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The Effects of Information and Augmentative Communication Technique on Attitudes Toward Nonspeaking Individuals

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This study investigated the effects of printed factual information and three augmentative communication techniques on attitudes of nondisabled individuals toward nonspeaking persons with physical disabilities. Employing a 3 (augmentative communication techniques) × 2 (presence/absence of information) factorial design, subjects viewed a videotape depicting a nonspeaking adult having a conversation with a normal-speaking individual. Subjects in Condition 1 viewed a tape depicting the nonspeaking individual using unaided communication techniques; Condition 2 subjects viewed the individual using an alphabet board; subjects in Condition 3 viewed the individual using a computer-based voice output communication aid (VOCA). A scale assessing attitudes toward nonspeaking persons, the Attitudes Toward Nonspeaking Persons Scale (ATNP), was developed and validated for purposes of this study and was employed as the dependent measure. Results revealed that subjects expressed more favorable attitudes when provided with the additional information concerning the nonspeaking individual. Attitude favorability also increased with the sophistication of the augmentative communication technique.

KEY WORDS: attitudes, nonspeaking, augmentative communication, nonspeech communication systems

Attitudes toward persons with disabilities have been investigated from numerous perspectives during the last 35 years. (Barker, Wright, Meyerson, & Gonick, 1953; Block & Yuker, 1977; Cruikshank, 1980; Jones, 1984; Siller, 1976a, 1976b, 1984; Wright, 1960; Yuker, Block, & Younng, 1966). Within this significant body of literature, there are discrepancies in findings due to the lack of systematic studies using well-developed instrumentation (Siller, 1984), the use of technically inadequate measures of attitudes, or the absence of established theoretical bases (Towner, 1984).

Historically, experimental research on attitudes became a focal area of interest during the first few decades of this century. Thurstone and Chave (1929) observed that the study of attitudes required objective and quantitative measurement. They developed a theory of attitude measurement that proposed that subjects' attitudes could be quantified and weighted by the expression of the acceptance or rejection of opinions. More recently, the term attitude is referred to as a general and enduring positive or negative feeling about some person, object, or issue (Bem, 1970; Insko & Schopler, 1967; Oskamp, 1977).

An attitude toward any given object, idea, or person is an enduring construct that seems to have a cognitive component, an affective component, and a behavioral tendency (Triandis, 1971). The cognitive component consists of the beliefs about the attitude object; the affective component consists of the emotional feelings connected with the beliefs; and the behavioral tendency is the readiness to respond in a

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particular way. *Belief* refers to the information that a person has about other people, objects, and issues. This information, in turn, may have a positive, negative, or neutral evaluative implication for the target of the information. *Behaviors* represent the overt actions that might be associated with the target (Ostram, 1969).

Two reviews of the literature on attitudes toward persons with disabilities, published more than 20 years apart (Barker et al., 1953; Siller, 1976b), reached similar conclusions: (a) Attitudes toward persons with disabilities were varied and frequently negative, (b) verbalized attitudes were, on the average, mildly favorable, (c) indirect evidence suggests that unverbalized attitudes were more frequently critical, and (d) society's rejecting attitudes toward persons with disabilities result in restricted social and vocational opportunities. In addition, attitudes toward persons with disabilities are multidimensional and may be affected by the degree and type of handicap. Attempts to modify negative attitudes have been unsuccessful for the most part.

Several correlates may affect attitude formation toward persons with disabilities: (a) disability type preferences, (b) experiential and behavioral correlates of attitudes, and (c) demographic correlates such as gender and educational level of the nondisabled person completing an attitude measure.

Research into disability type preferences has focused on attitudes toward a wide range of disabilities. In general, some differences do exist among the attitudes of able-bodied individuals toward persons with different types of disabilities (English, 1977; Jones, 1984). Block and Yuker (1977) found that people respond differently toward different types of physical disability and that the inappropriateness of behavior associated with a disability, rather than the actual severity of the disability, may be the cause of a disabled person's rejection by others.

Societal rehabilitation, or the efforts to reduce the general public's biased attitudes toward individuals with disabilities, has been an increasing concern of many professionals in recent years. High interest in this area has paralleled an increasing emphasis on mainstreaming and on the social and legal status of the disabled (Towner, 1984). Several methods have been employed to change negative attitudes, most based on three general techniques related to attitude change: contact, information about the individual, and a combination of both contact and information (Anthony, 1984). Block and Yuker (1977) reported that rejection of individuals with disabilities is strongest at an initial meeting and diminishes during subsequent meetings.

