scores obtained from an instrument are based on items that are internally consistent (i.e., related to each other), and reliable (i.e., elicit the same responses from the same people over time). Most of the seven instruments used in the studies reviewed with reported reliability data indicated good internal consistency for the overall scale (i.e., above 0.80). The exceptions were the AATAAC, with first graders (0.78) (Beck, Fritz et al., 2000); and the Communication Aid/Device Attitudinal Questionnaire (CADAQ) (Lilienfeld & Alant, 2002) and Macke's (1992) survey instrument, the results

of which showed only subscale internal consistency. Internal consistency of individual subscales of instruments was more variable. Subscale internal consistency ranged from 0.65 to 0.94 for the four attitude measures in which subscale data were reported. Because in several studies subscale results were reported, it is important to consider both the overall and subscale internal consistency in evaluating findings (Antonak & Livneh, 1988).

For four of the eight measures used across the studies, test-retest reliability was reported: AATAAC, Chedoke-McMaster Attitudes Toward Children with Handicaps (CATCH), PARCCA, and Macke's survey instrument; in all cases reliability was significant at $p < 0.05$. Based on the information reported, the evidence suggests that most of the instruments are internally consistent overall and demonstrate adequate test-retest reliability over a few weeks or months.

Validity

Reliability is not the only issue to consider in measurement; it is also important to examine validity of instruments. For several measures of the studies reviewed, validity was established by testing the construct (i.e., how well a scale measures the theory it is intended to measure). The validity of the CATCH and the PATCH was established against the gender hypothesis (i.e., females should have more positive attitudes than males) and the contact hypothesis (i.e., individuals who have had contact with people with disabilities will have more positive attitudes than individuals who have not had contact with people with disabilities). The validity of the AATAAC and CADAQ was established against the gender hypothesis, while the validity of the PARCCA was established against the experience hypothesis. If differences in attitude scores according to gender or experience were detected by a scale in testing, it was taken as evidence of the scales construct validity.

Examination of the data from all of the studies indicated that the factors investigated (e.g., gender, experience) only accounted for a small part of what influences people's attitudes toward individuals who use AAC. In three of the studies reviewed, Eta squared (Young, 1993) was calculated to determine the variance in attitude scores that could be accounted for by the independent variable (Beck & Dennis, 1996; Beck, Fritz et al., 2000; Beck, Kingsbury et al., 2000). Eta squared values from the three studies ranged from 0.002 to 0.16 (i.e., a single factor accounted for as little as 0.2% and as much as 16% of the variation in

TABLE 2 Summary of scales used to measure attitudes toward individuals who use AAC

Instrument	Reliability	Validity	Items	Group tested
AATAAC Assessment of Attitudes Toward Augmentative/Alternative Communication	Internal consistency = 0.78, 0.92, 0.95 grades 1, 3, 5 respectively Pearson test-retest = 0.79 (1 week)	Concurrent with CATCH $p < 0.01$ Construct = Tested against gender differences	26	Grades 1, 3, 5 (USA) (non-integrated school)
ATNP Attitudes Toward Nonspeaking Persons	Internal consistency = 0.90 overall	Concurrent with ATDP ^a $p < 0.01$	29 ^b	Undergraduate Students
CADAQ Communication Aid/Device Attitudinal Questionnaire	Subscale consistency = 0.76– 0.89 Item scale correlation = 0.34– 0.81	Construct = Tested against gender differences	37	Ages 11–13 (non-integrated school)
CATCH Chedoke-McMaster Attitudes Toward Children with Handicaps	Internal consistency = 0.90 overall Subscale consistency = 0.65, 0.74, 0.91 Test-retest $\alpha = 0.73$ (1 month)	Construct = Tested against gender & experience differences	36	Ages 9–13
PARCCA Professionals' Attitudes Regarding Children who Communicate Augmentatively	Internal consistency = 0.89, 0.90 overall Subscale consistency = 0.70– 0.81 Pearson test-retest = 0.71 (1 week)	Construct = Tested against experience differences	36	Preservice under- graduate and graduate students
PATCH Parental Attitudes Toward Children with Handicaps Survey (Macke, 1992)	Internal consistency = 0.89 overall Subscale consistency = 0.93– 0.97 Test-retest $\alpha = 0.81$ –0.89 (2 weeks)	Construct = Tested against gender and experience differences + presence or absence of child with a disability in the family Content = Panel of SPED faculty at U of North Texas + 2 experts in AAC	30 30	Parents Pre-service under- graduate students
TAS Teacher Attitudinal Scale	Not reported	Reported Soto (1997) as a reference point	7 ^c	Teachers

Note. All measures used 5-point Likert scales exception for the survey by Macke (1992), which used a 7-point Likert scale.