Over the years, an increasing number of disciplines have developed interests in the measurement of attitudes and attitude change toward the disabled (Marinell & DellOrto, 1984). For example, considerable theoretical and applied research on attitudes and attitude change has been conducted in the fields of special education (Jones, 1984) and medicine (Rosenbaum, Armstrong, & King, 1986, 1987, 1988). In addition, over the last 30 years or so, attitude research in the field of speech-language pathology has focused on a variety of communication impairments: fluency disorders (Andrews & Cutler, 1974; Silverman, 1980; Watson, 1989), voice disorders (Blood, Mahan, & Hyman, 1979), articulation (Ashmore, 1958; Mowrer, Wahl, & Doolan, 1978; Silverman, 1976), alaryngeal speech (Bennett & Weinberg, 1974; Edelman, 1984), and hearing impairment (Blood, Blood, & Danhauer, 1977).

Since 1981, nonspeech or augmentative communication has been formally recognized as an area of clinical and scientific interest within the field of speech-language pathology. A significant body of research in the area of augmentative communication has focused on interaction patterns of augmentative system users and normal speakers (Buzolich & Wiemann, 1988; Harris, 1978; Light, Collier, & Parnes, 1985a, 1985b, 1985c; Wexler, Blau, & Dore, 1982). Kratt (1985) reported frameworks, implications, and numerous unpublished works on interaction between aided and natural speakers.

Although no empirical studies have been conducted specifically on attitudes toward the nonspeaking, several studies, in addition to the interaction research, have reported on aspects that may influence attitude formation. In a preliminary study, Mathy-Laikko and Coxson (1984) investigated listener reactions to augmentative communication output modes. They found that the "sensitized" group was more accepting of the augmentative modes than the "naive" group, thus implying the role of information or knowledge on attitude formation. Beukelman (1986) reported the need for the development of a tool to assess handicap, especially as more augmentative communication aid users are integrated into secondary and postsecondary school settings. Mirenda, Eicker, and Beukelman (1989) investigated listeners' preferences of synthetic and natural speech. Their study did not examine the issue of social acceptability of synthetic speech, but it provides a foundation for research in this area.

To date there are few, if any, empirical data on the attitudes of nondisabled persons toward individuals who use augmentative communication aids (Silverman, 1988). This investigation asked the following questions: (a) Does the type of augmentative communication technique have an effect on attitudes toward nonspeaking individuals? More specifically, what are the attitudes of nondisabled persons toward physically disabled nonspeaking individuals who use an unaided augmentative communication technique; use an aided, alphabet-letter board augmentative communication technique; and use an aided, electronic, voice-output communication aid (VOCA)? (b) What effect does the presence (or absence) of information about the nonspeaking individual have on attitude formation toward nonspeaking persons using different augmentative communication techniques? and (c) What factors are associated with attitudes toward communication aid users? The present investigation employed both an established theoretical model of attitudes (Ostram, 1969; Triandis, 1971) and a technically adequate measure of attitudes.

Method

Subjects

Subjects were 151 undergraduates at a large southwestern university who were enrolled in an introductory psychol-

ogy course and received credit towards the course for participation in the study. Seventy-eight of the subjects were males and 73 were females. Subjects were randomly assigned to the six experimental conditions formed by the factorial combination of augmentative communication technique (unaided, alphabet board, electronic aid-VOCA) and information (presence or absence).

Experimental Stimulus

Videotapes. Three videotapes were prepared that depicted a physically disabled nonspeaking male having a communicative interaction with a nondisabled female. During videotape preparation, the dyad participants were seated at a comfortable distance from each other (approximately 70–90 cm apart) in the filming room, a large room free of extraneous distractions or stimuli. The recording equipment was controlled by the experimenter in an adjacent room, connected to the filming room by a two-way mirror.

The nonspeaking male was a 22-year-old undergraduate student who had had moderate quadriparetic spastic cerebral palsy from birth. He required the use of an electric wheelchair, which he operated with his right hand. Results from the Peabody Picture Vocabulary Test (Dunn, 1965) revealed a vocabulary recognition level over the 18-year-old ceiling of the test. His oral speech was diagnosed as indicating spastic dysarthria characterized by the commonly appearing clusters of speech and voice dimensions outlined by Darley, Aronson, and Brown (1975). On the Assessment of Intelligibility of Dysarthric Speech test (Yorkston & Beukelman, 1981) he achieved a sentence intelligibility score of 39% at a speaking rate of 45 words per minute. From his academic status his intelligence was assumed to be within normal limits. He reported that, depending on different communicative purposes, he had relied on the use of his own voice throughout his life, an alphabet-letter board on a number of occasions, and a customized voice-output communication aid (VOCA) during the last 2 years (see section on independent variables for description). A functional assessment of his ability to use the alphabet board and the VOCA revealed more than adequate skills for a variety of communicative contexts. He was naive to the purpose of the research.

The nondisabled female participant was a 23-year-old graduate student in speech-language pathology who was also naive to the experimental purpose. She reported that she had no previous experience interacting with nonspeaking individuals using augmentative communication aids.

Script. In order to control for possible effects of conversational styles across experimental conditions, the same script was employed in each tape. Therefore, the nondisabled participant's responses were identical across all three conditions. The script was constructed to reflect a rather broad range of communicative functions. For example, each participant elicited approximately the same number of affirmative responses, exchanges, descriptive statements, and informative statements. The nonspeaking participant elicited a total of 61 words; the nondisabled participant elicited 69 words.

Independent variables. In order to determine the effect of different augmentative communication techniques on the perception of and attitudes toward a nonspeaking individual, the videotapes used as experimental stimuli differed in the type of augmentative communication system employed. Tape 1 depicted the nonspeaking individual using an unaided communication technique; that is, he used his own voice and any naturally occurring facial and body gestures to communicate. Videotape 2 depicted the nonspeaking individual using a nonelectronic alphabet board. The alphabet board (38 cm × 60 cm) contained 5-cm black letters on a white background arranged in the standard alphabetic order. The board was mounted on the wheelchair to facilitate optimal access for direct selection. The nonspeaking individual direct selected each letter of every word by pointing with either his right or left index finger. Videotape 3 depicted the use of a computer-based VOCA developed at the Artificial Language Laboratory at Michigan State University. This portable VOCA, mounted on the user's wheelchair, is operated via a standard laptop computer keyboard (TRS 80 Model 100). The VOCA is programmed to accept three types of input and to produce synthetic voice output. The first input mode is direct text-to-speech: The user types in an utterance in standard English orthography. The second input mode uses user-defined mnemonic abbreviations to retrieve full phrases and sentences. The third mode allows the user to utter any of a set of prestored, user-defined phrases with a single keystroke. The synthetic voice is produced with an adapted voice synthesizer (Intextalker) that uses the Votrax SC-02 synthesizer chip. The nonspeaking individual used the first two modes for the purposes of the videotape. The duration of interaction in the three videotapes differed according to the type of technique employed by the nonspeaking person. The duration of the unaided condition was approximately 6 min, that of the alphabet board approximately 12 min, and that of the VOCA condition 9 min.

The second independent variable, presence or absence of information, was provided in the form of a printed information sheet (Appendix A) with specific attitudinal goals in mind. The information sheet contained factual information about the nonspeaking person's physical disability, social activities, and academic and employment status.

Attitude Scale

In developing a scale to assess attitudes toward nonspeaking persons, the investigator constructed opinion statements representative of a broad range of favorableness and relevant to the issue. These statements were generated in accordance with standard procedures outlined by Petty and Cacioppo (1981).

Pretest scale. Two questionnaires, each composed of 30 Likert statements, were constructed. The first questionnaire consisted of 30 items (investigator-generated) designed to measure attitudes toward the nonspeaking. Equal numbers of positively and negatively worded items were included to control for response bias (either negative or positive). For example, the statement "This person understands what people say" is a positively worded statement; the statement

"You should not expect too much from this person" is a negatively worded statement. This questionnaire is called the Attitudes Toward Nonspeaking Persons Scale (ATNP). The second questionnaire was the Attitudes Toward Disabled Persons Scale (ATDP) Form B (Yuker et al., 1966) with the phrase *nonspeaking person* substituted for *disabled person.* On both questionnaires, subjects responded to each statement on a 5-point scale with end points of "strongly agree" and "strongly disagree."