^aA modified version of the Attitudes Toward Disabled Persons Scale (ATDP) (Yuker, Block, & Younng, 1966) was used. ^bValidation information is for the 29 item version; studies by Gorenflo et al. (1994) and Gorenflo & Gorenflo (1997) used a 27 item version. ^cThis is a 63 item scale but only 7 items apply to attitudes toward individuals who use AAC

attitude scale scores). There is no guarantee that the factors studied would continue to operate the same way (i.e., would account for the same amount of variation in scores) outside of experimentally controlled conditions (Schlosser, 2003b).

When there was a difference between groups, analysis of the means reported in each study revealed that statistically significant scores may have only differed by as little as 0.03 points on a 5-point scale. Gorenflo and Gorenflo (1997), for example, found that the difference between females who rated a female low in perceived similarity (mean = 4.1) and females who rated a female high in perceived similarity (mean = 4.4) was statistically significant on the evaluation subscale of the ATNP. Although these results may be statistically significant, they may not be clinically significant (Kirk, 1996). Even in cases where the difference between score means was greater than 0.03, the span of difference was usually smaller than the standard deviation about

the score means and was coupled with relatively low Eta squared values. This combination made assessing clinical significance more difficult.

Furthermore, the ratings in most studies were relatively high on average (suggesting positive self-reported attitudes). The fact that self-reported attitudes are generally higher than non-verbalized attitudes may provide a partial explanation for the results across the attitude studies reviewed (Wright, 1988). In all of these studies, self-report measures were used. However, individuals who use AAC have reported experiencing negative behaviors that they labeled as reflecting negative attitudes (McNaughton et al., 2001, 2002). The relatively positive scores in the studies in the present review underscore the difficulty in generalizing self-reported attitudes to actual behavior in different settings. Antonak and Livneh (1988) characterized attitude rating scales as analogous to "...looking at the stars with a pair of binoculars...a considerable amount of subtle

information concerning the respondents' attitudes may be lost" (p. 50).

General Conclusions

In AAC attitude studies, the focus has been on finding differences in attitudes between groups of typically developing individuals. The research suggests that a number of factors may result in attitude barriers or supports in classroom, job, or living situations. Research to date has enabled the identification of several factors that are important in leading to attitude differences, however these factors account for only a small amount of variance in measures of attitudes. It should be noted that the current review was limited to studies written in English and thus may not be generalizable across cultures.

Since AAC systems were not found to be a controlling factor in attitudes toward individuals who used AAC, it is not surprising that factors that influenced attitudes toward these individuals were generally consistent with those found to be important in the general disability literature. It was evident from this review, for example, that individuals who had experience with individuals with disabilities generally reported more positive attitudes than those who did not. Having contact with individuals with disabilities is one of the strongest predictors of more positive attitudes in the general disability literature (Yuker, 1994). Maras and Brown (1996), for example, found that typically developing children who were integrated with children with severe developmental delays had more positive attitudes toward individuals with disabilities than typically developing children who were not so integrated. Other researchers have found more positive self-reported attitudes in integrated versus non-integrated classrooms in studies with preschool (Diamond, Hestenes, Carpenter, & Innes, 1997), elementary (Gerson, 1996), and high school students (Krajewski & Hyde, 2000).

It has been reported consistently across attitude studies in AAC that females have more positive attitudes toward people with disabilities than males. In the general disability literature, Livneh (1988) suggested that females reported more positive attitudes on psychometric tests than males. Similarly, Gorenflo and Gorenflo (1997) reported an influence of perceived similarity on expressed attitudes toward an individual who used AAC. According to Yuker (1994), typically developing individuals tend to rate people with disabilities who share common characteristics more positively. Wright (1988) suggested perceived similarity might be correlated with attitudes toward disability, consistent with

Heider's (1983) theories on interpersonal relations. Heider (1983) suggested that when a person can identify with another on some level, the person will express more positive feelings.

From a review of the literature, Yuker (1994) concluded that "research should focus on alterable characteristics of nondisabled people, such as information and contact rather than on demographic and/or personality characteristics which are usually not amenable to change" (p. 8).

Attitude Change

There are few controlled studies into how to change attitudes toward individuals who use AAC, although there have been many such investigations in the general disability literature. Shaver, Curtis, and Strong (1989), for example, conducted a meta-analysis of 273 investigations into techniques to change attitudes towards people with disabilities in general. The research involved eight techniques: provision of information (via speakers, films, books, etc.), contact (observing or interacting with individuals with disabilities), vicarious experience (role-play or simulation to experience what it may be like to have a disability), persuasive message (messages designed to convince people to have positive attitudes), persuasive message contrast (comparisons of different messages given to different groups), positive reinforcement (behavioral conditioning to reinforce behaviors thought to be consistent with positive attitudes), and systematic desensitization (using nonthreatening situations to encourage a person to think about disabilities). The four largest effect sizes (where n = the number of studies) were for persuasive messages ($n = 23$, mean = 0.67), information plus contact ($n = 100$, mean = 0.51), contact ($n = 93$, mean = 0.43), and vicarious experience ($n = 58$, mean = 0.40).