In order to determine the reliability or internal consistency of the ATNP, it was administered to three groups of subjects (42 undergraduates enrolled in an introductory speech course). In order to validate a measure that taps attitudes toward the nonspeaking (i.e., ATNP), it was necessary to define areas of research for this purpose. The correlation between the two questionnaires served as the validity coefficient for the ATNP. Presentation order of the two scales was counterbalanced. Subjects were randomly assigned to one of the videotape conditions (i.e., unaided, alphabet board, VOCA) and were requested to complete the questionnaire immediately after viewing of the videotape.

Results from the reliability analysis (Cronbach, 1951) showed the Attitudes Toward Nonspeaking Persons Scale to be internally consistent (alpha = .89). With the deletion of one item, "You have to be careful what you say to this person," the reliability coefficient was raised to an alpha of .90. This item was found not to correlate with any other item and was therefore discarded for the purposes of the experimental attitude measure.

Reliability analysis of the modified Attitudes Toward Disabled Persons Scale (Yuker et al., 1966) also revealed good internal consistency; its alpha of .73 is an acceptable magnitude (Crano & Brewer, 1986).

In order to determine the validity of the ATNP Scale, a two-tailed Pearson Correlation Coefficient between the Attitudes Toward Nonspeaking Persons Scale and the Attitudes Toward Disabled Persons Scale (Yuker et al., 1966) was calculated. Results revealed that $r = .33$, $p < .01$, thus indicating the ATNP to be a valid measure of attitudes toward the nonspeaking.

Experimental Scale. On the basis of the results from the pretest, a 29-item scale (Appendix B), hereafter the Attitudes Toward Nonspeaking Persons Scale (ATNP), was administered to the subjects in the six experimental conditions.

Procedure

The experimenter told subjects that the study was concerned with how people make judgments. Subjects were then told the following with respect to the condition they served in: "You will be seeing a short videotape in which two people are having a conversation. One of the persons is in a wheelchair and is using his own voice to communicate [unaided condition]; using an alphabet letter board to aid or augment his communication [alphabet board condition]; using a computerized communication aid that has a voice synthesizer to aid or augment his communication [VOCA condition]." Half of all subjects were given the information sheet to read.

The videotape was then shown on two television monitors (Sony 60-cm Trinitron Videotek) positioned in the front of a large group room. Following the videotape presentation, information sheets were collected in designated conditions and subjects were given the attitude questionnaire (ATNP). After completing the questionnaire, subjects were debriefed and dismissed.

Results

Experimental Attitude Measure

Reliability analysis of the 29-item ATNP scale employed during the experimental phase was conducted. The ATNP was found to be reliable and internally consistent (alpha = .95). Subjects' responses on the ATNP scale were found to correlate highly with one another and be similarly affected by experimental treatments, thus contributing to the reliability of the measure.

In order to identify the number of variables or categories associated with the ATNP, a common factor analysis with varimax rotation (Kaiser, 1958) was performed on the data from the 29-item scale. This resulted in two orthogonal psychologically meaningful factors. The first factor consisted of 19 items focused on a *general evaluation* of the nonspeaking person. This factor accounted for 83% of the variance. Nine of the 19 items were reverse worded (i.e., negatively worded). Typical items loading on this factor were "This person is not intelligent" and "This person should expect to lead a normal life." The second factor, consisting of 10 items, focused on an *interactive/affective* component of attitude toward the nonspeaking person. Five of the 10 items were reverse worded. Typical items loading on this factor included "I would feel uncomfortable with this person" and "This person would be easy to talk to." The coefficients of internal consistency of the general evaluation and the interactive/affective factors were strong (coefficient alpha = .94 and .88, respectively); these results clearly indicate the existence of two subscales within the ATNP measure.

As might be expected, both factors (evaluative and interactive/affective) were found to correlate significantly with the ATNP ($r = .96, .83$, $p < .001$, respectively). In addition, the evaluation factor was found to correlate significantly with both of the independent variables, information and augmentative communication technique ($r = .21, .33$, $p < .01$ respectively). Subjects who had received the information sheet gave a more favorable evaluation of the nonspeaking person. As the communication technique became more sophisticated, evaluations became more favorable. Items loading on the interactive/affective factor correlated significantly with augmentative communication technique ($r = .27$, $p < .001$), whereas a nonsignificant correlation with information ($r = .13$, $p < .09$) was revealed.

Data Analyses: Attitude

A 3 (augmentative communication techniques) × 2 (information) analysis of variance was performed on the attitude data. The ANOVA revealed significant main effects for aug-

TABLE 1. Mean attitude ratings as a function of communication technique and information.

Information condition	Augmentative communication technique							
	Unaided		Alphabet board		VOCA		All	
	n	*M*	*n*	*M*	*n*	*M*	*n*	*M*
With	19	111.47	32	117.75	27	128.89	78	119.37
Without	27	104.70	22	114.23	24	118.38	73	112.44
M	46	107.50	54	116.31	51	123.94		

Note: Higher numbers reflect more favorable attitudes.

mentative communication technique, F (2, 145) = 8.92, p <.001, and for information, F(1, 145) = 5.34, p <.02. No two-way interaction was found. The means for these main effects are presented in Table 1. As Table 1 shows, mean ratings on the ATNP scale were more favorable in the information condition than in the no-information condition.

In terms of the technique conditions, as the augmentative communication technique became more sophisticated, attitudes toward the nonspeaking person became more favorable. To inspect these results more precisely, a least significant differences test (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) was conducted for comparing the group means between each of the augmentative communication techniques. The multiple range test within this procedure revealed that each group mean was significantly different from every other, F(2, 150) = 9.70, p <.0001. The group means for the unaided, alphabet board, and VOCA conditions were 107.50, 116.31, and 123.94, respectively.

Factor scales. To inspect the evaluation and interactive/affective subscales derived from the factor analysis more closely, a 3 (augmentative communication technique) × 2 (information conditions) analysis of variance was performed on each of the subscale's attitude data. The ANOVA on the evaluation scale revealed significant main effects for augmentative communication technique, F(2, 145) = 8.54, p <.001, and for information, F(1, 145) = 6.10, p <.01. Quite interestingly, in comparison to the evaluation scale, the ANOVA on the interactive/affective scale revealed a main effect for augmentative communication technique, F(2, 148) = 5.60, p <.01, with the means replicating the pattern found in the initial ANOVA. However, a nonsignificant effect for information was revealed, F(1, 148) = 1.82, n.s.

Discussion

The results of this investigation support the hypothesis that attitudes are significantly more favorable toward an individual using a technological augmentative communication technique such as a VOCA. Significant differences in mean attitude ratings were found between each pair of the communication technique conditions. The results also support the hypothesis that additional information concerning the nonspeaking individual has an effect on the formation of more favorable attitudes toward a nonspeaking individual using an augmentative technique.

The results of the present study revealed that information and augmentative communication techniques operate in a main effects manner on attitudes toward the nonspeaking. This suggests that there are two avenues through which to address the problem of negative attitudes toward the disabled (Barker et al., 1953; Siller, 1976b). Rather than having a combined effect on attitudes, the provision of information about the nonspeaking person and the use of a technological augmentative communication technique operated independently to increase attitude favorability. The results of this study suggest that people working in the field of rehabilitation—such as speech-language pathologists, occupational therapists, nurses, and so forth—as well as nonspeaking persons themselves, might use either a technological communication technique or carefully selected information about the physical, mental, and social status of nonspeaking persons to promote positive attitudes.

Although these two separate avenues for facilitating favorable attitudes may potentially apply to many nonspeaking individuals, caution must be exercised in generalizing these findings to other nonspeaking persons. This study used only one augmented communicator and a very limited number of augmentative communication techniques. Furthermore, the use of scripted material for the taping, although necessary to maintain consistency, may not be characteristic of most interactions.

The results of this study have also demonstrated the utility of a scale that can be used to assess attitudes toward the nonspeaking, the Attitudes Toward Nonspeaking Persons Scale. Furthermore, this study lends support to the premise that technically adequate measures must, and can, be carefully developed for the investigation of attitudes toward the disabled (Siller, 1984; Towner, 1984) and toward various communication disorders.