Information

From their meta-analysis, Shaver et al. (1989) reported that a combination of types of information led to the largest effect sizes in changing attitudes. The most effective information appeared to be that which (a) highlighted the similarities between individuals with and without disabilities and (b) discussed ways in which individuals without disabilities could be considered disabled. Film, video, and an instructional course appeared to be the most effective media with which to provide information. According to Shaver et al. (1989), the credibility, acceptability, and strength of the source of information were

important in addition to the content of information given.

The studies in the present review included investigations into the effects of giving typically developing individuals different types of information about an individual who uses AAC to examine its influence on their attitudes. In two studies, the effects of the presence or absence of personal information about an individual using AAC were reported. Gorenflo and Gorenflo (1991) found more positive attitudes when participants were given information about the person they were observing in a videotape than when they were not given any information. Beck et al. (2001) investigated the effect of the disability label given to the individual using AAC who was depicted on a videotape. There were no differences in reported attitudes according to whether the individual was given no label, identified as having an intellectual disability, or identified as having a physical disability.

Contact

Contact with individuals with disabilities is often cited as a means to change attitudes (Yuker, 1994). There were ten different categories to describe the situations with contact in the meta-analysis by Shaver et al. (1989). Only one category had enough studies to allow effect size to be calculated (guest speaker, mean = 0.24). Contact categorized as "other" and "combination" had effect sizes of 0.5 and 0.33 respectively. Yuker (1994) noted that, to be effective, contact must involve "equal status, cooperative interdependence, support from

authority figures, and opportunities for individualizing outgroup members" (p. 6).

In the current review, contact played an important role in two peer-reviewed studies in AAC of attitude change with children. A summary of these studies is shown in Table 3. Both studies used the CATCH (Rosenbaum, Armstrong, & King, 1986a) to measure attitude change. Rosenbaum, Armstrong, and King (1986b) set a criterion for attitude change prior to intervention, while Wilkinson (1993) looked for any statistically significant change. Although the intervention programs differed, both involved children without disabilities having contact with individuals who used AAC. All of the participants with disabilities in Wilkinson's (1993) study used AAC. Although specific pair information was not available for Rosenbaum et al. (1986b), the researchers indicated that 29% of the children with disabilities used AAC and that 38% were in wheelchairs. In contrast to Rosenbaum et al. (1986b), who implemented an intervention program that lasted 3 months, Wilkinson's (1993) intervention consisted of having participants play a video game for only 20 min. Rosenbaum et al. (1986b) found positive effects from contact (buddy program) in contrast to Wilkinson (1993), who failed to find any statistically significant change, quite possibly because of the brief intervention.

FUTURE DIRECTIONS

Given the importance of attitude and behavior change and the limited amount of research to

TABLE 3 Studies of methods to change attitudes toward individuals who use AAC

Study	<i>n</i>	Group	Intervention	Individuals using AAC	Instrument	Results
Rosenbaum, Armstrong, & King (1986b)	66	C	Information; contact; information + contact	6–17 yr. old children; 38% in wheelchairs; 29% used AAC	CATCH PATCH	Criterion improvement set at .75 of a SD increase on CATCH Information only (puppet program) no different than control No change in parent attitudes across any condition Contact (buddy program) participants more positive than information only (puppet program) or control Combined information + contact more positive than control Contact only = 67% reached criterion Combined information + contact = 11% reached criterion
Wilkinson (1993)	64	C	20 min playing a video game	7 male adolescents with mod/severe ID who use AAC	CATCH	No change in attitudes with intervention Pre-test attitude scores did not predict communication behavior during interactions

Note. C = child, ID = intellectual disability.

date, future research is urgently required to investigate techniques designed to modify attitudes and behavior toward individuals who use AAC. Future directions are discussed in terms of conducting comparative studies, changing behaviors, and studying role relationships.

Conducting Comparative Studies

Future research is needed into the comparative effects of interventions to change attitudes that have proven successful in the general disability literature: persuasive messages, contact, information plus contact, and vicarious experience (Shaver et al., 1989). It is critical that authors of such intervention studies carefully describe the population whose attitudes are being changed as well as the individual(s) using AAC, because different information, and different types of contact, may have differential effects with different groups (Yuker, 1994). Finally, interventions to change attitudes often contain multiple strategies (Shaver et al., 1989). It is recommended that, in future research into such interventions, the need for experimental control should be balanced with ecologically valid methods in order to change attitudes and behavior (Light, 1999).

All of the studies reviewed were group experimental designs, and hence, the focus was on reporting group results. Reporting only group results may obscure important individual variations in behavior and attitudes. An analysis focusing on the molar, intermediate, and molecular levels of attitude data (Light, 1999) could provide an important step in understanding the complexities of attitude behavior relationships at both individual and group levels. At the molar level, such a study would capture group differences in attitudes and behavior. The intermediate level of analysis would determine the extent to which individual behavior is consistent with group results. Finally, selecting typical versus atypical cases from group results for detailed analysis could reveal important factors influencing attitudes and behaviors that have not been evident in research to date (Light, 1999).

Changing Behaviors

Future attitude studies in AAC could help to clarify the relationship between attitudes and behavior (Schlosser et al., 2003). With very few exceptions (e.g., Wilkinson, 1993), the relationship of attitudes and behavior has not been considered in studies in the AAC field. To date, the results of AAC studies have been suggestive of the potential impacts of attitude findings on vocational roles (Gorenflo & Gorenflo, 1997)

and the integration of children who use AAC into classrooms (Beck & Dennis, 1996; Beck, Fritz et al., 2000). The effect of these factors on attitudes has not been studied directly, however, and these discussions presuppose the idea that attitudes can help to inform professionals about the behavior of others. The long-term assumption is that changing attitudes can affect a change in behavior.

Kraus (1995) reported significant correlations between attitudes and behavior in a meta-analysis; however he also warned, "clearly attitudes are not synonymous with behavior; attitudes should not be used as an easily measured substitute for behavior measures, nor does attitude theory suggest that attitudes will be the sole determinant of behavior" (p. 71). Future research is needed to measure changes in both attitudes and behavior, if the changes are to be meaningful. Depending on the research question, different types of attitude measures, such as open-ended opinion surveys, interviews, and ranking tasks, could complement behavioral measures (Antonak & Livneh, 1988).

A way to ensure meaningful change is by socially validating the behaviors to be changed (Schlosser, 1999). As an example, a researcher aiming to change the attitudes of peers in an elementary school classroom might also consider measuring changes across a variety of partners with whom a child using AAC interacts, the number of opportunities for communication, or the number of messages directed to a person using AAC (Calculator, 1999). Changes in partner attitudes from before to after intervention with an individual who uses AAC could also be a means of socially validating intervention results. Although they were not treatment efficacy studies, in two of the studies reviewed (Beck et al., 2001, 2002), the effects of communicative competence of an individual using AAC on listener attitudes were investigated. The definition of competence must be considered carefully in future studies where changes in the attitudes of others are used to document treatment efficacy. Yuker (1994) indicated that competence is a factor that affects attitudes when the area of competence is important to the observer. The studies reviewed here include initial attempts to investigate the effects of communicative competence on listener attitudes; however previous work suggests that competency of individuals using AAC involves more factors than response latency and prompting and may be differentially valued according to the observer (Bedrosian, Hoag, Calculator, & Molineux, 1992; Bedrosian, Hoag, Johnson, & Calculator, 1998; Light, 1989; Schlosser, 2003a).

Triandis et al. (1984) stated "when people have no established habits about a certain behavior

they do what is socially desirable, consistent with their self-concepts, intrinsically enjoyable, and has good perceived consequences” (p. 28). Different factors may be weighed differently from person to person or from behavior to behavior (Triandis et al., 1984). Therefore, it is recommended that researchers into attitude change studies should include measures of generalization, maintenance, and social validity (Light, 1999).

It is important to document whether or not changes in attitudes and behavior are stable over time. In addition, even with measured changes in attitudes and behavior, it is ultimately critical to ensure that the changes are important and meaningful (Light, 1999; Schlosser, 1999). Satisfaction questionnaires and interviews with key stakeholders are two methods that can be used to document these aspects of social validity (Light, 1999).

Role Relationships

Although not addressed in the AAC studies reviewed here, there have been investigations within the general disability literature into the effects of different role relationships on attitudes toward individuals with disabilities. On this issue, Yunker (1994) stated, “The attitudes of groups such as family members, friends, neighbors, educators, employers, and health care workers have been studied and differences have been found. Unfortunately, important intragroup differences were usually ignored” (Yunker, 1994, p. 11). Future studies in AAC could help to inform the general disability literature by addressing not only group differences in attitudes based on role relationships but also how attitudes vary among group members. To ensure the meaningfulness of results, studies of role relationships also need to include the impact of attitudes on the participation and quality of life of individuals who use AAC.

Conclusion

Attitude studies to date have helped to identify conditions that may limit the societal participation of individuals who use AAC. Future research can reveal ways to change participation barriers by assisting both individuals who use AAC and individuals without disabilities to understand each others’ perspectives about factors that influence attitudes, and by changing attitudes and behaviors that create barriers. Attitudes are complex, but a systematic pursuit of understanding and change through qualitative and experimental studies can help to ensure equal opportunities for all individuals in society.

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