Of interest were the results of the analysis conducted on the two subscales, general evaluation and interactive/affective, derived from the factor analysis on the experimental Attitudes Toward Nonspeaking Persons Scale. As was discussed previously, information and augmentative technique can be employed separately. However, the results from the analysis on the two subscales revealed that the interactive/affective subscale displayed no effect as a function of information. This implies that simply providing information about a nonspeaking person is ineffective if the desired attitude is a tendency toward interaction with or an emotional disposition toward the nonspeaking individual. It appears that the technological augmentative technique independently affects attitudes toward interaction with a nonspeaking person. This is not the case for general evaluative attitudes toward the

nonspeaking person: Both information and augmentative technique operate effectively.

In some respects, the finding concerning the effect of information on interaction supports and even augments the position suggested by Jones and Guskin (1984): "What evidence tells us is that when little additional information is available about a handicapped individual, people who are asked to state their preferences report less willingness to become close with a handicapped rather than a nonhandicapped person" (p. 6). In this study, even when factual information about the nonspeaking person was provided, subjects who were asked to rate the degree to which they would interact in various ways (e.g., "I would help this person with a task such as purchasing something") responded with less favorable ratings. What these findings seem to imply is that to increase interaction and, at best, communicative interaction between nonspeaking and able-bodied persons, much more is needed than information about the person's physical status, intelligence, academic achievements, and social activities; the use of a computer-based communication system may be necessary.

This study sought to explore the effects of different present-day augmentative communication techniques and information on attitudes of nondisabled persons toward nonspeaking individuals. Future research should attempt to delineate whether specific quantitative and qualitative aspects of augmentative communication aids have an effect on attitudes. Variables for investigation might be the rate of communicating, the size or positioning of the VOCA, the symbol set, the vocabulary size, the method of selecting vocabulary, and the quality or type of voice synthesis (e.g., age- and gender-appropriate or familial voice output) (Eulenberg, Wood, & Finkelstein, 1985; Mirenda, Eicher, & Beukelman, 1989).

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Appendix A

Information Sheet

John (not his real name) is a physically handicapped person who has cerebral palsy. His cerebral palsy is the result of brain damage that occurred at birth. Because of this, John cannot walk and cannot speak clearly with his own voice. He uses an electric wheelchair that he operates himself to get around. John likes to go to sporting events and often does his own shopping. He enjoys movies, reading, using computers, and camping.

John was a student at a university for four years and recently received a Bachelor of Science degree. He plans to work in his chosen field. Last summer, he was employed by IBM Corporation in their student training program.

Appendix B

Attitudes Toward Nonspeaking Persons Scale (Experimental Scale)

Below you will find a number of statements. The words *this person* refer to the person in the wheelchair on the videotape. Please answer all of the questions by circling your choice on the scales provided for each question. Base your answer on *your own* beliefs and behavior. Indicate whether you Strongly Agree (SA), Agree (A), are Undecided (U), Disagree (D), or Strongly Disagree (SD) with each statement.

SA A U D SD I would study (for a class) with this person.
SA A U D SD I respect this person.
SA A U D SD I do not feel sorry for this person.
SA A U D SD This person is not intelligent.
SA A U D SD This person would be easy to talk to.
SA A U D SD This person is not capable of giving a short speech to a class.
SA A U D SD I would help this person with a task such as purchasing something.
SA A U D SD This person is trustworthy.
SA A U D SD This person won't make a contribution to society.
SA A U D SD This person understands what people say.
SA A U D SD This person is sociable.
SA A U D SD I do not feel any sympathy for this person.
SA A U D SD I would feel uncomfortable with this person.
SA A U D SD I would feel inhibited with this person.
SA A U D SD I would not trust this person.
SA A U D SD This type of person would not be able to complete high school.
SA A U D SD You should not expect too much from this person.
SA A U D SD This person is as self-confident as other people.
SA A U D SD I would help this person obtain someone's attention.
SA A U D SD I would feel anxious around this person.
SA A U D SD This person would be successful in a job.
SA A U D SD This type of person is mentally handicapped.
SA A U D SD This person should expect to lead a normal life.
SA A U D SD I would feel uncomfortable answering questions asked by this person.
SA A U D SD This person would be able to complete college.
SA A U D SD This person is independent.
SA A U D SD I feel sorry for this person.
SA A U D SD I would prefer not to talk with this person.
SA A U D SD This person doesn't have a good social life.